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**THE RELATIONSHIP BETWEEN CORPORATE GOVERNANCE
PRACTICES AND COST OF CAPITAL IN LARGE LISTED COMPANIES OF
NEW ZEALAND AND SINGAPORE**

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Salman Afkhami Rad



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ABSTRACT

This thesis investigates the effect of corporate governance practices on cost of capital in listed companies. In particular, this study examines: 1) the relationship between corporate governance practices and cost of capital in large listed companies in New Zealand and Singapore. 2) The effects of corporate governance on cost of capital in an open economy like Singapore which is well-known as the financial hub of its region and a more isolated commodity export economy such as New Zealand. 3) The pattern between each corporate governance variable and cost of capital. 4) The best method of calculating cost of capital in New Zealand and Singapore market.

Attempts at developing corporate governance in New Zealand go back to 1970s. The first set of rules and regulations regarding corporate governance practices were implemented in 1988 under the Securities Act of 1988 in New Zealand. Primary attempts in Singapore took place in 1980s by Security Industry Act of 1986. Continues efforts led to enactment of Companies Act of 1990 which was one of the effective acts regarding corporate governance. The main purpose of these mandatory corporate governance rules are promoting transparency, accountability and overall efficiency in corporate governance practices.

This thesis makes a number of contributions to corporate governance practices and cost of capital in several ways. First, the relationship between corporate governance practices and financial performance is investigated in prior studies but the relationship between corporate governance and cost of capital is largely missing. This study contributes to the body of knowledge by filling this gap. Second, the majority of corporate governance studies focus on large mature economies such as US and UK and other European markets. Smaller markets such

as NZ with significant agriculture based industries may differ. Analyses based on NZ and Singapore play an important role in adding to the generalizability of the understanding of corporate governance relationships. Third, the impact of the global financial crisis may differ between industrial markets and protein supply based economies. This difference and corporate regulatory changes as response to the financial crisis again inform a broader understanding of the corporate governance sophistication and foci. Fourth, an open economy like Singapore which is well-known as the financial hub of its region has different experiences in corporate governance and cost of capital rather than a more isolated commodity export economy such as New Zealand. Fifth, one major concern of academics and practitioners alike is finding the best method of calculating cost of capital. Developing a more about method of calculating cost of capital in New Zealand and Singapore is the major contribution this study makes to the finance literature.

Data needed to test various hypotheses are sourced from the NZX company research (NZX Deep Archive), Singapore Exchange Market website (SGX), and Datastream and Thomson one banker databases. Required data collected from large listed companies in New Zealand (NZX50) and Singapore (STI Constituent) during 2006-2010. Care is taken to clean the data reviewing missing data, outliers and distributional properties. The focus of this thesis is on the corporate governance variables that have been supported in the literature and related theories as providing an appropriate structure for the institutions in the environment in which they operate. Because of causality test, Generalized Least Square method in pooled data estimations to explore the role of corporate governance variables on cost of capital. Careful diagnostic testing is under taken

related to multicollinearity, endogeneity and heteroskedasticity employed in this study to check hypotheses relevant in this study.

The findings indicate that there is negative relationship between corporate governance and cost of capital and this means that complying corporate governance guidelines help companies to control their cost of capital. However, the process by which corporate governance affects cost of capital is different in New Zealand and Singapore. Different characteristics of corporate governance in these countries led to different recommendations made by this thesis. Larger companies need higher levels of control and that is the reason of having larger boards in Singaporean companies. Findings of this thesis indicate that large boards in New Zealand and smaller boards in Singapore could help companies to control their cost of capital. Recommendations of this thesis indicate that less outside directors required in Singapore while the level of outside directors in New Zealand seems effective. Findings of this thesis about ownership structure indicate that the present level of insider ownership in both countries needs modification. Higher levels of insider ownership in both countries could help companies to control their cost of capital. Recommendation of this thesis about block ownership was slightly different in two countries. While higher levels of block ownership in Singapore recommended, the present situation of block owners in New Zealand seems to be ineffective. The findings of this thesis recommend that the level of block ownership in New Zealand should whether increase or decrease in order to help companies control their cost of capital. Various recommendations made by this thesis indicate that it is important to further develop the corporate governance code incorporating country specific characteristics.

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Chapter 1 INTRODUCING THE STUDY

1.0 Introduction

This research investigates the relationship between corporate governance practices and cost of capital in large publicly listed companies. There are many theories of corporate governance and their link with shareholders' wealth is a common theme. The Stewardship theory for example suggests governance is about maximizing shareholders' wealth. This might be too narrow a view to be currently popular but nevertheless, emphasizes that governance and shareholder's wealth are linked. Cost of capital is a key component of wealth creation. Discussions about optimal capital structure link capital structure with cost of capital and shareholders' wealth. To date the relationship between corporate governance and cost of capital has not been adequately explored.

This study empirically investigates this question by using data from companies in New Zealand and Singapore. New Zealand is selected for study as this is where I live and empirical studies of corporate governance are relatively sparse. Singapore has a similar population to New Zealand but differs in terms of industrial structure, providing an opportunity for meaningful comparative analyses of similarities and differences of governance in relation to cost of capital.

This study builds on prior studies in a number of ways:

- 1) The relationship between corporate governance practices and financial performance is investigated in prior studies but cost of capital and governance is largely missing. This study contributes to the body of knowledge by filling this gap.

2) The majority of corporate governance studies focus on large mature economies such as US and UK and other European markets. Smaller markets such as NZ with significant agriculture based industries may differ. Analyses based on NZ and Singapore play an important role in adding to the generalizability of the understanding of corporate governance relationships.

3) The impact of the global financial crisis may differ between industrial markets and protein supply based economies. This difference and corporate regulatory changes as response to the financial crisis again inform a broader understanding of the corporate governance sophistication and foci.

4) An open economy like Singapore which is well-known as the financial hub of its region has different experiences in corporate governance and cost of capital rather than a more isolated commodity export economy such as New Zealand.

5) One major concern of academics and practitioners is finding the best method of calculating cost of capital. Developing a more about method of calculating cost of capital in New Zealand and Singapore is the major contribution this study makes to the finance literature.

Corporate governance focuses on board characteristics in companies and according to Castellano (2000) board of directors plays an important role in monitoring and controlling managers' performance. The importance of this role has been emphasized in many different debates and conferences (Erkens, 2012; OECD, 2009). Although importance of corporate governance practices has been investigated over the last four decades numerous controversies and debates suggest that it's not working in its present form. (Gugler, 2001). Numerous suggestions have been made and spates of corporate failure have been held up as

evidence of poor governance. The issue of policy concerning cost of capital has not received attention in the prior discussions.

In companies that rely primarily on domestic resources for capital, good corporate governance practices will help in different ways: 1) improving the confidence of domestic investors, 2) reducing the cost of capital, 3) underpinning the good functioning of financial markets and ultimately inducing more stable sources of finance (OECD, 2004). Companies that rely on international flow of funds have access to a larger pool of investors. If companies want to enjoy the advantages of working in larger capital markets and have the ability to attract more long-term patient capital (lower cost of capital), corporate governance arrangements must be credible, well understood across borders and have internationally accepted principles (Stulz, 2007).

Based on a general definition, corporate governance deals with the ways in which suppliers of funds assure themselves of getting a return on their investment (Shleifer, 1996). Thus, exploring corporate governance as an effective factor in improving companies and its role in cost of capital seems an important issue.

Different aspects of corporate governance are explored in different theories. As a brief background, the assumptions, year of origin and key issues of these theories are presented in Table 1.1. These theories help academics and practitioners to understand the situations and improve their decisions. Similarities and differences between these theories make the investigations more interesting. Emphasis on the importance of shareholders' wealth is the central issue in these theories.

Agency theory, stewardship theory, stakeholder theory, resource dependency theory and managerial hegemony theory have emphasis on the importance of

shareholders' wealth. Agency theory suggests that shareholders' wealth should be protected while shareholders and managers might have different interests. Shareholders' wealth is the central issue of stewardship theory as it indicates that similar interests of managers and shareholders will lead to higher firm value. Stakeholder theory maintains that boards of directors will focus on increasing stakeholder's wealth rather than the company's wealth; thus, with this theory, a higher level of control on boards of directors is required. Resource dependency theory and managerial hegemony theory propose that boards of directors require more control in order to perform better and protect shareholders' wealth.. This study tries to cover the issues raised by these theories through employing different variables related to corporate governance and assess their role on controlling cost of capital.

However, at the same time, the difference between assumptions and functions of these theories make them more confusing. The difference between agency theory and stewardship theory is an example. Agency theory suggests that owners and managers have different interests while stewardship theory states the opposite. Agency theory suggests that CEO and chairman of the board should be separate entities in order to increase the control level, while stewardship theory indicates that duality of CEO and chairman will facilitate the company's decisions. Therefore, one of these theories recommends a higher level of control while the other one relies on the board's honesty and loyalty.

Table 1.1: Corporate Governance Theories

THEORY	Assumptions	Year of Origin	Board member role	Main board function	Key issues
Principal-Agent theory	Owners' interests may differ from managers' interests	From 1930s onwards	Supervisor (Chosen to represent owners interests, and be independent of management)	Conformance: - Safeguard owners resources and interests - Supervise management/staff	Emphasis on control may stifle innovation and risk taking, and reduce staff motivation
Stewardship theory	Owners and managers have similar interests	From 1990s onwards	Partner (Chosen for expertise)	Improving Performance: - add value to top decisions/strategy - partner management	Management proposals and systems may not be given adequate scrutiny.
Stakeholder theory	Different stakeholders have legitimate but different interests in the organisation.	From 1970s onwards	Represent different stakeholder views	Political: - represent and balance different stakeholder interests - make policy - control executive	Board members may promote stakeholder interests rather than the organisation's interests. May be difficult to agree objectives.

THEORY	Assumptions	Year of Origin	Board member role	Main board function	Key issues
Resource dependency theory	Organisational survival depends on maintaining coalition of support to obtain resources and legitimacy	From 1970s onwards	Supporter (Chosen for influence or resources they may bring.)	External influence: - secure resources - improve stakeholder relations - bring external perspective	External focus of board members may mean internal supervision is neglected. Board members may lack expertise.
Managerial hegemony theory	Owners and managers have different interests, but managers control main levers of power.	From 1980s onwards	Symbolic	Legitimacy: - ratify decisions - support management - give legitimacy	Management may pursue its own interests at the expense of owners. Managers gain little of value from board.

Within the literature a wide range of variables relating to governance are used. Often the choice of variables seems to be driven by availability of data rather than relationship to an underlying theory. Consequently a gulf appears between the normative and positivists research in corporate governance. Agency theory has clear finance implications and provides a useful umbrella for the consideration and filtering of variables.

Board size, board independency, board diversity, block ownership, managerial ownership, CEO duality and CEO tenure are some of the most important variables considered by agency theory. In agency theory managers' characteristics and shareholders' characteristics should be in a way that support shareholders' wealth. This research will employ all of these variables to clarify their role on cost of capital of companies in New Zealand and Singapore.

Two important limitations that prior studies faced with will be covered in this research. The first limitation is the relevance of data. Performance values employed in prior studies might have been manipulated by managers in order to portray a better performance by their companies (Isa, 2011; Tilden, 2012). Some companies may desire to manipulate the data related to performance values, which are employed in almost all the assessments inside and outside the companies. In this study, cost of capital values will be used instead of performance values in order to overcome this shortcoming. Although cost of capital may not represent the performance of companies, it can be used to assess companies' situations (Exley, 2006). Employing cost of capital will protect this study from using manipulated data because there is less intensive to manipulate the cost of capital

data. Thus, a better picture of corporate governance can be presented in this research.

Empirical evidence indicates that good corporate governance improves the companies' financial performance (Brown, 2006a, 2006b; Chahine, 2004; Klapper, 2003; MacAvoy, 2003). Better corporate governance helps managers and shareholders to forecast the future of their company in two ways: 1) Better corporate governance practices lead to a higher cash flow for shareholders rather than expropriation of shareholders' wealth by company managers (Jensen, 1986; La Porta, 2002). 2) Good corporate governance reduces the cost of monitoring and auditing and helps companies to efficiently reduce costs (Beiner, 2004). Burton (2000) believes that monitoring managers' behaviour, in order to limit their managerial discretion, results in controlling agency costs.

This study will investigate the effect of corporate governance components on cost of capital. The first step in achieving this is to investigate the direction of effects. Direction of effects should be studied through causality test. Causality test determines whether good corporate governance reduces the cost of capital or whether lower cost of capital leads to better corporate governance. Results of causality tests show that there is a significant causality from corporate governance to cost of capital. No reverse causality of corporate governance to cost of capital detected. Results of causality tests are reported in Appendices A and B.

In the pursuit of improved corporate governance countries promulgate new rules and regulations to improve corporate governance practices. The United States in the Sarbanes-Oxley Act of 2002 implemented new regulations regarding special aspects of corporate governance. Other countries such as New Zealand, UK,

Canada and Australia used similar rules and regulations. These countries believe that companies that implement these rules and guidelines have a specific governance structure that helps them to enhance efficiency. Nowadays corporate governance codes and practices that emphasize accountability and conformity have spread all around the world (Edwards, 2005).

Different institutions and organisations have released a variety of codes and principles for corporate governance. Some of these institutions are: “OECD corporate governance principles”, “Cadbury code” in the UK, “New Zealand corporate governance principles and guidelines” and the “Commonwealth Association for Corporate Governance” (CACG) in Singapore. These institutions (among others) try to guide companies to implement the most up-to-date corporate governance codes and principles in order to improve their performance (Edwards, 2005). These codes and principles are very similar in some parts. Some of the most common emphases of these codes and principles are separation of chief executive officer (CEO) and chairman of the board, employment of independent directors and independent sub-committees such as audit, remuneration and nomination.

Weakness of corporate governance practices and poor financial performance made local and international investors assume that lack of good governance led companies to confront the latest financial crisis. Other research had the same idea regarding the role of corporate governance. Johnson et al.(2000) point out that the behaviour of companies in emerging markets, like Singapore, during the financial crisis of 1997-98 is more understandable when the corporate governance factors are employed instead of macroeconomic variables. Johnson et al. (2000) believe that the behaviour of companies can be predicted by assessing corporate

governance variables. Although financial crisis had different effect on countries, the unique geographic and economic situation of New Zealand protected its market in the latest financial crisis to some extent. But, a highly internationalised country like Singapore got more affected by financial crisis. The financial crisis and collapse of large companies acted as a sign for New Zealand and Singapore to promote their market efficiency by enhancing higher standards of corporate governance.

The following section provides a brief discussion on corporate governance in New Zealand and Singapore.

1.1 Corporate governance environment in New Zealand

The primary attempt at implementing governance rules and guidelines in New Zealand was the Companies Act 1955. This act was a copy of the United Kingdom Act of 1948. This act emphasized the requirements of boards of directors, not corporate governance practices. After that collapse of major companies in the mid-1970s persuaded authorities to develop corporate governance practices in New Zealand. Attempts at developing corporate governance practices in New Zealand go back to the introduction of the Securities Act 1978. New Zealand authorities tried to enact rules and regulations that protect investors' interests.

The first set of rules and regulations regarding corporate governance practices were implemented after the 1988 stock market. These rules sat under the enactment of the Securities Act 1988 in New Zealand (Hossain, 2001). These sets of rules and guidelines evolved through time. For example, rules and guidelines regarding directors' duties were enacted in the Companies Act 1993. New

Zealand authorities outlawed insider trading in the late 1990s after some cases of takeovers and market manipulation took place. Equiticorp, Chase and Fortex are some examples of takeovers.

The poor quality of corporate governance caused serious problems for some big companies such as Bank of New Zealand (BNZ) and Air New Zealand. These companies were examples of companies who lost shareholders' wealth due to the poor quality of corporate governance (Healy, 2003). McKinlay (2003) indicates that financial failure of the public and not-for-profit sectors was due to poor quality corporate governance. These shortcomings damaged New Zealand's international image in the eyes of investors. Local and international investors wanted protection but these collapses and shortcomings persuaded them that they lacked protection in New Zealand. These failures encouraged academics, practitioners and policy makers to focus on improving corporate governance.

Other incentives that motivated New Zealand's authorities to work harder on corporate governance practices and that led to change are:

1) Improvement in countries that implemented better corporate governance practices, especially when they had economic relations with New Zealand; and 2) Deregulation of the economy in 1984.

New legislation in New Zealand sought three main goals: (1) promoting investor protection; (2) safeguarding and developing the efficiency of New Zealand's capital market; and (3) and attracting more international attention by introducing a cost effective securities regulation. Good corporate governance is not the only solution for corporate failure, though implementing corporate governance rules and regulations will help companies to achieve higher shareholder wealth. This

implementation of rules and regulations should be accompanied by continuous monitoring and updating in order to control fraud and opportunistic behaviour. The New Zealand Securities Commission (NZSC) has published a report on the nine high level principles and guidelines of corporate governance in New Zealand. The principles are intended to contribute to high standards of corporate governance practices in New Zealand. Principles that are mentioned in this research are:

1. Ethical standards

Directors should observe and foster high ethical standards.

2. Board composition and performance

There should be a balance of independence, skill, knowledge, experience, and perspectives among the directors so that the board works effectively.

3. Board committees

The board should use committees where this would enhance its effectiveness in key areas while retaining board responsibility.

4. Reporting and disclosure

The board should demand integrity both in financial reporting and in the timeliness and balance of disclosure on entity affairs.

5. Remuneration

The remuneration of directors and executives should be transparent, fair and reasonable.

6. Risk management

The board should regularly verify that the entity has appropriate processes that identify and manage potential and relevant risks.

7. Auditors

The board should ensure the quality and independence of the external audit process.

8. Shareholder relations

The board should foster constructive relationships with shareholders to encourage them to engage with the entity.

9. Stakeholders' interests

The board should respect the interests of stakeholders within the context of the entity's ownership type and its fundamental purpose (Securities Commission New Zealand, 2011). These guidelines and recommendations are for listed companies but at the same time these guidelines provide good recommendations for other companies.

Companies need to control their cost of capital in order to protect shareholders' wealth. All of the operational and development plans in companies rely on the amount of accessible money and cost of capital play a critical role in this issue. Controlling the cost of capital is an important issue, especially in small markets with restricted access to money such as New Zealand. This study is going to investigate the important role of corporate governance practices on cost of capital.

1.2 Corporate governance environment in Singapore

In Singapore, just like New Zealand, most corporate governance practice reforms took place after different crisis; the most important was the Asian financial crisis

in 1997-1998. A brief history of corporate governance reforms reveals different stages: 1) financial misreporting and collapse of corporates in the United States in the 1970s, which led authorities to emphasize the role of outside directors and audit committees; 2) Corporate collapse in the United Kingdom in the 1980s which led to the Cadbury Report; 3) The Asian financial crisis in 1997 which led to regulatory changes; and 4) the Enron fraud in the US in 2002 which led to reformed company-auditor relationships, better accountability for financial reports, greater board oversight and stronger internal controls.

One effective act regarding corporate governance practices in Singapore was the Companies Act of 1990. This act considered the registration of companies and protection of shareholders' rights. Regulations regarding higher disclosure rates in companies are pointed out in the Companies Act 1990 and Securities Industry Act of 1986. Share options are also covered in the Companies Act 1990 covering compensation for directors, managers and employees.

The Post-Asian crisis era was indeed the period of rapid improvement in corporate governance practices and philosophy toward the Organisation for Economic Cooperation and Development (OECD) promulgated standards (Phan, 2000). Compared with the accelerated speed of change in corporate governance rules and regulations in most parts of the world, Singapore didn't experience huge changes. Significant factors that prevented the Singapore market from implementing high standard corporate governance guidelines can be summarised in five categories. 1) Ownership structure, 2) disclosure regime, 3) structure of the board of directors, 4) government ownership and 5) employment of share option schemes.

The Commonwealth Association for Corporate Governance (CACG) also identifies some important factors for Singapore's corporate governance principles.

1. Board issues

Some factors such as accountability to shareholders or stakeholders, disclosure of director, independency, audit committee and term limits are mentioned in this section.

2. Remuneration

Disclosure of the firm is mentioned in this part.

3. Role of shareholders

Shareholder voting and general meetings are mentioned in this section.

4. Financial reporting, transparency and audit

Financial reporting, transparency and internal control are the components of this section.

5. Ethics

Listed issuers should devise their own codes of best practices

6. Source

Stock Exchange of Singapore "Listing Manual (as amended) and best practices guide": Singapore, 1999.

7. Table format

Adapted from Investor Responsibility Research Centre, "Global corporate governance – codes, reports and legislation", IRRC, Washington D.C. 1999 (Commonwealth Association for Corporate Governance, 1999).

Cost of capital is another important economic issue in the Singapore market. Singapore is an open economy and is well-known as the finance hub of the region. Better access to financial resources helps Singaporean companies to experience a different situation regarding cost of capital. As the role of corporate governance in Singapore is improving based on guidelines and principles and Singaporean companies are experiencing better access to financial resources, investigating the role of corporate governance on cost of capital in this market will reveal different outcomes in compare with New Zealand market.

1.3 Governance Structures

Importance of corporate governance in companies is the base for many empirical studies (La Porta, 1998, 1997). Researchers believe that good corporate governance not only affects private companies but also affects the quality of institutions (North, 1990). A good quality corporate governance mechanism is assessable from different angles: 1) political stability, 2) voice and accountability, 3) government effectiveness, 4) rule of law, 5) control of corruption and 6) quality of regulation (Kaufmann, 2006).

As different companies working in economies, each sector of the economy needs its unique considerations. To understand the purpose and nature of companies, prior studies highlighted different characteristics. These characteristics can be summarised as below: 1) Level of shareholders' control, 2) Degree of ownership, 3) Characters of affective shareholders, 4) Board accountability, 5) Legal and regulatory environment and 6) Competition level of company in markets (La Porta, 1998; Maher, 1999; Shleifer, 1997). Companies have different situations regarding each of these characteristics. Difference in these characteristics reveals

the difference in corporate governance situations that can be successful in companies.

Therefore, it is clear that no single governance structure can suit all companies. Each company should have a particular governance structure that best suits its situation. Not only may particular governance structures vary among companies, but in particular periods, these structures need to be reconsidered. For example, market-based systems have strong recognition of minority shareholders' rights while bank-based systems normally prefer a concentrated ownership structure

Singapore is part of the global drive toward adopting better corporate governance practices. The publication of Organisation of Economic Corporation and Development (OECD) is a sign of global convergence in corporate governance practices and Singapore plays its role as part of this convergence. Different factors that lead to this convergence can be summarized as below: (a) Globalization and liberalization that lead to integration of financial markets, (b) Convergence of laws and regulations in companies and securities all around the world, (c) Activities of inter-governmental bodies such as OECD, World Bank and IMF that push companies for corporate governance reform and (d) Technology. Technology offers the opportunity to publish corporate information that could accelerate the convergence of corporate governance practices. Singapore corporate governance standards and practices are heavily under the effect of global convergence of corporate governance because Singapore is an international financial centre and its companies are becoming increasingly international.

Importance of corporate governance is supported by different theories. These theories, which are summarized in Table 1.1, are: agency theory, stakeholder

theory, resource dependency theory etc. The fundamental issue that proves the importance of good governance structure is agency problems that arise from the separation of ownership and control in each company. Therefore, the perspective of agency theory, stakeholder theory, resource dependency theory etc. will be the framework of this research in order to assess the role of corporate governance in companies. The model of corporate governance in New Zealand and Singapore is related to market-based or outsider systems of governance, which is typical in Anglo-Saxon countries like Australia and Canada. The law points out the role of boards of directors in these countries.

1.4 Objectives of this study

This study investigates the relationship between corporate governance practices and cost of capital in large listed companies in New Zealand and Singapore. New Zealand represents a more isolated economy and Singapore represents a widely open economy. Results of this investigation reveal the differences in the two economic structures. By contributing to the pool of knowledge the bigger picture of what is generalizable is promoted through achieving the different objectives listed below.

1. To determine which method of estimating cost of equity is preferable in these countries: CAPM, Fama-French three factor model or Fama-French four factor model.
2. Whether an economy with light engineering sector and restricted access to money can work better in the field of corporate governance and cost of capital than an economy that relies heavily on export and import and easy access to money.

3. To determine the causality relationship between corporate governance variables and cost of capital in two different countries.
4. To determine the relationship between corporate governance practices of New Zealand's large listed companies and cost of capital measured by Fama-French four factor model.
5. To determine the relationship between corporate governance practices of Singapore's large listed companies and cost of capital measured by Fama-French four factor model.
6. To determine the critical value of corporate governance in large listed companies in New Zealand and Singapore.

1.5 Significance of this study

One of the most significant objectives in any country is to improve the Gross Domestic Product (GDP) growth rate (Smith, 1776). In order to increase GDP growth rate, each section of the economy should work efficiently. Among these sections business sector, which includes companies and enterprises, is one of the important sectors that should work efficiently. The performance of the business sector is a big concern for authorities and policy makers. Different methods are employed to estimate the performance of this sector. Two important ones are: share prices and financial benefits of the businesses. The potential power of each firm to produce benefits and raise the share price indicates that the firm will perform well in future. This potential power is what investors take into account when making investment decisions.

Quality of control and management in companies is evaluated by/through their corporate governance practices. Better corporate governance practices could help

companies to increase shareholders' wealth. Besides the importance of corporate governance, cost of capital in each company indicates the efficiency of that company in working with capital. Therefore, a good firm performance reputation allied with reputable corporate governance and cost of capital structure is important for companies. Good reputation means more satisfied shareholders, which will guarantee the future financial flow of the company.

Firms should have good financial performance in order to increase shareholders' wealth. Therefore, managers and shareholders should take care of running issues in firms in order to establish a good performance reputation. Sometimes managers prefer to manipulate the performance data to cap the inefficiencies and enjoy the remunerations. Although firm performance plays a critical role in shareholders' wealth, cost of capital has its own importance. The difference between firm performance and cost of capital is that companies have less incentive to manipulate data related to cost of capital rather than firm performance. The significant role of corporate governance in companies can be summarized in two categories: 1) corporate governance is significant because it reflects the quality of a firm's governance. Corporate governance indicates topics that are related to the present and future of the firm and that is important for managers, shareholders and investors. 2) Corporate governance is significant because it affects the performance of the firm. Corporate governance is related to running issues of the firm including firm's financial performance and cost of capital.

Most studies on corporate governance and cost of capital are carried out in large developed economies like the US and UK. Some studies focused on small economies and clarified the relationship between corporate governance practices

and cost of capital (Andjekovic, 2002; Hossain, 2000). But, the shortcoming of these studies was the various economic structure and economic development plans in different countries. This difference prevents the results of previous studies to be easily adapted to small countries.

U.S. and U.K. based studies indicate that value creating projects are more probable in companies with the best governance structures (Shleifer, 1997). Easier access to financial resources, lower cost of capital and better financial performance are some of the most important benefits of establishing efficient corporate governance practices in companies. Weak corporate governance practices lead to poor financial performance and consequently higher cost of capital. On a large scale, weak corporate governance leads to macroeconomic crisis. This could be due to pursuing riskier patterns in companies with weak corporate governance (S. Claessens, Djankov, S., Fan, J., Lang, L, 2003).

Ashbaugh (2004) indicates that agency costs rise when investors cannot determine the true value of the firm. These agency costs could occur because management quality is unclear. This situation leads to information asymmetry that creates an adverse selection problem. Therefore, shareholders will face higher information risk when there is lack of transparent financial information. Rational investors will implement different policies such as price-protecting against expected agency costs when there is lack of control, lack of effective monitoring and lack of transparent financial information. This investor behaviour will effectively raise the firm's cost of capital. Corporate governance encompasses a broad spectrum of mechanisms intended to mitigate agency problems. These mechanisms increase

the monitoring of managers' actions, limit managers' opportunistic behaviour and reduce the information risk that shareholders face.

Outcomes of this study become more significant when the present situation of corporate governance in New Zealand and Singapore are explored briefly. Singapore's economy is dominated by larger companies compared to New Zealand's economy which is dominated by small and medium sized companies. A small pool of directors is available in New Zealand. Lack of directors in New Zealand gives established directors the opportunity to serve on different boards. Keown (2009) indicates that some directors are engaged in four to ten different boards in New Zealand. When directors are on different boards, they can't allocate sufficient time to each of them.

In Singapore, 79% of companies have dual leadership structures while the average board size is about 7 (Y. T. Mak, Kusandi, Y, 2001). Different issues affect the outcomes of corporate governance practices such as: duality, relatively small board size, difficulties in removing ineffective directors because of their large ownership equity, family members' involvement in the company and passive shareholders. These issues affect corporate governance in different ways that will be clarified in this study.

Healy (2003) reports that foreign institutions and corporations hold 54% of equity in New Zealand listed companies while local institutions hold 15%. Bhabra (2007) indicates that this much foreign ownership will not lead to effective monitoring. International funds are more accessible in companies with higher international relations and this can positively affect cost of capital. Mak et al. (2001) reports block ownership in Singapore of 63%, which is relatively high in

comparison with many developed Western economies. Absence of banks in Singapore's block ownership makes it different from block ownership in other economies. Absence of banks in Singapore companies is due to the Banking Act of 1970. According to this act, banks are not allowed to own a significant proportion of shares in Singapore companies. Mak et al.(2001) indicates that block holders in Singapore are mainly wealthy individuals, the government, and multinational and large domestic corporations. Ownership structure in Singapore, which includes a high proportion of government ownership, is one of the characteristics affecting the results of studies on corporate governance practices.

Full disclosure of companies' information is required in New Zealand based on the Companies Act 1993, especially information related to corporate governance. This information is accessible through a company's annual report. Availability of such information makes this study possible and makes the results of this study more reliable. While the Companies Act of 1993 in New Zealand forces companies to have a higher level of disclosure, the Singapore market suffers from disclosure of a relatively less detailed nature.

One of the criticisms of East Asian economies during the 1997 crisis was the low quality of disclosure and accounting standards. Singapore has one of the highest levels of disclosure in the region. But its disclosure and enforcement of accounting standards are not similar to most developed countries such as the US, UK and Australia (Phan, 2000). Investors are not interested in investing in companies with low level of disclosure quality. Therefore, low quality of disclosure restricts the accessible money to the company and increase the cost of capital. One of the main reasons for this shortcoming is that professional

accounting bodies set standard and enforcement in Singapore and they don't face scrutiny from regulatory agencies. Another reason is the weakness of the Singapore Stock Market (SGX) in enforcing its own disclosure and listing rules because it has limited experience of being market regulator and market maker.

Comparing large listed companies in New Zealand and Singapore is a good proxy to achieve interesting results about the role of corporate governance practices on cost of capital in different situations. Codes and principles for better corporate governance were introduced in 1992 and revised in 2004 in New Zealand. Enactment of these codes and regulations in Singapore goes back to post Asian Crisis era in 1997 when significant attempts were made to improve corporate governance practices in Singapore. Corporate governance dynamics in these economies is not well understood and needs further clarification.

The role of corporate governance practices on cost of capital should be assessed periodically because of 1) enactment of new rules and regulations, 2) new situations that businesses and investors face and 3) new methods of calculation that promote continuously specially in calculating cost of capital. Study on the relationship between corporate governance practices and cost of capital in two less developed countries will help the investors, managers and policy makers to have a better understanding of the corporate governance role in companies. Each of these economies represents a unique economic situation.

1.6 Organisation of this study

The remainder of this thesis is organised in the next five chapters in the following manner. A review of corporate governance variables, their importance in New Zealand and Singapore along with cost of capital literature is undertaken in

chapter 2. As investigating the relationship between corporate governance practices and cost of capital is not well developed in prior studies, this thesis builds on the platform of previous studies that focused on corporate governance practices and financial performance. The literature that does address aspects of the relationship between corporate governance practices and cost of capital are reviewed in chapter 2. Methods of measuring variables and data along with methodology undertaken for empirical analysis are explored in chapter 3. The metrics applicable to both explanatory and dependent variables are discussed. Chapter 4 examines the empirical results relating to the link between corporate governance practices and cost of capital in large listed companies in New Zealand. Chapter 5 is similar to chapter 4 covering material relating to Singapore. Chapter 6 rounds out the thesis with coverage of the main conclusions drawn from the research, the contributions made to new knowledge, limitations, policy implications and future directions for governance research in the area of corporate governance and cost of capital.

Chapter 2 LITERATURE REVIEW

2.0 Introduction

For many years academic members focused on the assessment of corporate governance practices on companies' value. Adam Smith who cited as the father of modern economics indicates his concerns about separated ownership and control in 1977, as below:

The directors of such (joint-stock) companies, however, being the managers rather of other people's money than of their own, it cannot well be expected, that they should watch over it with the same anxious vigilance with which the partners in a private copartnery frequently watch over their own. Like the stewards of a rich man, they are apt to consider attention to small matters as not for their master's honour, and very easily give themselves a dispensation from having it. Negligence and profusion, therefore, must always prevail, more or less, in the management of the affairs of such a company (Smith, 1776 & 1939 cited in Jensen & Meckling(1976)).

Adam Smith believes that it is inefficient to have separate owners and managers. Smith indicates that in the case of separation between ownership and management, professional managers will not be interested in running the company efficiently. Smith indicates that owners of a company should employ control mechanisms to track managers' behaviour to be sure of their performance. Berle and Means (1932) also focused on the separation of ownership and control. Berle and Means

believe that diffused ownership structures in modern and large corporations allow managers to take control of companies. Each shareholder in large corporation holds a relatively small proportion of the corporation's value. These shareholders don't have enough incentive to monitor the managers effectively. Different causes of this problem are: shortage of knowledge, lack of time and money. Small shareholders tend to ignore their monitoring role because of the costs of monitoring. Small shareholders prefer to pass the monitoring role to large shareholders and enjoy the benefits of large shareholders' monitoring as free-riders. Consequences of this attitude lead to uncontrolled managers and allow managers to focus on their own interests (Berle, 1932).

Adam Smith and Berle and Means indicate that separate owners and managers make the corporation less sustainable. Therefore, the main issue for companies is to find mechanisms that allow the owners to monitor the managers' performance. These mechanisms are necessary so that companies can maintain a value maximizing attitude. Different approaches exist in finding the best control mechanism for dealing with separated owners and managers. Two of the most important ones are: 1) Some studies believe that tighter regulations lead the managers to be more responsible (Cary, 1974; Ruder, 1965). 2) New-classic economists rely on competition and believe that competition address shortcoming in the market. They believe that no interference is required in a competitive market situation. Thus, no more action is required by authorities.

However there are some shortcomings prevent companies from reaching wealth maximising equilibrium. Different characteristics of the competitive market for disciplining managers to remind them take care of owners' interests were highlighted by extant literature as follow: 1) product market competition (Stigler,

1958), 2) the market for corporate control (Manne, 1965) and 3) labour market pressure (Fama, 1980). Competitive markets include shortcomings such as principal-agent problems and asymmetric information. These shortcomings are more important in some countries such as New Zealand and Singapore. These shortcomings reduce the available mechanisms for disciplining managers. Berle and Means (1932) believe that opportunistic behaviour of managers leads to expropriation of shareholders' wealth. Expropriation of shareholders' wealth may occur due to deficiencies in product, factor and capital. Shleifer and Vishny (1997) argue that competition will reduce managers' expropriation but is not sufficient to achieve better financial performance.

Berle and Means (1932) and Williamson (1970) indicate that competition by itself cannot solve the problems of modern corporations in regard to managers' performance, financing and corporate control. Academics and practitioners try to address market failure caused by competitiveness by implementing some degree of corporate control and regulations of company practices. Some studies believe that a strong regulatory and legal environment improves the market competitiveness (Shleifer, 1997). Therefore, other research focused on employment of other mechanisms to control managers' behaviour. Agency-theoretic studies identified different internal and external mechanisms to control managers such as corporate governance. Shareholders can control the managers' behaviour and agency costs through these tools and mechanisms (Becht, 2002; Shleifer, 1997).

Corporate governance is the main topic that includes all company related issues. Different factors such as: laws, regulations, the companies' own constitution and people who own the company and who are served by the company affect the governance principles and frameworks (Cadbury, 2003). Governance frameworks

vary widely from country to country. For example, large companies in Singapore have 11 board members on average but this figure in New Zealand is 7. Singapore is a larger market with more international relationships while New Zealand is relatively smaller and more local. Block owners in Singapore hold an average ownership of 72 per cent of the company while block owners in New Zealand hold 49 per cent (Afkhami Rad, 2013). These statistics illustrate that the internal situation (history and culture) of each country affects the corporate governance situation (Cadbury, 2003). Therefore, factors such as: legal and financial environment determine the corporate governance characteristics. New Zealand as a more isolated economy with limited access to global financial resources is experiencing different corporate governance situation in compare with Singapore as a highly internationalised economy which well-known as the financial hob of its region.

2.1 Agency Theory

Agency theory concerns the difficulties in motivating one party (agent), to act in the best interests of another (principal) rather than in his own interests. Jensen and Meckling (1976) demonstrate that shareholders(principals) and managers (agents) have different interests tend to focus on different issues. This divergence of interests leads to agency problems. Williamson (1970) introduced adverse selection and moral hazard as aspects of company practices that can lead to agency problems. Adverse selection problems create a gap between shareholders (principals) and managers (agents). This gap holds the shareholders back from knowing whether their managers work properly or not. Moral hazard problem indicates the opportunistic behaviour of managers. Managers tend to use their power to satisfy their own interests which are not necessarily in line with the

company's interests. Thus, in order to control the agency problems, corporations will face higher costs and therefore shareholders are going to have wealth loss.

One of the main reasons for increased agency costs in companies is that managers tend to abuse their power (Jensen, 1976). Denis (2001) believes that when managers have control over the company, they figure out procedures for expropriating company's wealth. Divergence of interests between manager and shareholders let the manager focus on his/her interests. Denis (2001) indicates four sources of agency costs which are caused by lack of adequate contracts. These sources are: 1) managerial shirking and consumption of perquisites, 2) desire of managers to stay in power, 3) risk aversion of managers and 4) free cash flow.

Therefore, agency costs limit the companies in maximising shareholders' wealth. If a company is not performing well and weak management is the reason for this weakness, then the manager should be replaced. But, because of divergence of interests as noted above these managers are not interested in leaving the company. These shortcomings impose agency costs on the company that can limit the ability of the company in increasing wealth. Risk of investment is one of the shareholders' and managers' concerns. Shareholders require maximum return from their well-diversified portfolio; thus, they will invest in risky projects in order to have higher expected returns (Brealey, 1995). Managers impose higher costs to the company by ignoring shareholders' interests in higher returns. Therefore, these kinds of managers are not the type of managers that shareholders prefer. And finally, managers control and allocate the company's cash flow. Shareholders expect managers to invest free cash flows of the company in projects with positive net present value (NPV). But managers do not think exactly the same as shareholders. Prior studies indicate that managers are more concerned about the

size of the company than the return (Murphy, 1985). Most of the compensation plans of companies rely on the size of the company. Also managing a bigger company is more preferable for managers. Thus, this divergence of interests constrains agency costs in the company (Chalmers, 2006; Murphy, 1985; Shah, 2009).

It is evident that companies need to control their agency problem in order to manage their costs and operate more efficiently. They can do this by managing the principal-agent problem through different mechanisms. Shleifer and Vishny (1997) believe that shareholders can control managers' performance by mechanisms that are either internal, such as insider ownership and board characteristics, or external, such as block holders ownership and legislation (Barnhart, 1998; Gedajlovic, 1998). The role of these internal and external mechanisms in companies' value and cost of capital will be discussed in following sections.

2.1.1 Ownership

Studies on the relationship between ownership structure and performance of firms go back to 1932, when Berle and Means released the results of their study on US firms. They indicate that insider managers are less likely to perform well in companies with many small shareholders and diffused ownership. Following their study, in (1976), a more classical owner-manager agency problem was identified by Jensen and Meckling. They document that the presence of managers who own shares in a company will lead to an alignment of interests between managers and shareholders. Managers who own shares in a company are less likely to expropriate shareholders' wealth, or to engage in external activities that harm companies' profit.

Further studies conducted by Shleifer and Vishny (1986) find that large equity holders have strong incentives to monitor managers' performance and consequently cut agency conflicts. Prowse (1994) also supports prior studies by stating that concentrated ownership in companies will mitigate the agency problems and cut agency costs. However ownership is not the only factor affecting corporate governance other determinants create the ownership structure. Demsetz and Lehn (1985) identify these determinants as: Value-maximizing size, control potential and systematic regulation.

Value-maximizing size

Larger firms have higher capital resources and consequently a given fraction of these firms have higher value. So by having a specified amount of money each shareholder will have a lower percentage of ownership in large companies compared to smaller companies. Large companies have a lower degree of concentrated ownership. So an inverse relation between firm size and ownership concentration exist in these companies.

Control potential

Control potential refers to the profit that is accessible through monitoring of managers by shareholders. Demsetz and Lehn (1985) point out that noisiness of the firm's workplace environment directly affects the control potential of that firm. They assert that noisier environments require owners to maintain tighter control. Hence, noisier environments lead to more concentrated ownership structures.

Systematic regulation

Systematic regulation will restrict the owners' options by affecting the profit instability of the firm. In regulated firms some subsidized monitoring and disciplining are imposed on management through regulation. These regulation effects reduce ownership concentration.

The relationship between ownership structure, firm performance and cost of capital is not well documented yet because ownership structure, firm performance and cost of capital vary among countries. Some studies indicate that there is a direct relationship between ownership structure and firm performance (S. Claessens, Djankov, S., Fan, J., Lang, L, 2003; Y. Hu, Zhou, X., 2008; Shleifer, 1986). Other studies indicate a non-monotonic relationship between ownership structure and firm performance (Davies, 2005; McConnell, 1995; Morck, 1988) and some other research indicates no relation between ownership structure and firm performance (Demsetz, 1985, 2001; Himmelberg, 1999). Lack of consensus in this area clarifies that the relationship between ownership structure and cost of capital needs to be more thoroughly investigated.

In contrast to the literature on the relationship between ownership structure and firm performance (Himmelberg, 1999; Morck, 1988), investigation of the relationship between ownership structure and capital structure has remained largely unexplored. In recent years, Brailsford et al. (2002), Short et al. (2002) and King and Santor (2008) investigated the relationship between ownership structure and capital structure in Australia, the UK and Canadian firms respectively. They find that family firms and firms with more block ownership have a higher leverage level. Among different types of ownership, insider ownership and block holder ownership are employed in this study. These types of ownership are more related to corporate governance issues.

2.1.1.1 Insider ownership

Managers will behave differently when they own large portions of the firm. In this situation managers, shareholders and the whole firm have similar interests (Gugler, 2008). In companies with widely dispersed ownership, none of the outside shareholders have strong incentives to monitor managers. The same problem exists when managers do not own large proportions of the firm. These managers don't have the same goals as shareholders. Jensen and Meckling (1976) indicate a method to mitigate agency problems which arises from separation of ownership and control. They suggest that unified interests of shareholders and managers could cut agency problems. Jensen and Meckling believe that the creation of either financial or non-financial incentives for managers will unify the interests of managers and shareholders. In other words, they suggest that allocating shares to managers will align their interests with shareholders' interests. Jensen and Meckling indicate a linear relationship between managerial ownership and firm financial performance.

Mehran (1995) in his study of the US market reports a positive linear relationship between managerial ownership and firm performance. Different studies in different parts of the world support the linear relationship between managerial ownership and firm performance. Welch (2003) in the Australian Stock Market (ASX) and Oswald and Jahera, Jr. (1991) in the New York and American Stock Market also found positive linear relationship between managerial ownership and firm performance as well. Bhagat and Bolton (2008) believe that there is a positive relationship between present value of shares owned by managers and companies' performance. Hossain et al. (2001) report a positive linear relationship between proportion of shares owned by managers and financial performance in

the New Zealand market. Gelb (2000) indicates a positive relationship between managerial ownership and firm performance.

Demsetz (1983) finds that there is a negative relationship between managerial ownership and companies' financial performance. He attributes this to the opportunistic behaviour of managers (entrenchment effect). Ang, Cole and Lin (2000) document a negative relationship between proportions of shares owned by managers and financial performance in the US market. Reddy et al. (2008a) find negative relationship between insider ownership and financial performance in New Zealand small cap companies.

Beside studies that indicate a linear relationship between managerial ownership and firm performance, some studies express in the presence of non-linear relationships. Morck, Shleifer and Vishny (1988) find two conflicting effects for insider ownership: (1) an alignment effect, (2) an entrenchment effect. The alignment effect indicates the alignment of financial interests between insiders and firm. This leads to a positive relationship between insider ownership and firm performance. The entrenchment effect deals with the likelihood of replacement through a proxy fight or takeover. This effect shows that higher insider ownership provides the incentive for managers to pursue their own goals. Entrenchment effect demonstrates that alignment of the managers and shareholders' interests is not accessible because of the expropriation of minority shareholders (Johnson, 2000; Shleifer, 1997).

Some studies have found a negative relationship between insider ownership and firm performance because of entrenchment effects (Demsetz, 1983; Fama, 1983b).

These studies indicate that entrenchment effect can increase the opportunistic behaviour of management at the expense of outside investors.

However some studies indicate the presence of linear relationship between managerial ownership and performance (Demsetz, 1983; Jensen, 1976), other studies have different views. Some studies demonstrate that there is a quadratic relationship between insider ownership and firm performance (Han, 1998; McConnell, 1990). These studies show that interests of managers and shareholders are aligned in primary levels of managerial ownership. In this view managers with low level of ownership are not interested in engaging in non-maximising projects (alignment effect). Therefore, low insider ownership positively affects firm performance. However with high level of managerial ownership, managers become more interested in collecting private benefits and entrench they at the investors' expense (entrenchment effect). At a higher level of insider ownership, the entrenchment effect prevents the alignment of interests between managers and shareholders and firm performance will decrease (Chen, 1993; Griffith, 1999). McConnell and Servaes (1990) support this view in their empirical study by showing a curvilinear relationship between insider ownership and firms' performance. They document that firm performance increases when insider ownership rise up to 40% – 50% (alignment effect). For managerial ownership of more than 40% – 50%, firm performance starts to decrease because of the entrenchment effect. However, Hossain et al. (2001) in New Zealand found no evidence of a curvilinear relationship between insider ownership and firm performance.

A cubic relationship between insider ownership and firm performance is reported by prior studies (De Miguel, 2004; Short, 1999). These studies believe that

increasing insider ownership at primary level, converge the interests of managers and shareholders and consequently firm performance increases (alignment effect). This positive relationship exists up to the level where entrenchment effects mitigate managers' performance. Divergence of interests between managers and owners happens at this point and consequently firm performance decreases. At higher levels of insider ownership interests of managers and shareholders align again and this overcomes the entrenchment effect and firm performance increases. So, managers will positively affect firm performance when they own a high proportion of a company.

There is no clear relationship documented by prior studies of insider ownership, firm performance and cost of capital. Empirical studies provide some guidelines for this relationship. For instance, prior studies that document a cubic relationship between managerial ownership and firm performance introduce different values for this relationship. Two limits (values) where the directions of this cubic relationship change are different in each country and economy. For example these limits (values) are 5 per cent to 25 percent of insider ownership in the U.S. (Holderness, 1999) and 12 percent to 41 percent in the U.K. (Short, 1999). This means that in the US market, insider ownership of less than 5 percent negatively affects firm performance but insider ownership of more than 5 percent up to 25 percent increases firm performance simultaneously. This happens because of the alignment effect. Insider ownership of more than 25 percent leads to the entrenchment effect that makes managers less concerned about shareholders' wealth. That is the reason that insider ownership of more than 25 percent negatively affects firm performance in the US market. Insider ownership of less than 12 percent and more than 41 percent negatively affects UK firms'

performance. But insider ownership between 12 per cent and 41 per cent positively affects firms' performance.

Agency theory suggests that firms with a low level of managerial ownership who operate on behalf of external shareholders may suffer from principal-agent problem (Eisenhardt, 1989). This low level of ownership gives managers the incentive to make decisions that maximize their own benefit at shareholders' expense (Jensen, 1976). There are two reasons that would motivate managers to reduce shareholders' wealth. 1) Engaging in short-run cost augmenting activities to reach the non-salary income. 2) Incentives to respond to their own needs, like power and prestige, by concentrating on maximizing the firms size or growth instead of profit (Gedajlovic, 2002). Brailsford et al. (2002) report that higher level of debt is employed at low level of managerial ownership because of agency conflicts. But a lower level of debt is employed in higher level of managerial ownership because of entrenchment effect. So, there is a nonlinear relationship between managerial ownership and leverage. In contrast, Anderson and Reeb (2003) find no relation between insider ownership and leverage. In contrast to Anderson and Reeb, King and Santor (2008) report that family firms and firms that are controlled by financial institutions employ a higher level of debt.

As the average of managerial ownership differs in different countries and in different periods its role on companies should investigate all the time. For example Phan (2000) documents a significant insider ownership in Singapore. He documents 21 per cent insider ownership in the Singapore market. This much insider ownership with regard to the high proportion of government presence in the Singapore market seems to be significantly high (Y. T. Mak, Li, Y, 2001). Average managerial ownership was 12 per cent in New Zealand in 2010.

2.1.1.2 Block holders

Different elements affect the ownership structure of a firm. Capital market situations and regulations are two important issues that affect ownership structure. For instance, weak capital market, lack of anti-takeover regulations and weak protection rights for minority shareholders lead to a more concentrated ownership structure (Anderson, 2007; Gunasekarage, 2008). More concentrated shareholders can affect their companies in different ways.

Different ideas exist about the relationship between ownership and firm performance. Berle and Means (1932) indicate that more diffused ownership negatively affects firm performance. In their support Shleifer and Vishny (1986) document a positive relationship between block owners and firm performance. They believe that block holders have the incentive to collect information and monitor managers. Block owners can also affect firm performance through the voting control they hold. La Porta et al. (2002) also support prior studies by documenting a positive relationship between equity concentration and firm performance. Gedajlovic and Shapiro (2002) indicate a positive relationship between block ownership and financial performance in Japanese firms.

Grossman and Hart (1982) document a strong incentive for external block holders to control the opportunistic behaviour of managers. Besides, the positive role of block holders in firm performance that arise because of strong monitoring incentives and voting control, some issues prevent block holders from improving firm performance. The first one is the cost of monitoring. Monitoring managers and firm's information has a cost for block owners and create a free riding situation for other shareholders. The second one is entrenchment Effect. Block owners can use their power to persuade managers to act for their benefit rather

than for other shareholders' benefit. Shleifer and Vishny (1997) indicate that block holders receive benefits at the expense of minority shareholders.

Despite the large number of studies in this area, the literature does not document an obvious relationship between block holders ownership, firm performance and cost of capital. Cable and Yasuki (1985) document a positive relationship between ownership concentration and firm performance in Japanese firms except keiretsus. McConnell and Servaes (1990) and Thomsen and Pedersen (2000) also show a positive relation between firm performance and ownership concentration. Gedajlovic and Shapiro (2002) in Japan and Agrawal and Mandelker (1990) in the U.S. also support prior studies by demonstrating a positive linear relationship between ownership concentration and firm performance. They believe that the monitoring role of block holders will control the managers' behaviour and consequently improve the firm performance.

In contrast some other studies indicate no relationship between block ownership and firm performance. Prowse (1992) finds no significant relationship between ownership concentration and financial performance of Japanese firms either keiretsus or non-keiretsus. But in contrast to studies mentioned above Mudambi and Nicosia (1998) in the U.K. and Lehmann and Weigand (2000) in Germany found a negative linear relationship between ownership concentration and firm performance. They believe that expropriation behaviour of block holders negatively affects the firm performance because block owners will try to have benefits at minority shareholders costs.

Some studies document a nonlinear relationship between ownership concentration and firm performance. Gedajlovic and Shapiro (1998) in the U.S. and Miguel,

Pindado and La Torre (2004) in Spain predict a quadratic relationship between firm performance and ownership concentration. They indicate that when block owners hold a small amount of shares, there is a positive relationship between block holders and firm performance. Monitoring the role of block owners positively affects firm performance. In this case, block ownership will control the cost of capital. When block owners own a large amount of shares, there is a negative relationship between block owners and firm performance. The negative effect of block owners on firm performance is because of expropriation effect (entrenchment effect).

Some studies document a cubic relationship between ownership concentration and firm performance. These studies indicate a cubic relationship which is an up/down/up relationship between performance and ownership concentration (Gugler, 2004; Short, 1999). Gugler, Mueller and Yurtoglu (2004) document that when block owners own low proportion of shares, there is a positive relation between block holder ownership and firm performance. This is because of block holders' incentives to monitor managers' performance. When the ownership of block owners passes a specific level there is a negative relationship between block ownership and firm performance. Expropriation behaviour of block holders (entrenchment effect) affects their performance negatively and as a consequence, their role in firm performance becomes negative. This happens because the ownership is not high enough to make block owners highly concerned about firm performance. But they still have the costs of monitoring. In high levels of block holders' ownership, there is a positive relation between block holders and firm performance. In this situation they have more incentive to monitor firm

performance because their wealth is highly tied to the firms' performance. So they will accept the costs of monitoring in order to protect their wealth.

Grossman and Hart (1982) show that firms with large external block holders tend to have a higher debt ratio to the point that the risk of bankruptcy forces them to stop. Anderson et al. (2003) find this also to be the case for family firms. They believe that family firms employ debt to a level that they perceive to be less risky. If managerial block holders decide to protect non-diversifiable human capital and firm's wealth, there will be a negative relationship between leverage and insider ownership (Friend, 1988). Although expropriating minority shareholders may still exist in family firms (S. Claessens, Djankov, S., Fan, J., Lang, L, 2003; Villalonga, 2006), family firms with large personal share ownership perform better than non-family firms (King, 2008; Maury, 2006; Villalonga, 2006). Lemmon and Lins (2003) show that family firms perform better during crisis and their tendency to bankruptcy is less than other firms (s. Claessens, Djankov, S., Leora, Klapper.,, 2003).

Singapore has more concentrated ownership and significant government ownership (Y. T. Mak, Li, Y, 2001). La Porta et al. (1996) indicate a high proportion of block holders ownership in Singapore. They document that block owners own almost 60% of companies in Singapore. One of the biggest block holders in Singapore is the government which owns more than 20% of the 10% of listed firms in Singapore (Y. T. Mak, Li, Y, 2001). Previous studies indicate that the positive relationship between block holder ownership and firm performance is because block owners have better monitoring of managers' performance (Kaplan, 1994; Shivdasani, 1993). Mak and Li (2001) argue that because of the absence of hostile takeovers in Singapore, block holders hardly improve corporate

governance and firm performance by facilitating takeovers. Thus, block holders can improve monitoring by acquiring better information about managers and excluding poor managers.

2.1.2 Corporate Governance

Companies employ different control mechanisms to minimise the problems of divergence of interests between shareholders and managers. The private sector employs control mechanisms in capital markets, product and factor markets, legal systems, political and regulatory systems, and boards of directors as internal control systems (Jensen, 1993). But different mechanisms are employed in the public sector. Dyck and Wruck (1999) found three areas need these mechanisms in the public sector. These three areas are: allocation of decision rights, performance measurements and reward systems.

In contrast to prior studies, Fama and Jensen (Fama, 1983a, 1983b) believe that separation of management and control in a company helps the company in controlling the agency costs. They believe that the management section implements the decisions while the control section is involved in monitoring the decisions. Thus, while managers are implementing the various decisions, the board of directors monitor the managers' performance and replace poor managers. The board of directors is also responsible to shareholders. This method of governance is the best method among other internal and external mechanisms in aspects of costs and efficiency. A brief summary of corporate governance characteristics will be discussed in the following lines.

Different studies investigate the effectiveness of the board of directors in companies but lack of consensus still exists in this area. Most of these studies

found a positive role of outside directors in increasing a firm's value (Fama, 1980, 1983b). Talmor and Wallance (2000) support this idea by demonstrating that outside directors seek to enhance their own reputations through cutting the CEO's compensation. In contrast, the alternative opinion is that outside directors are not as independent in their own monitoring as it seems due to managers overseeing the selection or reappointment of them (Hermalin, 1998). Other studies points out the high tendency of removing poor performed CEOs by outside directors in comparison with inside directors (Weisbach, 1988). Byrd and Hickman (1992) show that a board of directors which is dominated by outside directors give more benefit to shareholders in tender decisions, management buyouts and poison pill adoptions (Brickley, 1994; Lee, 1992). Beasley (1996) supports prior studies by showing an inverse relationship between fraud and number of outside directors. In contrast, some studies have rejected the relationship between outside directors, long-term performance and firm value (Agrawal, 1996; Hermalin, 1991; Klein, 1998). A number of highlighted characteristics of boards of directors will be discussed in the following parts.

2.1.2.1 Board Size

Prior studies demonstrate that the number of directors in boards is an important factor in corporate governance (Jensen, 1993; Lipton, 1992; Reddy, 2008a), while some other studies reject the relationship between board size and firm performance (Juran, 1966). Although it is difficult to find an optimal size for every company, Jensen (1983) suggests that seven to eight board members is the effective size for each board.

Lipton and Lorsch (1992) believe that larger board size decreases the productivity of firms, because agreement with the CEO becomes more difficult when boards

are large. Forbes and Milliken (1999) and Hackman (1990) support Lipton and Lorsch by demonstrating that large boards are difficult to coordinate and free riding is common among these boards. They also believe that large boards have a problem with making value-maximizing decisions. Yermack (1996) asserts prior studies by indicating a negative relationship between board size and firm value. Eisenberg, Sundgren and Wells (1998) support Yermack's result in their study of Finnish firms.

In contrast, some articles propose that larger board size will increase firm performance. Supporters of large boards believe that larger boards are more capable of monitoring top management's performance, because it is more difficult for CEOs to dominate a larger number of directors (Zahra, 1989).. Singh and Harianto (1989) also believe that unifying the boards' ideas is difficult for a CEO when difficult decisions regarding shareholders wealth are being made. Proponents of larger boards employ the resource dependency theory in their discussions. Based on resource dependency theory larger boards organise a greater pool of expertise and environmental linkage that the company requires for growth (Dalton, 1999; Hillman, 2000). Zahra and Pearce (1989) also demonstrate that large boards will monitor the managers more effectively. They believe that a CEO cannot control large boards easily. Fox (1995) also shows that there is a positive relationship between board size and the financial performance in New Zealand firms. He indicates that larger boards display a better financial performance.

Adding to this line of thought, Pfeffer and Salancick (1978) and Lipton and Lorsch (1992) found a significant relationship between capital structure and board

size. In their support Berger et al. (1997) believe that firms with more board members have low leverage or debt ratios. They assume that larger board size translates into strong pressure from the corporate board to make managers pursue lower leverage to increase firm performance. Wen et al. (2002) also show that there is a positive relationship between board size and capital structure. Anderson et al. (2004) show that in firms with larger boards, the cost of debt is lower because these firms have more effective monitors of the financial processes.

In contrast to proponents of large board size, some studies show that small boards have the ability to make timely strategic decisions (Goodstein, 1994; Judge, 1992). Goodstein, Gautam and Boeker (1994) demonstrate that the role of board size is assessable through two different perspectives, the first one is resource dependence and the second one is strategic decision-making. Results of their study in these two perspectives indicate that larger boards benefit from the resource-dependence perspective while they are not efficient in strategic decision-making perspective. Thus Goodstein suggests that small boards are more effective than large boards. Yermack (1996) also finds a negative relationship between board size and firm value in a sample of 452 large US firms over the period 1984-1991. Eisenberg et al. (1998) find a similar relationship in their study. Hossain et al. (2001) support prior studies by finding a negative relationship between board size and firm performance in New Zealand. Eisenberg, Sundgren and Wells (1998) find the same results in small and medium sized companies in Finland.

Beside the studies that demonstrate the relationship between board size, companies' performance and cost of capital some studies suggest that an optimal board size should exist for companies (Jensen, 1993; Lipton, 1992). They

recommend that seven to eight people on the board is the optimal board size. Both of these studies document that it is easier for a CEO to control a large board, and such boards can become less effective. Boone, Field, Karpoff and Raheja (2007) and Linck, Netter and Yang (2006) also demonstrate that the skills of directors along with the skills required by the company should be considered in selecting directors. They believe that there is an optimal board size for each company according to its nature and situation. Reddy et al. (Reddy, 2008a, 2008b) in their study in New Zealand find that the average board size ranged between six to eight members. Singaporean companies also accept this type of board and mention that effective boards have seven or eight members (small boards). Singaporean companies believe that large boards are easier for CEO's to control (Phan, 2000).

2.1.2.2 CEO Duality

CEO duality means that the same person has the CEO hat and is chairperson of the board and non-duality implies different people hold these positions. Baliga, Moyer and Rao (1996) document that regarding the limited empirical evidences, CEO duality is the reason for poor performance and failure of firms. They summarize the results of their study in three points: (1) firm's duality status is not important to the market; (2) duality status doesn't affect the firm's operating performance; (3) weak relationship exists between CEO duality and long-term performance after accounting for other affecting variables on firm performance. Different studies indicate that a board can't perform its legitimate governance role when it is dominated by the CEO (Dalton, 1985; Molz, 1988).

Different studies indicate different relationships between duality and firm performance and lack of consensus exists in this area. Mallette and Fowler (1992) find that firms with separate CEO and chairperson have perform better in the US

market. Previous studies point out that firms with higher agency problems tend to employ more outside directors, dual leadership and have larger boards (Goodstein, 1994; Judge, 1992; Mak, 2000). But, Kesner, Victor and Lamont (1986) find no statistical relationship between leadership duality and commission of illegal acts by Fortune 500 companies.

In contrast, supporters of duality argue that superior firm performance is the result of CEO duality. They believe that CEO duality cuts leadership strategy formulation and implementation purposes (Anderson, 1986). Baliga, Moyer and Rao (1996) report four positive points for CEO duality as below: (1) non-duality situation dilutes CEO's power to effectively lead the firm and increase the discrepancy between actions and decisions of management and board; (2) duality prevents the creation of competition between CEO and board chairperson; (3) in non-duality situations, firms could suffer from the existence of two public spokesmen; (4) if a CEO feels that the board will perennially second guess his actions it can limit innovation and entrepreneurship.

One possible reason of lack of consensus is that performance measurements differ between studies. For example, Pi and Timme (1993) and Rechner and Dalton (1991) employ accounting as a measure of performance like return of investment or return on equity and find a positive role for non-duality. But, Changati, Mahajan and Sharma (1985) employ firm bankruptcy/survival as firm performance and find a positive role for duality in firm performance. None of these studies control industry effects or other offsetting governance factors and this can be another reason for having mixed results.

Most articles argue that separation of CEO and chairman can improve the performance of the firm by clarifying the CEO behaviour. Fama and Jensen (1983b) show that decision management (CEO) has the right to initiate and implement new proposals for the expenditure of the firm's resources. And decision control (chairman) has the right to confirm and monitor those proposals. Preventing an insider from having decision management and decision control authority over the same proposal, leads to a series of checks and balances in the firm. These checks and balances make the situation more difficult for insider managers to engage in any type of opportunistic behaviour. Boards of directors should not be under the control of the CEO because boards have the highest level of decision control in a firm. As the chairman has the greatest influence on the board's actions, separation of decision management and decision control is compromised when the chairman of the board is also the CEO. Fama and Jensen (Fama, 1983a, 1983b) also demonstrate that separation of management and control in the decision-making process reduces the agency cost. Management refers to initiation and implementation of decisions while control refers to ratification and monitoring of the decisions. According to Fosberg (2004), firms with a separated CEO and chairman should be more likely to employ the optimal amount of debt in their capital structure than firms with the same CEO and chairman.

Having the same person with too much control over the board and managers creates different problems, for example: lower levels of effort, lower level of conflicts and lower level of usage of knowledge and skills on the board and in management (Wan, 2005). Opponents of duality believe that: (1) duality in a firm negatively affects board independence and prevents the board from monitoring

and establishing governance roles (Fizel, 1990; Millstein, 1992); (2) surviving in a competitive environment requires separation of decision management and control management (Fama, 1983b); (3) duality leads to long term organisational drift by affecting the honesty of insecure directors in evaluating firm performance (Carver, 1990).

In contrast, supporters of duality argue that duality leads to better firm performance as it permits clear-out leadership for purposes of strategy formulation and implementation (Anderson, 1986). CEOs who support this position indicate that non-duality would: (1) reduce their power to provide effective leadership in the company. This could happen through increasing the possibility that actions and expectations of management and the board are at odds with each other (Alexander, 1993); (2) create the potential for competition between chairperson and CEO; (3) create confusion as a result of the existence of two public spokesmen, the chairperson and the CEO; (4) limit innovation and entrepreneurship if the CEO feels that the board will perennially second guess his or her actions (Baliga, 1996).

There are some other ideas in this area that indicate there is no relation between CEO duality and firm performance. Kesner, Victor and Lamont (1986) document no relationship between CEO duality and performance of board. Evidence from a study of short-run performance of firms in the US market also shows that these firms are indifferent to changes in a firm's duality status (Baliga, 1996). Chen et al. (2008) support this idea by documenting that although firms may change their leadership structure (from duality to non-duality or vice versa), there is no evidence of improvement in performance. Iyengar and Zampelli (2009) also find no evidence that CEO duality is purposely chosen to optimise firm performance.

2.1.2.3 Board Composition

The main purpose of boards is monitoring. Empirical studies indicate that the degree of effective monitoring is directly related to the degree of independency of boards (John, 1998). Based on this fact independency of boards becomes increasingly important and the number of outside directors plays a significant role in boards' performance (Zahra, 1989). Outside directors have enough incentive to monitor managers because their own reputations depend on it and also improve their human capital. Prevost, Rao and Hossain (2002b) also find an inverse relationship between the proportion of outside board members and commitment to capital expenditure (a proxy for growth). They also find a positive relationship between the proportion of outside board members, firm performance and board size. Prevost, Rao and Hossain demonstrate that the proportion of outsiders on boards in the New Zealand market increased after the passage of the 1993 Companies Act and related legislations. In this regard the New Zealand Securities Commission (New Zealand Securities Commission, 2004) published principles and guidelines for all New Zealand companies to have a high proportion of outside directors on their boards. This commission asked the companies to allocate one third of their board to outside directors.

In support to prior studies, Wan and Ong (2005) indicate that outside directors are more likely to show independency in their roles and duties. They indicate that outside directors are willing to improve effort norms of the board, because they prefer to show that the board is doing a good job. A high proportion of outside directors on the board presumed to be more conducive to the firm's mission, goals and strategies. Wan and Ong (2005) also believe that outside directors bring more skills and knowledge to the company, because unlike the insiders who are well-

versed in their working relationships, outside directors have different backgrounds from different organisations and are unsure about the procedures and unacquainted with the inside directors. Mak and Roush (2000) also find a positive relationship between the proportion of outside directors and growth opportunities of the firm.

Different studies investigate the role of outside directors on financial performance and cost of capital. But the outcomes of these studies indicate mixed and inconclusive results about the relationship between outside directors, firm performance and cost of capital. For example, Hermalin and Weisbach (1991) argue that it is impossible to find a relationship between outside directors and performance when outside directors and inside directors are optimally weighted or if they reduce the agency problems to the same level. Different studies support the presence of outside directors in different aspects such as removing the CEO in poorly performing firms (Weisbach, 1988), substitution of takeover restrictions (Brickley, 1987), in tender bidding situations (Byrd, 1992) and in management buyout situations (Lee, 1992).

In this regard, Ashbaugh et al. (2004) find a negative relationship between the cost of equity and the independence of a board, the percentage of the board who own stock, the proportion of shares owned by directors, and managerial power, as proxies for the shareholder rights level. Fama and Jensen (1983b) explain that a board should include inside and outside directors. While the insiders have technical capabilities and good knowledge about the firm, outsiders participate in the strategic decisions of the firm and may add value by offering relevant complementary knowledge.

Weisbach (1988) also reports that outside directors of the US firms play a more important role in monitoring management than inside directors. In his support Block (1999) suggests that outside directors can accomplish their duty as monitors in the market by reacting favourably to the appointment of outside directors. This could happen when strong monitoring practices did not exist previously. Borokhovich, Parrino and Trapani (1996) also find that outside CEOs increase shareholders' benefit, but replacing them with insider CEOs will harm shareholders' wealth. Therefore, a widely held view is that boards are more effective in monitoring management when there is a strong base of independent directors on the board (Fitchratings, 2004).

In this regard, Dahya et al. (2008) report a positive relationship between firm performance and the proportion of outside directors. Wintoki et al. (2010) also find a strong positive relationship between board structure and past performance of the firm, while they find no significant relationship between board structure and current firm performance. Phan (2000) demonstrates that outside directors play a critical role in Singapore's companies. He mentions that a larger proportion of outside directors could make the company work more efficiently. In New Zealand market, Fox (1995) suggests that a larger proportion of outside directors could lead to better financial performance.

In contrast to prior studies, Hermalin and Weisbach (1991) find no relationship between board composition and firm performance. They illustrate that there is an optimal weight between insiders and outsiders according to the particular situation of each firm. Thus, no relationship between board composition and performance could be detected in equilibrium. Baysinger and Butler (1985) also demonstrate a

weak relationship between outside directors, return on equity. Agrawal and Knoeber (1996) also find a negative relationship between the number of outside directors and firm performance through a simultaneous estimation. They explain that board of directors may expand for different reasons such as political reasons (politicians, environmental activists, etc.), so these boards will not necessarily add value to the firm. Same situation exist in UK market. Outside directors in the UK have fewer obligations compared to the US. These directors primarily have an advisory role. So no evidence of relationship is detected between outside directors and firm performance (Franks, 1999). Another study by Lawrence and Stapledon (1999) also finds no consistent evidence that independent directors add to or detract firm value in Australian market. In this regard some studies indicate that firm-specific knowledge and expertise are unavailable to outside directors. Thus, inside directors who have this knowledge improve the firm performance and positively affect the firm (Baysinger, 1990; Hoskisson, 1994).

Other studies demonstrate different views about outside directors. For example, Wagner, Stimpert and Fubrara (1998) find a significant correlation between outside directors and firm performance but they also find a positive relationship between inside directors and firm performance. They conclude that a higher presence of either outside or inside directors leads to better performance. In their empirical study, Dalton, Daily, Elstrand and Johnson (1998) find little evidence of any relationship between board composition and firm performance. Hermalin and Weisbach (1988) also try to find the reasons for leaving and joining a board. They indicate that when a CEO nears retirement more inside directors join the board, maybe in order to prepare a wider range of choices for the new CEO. They also find that after appointing the CEO, insiders with short tenures depart from the

board and outside directors are more likely to join the board after a firm performs poorly.

As expressed in previous paragraphs, there are different ideas about the relationship between board composition, firm performance and cost of capital. Inconclusiveness of prior studies about this relationship leads this study to work on the issue. The majority of literature on board composition is based on countries with unitary boards, while the role of board composition in countries with compound board structure remains mainly unexplored.

2.1.2.4 Board Diversity

Institutional investors and shareholders have increased the pressure on firms to increase the proportion of female directors. They believe that gender diversity on boards will improve the decision making process (Useem, 1993). Some positive points of diversity on board are: 1) it creates an atmosphere that prompts divergent thinking, 2) it leads to change or expands the criteria used to evaluate strategic alternatives and 3) diversity leads others to rethink the assumptions that implicitly guide their reasoning (Hitt, 1991). In their support, Rosen and Lovelace (1991) report that boards with female directors have higher sales growth rates. Reddy et al. (2008a) also find a positive role for board diversity in small cap listed companies in New Zealand.

In this regard Adams and Ferreira (2009) find that female directors have a significant positive effect on firm performance. They find that female directors have better attendance records than male directors and also more likely to join monitor committees. In particular, female directors are interested in being

assigned to audit, nominating, and corporate governance committees. They conclude that gender-diverse boards have better monitoring records.

Carter, Simkins and Simpson (2003) support prior studies by documenting a positive relationship between gender diversity and firm performance. They list the advantages of diversity in boards as follows: 1) improving the understanding of the market place, 2) increasing the creativity and innovation and 3) its effective role in solving company's problems. Westphal and Zajac (1997) show that there is a growing trend towards employing female directors in US corporations.

The most common responsibility of directors is to monitor management but they serve in resource-dependence roles as well. Essential resources, or secure resources, will be provided for the firm by directors through linkage to the external environment (Hillman, 2000; Johnson, 1996; Pearce, 1992).

Four key benefits that arise from environmental linkage of the board are: 1) variety of advice because of variety of experiences and backgrounds, 2) connecting the information channel between firm and outside organisations, 3) providing commitment from important elements outside the firm, and 4) legitimacy (Pfeffer, 1978). Legitimacy plays an important role in selection of boards but it is not the only reason for choosing female directors on boards. Bilimoria and Piderit (1994) indicate that female directors are commonly employed on important board committees besides taking part on boards. So legitimacy is not the only reason for choosing female directors.

But the present situation of board diversity is not satisfactory as Catalyst (2007) reports that the proportion of women on board is still low. Women held 14.8% of Fortune 500 board seats in 2007. The percentage of female directors in Australia,

Canada, Japan and Europe is similar at 8.7%, 10.6%, 0.4%, and 8% respectively ((EOWA), 2006). Boards of directors and firms around the world are under increasing pressure to choose more female directors, therefore, the present situation regards female directors is likely to change.

The British Department of Trade and Industry also documents that the presence of females on boards enhance board effectiveness (Higgs, 2003). Swedish authorities have threatened companies with enforced gender diversity as a legal requirement if firms don't employ a minimum of 25% of females on their boards. Norway has the most extreme proportion of female employment which is about 40% since January 2008. Spain also passed a law stating that firms have to have 40% female directors on their board by 2015.

This legislation and voluntary employment of women has happened based on a view that female directors positively affect the companies' performance. One argument is that women directors do not belong to the "old boys club" so they can correspond to the concept of the independent director. Another argument is that boards can benefit from a bigger pool of talent by having diversity.

In contrast, some studies indicate that greater gender diversity on boards can decrease firm performance. These studies believe that too much monitoring from female directors negatively affect firm performance (Adams, 2007; Almazan, 2003). Thus, the positive effect of gender diversity occurs when additional board monitoring would enhance firm value (Adams, 2009).

Based on the literature, suggestions about the relationship between board diversity, firm performance and cost of capital are inconclusive and mixed. This

study is going to investigate the role of board diversity in New Zealand and Singapore companies.

2.1.2.5 CEO tenure

CEO tenure refers to the years that the CEO remains in his or her position. Decisions of the CEO have an impact on the performance of the firm. So having more experience will help the CEO to perform better. A more experienced CEO will have a better understanding of the markets, firm, its employees and all issues surrounding company operations. Therefore, empirical evidence suggests a negative relationship between the tenure of CEO and leverage.

But the important point is that CEOs may be interested in maximizing their own wealth and consequently focus on their private return. This may create conflict of interests between shareholders and CEOs. In particular, most researchers believe that CEOs are interested in establishing an empire by investing the cash flows in projects that yield returns below the cost of capital in order to increase the size and scope of their firms (Jensen, 1976).

Simsek (2007) indicates that the relationship between CEO tenure and firm performance is much more complex than it was thought originally. Short tenured CEOs may negatively affect performance because they may suffer from lack of sufficient awareness to notice and assess strategic risks and also they are unknown and untested. Long tenured CEOs accumulate a track record, achieve more information and knowledge about the firm's environment and acquire specific skills required for that job.

But at the same time different circumstances enable long tenure CEOs to influence board members. CEOs normally nominate new board members and by

doing this they can replace troublesome members with new ones. So, new board members, who owe their position to CEOs, are more loyal to them rather than to other shareholders and consequently can't evaluate the CEO's performance effectively (Finkelstein, 1989). Another reason is that older CEOs are able to control the firms' internal information systems. This helps them to withhold relevant information from compensation committee and board members and cover poor performances (Hill, 1991).

In this regard, some studies mention the entrenchment of CEOs as the reason for weak relationships between firm performance and turnover (Hill, 1991; Morck, 1988). Required period that boards take to learn about the CEOs true ability may be another reason for low turnover (Gibbons, 1992). In their support, Hermalin and Weisbach (1998) find that board independence declines over the period of a CEO's tenure. This may lead to more entrenchment in the CEO's behaviour. Gibbons and Murphy (1992) also argue that board members are more lenient regarding poor performance of new CEOs. Thus, a specific level of CEO's performance which is acceptable in the primary stages will not be acceptable in later stages.

Long tenured CEOs can negatively affect firm performance by becoming more committed to their paradigm, avoiding information that disconfirms this paradigm, losing interest in their jobs and ignoring calls for strategic changes (Hambrick, 1991). Besides that, long tenured CEOs have enough time to build up considerable human capital. Miller (1991) also finds a negative relationship between firm strategies, structures, environmental demand and long-tenured CEOs. He believes that long tenured CEOs cause strong inertia that can create serious problems in a firm. Shen and Cannella (2002) support prior studies by

finding a negative relationship between a long-tenured CEO and post succession operational performance.

But, Simsek (2007) finds an inverse U-shape relationship between CEO tenure and firm performance. He believes that in the primary stages of a CEO's tenure, firm performance increases and in later stages a CEO can negatively affect firm performance. Hambrick and Fukutomi (1991) also document that new CEOs may have insufficient knowledge to run the firm perfectly but they learn about their jobs and firms steadily. Thus an inverted U-shape relationship exists in the relation between CEO tenure and firm performance. This means that in primary stages, lack of required knowledge may affect CEO performance, but in later stages achieving required knowledge compensates the loss in primary stages. Miller (1991) also argues that although CEOs get familiar with their environment during their early years, they lose their touch and become stale as their tenure endures. During time, CEOs surround themselves with like-minded executives who support the CEO's entrenched ideas (Hambrick, 1995). In their support, Miller and Shamsie (2001) find that firm performance increases for the first 8-10 years of CEOs tenure and declines after that. Henderson, Miller and Hambrick (2006) document an inverted U-shape relationship between CEO tenure and firm performance as well. They find that firm performance increases during the first ten years of CEO tenure but it declines in years after this point.

Allgood and Farrell (2000) indicate that the effect of entrenchment and learning are different when the CEO is an outsider, insider or a founder. When outside CEOs are hired they do not affect the board but it is assumed that they need several years to become entrenched. In this case, firm performance decreases with CEO tenure. When CEOs are hired from within an organization they may already

have their relationship with board members and consequently, may be entrenched from the beginning of their tenure. But if the inside CEO is hired and does not affect the board positively, it is assumed that his/her tenure does not lead to entrenchment. Shivdasani and Yermack (1999) also find that founder CEOs are more likely to get involved in director appointments. This implies that founding CEOs have more entrenchment characteristics in their early tenure.

Among different points of views, Berger et al.(1997) and Wen et al.(2002) indicate that the tenure of the CEO is negatively related to leverage. But, Grossman and Hart (1983) indicate that the conflict between shareholders and CEO can be solved by tying the compensation of CEO to firm's stock return through a contract. Empirical evidence of assessing this strategy document mixed results. Jensen and Murphy (1990) and Murphy (1985, 1986) document a positive relationship between stock return and CEO pay. But, Benston (1985) and Kerr and Bettis (1987) find no relationship between stock return and CEO pay. Hill and Phan (1991) argue that longer tenure CEOs make CEOs more entrenched and guide them to use their power to pursue their own interests. In particular, a longer period enables CEOs to dominate their board of directors and demand a compensation package that caters to their preferences more than shareholders' preferences.

Lack of consensus in prior studies about the role of CEO tenure in companies guides this study to investigate the relationship between CEO tenure and cost of capital in large listed companies in New Zealand and Singapore.

2.2 Corporate Governance in New Zealand

New Zealand experienced a series of economic reforms during 1984-1990. These reforms took place in order to improve the unacceptable level of poverty, housing difficulties and health care (Dalziel, 2002; ESC, 1984). Dalziel (2002) demonstrates that New Zealand was successful in improving microeconomic efficiency, price stability and fiscal balance. But he believes that all reforms were not successful in New Zealand. Evans (2009) supports Dalziel's idea and finds a decline in the domestic equity market to GDP growth in New Zealand during 1996 to 2007 in comparison with other countries, such as Australia, Denmark and Singapore. Evans (2009) reports that the size of New Zealand listed companies was constant. But, companies in other countries kept increasing in size.

La Porta et al. (1997) report that the size of capital market in countries with poor investor protection is smaller than countries with high investor protection. Evans, Quigley and Counsell (2009) indicate that New Zealand has the weakest private property rights among OECD countries. They indicate that lack of foreign owned companies in New Zealand could be the reason for this shortcoming.

Choosing New Zealand as an example in this study provides the opportunity to examine the effects of new rules and legislations on companies. New legislation was designed in New Zealand to increase the monitoring efficiency in companies. This efficiency is achievable through increasing the responsibilities of board members. So, the passage of the 1993 Companies Act and related legislation caused an increase in the proportion of outside directors on boards. This means that the firms' response to the legislation comes through increasing outside directors in order to enhance the monitoring efficiency.

In this regard, Prevost et al. (2002b) demonstrate that New Zealand's companies suffer from lack of effective corporate governance practices. These effective practices are: majority of outside directors and separated CEOs and chairmen in New Zealand before late 1980s. Presence of large shareholders in New Zealand was another sign of inadequate protection rights in New Zealand (La Porta, 2002). These issues reflect the unsatisfactory situation of New Zealand in protection of investors, and corporate governance practices (Godfrey, 2003).

Different aspects of good corporate governance, like presence of a majority of outside directors on boards and separated CEOs and chairmen are commonly accepted in big markets like the US, the UK and Australia. But, executive director-shareholder with a controlling ownership stake and CEO duality were characteristics of the New Zealand market before the 1987 stock market crash (Hunt, 1994; Mackey, 1993). After 1987 crash, a majority of non-executive directors were appointed to boards. In 1989 the New Zealand Stock Exchange (NZSE) initiated tougher disclosure and corporate governance listing rules. In this regard, the Companies Act 1993 asks for a majority of independent directors on New Zealand boards. However, decision about the number of outside directors is left to companies.

The Securities Market Act in 1988 points out the eligibility of immediate disclosure of trades by company directors and officers. New Zealand companies understood the important role of proper governance practices after this reform. Some of these companies disclose their corporate governance practice in their annual reports voluntarily (Lindsay, 1998). Finally, The Financial Reporting Act of 1993 requires disclosure of financial information to shareholders. Thus, in the

1990s New Zealand experienced a notable evolution in corporate governance practices. Other countries had this evolution earlier (Prevost, 2002a).

The Institute of Chartered Accountants of New Zealand (ICANZ), the Securities Commission (NZSC) and the New Zealand Stock Exchange (NZX) published principles and guidelines concerning corporate governance practices for New Zealand companies after 2001. Nine high level guidelines and principles which were published by them are: balance of composition of boards, ethical behaviour, effective board committees, integrity in reporting, good remuneration policy, risk management processes, independence of auditors, constructive relationship of shareholders, and significance of other stakeholders in a governance context (New Zealand Securities Commission, 2004). Although these guidelines are not compulsory, all of the listed corporate entities are asked to implement the guidelines completely.

A strong focus of corporate governance guidelines in New Zealand is on monitoring and control leaves critics to argue about the efficiency of these guidelines. The critics believe that this much focus on monitoring and control prevents the boards from focusing on value creating activities. Regarding the compliance of these guidelines in some companies little has been mentioned about the effects it has.

Studies on corporate governance practices in New Zealand have focused on issues such as board composition, board size (Firth, 1987; Fogelberg, 1974) and CEO duality as well (Turner, 1985). Fox (1996) shows that the size of boards declined during the period from 1962 to 1993. Hossain, et al. (2001) assess the relationship between outside directors and companies' financial performance before and after

the Companies Act of 1994. In their support, Prevost, Rao and Hossain (2002a) find that there is a positive relationship between the proportion of outside directors and debt leverage. They also find a relationship between the proportion of outside directors and profitability of New Zealand companies. In contrast to prior studies, Chin et al. (2003) find no statistical relationship between board composition, board size, ownership structure and corporate financial performance in New Zealand companies.

Employment of different data, different variables and different performance measurements may be the reasons of lack of consensus about the role of corporate governance. Among these mixed results, the role of corporate governance practices in controlling cost of capital remains widely unexplored. Cost of capital plays an important role inside and outside the company. While insiders measure the effectiveness of their strategies and realized return of their performance, outsiders evaluate the past, present and future return of their investment through cost of capital. This study intends to fulfil the gap of theoretical and practical studies in this area.

2.3 Corporate governance in Singapore

Primary attempts at improving corporate governance practices standards in Singapore took place in 1996. The Singapore Stock Market issued new guidelines in its listing manual at that time. This new chapter was (Chapter 9B) on corporate governance which was related to the listing manual. After the Asian Financial Crisis of 1997 and after consulting with listed firms in Singapore market, Chapter 9B was replaced with the Best Practice Guide in 1998. After that The Monetary Authority implemented a new act in 2001 called The Securities and Futures Act

(SFA) in Singapore. This act aimed to improve the disclosure requirements of listed firms. According to this new act, non-disclosure or late disclosure of information would face either civil or criminal penalties.

In order to improve the corporate governance practices, The Code of Corporate Governance (COCG) was issued by the Corporate Governance Committee in Singapore in 2001. These codes were about the best practices of corporate governance. These practices were in different areas such as remuneration matters, accountability, audit issues, communication with shareholders and composition of board members. These rules and guidelines are not compulsory currently, but listed firms in Singapore are asked to disclose their corporate governance practices at annual general meetings. The listed firms are also asked to explain their deviations from the codes to shareholders at annual meetings.

But, Goodwin and Seow (1998) reported poor disclosure practice in Singaporean corporations in their study of Singaporean companies compared to the US and UK companies. Singapore's financial reporting standards give more discretion in adopting accounting policies to companies. These standards are adapted from the International Accounting Standards (IAS). Employment of these standards makes the acceptability of certain accounting policies uncertain. In this regard Chareonwong (2011) finds that the same directors in Singapore sit on several companies' boards. This fact in Singapore not only increases the possibility of directors devoting insufficient time, but also raises the possibility of a conflict of interest in transactions of these related firms.

Mak and Li (2001) also report a low rate of hostile takeovers that leads to replacement of inefficient management teams in Singapore. Explaining this,

Chandrasegar (1995) documents two reasons. First of all, there is an avoidance of aggression, bitterness and confrontation which is the characteristic of the Asian way of doing business. Secondly, merchant bankers in Singapore are more concerned about involvement in takeovers compared to counterparts in London and New York. Singaporean merchants do not get involved in takeovers without obtaining prior clearance with the government agency charged with administering the Takeover Code in Singapore, the Securities Industry Council (SIC).

La Porta et al. (1996) find that block ownership tends to be higher in Singapore and consequently the protection of minority stockholders' rights is weaker. This high concentration of ownership, especially among government and family shareholders, makes it difficult to have a takeover without the support of these shareholders. That may be one reason for the low rate of hostile takeovers in Singapore.

Companies controlled by the government in Singapore are under the Companies Act and governed the same as private companies. Although government-linked companies are governed the same as private companies, they are not eager to have outside directors. Government-linked companies are less concerned about accountability of financial performance. These companies have easier access to financing, and also have weaker monitoring by shareholders. Mak and Li (2001) find that it is more probable to have companies with higher block holder ownership, more unregulated, longer tenure CEOs and dual leadership.

Results of prior studies on the relationship between corporate governance, company performance and cost of capital are mixed and inconclusive.

Employment of different data, different variables and different performance measurements by prior studies may be the reasons for this inconsistency in results. The unique situation in Singapore's corporate control and ownership makes it necessary to explore corporate governance practices more sensibly. Among these mixed results, the role of corporate governance practices in cost of capital remains widely unexplored. This study intends to fill the gap between theoretical and practical studies in this area.

2.4 Capital Structure

Almost fifty years have passed since the seminal work of Modigliani and Miller (1958, 1963). But the importance of capital structure and the question of how to finance fixed assets still remain inconclusive. The empirical evidence related to a firm's optimal mixture of financing has been both voluminous and mixed (Bradley, 1983; Frank, 2008; Harris, 1991). Three competing theories have evolved with little consensus as below:

2.4.1 Pecking Order Theory (POT)

Pecking order theory was introduced by Donaldson in 1961. This theory was modified by Myers and Majluf (1984). They argue that equity is a less preferred means to raise the capital. It states that companies prioritize their sources according to the cost of financing. Companies prefer to raise equity as a financing means of last resort. Hence, internal funds are used first. When that is depleted, debt is issued, and when it is not sensible to issue any more debt, equity will be issued.

2.4.2 Trade-Off Theory (TOT)

Trade-off theory refers to the idea that a company chooses the balance of debt and equity in its financing by balancing the costs and benefits. This theory was first presented by Kraus and Litzenberge (1973). They considered a balance between the dead-weight costs of bankruptcy and the tax saving benefits of debt. Agency costs are also included in this balance. This theory was employed to show that corporations usually financed partly with debt and partly with equity. It states that there is an advantage in employing debt, the tax benefits of debt, and there is a cost of financing with debt, the costs of financial stress including bankruptcy costs of debt and non-bankruptcy costs (e.g. staff leaving, suppliers demanding disadvantageous payment terms, bondholder/stockholder infighting, etc.). A firm that is optimizing its overall value will focus on a trade-off when choosing the balance between debt and equity. This occurs due to the decline in managerial benefits as the debt increases, while the managerial costs increase as well.

2.4.3 Market Timing Theory (MTT)

The market timing theory explains how firms decide whether to finance their investment with equity or with debt. The idea that firms pay attention to market conditions in an attempt to time the market is a very old hypothesis. Baker and Wurgler (2002) argue that the first order determinant of a corporation's capital structure in employment of debt and equity is market timing. In other words, firms do not generally care whether they finance with debt or equity. They just choose the form of financing which, at that point of time, seems to be of more value in the financial market (Baker, 2002).

Market timing does not express the reason why firms explain the miss-pricing better than financial markets. This theory assumes that miss-pricing exists, and describes the behaviour of firms. Baker and Wurgler show that an index of financing that reflects how much financing was done during hot equity periods is a good indicator of firm leverage over long periods. A complete market timing theory has to explain the reason why some firms issue debt while other firms issue equity. This theory is one of the different corporate finance theories, and is often in contrast with the pecking order theory and the trade-off theory.

2.5 Cost of Capital

Cost of capital plays a critical role in business decisions. Both academics and practitioners try to establish the full picture about cost of capital because consideration of the cost of capital leads to better understanding of the businesses. The existence of all businesses is tied to calculation of cost of capital. But, most existing research focuses on the US and European markets and investigates the effect of different factors on cost of capital in these markets.

The financial sector of each business consists of two subsections, debt and equity. So in calculating cost of capital two elements should be mentioned, cost of debt and cost of equity. Cost of debt consists of interest that should be paid by businesses to borrow money, and cost of equity consists of the amount of money that should be paid to investors.

2.5.1 WACC

Correct estimation of investment costs and economic life of any investment is the main requirement of any business. Accepting or rejecting any investment is based on calculation of net present value and discounting of cash flows to the present,

by using cost of capital or firm's discount rate. The behaviour of net present value (NPV) impacts on any decisions. If $NPV > 0$, accept; if $NPV < 0$ reject. Incorrect calculation of cost of capital leads to incorrect calculation of NPV, profit and EVA.

Firms with more than one type of financial source require a weighted average cost of capital calculation in order to calculate the cost of capital (Farber, 2006). In this case, after tax cost of capital for each source of funding is calculated through the proportion of each source in the whole financing structure (Baker, 2005; Ross, 2005). The WACC has obtained from Modigliani and Miller (1958, 1963) and Miles and Ezzell (1980) studies, is arguably the most widely used method of calculating cost of capital in the real world (Ross, 1996).

WACC equation for a firm which is using common share (equity) and bond (debt) financing is as below:

$$WACC = r = w_d r_d (1-t) + w_e r_e \quad (2.1)$$

where, r_d represents the market rate on the firm's outstanding debt as cost of debt and r_e represents cost of equity which is frequently calculated through Capital Asset Pricing Model (CAPM). w_d is the proportion of debt in the firm's financing and w_e is the proportion of equity in the firm's financing. Proportion of debt is value of debt / value of debt plus value of equity. And proportion of equity is value of equity / value of debt plus value of equity. In this situation $w_d + w_e = 1$ because debt and equity are the only sources of firm's financing. In this equation t represents tax rate on corporate income. The standard treatment in WACC in order to reflect the deductibility of interest payments is $(1-t)$. In this procedure the interest cost of debt will decline. The interest payments are not calculated in the

prospective cash flows in order to avoid calculating the tax advantage of debt twice.

Despite the wide acceptance of WACC by prior researchers some studies have concern about its unrealistic assumptions like assuming a constant leverage ratio (Miles, 1980). Miles and Ezzell (1980) show that the WACC method assumes that capital structure proportions are stable. Thus, when future asset values are uncertain, the future debt tax shield is uncertain as well. Lewellen and Emery (1986) argue that the difference in predicting the of cost of capital increases because of the alternative characteristics of corporate debt management policy. They conclude that the best way to respond to evolving new information on expected future operating cash flows is to assume a periodic rebalancing policy for firm's debt levels.

Another shortcoming is the need to have correct calculation of the tax shield's value. This value depends on the company's debt policy. Miles-Ezzell's assumption argues that the only way to implement debt policy is to maintain a fixed market value debt ratio (Cooper, 2006; Farber, 2006).

Arzac and Glosten (2005) use a general formulation for arbitrary cash flows under a financial policy of constant leverage to propose a reconsideration of tax shield valuation. In support, Fernandez (2004) argues that the present value effect of tax saving on debt is not a simple calculation. He implies that although the capital market is complete, value-additively is violated. However, Cooper and Nyborg (2005) reject this argument by demonstrating that the value of debt tax saving is the present value of the tax saving from interest. Because of these problems some authors like Copeland, Koller and Murrin (2000) believe that the WACC equation

should be modified further. They believe that a growth factor can solve this problem, while some other authors like Ruback (2002) believe that appropriate discount rate for tax saving is the unleveraged cost of equity rather than the cost of debt financing.

In this regard, Miller (2009) documents a shortcoming for WACC and suggests a modified WACC while Pierru (2009) rejects his argument and modified WACC by questioning the assumption of Miller's calculation. Pierru (2009) argues that in Miller's example, the debt ratio is assumed to be constant throughout the project's life which is an incorrect assumption. Pierru (2009) suggests that debt ratio should be calculated in any year because it changes with respect to the economic value of the firm. Massari, Roncaglio and Zanetti (2007) also show that the WACC method is still widely employed all around the world especially in Europe, by banks and financial analysts.

2.5.2 Cost of equity

Two popular approaches exist in calculating the cost of equity capital: ex post cost of equity capital and ex-ante cost of equity capital. The least supported approach by literature is the ex-ante method. Growth potential and cash flows are the concerning aspects of this approach (Hail, 2006). Two important factors in this method which are earnings forecasts and stock prices calculated through different models. These models are: Claus and Thomas (2001) (R_{CT}), Gebhardt, Lee and Swaminathan (2001) (R_{GLS}), Ohlson and Juettner-Nauroth (2005) (R_{OJ}), and Easton (2004) (R_{PEG}). The base of these models is residual income model or dividend discount model. The differences between these models are forecasting horizons and future growth patterns. Existing evidence shows different ideas

about the effectiveness of the ex-ante approach in capturing variation in expected return.

The relationship between the ex-ante cost of capital estimates and future realized returns have been evaluated in different studies. These studies indicate a positive correlation between future portfolio stock return and portfolio ranking based on the ex-ante approach (Gebhardt, 2001; Gode, 2003). In support, the relationship between future returns and implied cost of capital is estimated by Easton and Monahan (2005). Through the variance decomposition technique, Easton and Monahan find that the ex-ante approach has low explanatory power in realized returns after putting controls in place for cash flow news and discount rate news.

However Botosan, Plumlee and Wen (2010) using the same method find that the relationship between the ex-ante approach and future returns is significantly positive. The relationship between the ex-ante approach and different risk proxies, like book-to-market ratio, firm size, growth and beta is investigated in different studies. (Botosan, 2005; Gebhardt, 2001; Gode, 2003).

For example, Botoan (1997) and Gebhardt (2001) report significant positive and negative relation between the ex-ante approach and beta respectively. Gode and Mohanram (2003) and Gebhardt (2001) report significant positive and negative correlation between the ex-ante approach and short and long-term growth forecasts respectively. Botosan and Plumlee (2005) implement a general study about the relation between the ex-ante approach and risk proxies. They find no correlation between risk proxies and the ex-ante approaches based on Gebhardt (2001) and Ohlson and Juettner-Nauroth (2005). But they find consistent correlation between risk proxies and other ex-ante approaches.

The measurement of error in analysts' forecasts is one of the main problems associated with the ex-ante approach, a shortcoming acknowledged by Easton and Monahan (2005). Relying on analysts' forecasts in cost of capital and expected return, makes most studies uncertain about their results (Guay, 2011). Some studies find no correlation between the ex-ante approach and future realized return (Guay, 2011) while some others find small correlation between them (Chen, 2009). As the correlation between the ex-ante approach and future realized returns is not obvious it is hard to cover this problem. Thus, the discussions on finding a unique approach still exist. (Botosan, 2005; Easton, 2005; Gode, 2003; Guay, 2011).

The second approach in calculating cost of equity is ex post approach. This method is the most promoted method in literature but like ex ante method it has shortcomings. Recent studies have find that this method is a poor proxy for cost of equity (Elton, 1999; Guay, 2011) with regard to the high usage of this approach in related literature (Da, 2012; Grandes, 2010). The Capital Asset Pricing Model (CAPM) and Fama and French Three Factor model are the prevalent methods in this approach which will be discussed in following sections (Fama, 1993).

2.5.2.1 Capital Asset Pricing Model (CAPM)

Literature related to the capital asset pricing model (CAPM) goes back almost 50 years. Primary attempts were undertaken by Sharpe (1964) and Lintner (1965). Their studies led to the introduction of the capital asset pricing model (CAPM) which became one of the most famous methods and the base for further studies. The model assumes that the market has a comprehensive explanatory power and the market return fluctuations can reflect the behaviour of firms' returns. Market fluctuations are considered risk factors and that these risk factors affect the

expected return. In this model, changes in expected market return illustrate the expected return. The CAPM model is as below:

$$E(R_i) = R_f + [E(R_m) - R_f]\beta_{im} \quad (2.2)$$

where $E(R_i)$ is the expected return on asset i , R_f is the risk-free rate, $E(R_m)$ is the expected return of market, $[E(R_m) - R_f]$ is the market risk premium and β_{im} is the proportion of risk of each dollar invested on asset i contributes to the market portfolio.

The regression equation of this model is as below:

$$R_{it} - R_{ft} = \alpha_i + \beta_{iM}(R_{Mt} - R_{ft}) + \varepsilon_{it} \quad (2.3)$$

where α_i is called the stock's alpha (abnormal return) for stock i ,

β_{iM} is the equity beta coefficient for stock i ,

and ε_{it} is a diversifiable or idiosyncratic risk (Fama, 2004).

Alpha is a risk-adjusted measure of the so-called active return on an investment. It is the return in excess of the compensation for the risk borne and is commonly used to assess active managers' performances.

A list of share returns and returns of the index (market) is required to estimate beta. These returns can be daily, weekly, or in any other period. The number of years employed in any study could be one, two, five or more. The most important part of this model is beta that describes the relationship between portfolio return and market return (Levinson, 2006). Correct estimation of firm-specific betas is crucial in all applications of modern finance theory, including asset pricing, corporate cost of capital calculation and risk management.

As noted by Campbell, Lettau, Malkiel and Xu (2001), firm specific betas are difficult to estimate and may well be unstable over time. A large body of empirical evidence suggests that betas vary across firms and over times (Ang, 2009; Jagannathan, 1996; Sunder, 1980). Moreover, Ferson and Locke (1998) find that beta estimations have a substantial amount of time variation. This error only makes a small contribution to overall estimation error of cost of capital.

Beside these shortcomings about beta there are two approaches to beta estimation. The first method sorts shares into portfolios based on characteristics to reduce measurement errors. This method assumes that all stocks within a given portfolio share have the same beta (Fama, 1973). However, when stocks in the same portfolio have exposure to other determinants of risk than the characteristics on which they are sorted, may manifest serious errors. The second method consists of estimating a separate time series for each firm to obtain individual betas (Brennan, 1998). However, this method can lead to serious problems if either the period of time is too short or the number of observations is too small.

There are possible estimation errors through time that are crucial in estimating cost of capital. Ferson and Locke (1998) indicate that analysts usually use historical average returns to estimate the risk premium on a market index and beta in CAPM. They indicate that correctness of cost of capital estimation will improve by improving the estimation of expected premium, even if the CAPM is a wrong model. They believe that improving the estimation of market premium is much more important than concerns about using the wrong beta when errors in cost of capital over time are the issue. Ferson and Locke (1998) report that the smallest overall errors are obtained when a regression model is employed and the largest errors occur when using the past historical average. Therefore, this study

will use regression models instead of historical average in order to minimize the potential errors in estimating the cost of capital.

Some consideration in calculating beta could lead to better results. For example, Theil (1971) notes that a large number of observations are needed to reliably estimate beta. Cosemans (2009) observes that a limited number of observations will lead to poor estimations. Thus, a large number of observations, something like more than 300, is suggested by earlier studies (Sunder, 1980; Theil, 1971). More recent papers show that around 50 to 100 observation would be enough (Jin, 2006). Data period is another important issue in calculating cost of capital. Too short a period lets the beta estimation be influenced by recent market behaviour (Hoberg, 2007) and thus leads to high standard errors in estimations. Although a longer period reduces some problems, it can also lead to other problems, like making data collection difficult or having to make more assumptions such as estimating investors' tax positions. Relevancy of the market's performance to the past may be irrelevant over longer periods (Jin, 2006). In this regard, some prior studies suggest that weekly data is more reliable compared to monthly data. This could be right because of the higher number of observations during the same period (DeJong, 1985). Although some articles employ daily data (Cosemans, 2009) many articles mention a non-synchronicity problem that arises with daily data, because smaller firms may not trade every day (Scholes, 1977). Thus, weekly data for a period of two years which include almost 100 observations will be employed by this study.

Another body of research suggests an alternative to beta which is Arbitrage Pricing Theory (MacKinlay, 1995). Conner and Korajczyk (1988) document that APT is a better approach for detecting the affecting factors on asset returns.

Ferson and Korajczyk (1995) indicate that the great fraction of predictability for all of the investment horizons can be captured by APT. Although prior studies suggest APT as a better model than CAPM, there are disadvantages associated with the APT approach.

The APT theory faces some shortcomings as well. First of all the underlying factors and the required number of them are not indicated in arbitrage pricing theory. Secondly, unlike CAPM, pervasive and systematic influences on the asset price are ambiguous. Cheng (1995) categorized variables that explain the UK stock market into three economic factors. The first one involves market indices. The second comprises longer leading indicator, lagging indicator, money supply, interest rate and unemployment rate. The third consists of output measures variables such as GDP growth rate, consumer expenditures on durable goods, industrial production and short leading indicator.

Despite the shortcomings of APT, the CAPM model which was developed by Sharpe (1964), Lintner (1965) and Black (1972) implies that differences in market beta will completely explain the differences in expected returns for portfolios and securities. Many articles try to modify the primary version of CAPM and improve its explanatory power by expanding its covered variables. Supporters of the empirical failure of this version of CAPM can be categorized into two groups as below:

The first group is the behaviourists. They believe that evidence proves that stocks with low book value to market value belong with growth firms, and high ratio of book value to market value is associated with firms enduring bad periods (Fama, 1995; Lakonishok, 1994).

The second group believes that many simplified and unrealistic assumptions of CAPM, lead to empirical contradictions. For instance, assumptions like variance and the mean of one-period portfolio returns will be mentioned by the investors. It is logical that the relationship between issues like labour income or opportunities for future investment and portfolio return will be mentioned by investors. If so, market beta will not describe asset risk comprehensively. And differences in beta cannot explain the differences in expected returns.

CAPM predicts that the cost of equity is positively associated with market beta. Regardless of criticisms of this method in literature, it is still the most preferred method in calculating cost of equity (Da, 2012). Some studies mention that almost 75% of academics and practitioners still believe that CAPM has reasonable estimation (Graham, 2001; Welch, 2008).

Differently managed portfolios earn different returns from those returns predicted by CAPM. This is one of the primary problems of this method. Different anomalies are found with CAPM. Firm size and book-to-market were two famous anomalies uncovered by Fama and French (1993). The third one is PE ratio that indicates that firms' high PE ratio seems to be more profitable than firms with low PE ratio (Fama, 1996). Other problems are cash-flow to price (Afkhami Rad, 2013; Lakonishok, 1994), past long-term returns (MacKinlay, 1995), past short-term returns (Jegadeesh, 1993) and past sales growth (Fama, 1996). Other problems relate to firms with real options. A nonlinear relationship between firm return and risk factor requires additional risk factor as explanatory variables, so CAPM may have shortcomings in these areas.

These problems and convincing evidence of failure of CAPM prepared the situation for Fama and French (1993) to introduce their three factor model (Fama, 1996, 1992, 1998).

2.5.2.2 Fama-French Three Factors (FF3F) Model

Fama and French published the results of their studies in 1992. Their model assumed that market fluctuation is not the only factor affecting firm's return citing size and book-to-market value as two other risk factors. Although these variables are not state variables, they can reflect the effects of unidentified state variables that cause undiversified risks.

Fama and French (1992) find a negative and positive correlation between firm size and firm returns and between book-to-market equity and firm return respectively. They also show that the small firms share returns and returns of higher book-to-market shares vary more with one another than returns of large firm's shares and returns of low book-to-market shares. Fama and French (Fama, 1996, 1993) suggest a three-factor model for expected returns:

$$E(R_{it}) - R_{ft} = \beta_{iM}[E(R_{Mt}) - R_{ft}] + \beta_{is}E(SMB_t) + \beta_{ih}E(HML_t) \quad (2.4)$$

In this equation, $E(R_{it})$ is the expected return on asset i in time t , R_{ft} is the risk-free rate of return, SMB_t (small minus big) represents difference between the returns of diversified portfolios of small and big shares, HML_t (high minus low) is the difference between the returns on diversified portfolios of high and low book to market ratio shares, and betas are the slopes of multiple regression of $R_{it}-R_{ft}$ on $R_{Mt}-R_{ft}$, SMB_t and HML_t .

The time-series regression of this model is:

$$R_{it} - R_{ft} = \alpha_i + \beta_{iM}(R_{Mt} - R_{ft}) + \beta_{iS}SMB_t + \beta_{iH}HML_t + \varepsilon_{it} \quad (2.5)$$

In order to calibrate the sensibility of share prices to new information α_i is added to the model. Fama and French (1993), (1996) show that a model shaped by size, book-to-market ratio and other price ratios can explain most of the average return variation and will cover the shortcomings of CAPM. Cummins (2005) shows that applying the three-factor model has different outcomes for each business. For example, in the property-liability insurance industry, it shows higher cost of capital than CAPM. Thus it is reasonable to employ the Three Factor Model in this industry.

Many empirical studies prove the important role of size and book to market equity in explaining most of the US share returns. But, some other work has been done to prove this issue in other parts of the world. For instance, Chui and Wei (1998), Ho (2000) and Lam (2002) indicate an important role for size and book to market equity ratio in reflecting the share returns in Hong Kong. Wong and Lye (1990) and Lau (2002) find that the firm size has an effective role in explaining Singaporean share returns. Drew and Veeraraghavan (2003) document an important role for the three-factor model in the Philippines, Malaysia, Korea and Hong Kong through some specific robustness tests. Shum and Tang (2005) show effective explanatory power for the three-factor model through their study in Hong Kong, Taiwan and Singapore.

However, there are some shortcomings associated with this model. As mentioned by Fama and French (2004) the empirical motivation of the three-factor model is its main weakness. The small-minus-big (SMB) and high-minus-low (HML) are not mentioned as state variables by investors. They are just means to capture the

reaction of share returns to size and book-to-market equity ratio and they are not risk factors.

Daniel and Titman (1997) reject the three-factor model by examining the irrational pricing against the three-factor model. They mention that expected returns are not related to an asset's covariance with any economic risk factor. Davis (2000) rejects their idea and indicates that HML of the three-factor model better explains the expected returns than the characteristic model of Daniel and Titman. Evidence presented by Martinez (2005) documents the limited explanatory power of the Fama and French three factor model in Spanish market. Charoenrook and Conrad (2005) show that size can be a risk factor and that employing size in calculation is reasonable but employing book-to-market ratio is not always accepted. Moskowitz's (2003) study supports a similar idea about size and book-to-market ratio. He finds that book-to-market ratio cannot be assumed as a risk factor. Despite the studies that reject the accuracy of FF3F, academic and non-academic works still employ this method. Further studies that tried to improve this method led to the introduction of the momentum model which is described in the following part.

2.5.2.3 Momentum Model

Further studies focus on improving the three-factor model revealed another serious problem called the momentum effect (Jegadeesh, 1993). This effect is based on the assumption that well performed shares in the last three to twelve months tend to continue their good performance and shares that performed poorly in this period continue to perform the same. This effect has different effects on cost of capital compared to the effect of book-to-market equity and other price ratios on cost of capital. Carhart (1997) therefore added this variable (momentum

factor) to the three-factor model in order to enrich its explanatory power. This momentum variable states the difference between the returns on diversified portfolios of short-term winners and losers.

$$E(R_{it}) - R_{ft} = \beta_{iM}[E(R_{Mt}) - R_{ft}] + \beta_{is}E(SMB_t) + \beta_{ih}E(HML_t) + \beta_{iw}E(WML_t) \quad (2.6)$$

where, the β_{iw} is the beta coefficient for the momentum factor (winner minus loser) for firm i . $E(WML_t)$ represents the difference between the returns of diversified portfolios of winners and losers.

Time-series regression of this model is:

$$R_{it} - R_{ft} = \alpha_i + \beta_{iM}(R_{Mt} - R_{ft}) + \beta_{is}SMB_t + \beta_{ih}HML_t + \beta_{iw}WML_t + \varepsilon_{it} \quad (2.7)$$

The critical role of the momentum factor in cost of equity capital estimation has been demonstrated by many empirical studies (Barberis, 1998; Conrad, 1998; Hong, 1999). Liew and Vassalou (2000) documented significant roles for SMB, HML and WML in the Canadian stock market. Tien and Wang (2010) find that in some lines of business, applying FF3F and momentum model significantly increases the cost of equity capital, especially in property-liability insurers. So they suggest that the government should set up more strict regulations in property-liability insurers.

Frankel and Lee (1998) and Piotroski (2000) document another shortcoming for CAPM and the three-factor model. This shortcoming is that shares with higher expected cash flows tend to have higher average returns. They consider that lack of available information about the expected profitability by irrational share pricing being the reason for the shortcoming.

Some studies reject the role of momentum factor as a risk factor. These studies find that momentum factor is not a risk factor and therefore should not be included in cost of capital estimations (Charoenrook, 2005; Moskowitz, 2003). Charoenrook and Conrad (2005) document that the relation between conditional variance and conditional mean of momentum factor is in a manner that momentum factor cannot be assumed as a risk factor. Different ideas that support momentum factor (Barberis, 1998; Hong, 1999; Liew, 2000) or reject its role (Chen, 2003; Moskowitz, 2003) exist in prior studies. The idea of using momentum factor still exists because the arguments put forward were not strong enough to convince academics and practitioners to avoid this factor.

Although Ordinary Least Square (OLS) is the most recommended method of estimating cost of capital in literature (Chen, 2009; Da, 2012), some studies suggests Generalized Method of Moments (GMM) as a substitute method (Grandes, 2010). GMM supporting literature states that this method overcomes the shortcomings of OLS like normality or homoskedasticity. The size of market or exogenous factors can cause heteroskedasticity and affect the estimations of OLS. For instance, Garcia and Bonomo (2001) employed GMM in their studies because in the Brazilian market, high inflation rate is a significant issue which may cause heteroskedasticity and affect the OLS estimations. Although GMM is an appropriate alternative for OLS in special markets and OLS is the most recommended method in estimating cost of capital, assumptions of OLS will be checked in this study to identify which method is the best.

The financial crisis in 2007-2008 affected the performance of firms around the world. Almost all countries experienced a recession period after this financial crisis. However, the level and depth of this effect was different in various

countries (Erkens, 2012; Liu, 2012). The structure of a particular economy indicates the volume of change that occurs in that economy. It is clear that New Zealand and Singapore have big differences in their geographical situation. Investigations of this study indicate different behaviour in the New Zealand market and the Singapore market when facing the financial crisis.

2.6 Summary of Chapter

This chapter surveyed existing literature pertaining to the relationship of corporate governance practices, company financial performance and cost of capital whilst also clarifying the contribution of this research. An overview of corporate governance practices and mechanisms in developed economies along with New Zealand and Singapore were presented in this chapter. Relevant empirical studies on corporate governance practices in New Zealand, Singapore and other parts of the world were also presented. This section also included a discussion on corporate governance acts, rules and guidelines in New Zealand and Singapore and stated the developments of corporate governance practices in these economies.

Chapter 3 RESEARCH METHODS: RESEARCH FRAMEWORK. HYPOTHESES AND EMPIRICAL MODELS

3.0 Introduction

This chapter introduces the framework for this study. This chapter also develops hypotheses and presents empirical models of this research. The methods of investigating the relationship between corporate governance and cost of capital in large listed companies in New Zealand and Singapore are also presented.

3.1 Research framework

Improvement of transparency and accountability in managerial decision making is strongly related to good corporate governance practices in companies. This idea is supported theoretically and practically in prior research (Ingley, 2007; Psaros, 2009). However, research on the interaction between corporate governance practices and firm performance shows inconclusive results investigation on the interaction between corporate governance practices and cost of capital in companies remain unexplored.

Different features of corporate governance were employed by previous studies in order to evaluate the relationship between corporate governance, firm performance and cost of capital. Establishing the relationship between corporate governance, firm performance and cost of capital becomes more complicated when specific features are employed in estimations (Bauer, 2008).

One important issue in assessment of corporate governance is the direction of the relationship between corporate governance practices, firm performance and cost of capital. Prior studies which reported a causal relationship between corporate governance practices (such as insider ownership) and firm performance were not

successful in considering the endogeneity effects of ownership (Y. Hu, Izumida, S, 2008) caused by internal relationship of corporate governance mechanisms leads to endogeneity. When financial performance affects the governance issues, it is called reverse causation. It may happen when privately informed insiders ask for bonus plans before unexpected earnings are reported. Different studies support the idea of rejecting the single equation methods when evaluating the ownership, performance and cost of capital relationships (Agrawal, 1996; Bhagat, 2002). This study will consider the endogeneity of ownership structure when assessing the relationship between ownership structure and cost of capital.

This study extends the existing literature in different ways. 1) Employment of a wider range of corporate governance variables in comparison with prior studies. Employment of these variables leads to a better understanding of different corporate governance mechanisms which interacts with cost of capital. This approach allows academics, investors and managers to track the effective factors on cost of capital more efficiently. 2) Examining the effect of corporate governance practices on cost of capital clarifies the efficiency of corporate governance principles and guidelines implemented by authorities in New Zealand and Singapore. 3) Comparison of New Zealand and Singapore reveals many interesting issues regarding the difference in corporate governance practices, the economic situation and the nature of companies. The geographical isolation of New Zealand and its smaller companies constrains specific characteristics of corporate governance practice outcomes. Singapore experiences a different situation as a highly international economy with larger companies and different corporate governance characteristics such as ownership structure. 4) Large listed companies increase the possibility of implementing more corporate governance

regulations and guidelines. Thus, employment of large listed companies in both New Zealand and Singapore helps promote a better understanding of the corporate governance guidelines in these countries. Employment of large listed companies also prepares a better context for comparing the efficiency of corporate governance guidelines. 5) Most prior studies explored the relationship between corporate governance practices and corporate financial performance while evaluating the relationship between corporate governance practices and cost of capital remains highly unexplored.

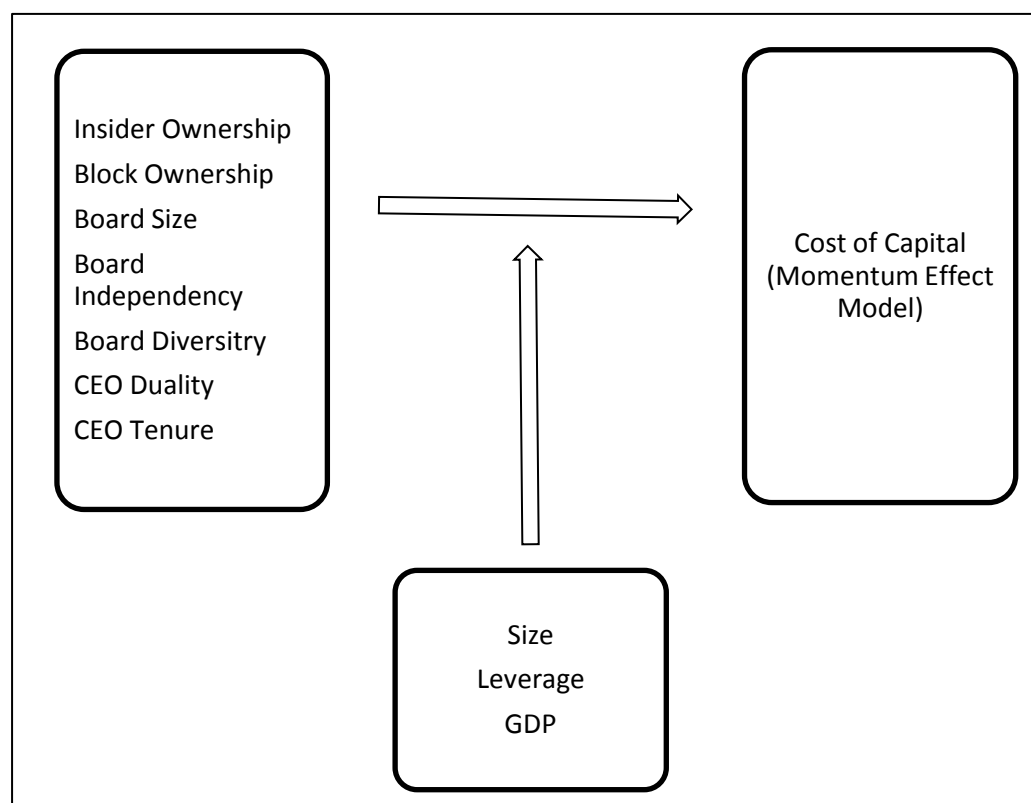
Cost of capital plays an important role in decision making either inside or outside companies. Therefore, revealing the potential role of corporate governance practices in cost of capital can help both academics and practitioners. This study examines whether or not corporate governance practices in large listed companies in New Zealand and Singapore affect the companies' cost of capital. Companies listed in New Zealand's top 50 companies (NZX 50) are used to showcase the New Zealand market, while 30 large companies that are listed as STI constituents in the Singapore market, will be the representative of the Singapore market.

3.2 Conceptual Framework of this study

The conceptual framework of this study is presented in Figure 3.1. The corporate governance variables which previous studies and authorities in New Zealand and Singapore indicated as important principles are listed on the left hand side. These variables are: Insider Ownership, Block Ownership, Board Size, Board Independency, Board Diversity, CEO Duality and CEO Tenure. Proxy of firms' cost of capital is indicated on the left hand side. Fama-French Four Factor or Momentum Effect of Jegadeesh and Titman is employed as the proxy of

calculating cost of capital. Size and leverage of companies along with Gross Domestic Product (GDP) growth rate of countries are adopted as the affecting variables in the linkage between governance characteristics and companies' cost of capital.

Figure 3.1: Possible Linkage attribute to Corporate Governance Mechanisms and Cost of Capital



Theoretical and empirical links between corporate governance mechanisms and cost of capital of firms are provided in the following section.

3.3 Governance Mechanisms

The main thrust of this study is to understand the potential relationship between corporate governance practices and cost of capital. In order to evaluate the role of corporate governance variables in cost of capital, this study employs different corporate governance variables which are identified in Figure 3.1. The

Mechanisms of each of these variables are discussed and relevant hypotheses of the relationship between corporate governance practices and cost of capital are developed in this section.

3.3.1 Block Ownership

Different studies offer different measurement regarding block ownership. Some prior studies have consider the percentage of shares owned by the top five shareholders, whereas others consider the percentage of shares owned by the top 20 shareholders. Ownership of 5% or more in a company is another method of considering block owners (New Zealand Securities Commission, 2006). There are limitations in employment of each of these measurements. Employment of 5% ownership or more poses a problem. Because in large companies with high defused ownership, it is hard to find shareholders with 5% of shares or more. Percentage of shares owned by the top 20 shareholders is also not a good proxy for block shareholders, because in most companies the percentage of shares held by the second 10 shareholders is not high enough and these shareholders do not play an effective role in companies. The top five shareholders in most companies are more effective shareholders (Prevost, 2002b). This study will consider the percentage of shares owned by the top five shareholders as block ownership.

Various costs and benefits are associated with block ownership. Therefore, the effect of block ownership on firms is unclear as yet (Bohren, 2003). Positive effects of block ownership are due to the different characteristics of block owners. These characteristics include: 1) Good monitoring by block owners (Shleifer, 1986). 2) Higher takeover premium (Burkart, 1995). 3) lower free-riding by dispersed shareholders (Shleifer, 1986). These characteristics positively affect the

firm. In this regards, Holderness (2003) shows that block owners have the opportunity to monitor and affect managers' decisions.

Besides these positive characteristics, some negative characteristics of block ownership can diminish the performance of companies and increase the costs. Some of these characteristics are: 1) Reduced market liquidity (Chordia, 2001). 2) Block owners are associated with lower diversification benefits (Demsetz, 1985). 3) Block ownership reduces the management initiative (Burkart, 1997). 4) Block owners can increase the conflict between majority-minority. Presence of different ideas about the role of block ownership happens because of the uncertainty about the power of each of these positive and negative effects.

In this regard, Morck et al. (1988) argue that when managers are block owners, some entrenchment problems may occur. They believe that block ownership of managers will increase the power of internal constituency. But some studies claim a non-linear role for block ownership. For example, Chahine (2004) believes that increase in block ownership of a firm first increases the firm's value and then decreases the firm's value. He shows that people who own a higher proportion of shares are more interested in monitoring the company. These investors are unlikely to be indifferent about the firm's future. So in this case, the board should work clearly and efficiently to enhance its reputation in order to satisfy the block owners (Shleifer, 1986).

Since block ownership is an important affective factor in each company and plays a significant role in New Zealand and Singapore, assessing the role of this kind of ownership becomes an important issue in this study. In order to address the issues regarding block ownership, the following hypothesis was postulated:

H₀: Block ownership is positively related to cost of capital in the New Zealand market.

H₀: Block ownership is positively related to cost of capital in the Singapore market.

3.3.2 Insider Ownership

In the seminal work by Berle and Means (1932) and Jensen and Meckling (1976) they find that if top managers (officers and directors) hold a higher percentage of shares, they will try to maximize their own wealth. These managers will therefore make decisions consistent with stockholders' wealth maximization because there is a better alignment of interests between insider (officers and directors) and shareholders.

Morck et al. (1988) indicate that despite the evidence of a positive relationship between managerial ownership and firm value, this relationship is weak at high levels of insider ownership. Stulz (1988) asserts that the value of a firm will decrease as managers become more dominant in the ownership structure. These varying views about the role of insider ownership can be categorized into three groups. 1) Studies that document a positive linear relationship between insider ownership and firm performance. 2) Studies that document a non-linear relationship between insider ownership and firm performance. 3) Studies that document no relationship between insider ownership and firm performance.

The first group of studies which document a linear relationship between insider ownership, firm performance and cost of capital consists of studies that accept the convergence of interests. This convergence of interests happens because of alignment of interests between managers and shareholders. These studies indicate

that decreasing the agency costs is achievable through convergence of interests (Elayan, 2003; Hossain, 2001; Welch, 2003).

The second group of studies support the non-linear relationship. This non-linear relationship could be a quadratic relationship or a cubic relationship (Chen, 1993; Griffith, 1999). Convergence of interests and entrenchment effect both appear for insider ownership. These studies show that insider ownership has a positive effect on companies' performance (convergence of interests) when insiders own less than a specific level of ownership. When insiders own more than that specific level, there is a negative relationship between insider ownership and firm performance. This is due to entrenchment effect.

This group consists of two sub groups. One believes in the quadratic relationship (Johnson, 2000; Morck, 1988) and the other in the cubic relationship (De Miguel, 2004; Short, 1999). Findings of studies that document a quadratic relationship support the convergence-of-interests hypothesis (alignment of interests) at low levels of insider ownership. These studies also indicate that entrenchment effect exists in higher levels of insider ownership.

In the empirical study in the US McConnell and Servaes (1990) show that firm performance increases while insider ownership is increasing up to 40% - 50% (alignment effect). When insiders own more than 40% - 50% of a firm, firm performance starts to decrease because of the entrenchment effect.

Morck et al.(1988) and Short and Keasey (1999) document a cubic relationship between insider ownership and firm performance. Two limits exist in a cubic relationship and the relationship between insider ownership and firm performance changes at these limits. The two limits of the cubic relationship in the US market

are 5% and 25% (Holderness, 1999). These limits are completely different from those for a quadratic relationship which are 12% and 41% in the U.K.(Short, 1999).

The third group of research documents no relationship between insider ownership, firm performance and cost of capital (Demsetz, 1985, 2001). Researchers claim that insider ownership has no effect on firm performance and costs arguing that insider ownership cannot affect corporations because it is determined endogenously.

In their view, the competitive capital market forces companies to choose a value maximizing ownership structure and that the ownership structures affect the insider ownership structure through company characteristics which are not necessarily determinants of performance and cost of capital. They identify company characteristics such as company size and return on asset affecting ownership structure (Demsetz, 1985).

Lack of consensus about the role of insider ownership on company's cost of capital indicates that each company needs its own optimal capital structure in order to maximize its value. Stulz (1988) finds that alignment of interests exist in low levels of insider ownership. As insider ownership increases, the managerial ability of pursuing non-value-maximizing activities increases and after a while this effect overtakes the effect of interest alignment. The costs of changing approaches to optimal form can mitigate by monitoring role provided by the capital market. A more efficient capital market leads to a better monitoring of companies.

The situation in New Zealand and Singapore are different. Insider ownership in New Zealand is less than the optimal level (Hossain, 2001; Reddy, 2008a). Thus, the increase in insider ownership will positively affect the performance and negatively affect the cost of capital. The high proportion of governmental ownership in the Singapore market restricts the opportunity for insider ownership to grow to the optimal level (Phan, 2000). This leads to the two hypotheses.

H₀: Insider ownership is positively related to the cost of capital in New Zealand market.

H₀: Insider ownership is positively related to the cost of capital in Singapore market.

3.3.3 Board Size

Different ideas exist about the effect of board size on corporate performance. Jensen (1993) believe in an optimal size for boards, because bigger boards are easier for CEOs to control. In his view seven to eight board members is an effective board size. Lipton and Lorsch (1992) document that eight or nine members on the board will be effective. Firstenberg and Malkiel (1994) support Jensen's (1993) idea about the effectiveness of smaller boards. They conclude that it is easier for smaller boards to reach consensus and for members to engage in genuine debates and interactions. In support, Hackman (1990) in his organizational behaviour research, suggests that larger board size diminishes productivity and return.

In contrast, some studies believe that there is a positive relationship between board size and firm performance. Zahra and Pearce (1989) conclude that a larger board is more effective in monitoring managers. In their support, Goostein,

Gautam and Boeker (1994) and Psaros (2009) argue that larger boards benefit companies by 1) providing a larger pool of expertise; 2) having greater management overview, and 3) providing access to a wider range of contacts and resources.

However this view is challenged by Juran and Loudon (1966) who argue that there is no relationship between board size and firm performance. Forbes and Milliken (1999), Yawson (2006) and Mak and Kusandi (2005) consider that it is difficult to coordinate and make value maximizing decisions with large boards (Yermack, 1996).

New Zealand and Singapore experience different situations in regard to board size. The average size of boards in New Zealand is seven similar to that suggested by Jensen (1993) as an optimal board size in the US market. However, Singapore experiences a completely different situation. Average board size is 11 in Singapore (Castellano, 2011). Therefore, the following hypotheses are formulated in regard to board size:

H₀: Board size is positively related to the cost of capital in the New Zealand market.

H₀: Board size is positively related to the cost of capital in the Singapore market.

3.3.4 Board Independence

Fama and Jensen (1983b) show that boards with higher independency monitor managers more effectively compared with less independent boards. The outside directors can decide more independently and are better decision-makers over long periods. Cadbury (1992) suggests that the independency of managers will improve the board's vigilance.

The financial independence of non-executive-independent directors is a strong point that helps them to monitor the company more efficiently and control any opportunistic behaviour of managers. A number of reforms have been undertaken in order to improve corporate governance practices regarding board independency. These reforms include: minimizing management's control over the appointment of board and committee members; employing a larger number of non-executive/independent directors on the board; implementing standards in determining independent members; and encouraging reviews of the performance of the board and each board member individually (Gani, 2006). NZSC (2004) in its corporate governance recommendations and guidelines documents the necessity of employing a majority of non-executive/independent directors in New Zealand companies. NZSC asks for a minimum of one-third of independent directors on New Zealand boards.

In contrast with the supporters of non-executive/independent directors some empirical studies document different results. Baysinger and Hoskisson (1990) believe that outside directors build careers on multiple boards, even though they may not effectively understand the company business. Gunasekarage, Locke, Reddy and Scrimgeour (2006) and Hutchinson (2002) document the negative role of board independency on the firm's performance. Some other studies do not support board independency in companies (Chin, 2003; Prevost, 2002b; Young, 2003). Chahine (2004) shows that firms with higher value tend to employ more outside directors compared with low valued firms. He expects to see a reverse U-shaped relationship between the number of non-executive/independent directors and firm's performance.

Non-executive/independent directors hold a majority on boards of directors in New Zealand and Singapore. It is argued that the lack of effective corporate control has convinced investors to rely on the internal control systems, such as the outside directors. The smaller pool of directors in New Zealand may be another reason for employing more outside directors; as the small pool of directors offers a more restricted pool of skills and companies try to overcome this problem by appointing more outside directors. The lack of conclusive results around the effect of board independency provides a reason for this study to investigate the relationship between outside directors and the cost of capital in the New Zealand and Singapore's large listed companies.

Therefore, the following hypotheses are formulated in regard to board independency:

H₀: Proportion of outside (non-executive/independent) directors is negatively related to cost of capital in New Zealand.

H₀: Proportion of outside (non-executive/independent) directors is negatively related to cost of capital in Singapore.

3.3.5 Board Diversity

Prior studies document mixed and inconclusive results about the effectiveness of board composition in corporations (de Andres, 2005). Board diversity and board independency are the two significant corporate governance issues (Milliken, 1996). Prior research documents two main reasons to support board diversity in companies.

First of all board diversity can increase discussions and the exchange of ideas on boards. Thus, board diversity can improve company performance and help the

company to control costs through providing wider insights and perspectives on the board (Carter, 2003; Knippenberg, 2004). Secondly, board diversity can help companies protect shareholders' interests. This is because board diversity brings different gender, ethnicity and cultural background which provide different insights to board operations. The diversity helps the corporation to better protect shareholders' interests (Arfken, 2004).

A concern for achieving board diversity has led some countries to legislate or threaten companies to legislate higher diversity on boards (McGregor, 2008). For example, in Norway, the government asked companies to dedicate 40% of their boards to female directors voluntarily or the government will make this a legal requirement. Almost 15% of Fortune 500 companies in the US had female directors in 2007. In New Zealand almost 9% of NZX listed companies had female directors on their board (McGregor, 2008). Presence of female directors on boards is less than 1 in Singapore (Castellano, 2011).

Prior studies document a positive relationship between female directors and firm's performance. Reddy et al (2008a) document a statistically significant relationship between female directors and the performance of small cap companies in New Zealand. Brennan and McCafferty (1997) document two reasons in supporting female directors. First of all, female directors are not part of the "old-boys" network, so they are more independent. Secondly, female directors have a better understanding of customers' behaviour and interests.

Therefore, the following hypotheses are formulated in regard to board diversity:

H₀: Board diversity is negatively related to the cost of capital in the New Zealand market.

H₀: Board diversity is negatively related to the cost of capital in the Singapore market.

3.3.6 CEO Duality

CEO duality means that the same person has the CEO hat and chairperson of the board hat and non-duality implies that different people hold each position. Separating decision management (CEO) and decision control (chairman) in a firm provides checks and balances that stop the managers from engaging in opportunistic behaviour (Abor, 2007). The importance of separating the chairman and the board in some countries such as New Zealand lead them to legally ban companies from having CEO duality. In Singapore, Tan et al. (2001) found that CEO duality decreased slightly from 43 percent in 1995 to 35 percent in 1997.

In contrast, some studies argue that CEO duality can help the company work more efficiently. These companies don't have to wait for the CEO and chairman of the board to reach the same decision. In this regard, Peng et al. (2007) document a positive role for CEO duality in the Singapore market. But, some studies suggest that there is no significant relationship between CEO duality, firm performance and cost of capital. Tan et al. (2001) finds that CEO duality had no impact on companies in Singapore during 1995-1996.

Inconclusive results of prior studies on this issue and different situations of New Zealand and Singapore, guide this study to investigate the role of CEO duality on the cost of capital in these countries.

The following hypotheses are formulated in regard to CEO duality:

H₀: CEO duality is positively related to the cost of capital in the New Zealand market.

H₀: CEO duality is positively related to the cost of capital in the Singapore market.

3.3.7 CEO Tenure

Shareholders care about their firm's performance and consider that CEOs should pursue strategies that maximize stock returns. However, CEOs may be more interested in maximizing their own wealth rather than the company's wealth. So they focus on their own interests. This creates a conflict of interest between shareholders and CEOs. One of the factors affecting this behaviour of CEOs is their tenure in the company (Simsek, 2007).

Simsek (2007) indicates that the relationship between CEO tenure and firm's performance is a complex issue. Short tenured CEOs may negatively affect firm performance because these CEOs may suffer from lack of sufficient information to notice and assess strategic risks and also they are unknown and untested. Long tenured CEOs accumulate a track record; achieve more information and knowledge about the firm's environment and acquire specific skills required for the job.

Long tenured CEOs can negatively affect performance by becoming more committed to their way of working, avoiding information that questions this paradigm, losing interest in their jobs and ignoring calls for strategic changes (Hambrick, 1991). Long tenured CEOs also have enough time to build up significant human capital. Hambrick and Fukutomi (1991) argue that the commitment between CEOs and strategic paradigms increases along with increase in CEO tenure. After a couple of years, the opportunistic behaviour of the CEO

may surface and that behaviour may reduce firm performance. After a long period the CEO may lose his/her incentive to work for the maximum benefit of the firm.

Wen et al.(2002) suggests that companies which have CEOs with more background in the company have lower leverage. So the presence of these CEOs can improve the firm's performance and reduce cost of capital. The more experience the CEO has in his position, the better the firm's performance will be. Because the CEO has more experience in his career and also s/he is more familiar with the character of the firm, employees and market.

Long tenure CEOs can influence board members for a number of reasons. CEOs normally nominate new board members and through this procedure can replace those board members who less supports them. So, new board members who owe their position to CEOs are more loyal to CEOs rather than shareholders. Consequently this affect the ability of new board members to evaluate the CEO's performance effectively (Finkelstein, 1989). Another reason is that older CEOs are able to control the firms' internal information systems and withhold relevant information from compensation committees and board members and cover any poor performances (Hill, 1991).

The CEO tenure has almost the same situation in the New Zealand and Singapore markets. Average CEO Tenure in New Zealand and Singapore is six years. Inconclusive and mixed results of prior research lead this study to consider the effect of the CEO's tenure on the cost of capital in New Zealand and Singapore. The following hypotheses are formulated in regard to CEO tenure:

H₀: CEO tenure is negatively related to the cost of capital in the New Zealand market.

H_0 : CEO tenure is negatively related to the cost of capital in the Singapore market.

3.4 Data and Research Method

The following section describes the methods used to test the research hypotheses and framework which are presented above. Data collection method and measurement of the variables along with empirical models and techniques of analysing data and exploring the data are described in the following section.

3.4.1 Data

Required data for the study were collected from the NZX company research (NZX Deep Archive), Singapore Exchange Market Website (SGX), Datastream and Thompson one banker databases. Data from the top 50 publicly listed companies (this top fifty constitute the NZX 50 index) in New Zealand and the STI Constituent (the large 30 companies which constitute STI constituent) in Singapore were collected for large listed companies in New Zealand and Singapore.

The period of this study was originally from 2005 to 2010. However, lack of sufficient data in 2005 required this study to ignore 2005 in estimations. Therefore, the sampling period is five years from 2006 to 2010. Companies included in this study cover all sectors of the economy: energy, property, goods, primary services and investment.

The sample of this study includes 50 large listed companies from New Zealand and 30 large listed companies from Singapore. 400 company-year observations were made in the sample period. Fourteen companies were excluded from the sample which means 70 company-year observations. The remaining 330

company-year (82.5% of the sample) observations are included in the pool data set of this study as the representatives of large listed companies.

The exclusion of companies especially related to New Zealand companies. The small size of the New Zealand market caused some shortcomings that led to a shortage of data. The lack of every day trading in companies' shares is one of the associated problems in the New Zealand market. This leads to missed information in some companies. Eleven large listed companies out of 50 large listed companies in the New Zealand market were excluded from the sample. This means 55 company-year (13.75% of New Zealand sample) observations. The Singapore market is relatively larger than New Zealand's and consequently the exclusion of companies in this sample is less than for New Zealand. Only three companies were excluded from the Singapore market which means 15 company-year (3.75% of Singapore sample) observations.

Table 3.1: Number of Large Listed Companies' data included in this study each year

Year	2006	2007	2008	2009	2010	Total
New Zealand	39	39	39	39	39	195
Singapore	27	27	27	27	27	135

3.4.2 Variables

Dependent and independent (explanatory) variables used in this study are described in the following section.

3.4.2.1 Dependent Variables

One well-known method of calculating cost of capital is weighted average cost of capital (WACC). This method was first introduced by Modigliani and Miller (1958, 1963), and Miles and Ezzell (1980). Ross, Westerfield and Jaffe (1996) and other researchers argue that WACC is the most widely used method of calculating the cost of capital in the real world by far (Massari, 2007; Pierru, 2009). The basic definition of WACC includes the cost of capital coming from both equity and debt. This advantage makes WACC one of the fundamental concepts in corporate finance (Farber, 2006). WACC equation for a firm which is using common share (equity) and bond (debt) financing will be:

$$\text{WACC} = r = w_d r_d (1-t) + w_e r_e \quad (3.1)$$

Where, r_d represents the market rate on the firm's outstanding debt as cost of debt and r_e represents cost of equity which is frequently calculated by CAPM method. w_d is the weights of debt and w_e is the weights of equity. Debt weights in a firm with both debt and equity is (value of debt / value of debt plus value of equity). Equity weight in a firm with both debt and equity is (value of equity / value of debt plus value of equity). In this equation $w_d + w_e = 1$. So, debt and equity are the only sources of finance in this equation. In this equation t represents tax rate on corporate income. The standard treatment in WACC in order to reflect the deductibility of interest payments is $(1-t)$. By this procedure the interest cost of debt will reduce. The interest payments are not calculated in the prospective cash flows to avoid double counting the tax advantage of debt.

WACC is the discount rate which is widely used in corporate finance. A correct WACC requires proper calculation of the value of tax shields which depends on

the company's debt policy. Cooper (2006) and Farber (2006) argue that the only way to implement debt policy is maintaining a fixed market value debt ratio (Miles-Ezzell's assumption). Massari, Roncaglio and Zanetti (2007) show that WACC approach is still widely used all around the world especially in Europe, by banks and financial analysts. One of the important issues in employing WACC is the method of measuring the cost of equity. Among different methods of calculating the cost of equity, Capital Asset Pricing Models are widely employed and accepted (Chen, 2009; Da, 2012). The most important difference in Asset Pricing Models is the way each aligns with risk proxies and risk factors.

3.4.2.2 Cost of Debt

The method of calculating cost of debt is not as complicated as that for cost of equity. Cost of debt refers to the amount of money a company should pay as the cost of its debts. The cost of debt is computed as the rate on a risk-free bond. This study employs the yield to maturity of bonds in companies as the cost of capital. In case the yield to maturity was not accessible through the released information, interest paid on long-term bonds was assumed as the cost of debt. In case of inaccessible information for the above items, interest paid on long-term borrowing is captured as the cost of debt.

3.4.2.3 Cost of Equity

Different studies suggest different shortcomings in the risk proxies of the Fama-French Three Factor Model, the Momentum Model and the CAPM. To be more comprehensive, this study will employ FF3F and Momentum model. The cost of equity in these methods can be estimated through different equations as below (Chen, 2009):

$$R_i = R_f + [R_m - R_f] \beta_{im} \quad (3.2)$$

$$R_{it} - R_{ft} = \alpha_i + \beta_{iM}(R_{Mt} - R_{ft}) + \beta_{is}SMB_t + \beta_{ih}HML_t + \varepsilon_{it} \quad (3.3)$$

$$R_{it} - R_{ft} = \alpha_i + \beta_{iM}(R_{Mt} - R_{ft}) + \beta_{is}SMB_t + \beta_{ih}HML_t + \beta_{iw}WML_t + \varepsilon_{it} \quad (3.4)$$

where, R_i is the return on asset i , R_f is the risk-free rate, R_m is the return on market, $(R_m - R_f)$ is the market risk premium, SMB_t (small minus big) represents the difference between the returns of diversified portfolios of small and big shares. HML_t (high minus low) is the difference between the returns on diversified portfolios of high and low book to market ratio shares. WML_t represents the difference between the returns of diversified portfolios of winners and losers and betas are the slopes of multiple regression of $R_{it}-R_{ft}$ on $R_{Mt}-R_{ft}$, SMB_t and HML_t and WML_t .

The correct way to estimate these models is linear regression which has been used in prior studies (Chen, 2009; Da, 2012). The Ordinary Least Square (OLS) regression model is employed to estimate these models. According to the literature, one of the major problems in estimating cost of capital through OLS is violation of its primary conditions. It is argued that White coefficient covariance matrix can be used as an instrument for OLS in order to eliminate OLS's shortcomings (Garcia, 2001; Grandes, 2010).

In the first step of the estimations Unit root test and Normality test are employed to assess the primary conditions of OLS method. Results of these tests confirm that there is no unit root problem. However, normality tests indicate problems in distribution of some variables. This shortcoming is covered through employing

Generalizes Least Square (GLS) method. This is explained in the following sections.

One of the other OLS conditions which should be mentioned is absence of correlation between dependent variables. Correlation between independent variables may cause biased estimations. In order to prevent the multi-co-linearity problem, the independent variables were checked through E-views software and no significant correlations were found.

Table 3.2: Correlation of independent variables

Covariance	New Zealand companies				Singapore companies			
Correlation								
t-Statistic								
	MARKET	SMB	HML	WML	MARKET	SMB	HML	WML
MARKET	3.0325 1 -----				8.0871 1.000 -----			
SMB	-0.1437 -0.0539 -1.0299	2.3462 1 -----			0.7529 0.1023 1.9623	6.6959 1.000 -----		
HML	0.0028 0.0008 0.0170	-0.6808 -0.2448 -4.8182	3.2955 1 -----		2.0846 0.1896 3.6857	6.2079 0.6207 15.106	14.936 1.000 -----	
WML	0.0136 0.0020 0.0394	-0.3438 -0.0591 -1.1311	-0.2658 -0.0386 -0.737	14.387 1 -----	-0.6319 -0.0522 -0.9983	-5.1751 -0.4702 -10.166	-8.2885 -0.5043 -11.142	18.085 1.000 -----

Investigating high pair-wise correlation between variables is one of the famous methods to assess co-linearity. Eigenvectors and Condition number also employed to check the co-linearity. The results were consistent with pair-wise correlation test and no co-linearity was detected.

Along with these diagnostic tests, the Durbin-Watson's test was employed to assess the Auto Correlation between variables. No Auto Correlation was detected in samples from this test. Another important factor that investigated the estimations was homoskedasticity. This condition indicates the constancy of variance of residuals in estimations. If variance of residuals changes during time then the results of estimations will show bias.

Garcia and Bonomo (2001) indicate this issue in their study of the Brazil markets. As mentioned in literature, high inflation rates cause changes in the variance of residuals. According to Gujarati (1995) high inflation rates affect the value of firms and thus all aspects of firms are affected. He argues that the heteroskedasticity problem does not exist, unless the economic situation affects the market.

Heteroskedasticity of all firms was checked through different heteroskedasticity diagnostics the White test, Glejser test and Breusch-Pagan-Godfrey test. The results of these tests imply the existence of heteroskedasticity in some of the estimations. Further assessment showed that companies with relatively higher returns have heteroskedasticity problems. Different firms with different variance in their returns can cause the heteroskedasticity problem.

Berry and Feldman (1985) indicate that a combination of large and small companies that have different variance in their costs and return may cause

heteroskedasticity. The Generalized Least Square model (GLS) was employed by this study to overcome the heteroskedasticity problem. Along with the generalized least square model, a white coefficient covariance matrix was employed by this study to remove the effects of heteroskedasticity from estimations.

Another important issue in estimating the cost of capital is the number of observations required to have unbiased estimations (Jin, 2006). Prior studies suggest that it is not necessary to have a long period for estimations. Such studies document the employment of relevant information as the reason for this suggestion. Most studies used five years of monthly data although most suggest that weekly data would be more reliable than monthly data as weekly data includes more observations during the same number of years (DeJong, 1985).

Some studies have used daily data (Cosemans, 2009) but recognise that a non-synchronicity problem may arise when applying daily data because smaller firms do not trade every day (Scholes, 1977). Therefore this study will use weekly data for a period of two years which includes more than 100 observations. In the cases where less than two years of data were available, one year of daily data was used. Eviews 7.1 and Excel software were employed as the analysis software in the calculation process.

Periods of two years are required in estimating betas of cost of capital. As the period of this study is 2006 to 2010 it means that data of 2004 and 2005 are required to calculate the beta for 2006. So in fact data from a 7-year period are required. Although in the primary proposal, the six-year period of 2005 to 2010 was suggested, lack of required data to calculate beta for the year 2005 guided this study to omit year 2005 from the analysis.

Estimating cost of equity capital through CAPM, FF3F and Momentum models requires two other sources of data. These are risk free rate and market premium. Risk free rate in this study is the short term government bonds yield. This figure was extracted from PriceWaterhouseCoopers (PWC) institution database. Market Risk premium (MRP) in this study was employed according to the estimation of PriceWaterhouseCoopers on market risk premium which is based on a long term calculation. Thompson One Banker and Datastream database were employed to extract the required data such as: Market Capitalizations, Book to market ratios and share prices.

The statistical significance of these coefficients was another concern. This was tested through evaluating the explanatory power of these dependent variables. In order to statistically check the estimations, a null hypothesis for each model was tested to check whether or not exclusion of any of these factors affect FF3F and Momentum model. The Wald test, which inspects the validation of coefficient, was employed to check the validity of coefficients. The Null hypothesis of Wald test is as below:

$$H_0: \beta_{is} = \beta_{ih} = 0 \quad (3.5)$$

$$H_0: \beta_{is} = \beta_{ih} = \beta_{iw} = 0 \quad (3.6)$$

Wald hypotheses indicate whether the independent variables have explanatory power or not. Rejection of the null hypothesis implies that SMB, HML, WML or all of them are significant systematic risk factors. Therefore, the presence of these variables in pricing models is meaningful and these variables have explanatory power (related tables are attached in APPENDIX C).

Two other statistics have been employed to check the validation of coefficients along with Wald test. In comparing statistical models, the standard criteria are: coefficient of determination, R^2 and an estimate of the error variance, S^2 . However R^2 measures the capability of model to fit the data and is not prediction oriented (Myers, 1990). Valuable information can be provided by estimation of error variance (S^2) when selecting the best model for prediction. This estimation of error can be used both in assessing the suitability of fit and prediction. The model with the smallest S^2 and the largest R^2 is preferable. Another method is prediction oriented is employed in order to select the preferable model (Bello, 2008). This method is PRESS (i.e. the prediction sum of squares). The PRESS statistic is calculated as below:

$$\text{PRESS} = \sum_{i=1}^n (Y_i - \hat{Y}_{i,-i})^2 \quad (3.7)$$

where, Y_i is the response and $\hat{Y}_{i,-i}$ ($i=1, 2, \dots, n$) is the prediction. This prediction is calculated by removing the first observation, then the second, then the third, and so on. Each time of fitting the model using the remaining observations, and then estimating the first observation (i.e. $\hat{Y}_{i,-i}$), then the second observation and so on. The model with smallest PRESS statistic is preferable. Table 3.4 shows the statistical properties of asset pricing model.

Table 3.3: Statistical Properties of Asset Pricing Model (New Zealand)

Measure of goodness of fit and prediction			
	CAPM	Three Factor Model	Four Factor Model
S^2	16.368	16.224	16.220
PRESS	16.370	16.228	16.226

PRESS is calculated as defined in equation above divided by the number of data.

Table 3.4: Statistical Properties of Asset Pricing Model (Singapore)

Measure of goodness of fit and prediction			
	CAPM	Three Factor Model	Four Factor Model
S^2	24.823	24.356	23.785
PRESS	24.818	24.363	23.795

PRESS is calculated as defined in equation above divided by the number of data.

Based on the lowest S^2 and PRESS statistic in both countries, the Four Factor Model is a better model not only in suitability of fit but also in prediction capability. Although the CAPM model is still being applied by researchers (Da, 2012) and finance textbooks its shortcomings are obvious (Fama, 2004). Different researchers try to overcome these weaknesses by adding more state variables to the model to make it more realistic. Although size and BE/ME add more explanatory power to CAPM, the dominating factor in explaining the expected return is still the market factor. Thus, a comprehensive investigation is required to find out the best method of calculation that suits the sample of this study.

3.4.2.4 Explanatory Variables

Independent variables of this study are factors reported as corporate governance components by prior studies (see Table 3.6). These variables affect firm performance either positively or negatively. The variables are block ownership, insider ownership, board size, board independency, board diversity, CEO tenure and CEO duality. And the way that they are defined in this study are as follows:

As already noted block holder ownership (BOWN) as designed in this study is the proportion of shares held by the top five shareholders in a company. Required data is extracted from the annual reports of each company. NZX Company

Research data base and SGX webpage were employed to extract the annual reports as all of the required data was accessible through these reports except for Hong Kong (Land, Jardine Matheson and Jardine) and strategic companies in Singapore. These companies only report the proportion of shares held by those shareholders with 5% of shares or more. Therefore, the proportion of shares held by shareholders who held 5% or more has been considered.

In order to have a standard approach that could be applied to all firms this study considers ordinary shares held by insiders as insider ownership. As noted in previous chapter, insider ownership (IOWN) is the proportion of shares owned by directors of the board and also officers who are board members, divided by the total shares outstanding.

Non-executive/Independent Directors (NED) is the proportion of outside directors (non-executive/independent) on boards. A non-executive director (NED) or outside director is a member of the board who is not part of the executive management team. They are not an employee of the company or affiliated with the company in any other way. Outside directors are differentiated from inside directors who serve or previously served as executive managers of the company.

Board independence is an important issue in corporate governance practices but specifying what constitutes independency has its shortcomings. Some companies disclose their boards' information as dependent and independent directors while some others employed executive and non-executive definitions in their annual reports. Comparing the independence between companies seems to be a problem for empirical studies. Some prior studies employed outside directors instead of independent directors in order to differentiate independent managers from others

or just consider the difference between executive and non-executive directors (Hossain, 2001). Other studies consider independence as separation from senior management of the company (Anderson, 2004).

Despite the lack of consensus on the definition of outside or independent directors, this factor is still one of the most recommended practices of good corporate governance. Corporations should make every effort to improve their boards' effectiveness by appointing more outside directors on their boards. In order to limit the bias that may arise from inconsistent reporting of independent directors, non-executive/independent directors (NED) are employed in this study. NED represents directors who are non-executive and independent.

Board size (BDS) is the total number of directors on the board. Female director (FMD) is the number of female directors divided by total number of directors which is the percentage of female directors on boards. Separation of CEO and chairman is defined by CEO duality (DUALITY) which is one if the CEO and chairman are the one person and zero if chairman and CEO are different people. CEO tenure (TENURE) is the number of years that the CEO was in his/her position with the company. Leverage (LEV) is the total debt divided by the total equity. The proportion of debt is defined as long term and short term liabilities. The company size is the natural logarithm of total asset ($\ln(S)$) which is the proxy for the size of companies. And GDP growth rate is the growth rate of gross domestic product in each country. Anderson and Reeb (2004) also employed this proxy for measuring the firm size.

Table 3.5: Table of Variables

Variables	Measurement Technique
Dependent	
WACC	Weighted Average Cost of Capital.
Independent	
BOWN	Proportion of shares owned by top 5 shareholders.
IOWN	Proportion of shares owned by insider.
NED	Proportion of non-executive/independent directors on the board.
BDS	Total number of board's members.
FMD	Proportion of female directors on the board.
DUALITY	CEO and chairman of the board is one person.
TENURE	Total number of years that the CEO works in his/her position.
CONTORL	
LEV	Leverage = Long-term liabilities plus short-term liabilities divided by total asset.
LN(S)	Proxy for size which is the LN of total assets.
GDP Growth	Gross Domestic Product Growth

3.5 Model specification

3.5.1 Model specification for the relationship between explanatory variables and cost of capital

3.5.1.1 Insider ownership

Existing literature documents different relationships between insider ownership, firm performance and cost of capital. Some studies indicate a linear positive relationship between insider ownership and firm performance (or linear negative relationship between insider ownership and cost of capital)(Coles, 2007; Loderer, 1997). The second group of studies indicate a curvilinear relationship between insider ownership, firm performance and cost of capital (McConnell, 1990).

The third group of studies indicate a cubic relationship between insider ownership, firm performance and cost of capital (Holderness, 1999; Short, 1999). Higher insider ownership increases the firm's performance in primary levels of insider ownership (alignment of interests). When insider ownership passes a specific level of ownership, a negative relationship between insider ownership and firm performance appears (entrenchment effect). And finally at high levels of insider ownership there is a positive relationship between insider ownership and firm performance.

In order to find the correct relationship between insider ownership and cost of capital, a panel data regression model is employed. Insider ownership, its square form and its cubic form are employed as independent variables. Some control variables such as firm size and leverage are also included in this equation.

The related equation is as below:

$$WACC_{it} = \alpha_i + \beta_1(IOWN_{it}) + \beta_2(IOWN_{it})^2 + \beta_3(IOWN_{it})^3 + \beta_4(LN(S)_{it}) + \beta_5(LEV_{it}) + \beta_6(GDP\ GROWTH_t) + \varepsilon_{it} \quad (3.8)$$

where WACC represents cost of capital for firm i in year t . IOWN represents insider ownership, $(IOWN_{it})^2$ and $(IOWN_{it})^3$ represents square and cubic form of insider ownership respectively. $(LN(S)_{it})$ represents size of firm i in year t . α_i is the intercept of equation. (LEV_{it}) represents leverage of firm i in year t . $(GDP\ GROWTH_t)$ represents the gross domestic product of each country in each year and, ε_{it} is the residual of equation.

Adding the second and third degree in the equation is just to track the potential pattern between that variable and cost of capital. This approach is consistent with prior research (Griffith, 1999; Henderson, 2006; Shen, 2002; Simsek, 2007). These variables should have explanatory power in the model. So, at each stage it needs to be tested. This was done and reported in Appendix D. Signs of β_2 and β_3 indicate the shape of this equation. Negative sign of β_2 and positive sign of β_3 indicate an up/down/up graph (Figure 3.2). The Positive sign of β_2 and the negative sign of β_3 indicate a down/up/down graph (Figure 3.3). Thus, the negative sign of β_2 and positive sign of β_3 indicate a cubic graph with a maximum and a minimum respectively as shown in Figure 3.2. In an opposite situation the negative sign of β_3 and the positive sign of β_2 indicate a cubic graph with a minimum and a maximum respectively (see Figure 3.3). Values of these maximum and minimum points will be achieved through solving the related equation and examining the second derivatives.

- If $f''(x) < 0$, There is a maximum extremum.
- If $f''(x) > 0$, There is a minimum extremum.

A sample of reaching to these values presented in part 4.4.

Figure 3.2: Model specification for the relationship of IOWN and cost of capital (up/down/up)

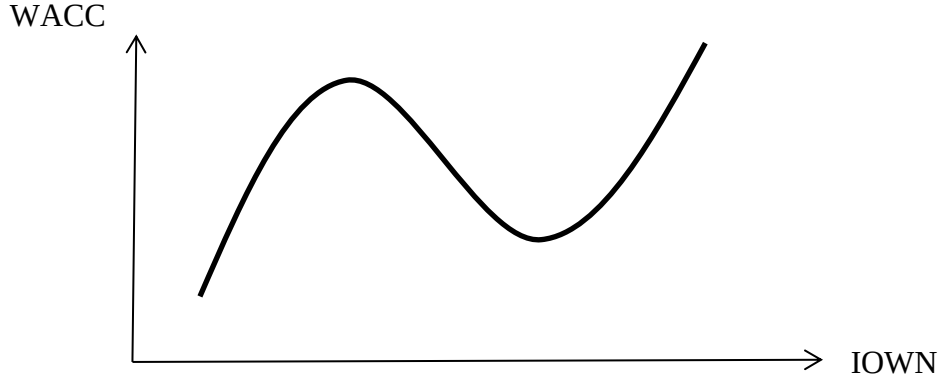
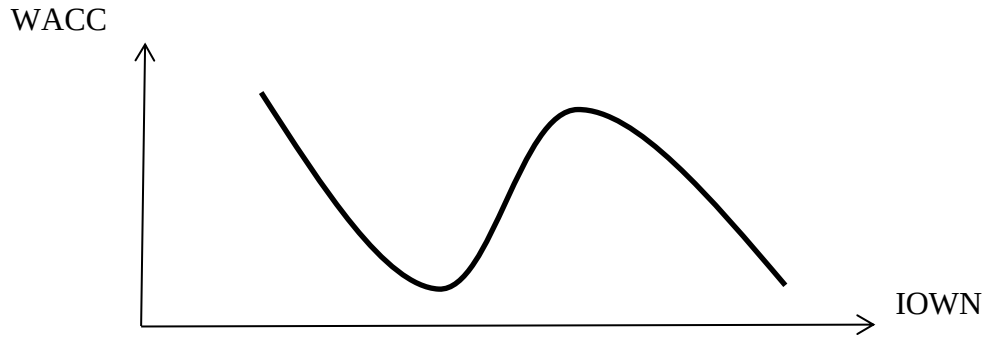


Figure 3.3: Model specification for the relationship of IOWN and cost of capital (down/up/down)

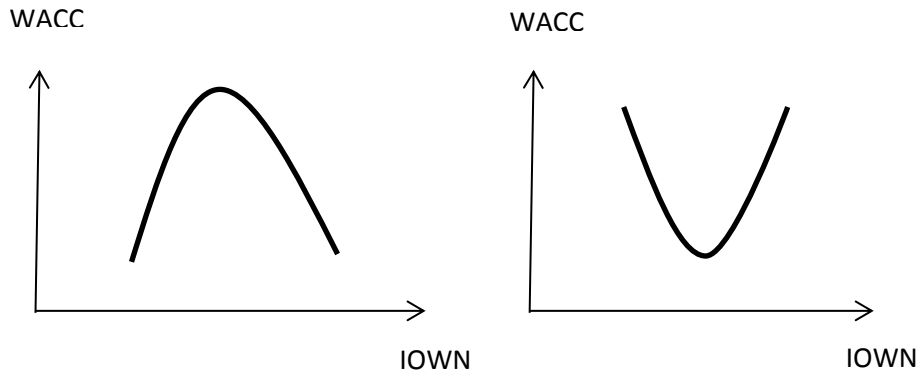


Control variables like size and leverage of the firm and GDP growth rate of economy were entered into this equation in order to track the effects of firm size and leverage on cost of capital. In a situation where cubic relationship was rejected through the above estimations, a curvilinear equation was employed in order to find a curvilinear relationship between insider ownership and cost of capital. The related equation is as below:

$$\begin{aligned} WACC_{it} = & \alpha_i + \beta_1(IOWN_{it}) + \beta_2(IOWN_{it})^2 + \beta_3(LN(S)_{it}) + \beta_4(LEV_{it}) + \\ & \beta_5(GDP\ GROWTH_t) + \varepsilon_{it} \end{aligned} \quad (3.9)$$

Negative sign of β_2 indicates a maximum point in the graph of this equation while a positive sign of β_2 documents a minimum point in the graph of this equation. Related graphs are respectively as below:

Figure 3.4: Model specification for the relationship of explanatory variable and cost of capital



3.5.1.2 Block ownership

Some prior studies indicate a cubic relationship between firm performance and block ownership (Gugler, 2004; Short, 1999). These studies believe that when block ownership is at the primary level, there is a positive relationship between block ownership and firm performance. When block ownership passes a specific level of ownership, there is a negative relationship between block ownership and firm performance, because block owners are not eager to accept the costs of interfering in the firm in order to increase the firm's performance. In high levels of block ownership, there is a positive relationship between block ownership and firm performance again. This relationship causes a cubic relation that is illustrated in the equation below:

$$WACC_{it} = \alpha_i + \beta_1(BOWN_{it}) + \beta_2(BOWN_{it})^2 + \beta_3(BOWN_{it})^3 + \beta_4(LN(S)_{it}) + \beta_5(LEV_{it}) + \beta_6(GDP\ GROWTH_t) + \varepsilon_{it} \quad (3.10)$$

where $WACC_{it}$ represents cost of capital for firm i in year t . $BOWN$ represents block ownership, $BOWN_{it}^2$ and $BOWN_{it}^3$ represent square and cubic form of block ownership respectively. $LN(S)$ represents the size of the firm i in year t and LEV_{it} represents the leverage in firm i in year t . GDP Growth represents the growth of gross domestic production of each economy. α_i is the intercept of equation and ε_{it} is the residual of equation.

Signs of β_2 and β_3 indicate the shape of the graph of this equation. Negative sign of β_2 and positive sign of β_3 indicate an up/down/up graph while positive sign of β_2 and a negative sign of β_3 document a down/up/down graph. Related graphs are shown in Figures 3.2 and 3.3 respectively.

If the cubic relationship is rejected through the estimations, a curvilinear equation will be employed in order to find a curvilinear relationship between block ownership and cost of capital. The related equation is as below:

$$WACC_{it} = \alpha_i + \beta_1(BOWN_{it}) + \beta_2(BOWN_{it})^2 + \beta_3(LN(S)_{it}) + \beta_4(LEV_{it}) + \beta_5(GDP \text{ GROWTH}_t) + \varepsilon_{it} \quad (3.11)$$

The negative sign of β_2 indicates a maximum in the graph of this equation; while positive sign of β_2 documents a minimum in the graph of this equation. The related graph is presented in Figures 3.4. The same methods of estimations as above however employed for exploring the relationship between board size, board diversity, board independence and CEO tenure with cost of capital in New Zealand and Singapore.

3.5.2 Model specification for the relationship between corporate governance and cost of capital

In this study, panel data for years 2006 to 2010 is employed through an Ordinary Least Square (OLS) and Generalized Least Square (GLS) regression technique in order to measure the effect of corporate governance mechanisms and control variables on cost of capital measured by WACC. The problem of reverse causality in governance research can be resolved by panel data estimation (Borsch-Supan, 2002). The model formulated will be as below:

$$\begin{aligned} WACC_{it} = & \alpha_i + \beta_1(BOWN_{it}) + \beta_2(IOWN_{it}) + \beta_3(NED_{it}) + \beta_4(BDS_{it}) + \beta_5(FMD_{it}) + \\ & \beta_6(DUALITY_{it}) + \beta_7(TENURE_{it}) + \beta_8(LN(S)_{it}) + \beta_9(LEV_{it}) + \beta_{10}(GDP \\ & GROWTH_t) + \varepsilon_{it} \end{aligned} \quad (3.12)$$

In order to track the type of relationship between each corporate governance component and cost of capital and also the role of corporate governance on cost of capital in New Zealand and Singapore's large listed companies, the above equations are employed for the New Zealand and Singapore market separately and the results will be reported in the following sections separately.

3.6 Check for multicollinearity, endogeneity and heteroskedasticity

Using the OLS estimation model could lead to biased results. Endogeneity and multicollinearity are two important problems that should be checked before applying the OLS. These problems are encountered when two or more variables are jointly endogenous. It means the explanatory variables are related to the residual of estimations. The Hausmann test will be employed to check for the endogeneity problem. Unit root test also conducted in this study and in case of having non-stationary in variables, cointegration test will be employed.

A multicollinearity problem arises when two or more explanatory variables are correlated with each other. High pair-wise correlation between variables is widely accepted method to assess multicollinearity. Eigenvectors and Condition number are other methods of evaluating multicollinearity which are employed here. Along with these diagnostic tests, the Durbin-Watson test is employed to assess the Auto Correlation in variables.

According to Field (2005) pair-wise correlation above 0.8 should be mentioned as a potential problem. Field's suggestion is one of the different approaches in this regard. Prior studies believed that the variance inflation factor (VIF) indicates the linear relationship between explanatory variables. Myers (1990) believes that at value of 10 this shortcoming arises while Bowman and O'Connell (1990) argue that VIF greater than 1 may result in biased estimations.

Ignorance of homoskedasticity can lead to bias in estimation. If variance of residuals changes in time then the results of estimations will be biased. Garcia and Bonomo (2001) point this out in their study of the Brazilian market. As mentioned in literature, a high inflation rate causes changes in variance of residuals, a high inflation rate affects the value of firms and thus all aspects of firms will be affected (Gujarati, 1995). White, Godfrey and Glejser tests will be employed to check for heteroskedasticity. Furthermore, in order to cover the bias in estimations that may arise because of heteroskedasticity, Generalized Least Square (GLS) model is also employed.

3.7 Summary of Chapter

The research framework and conceptual model of empirical analysis in this study have been described in this chapter along with the governance mechanisms,

sample, data and description of variables. Empirical methods of estimating the potential relationship between each corporate governance component and cost of capital were described. The Various hypotheses along with various empirical models to test them were presented. The empirical results of the relationship between corporate governance practices and cost of capital in New Zealand's large listed companies will be provided in Chapter 4.

Chapter 4 CORPORATE GOVERNANCE AND COST OF CAPITAL IN NEW ZEALAND: AN EMPIRICAL INVESTIGATION

4.0 Introduction

Results of the empirical study regarding the relationship between corporate governance mechanisms and cost of capital in large listed companies in New Zealand will be presented in this chapter. The required description of the sample size, corporate governance and cost of capital in New Zealand was provided in Chapter 3. This chapter consists of three sections which are: description of descriptive statistics of the sample, results of data analyses and conclusion.

4.1 Empirical results

4.1.1 Descriptive statistics

The sample of the New Zealand Stock Exchange companies comprised 50 large listed companies during the period 2006 to 2010. Companies that did not issue the required information were removed from the sample and a final sample of 39 companies remained. Therefore, 78% of the companies in the sample remained in estimations.

The summary of descriptive statistics for pooled data of New Zealand's large listed companies including means, medians, minimum, maximum, standard deviation, skewness, kurtosis and the number of observations is provided in Table 4.1. The mean cost of capital (WACC) is 6.54%, with a median of 6.28%. These two values indicate that the cost of capital of large listed companies in New Zealand is distributed normally around 6% to 6.5%. The mean proportion of

insider ownership (IOWN) is 8.21% and the median is 1.1% which means half of the sample's insider ownership is less than 1.1%. In this regards prior studies in the US and UK companies indicate that 58% of companies in the US and 48% of companies in the UK have an IOWN level of 5% or less (Morck, 1988; Short, 1999). Hossain et al. (2001) in their comprehensive sample of New Zealand companies (633 companies) report that mean and median of insider ownership are 6.8% and 0.6% respectively.

Table 4.1: Descriptive Statistics in New Zealand

Variables								
Dependent	Mean	Median	Maximum	Minimum	Std. Dev.	Skewness	Kurtosis	Observations
WACC	6.54	6.28	12.2	0.27	2.53	-0.04	2.62	195
Governance								
IOWN	8.21	1.1	65	0	13.79	2.21	8.11	195
BOWN	49.53	48.26	89.02	15.17	0.19	0.21	2.24	195
BDS	6.88	7	12	3	1.47	0.25	3.73	195
FMD	0.73	1	3	0	0.77	1.08	4.31	195
NED	4.8	5	8	1	1.64	-0.21	2.08	195
DUALITY	0.06	0	1	0				195
TENURE	6.39	4	32	1	6.21	2.09	7.62	195
Control								
LN(S)	13.25	13.23	15.99	8.57	1.26	-0.48	3.58	195
LEV	2.27	0.93	51.29	0.12	6.21	5.88	38.64	195
GDP Growth (%)	1.02	1.3	2.7	-2.1	1.78	-0.75	2.23	195

The mean and median of proportion of shares held by the top five shareholders (BOWN) is 49.53% and 48.26% respectively. Hossain et al. (2001) reports that the mean and median of block ownership (BOWN) in New Zealand were 76.3% and 78.3% respectively. The difference in results of this study and Hossain's study is because of different samples in the two studies and also because different methods were used to measure block ownership. Average block ownership of 76.3% during 1991/97 and 62% during 1999/2007 and 48.68% during 2006/10 indicates that block ownership in New Zealand declined during previous years.

And the figures for board size also show that the mean and median of board size in large listed companies in New Zealand are 6.88 and 7 respectively. Fox (1996) shows that board size declined in New Zealand from 7 to 6 during 1970s to 1980s. This indicates that the size of boards in large New Zealand companies is effective and boards in these companies manage to control the agency conflicts.

The mean and median of non-executive/independent directors in New Zealand are 4.8 and 5 respectively. This means that 69.76% of board members are non-executive/independent directors. So, more than two third of directors on boards are non-executive/independent. The mean and median of female directors on boards are 0.73 and 1 which means 10.61% of board members are female directors. The number of female directors ranged from 0 to 3. Although duality is limited by New Zealand authorities, some companies have duality. Mean and (median) of CEO tenure are 6.39 and 4 years respectively. This means that CEOs remain in their position almost 6 years on average.

The mean and median of company size are 13.25 and 13.23 respectively. Mean and median of Gross Domestic Product (GDP growth) in New Zealand economies

during 2006 to 2010 are 1.02 and 1.3 respectively. Mean and median of leverage are 2.27 and 0.93 respectively. These values indicate a significant employment of debt in large listed companies' financing. Therefore, a substantial proportion of cash flow is employed to service debt.

High standard deviation and difference between mean and median of some variables (especially ownership variables) indicate that the distributions of these variables are not normal. Along with high standard deviation, skewness of variables, which was reported in descriptive statistics, indicates that the distribution of variables have a tail on their right or left hand side. High kurtosis distribution reported in some variables shows that the distribution of these variables has a sharper peak and longer fat tails.

Dealing with such unbalanced data requires some consideration. Excluding outliers in the presence of fat tails may mask effective variables from consideration. In order to prevent the exclusion of such variables in fat tails, the Grubbs test has been implemented in this study. Difference between true outliers from outliers in fat tails which contain important information is detectable through comparing the Grubbs test and its critical value. Implementing this test reveals two real outliers in insider ownership variables. These variables have been corrected by reconsidering the databases. Thus, the presence of a high standard deviation beside skewness and Kurtosis distribution of data in this study does not lead to the exclusion of more data because the Grubbs test reveals the importance of data in fat tails. The non-normal distribution of the variables indicates that an ordinary least square (OLS) regression will not be appropriate. An alternative is to use a Generalized Least Square (GLS) model which will provide more robust estimates (Olsson, 2000).

4.2 Correlation between independent variables

Table 4.2 provides the correlation matrix of independent and control variables. The highest correlation is between DUALITY and LEV at 0.62. This means that companies with duality in their CEO positions tend to employ a higher amount of debt. The next high correlation is between BDS and NED correlated at 0.51 which means larger boards tend to employ more non-executive/independent directors. Other correlations range between -0.21 and 0.43. As the highest pairwise correlation between independent variables is 0.62, a low likelihood of multicollinearity was expected when applying OLS regressions.

Table 4.2: Pairwise Correlation Matrix for Independent Variables

	IOWN	BOWN	BDS	NED	FMD	DUALITY	TENURE	SIZE	LEVERAGE	GDP GROWTH
IOWN	----- -----									
BOWN	-0.055 (-0.760)	----- -----								
BDS	0.062 (0.861)	0.364*** (5.428)	----- -----							
NED	0.075 (1.038)	0.069 (0.966)	0.511*** (8.252)	----- -----						
FMD	0.154** (2.167)	0.148** (2.074)	0.230*** (3.288)	0.170** (2.393)	----- -----					
DUALITY	0.102 (1.423)	-0.085 (-1.182)	0.157** (2.208)	0.153** (2.145)	0.029 (0.399)	----- -----				
TENURE	0.352*** (5.225)	-0.210*** (-2.986)	-0.031 (-0.429)	-0.068 (-0.952)	0.063 (0.882)	0.433*** (6.676)	----- -----			
SIZE	-0.303*** (-4.419)	0.484*** (7.691)	0.322*** (4.732)	0.251*** (3.609)	0.138* (1.941)	-0.063 (-0.877)	-0.216*** (-3.073)	----- -----		
LEV	-0.109 (-1.522)	-0.060 (-0.832)	0.171** (2.412)	0.270*** (3.899)	0.262*** (3.776)	0.619*** (10.963)	-0.104 (-1.450)	-0.017 (-0.238)	----- -----	
GDP GROWTH	-0.022 (-0.310)	0.021 (0.290)	-0.020 (-0.272)	-0.062 (-0.861)	-0.030 (-0.421)	0.021 (0.293)	0.007 (0.103)	0.042 (0.581)	0.024 (0.335)	----- -----

***denotes correlation is significant at 0.01 level (2-tailed); **denotes correlation is significant at 0.05 level (2-tailed); *denotes correlation is significant at 0.1 level (2-tailed)

The following sections will present the relationship between corporate governance factors and cost of capital.

4.3 OLS Regression of WACC on Corporate Governance Variables

Table 4.3 presents the OLS and GLS (generalized least square) regression results of the equation regarding the relationship between cost of capital and corporate governance mechanisms. Table 4.3 provides coefficients of independent variables employed to illustrate WACC behaviour. The GLS method is employed in order to take into account the possibility of cross-section heterogeneity.

Through the OLS estimation method, the independent variables IOWN, BOWN, FMD, NED, LN(S), LEV and GDP growth have negative coefficients which mean that they negatively affect the cost of capital. Among these variables, IOWN and LEV are statistically significant at 5% and 1% level respectively. This means that higher levels of insider ownership negatively affect the cost of capital in companies. Thus, the presence of insider ownership in New Zealand's companies decreases the cost of capital and helps companies to perform better. A negative sign of the relationship between leverage and cost of capital indicates that companies which employ more debt to equity in their financing have a lower cost of capital.

Although the coefficient of BOWN (Block Ownership), NED (non-executive/independent directors) and FMD (female directors) are statistically insignificant, the negative sign of BOWN indicates that block owners positively affect companies' performance by decreasing the cost of capital. The negative signs of non-executive/independent directors and female directors' coefficients indicate the important positive role of these directors in companies.

The outputs of the OLS method indicate positive coefficients for BDS, Duality and Tenure. Positive and statistically significant coefficients of CEO duality and CEO tenure show that appointing the same person as CEO and chairman increases the cost of capital while a longer tenured CEO increases the cost of capital.

Slightly different results are tracked through the GLS method. Almost all of the coefficients are statistically meaningful at 1% and 5% levels. IOWN has a statistically significant and negative relationship with cost of capital at 0.01% level. Entrenchment and the expropriation effect of insiders at the present level of insider ownership could be the reason for this negative relationship. This will be discussed in the next section of this chapter.

The results of this study document a negative relationship between NED and cost of capital which is statistically significant at 10% level. This means that the presence of more non-executive/independent directors negatively affect the cost of capital. There is a statistically insignificant and negative relationship between FMD and LN(S) and cost of capital.

GLS method documents a statistically significant and positive relationship between GDP growth and cost of capital. There is a negative and statistically significant relationship between leverage and cost of capital in the GLS method which is the same as the OLS method. BOWN, BDS, Duality and Tenure positively affect the cost of capital. Although the coefficients of block ownership and board size are positive, they are statistically insignificant. Longer tenured CEOs increase the cost of capital because the coefficient is positive.

This finding is in line with literature that states larger boards negatively affect firm performance. The positive role of CEO duality indicates that the presence of

the same person in the CEO and chairman post on the board leads to an increase in cost of capital. Although CEO duality is legally prohibited by New Zealand authorities, presence of duality in some companies documents the negative role of CEO duality by increasing the cost of capital.

Table 4.3: OLS and GLS Regression of WACC on Corporate Governance and Control Variables

	OLS	GLS
	WACC	WACC
Variables	Coefficient	Coefficient
Const.	7.30*** (5.90)	7.91*** (5.23)
IOWN	-1.62** (-2.18)	-1.83** (-2.07)
BOWN	-0.06 (0.12)	0.12 (0.58)
BDS	0.19 (0.99)	0.22 (1.21)
FMD	-0.03 (-0.17)	-0.04 (-0.23)
NED	-0.13 (-1.14)	-0.13* (-2.13)
DUALITY	1.68*** (4.41)	1.50*** (5.25)
TENURE	0.04*** (3.57)	0.05*** (4.15)
LN(S)	-0.08 (-1.08)	-0.17 (-1.34)
LEV	-0.24*** (-6.24)	-0.23*** (-6.45)
GDP GROWTH	-0.02 (-1.42)	0.05* (2.11)
F	7.78 (0.00)	8.18 (0.00)
Adjusted R²	0.26	0.27
N	195	195

***denotes correlation is significant at 0.01 level (2-tailed); **denotes correlation is significant at 0.05 level (2-tailed); * denotes correlation is significant at 0.1 level (2-tailed). Standard errors are also provided for each variable.

Based on Table 4.3 there is a significant negative relationship between insider ownership and cost of capital. This means higher insider ownership leads to lower

cost of capital which is consistent with Hossain et al. (2001) study in New Zealand. This estimation find no significant relationship between block ownership and cost of capital which is inconsistent with the prior studies that find significant role for block ownership (Gugler, 2004). No significant relationship was found between board size and board diversity with cost of capital. These findings are inconsistent with prior studies in New Zealand (Reddy, 2008a). That could happen because of different samples between these two studies. Based on table above, there is a significant negative relationship between outside directors and cost of capital. This positive role of outside directors is in line with prior studies in New Zealand (Prevost, 2002b). Table above indicate significant and positive relationship between CEO duality and CEO tenure and cost of capital. This is in line with prior studies (Hambrick, 1991; Millstein, 1992). Based on above table there is no significant relationship between company size and cost of capital but leverage in companies has significant and negative role on cost of capital. This means employing more debt in New Zealand companies leads to lower cost of capital. Findings of this estimation also suggest that DGP growth has significant and positive role on cost of capital.

In the results table the adjusted R^2 reported rather than R^2 . This is because the use of an adjusted R^2 is an attempt to take account of the phenomenon of the R^2 automatically and spuriously increasing when extra explanatory variables are added to the model. It is a modification of R^2 that adjusts for the number of explanatory terms in a model relative to the number of data points.

The relationship between each of these explanatory variables and cost of capital is assessed in detail in the following sections. Some of these variables have a square or cubic relationship with cost of capital. The exact relationship between these

explanatory variables and cost of capital is assessed through different equations and estimation models. The role of these variables will be clarified in the following sections.

4.3.1 Robustness test

Unit root test were checked and no significant issue was detected (Appendix E). The endogeneity of independent variables were checked through the Hausman Test and no significant figure was found. The results are reported in Table 4.4 below. These tables (e.g. Table4.4) are just the outcomes of Eviews 7.1 software. These tables are not the outcomes of regressions. They are the outcomes of Hausmann test.

Unit root test added as Appendix E. These tables not only include the ordinary tests such as: ADF and pp test but also include: Levin, Lin and Chun test and Im, Pesaran and Shin W-statistic tests which are for panel data.

Table 4.4: Hausman test results for endogeneity

Variable	Fixed	Random	Prob.
IOWN	-1.92	-1.82	0.98
BOWN	4.01	1.00	0.10
BDS	-0.14	0.06	0.30
NED	0.12	-0.03	0.49
FMD	0.99	0.44	0.13
DUALITY	2.28	3.08	0.65
TENURE	-0.01	-0.00	0.92
LN(S)	-0.04	-0.18	0.58
LEV	-0.34	-0.30	0.47
GDP GROWTH	-0.01	-0.01	0.91

Similar coefficients in the fixed effect model and the random effect model imply that these variables are not subject to endogeneity. The Null hypothesis in

Hausman test in Eviews is that the estimated coefficients will remain unchanged by moving from fixed effect model to random effect model. Acceptance of this null hypothesis indicates there is no endogeneity issue in variables. The presence of endogeneity is checked by tracking the probabilities reported in Table 4.4, 4.6 and etc. When the probabilities are more than 0.1, there is no endogeneity issue at the 10% significance level. The generalized least square method which is robust to heteroskedasticity and not normally distributed data is employed in this study.

4.4 OLS Regression of WACC on Insider Ownership (IOWN) to find the pattern of their relationship

The results of estimating the relationship between insider ownership and cost of capital are reported in Table 4.5. In order to track the pattern of this relationship, square and cubic formats of insider ownership are entered into the equation. The equation is employed to track this relationship is:

$$\begin{aligned} WACC_{it} = & \alpha_i + \beta_1(IOWN_{it}) + \beta_2(IOWN_{it})^2 + \beta_3(IOWN_{it})^3 + \beta_4(LN(S)_{it}) + \\ & \beta_5(LEV_{it}) + \beta_6(GDP\ GROWTH_t) + \varepsilon_{it} \end{aligned} \quad (4.1)$$

As mentioned in the previous chapter, signs of $IOWN$, $(IOWN_{it})^2$ and $(IOWN_{it})^3$ reveal the pattern of relationship between $IOWN$ and $WACC$. The coefficients of $IOWN$, its square and cubic versions are statistically significant at 0.01% level in both OLS and GLS method. The statistically significant and positive sign of the coefficients of $IOWN$ and $IONW^3$ and the negative sign of $IOWN^2$ indicate a cubic pattern of relationship between $IOWN$ and $WACC$ which is an up/down/up relationship.

Table 4.5: OLS and GLS Regression of WACC on IOWN

	OLS	GLS
	WACC	WACC
Variables	Coefficient	Coefficient
C	5.59*** (-5.64)	4.31*** (-3.82)
IOWN	21.34*** (-4.17)	26.8*** (-11.51)
IOWN²	-102.12*** (-4.46)	-128.38*** (-23.55)
IOWN³	106.71*** (-4.21)	135.61*** (-14.04)
LN(S)	0.08 (-1.2)	0.15* (-1.94)
LEV	-0.19*** (-8.86)	-0.17*** (-9.15)
GDP GROWTH	-0.0005 (-0.02)	0.07 -1.38
F	11.76*** (0.00)	16.64*** (0.00)
Adjusted R²	0.25	0.33
N	195	195

***denotes correlation is significant at 0.01 level (2-tailed); **denotes correlation is significant at 0.05 level (2-tailed); * denotes correlation is significant at 0.1 level (2-tailed). Standard errors are also provided for each variable.

The coefficients of IOWN indicate the levels of insider ownership where the pattern line changes direction. Although the coefficients of two different methods were slightly different, the limits they revealed were almost the same.

Related equation to reach maximum and minimum points is as below:

$$WACC_{it} = \alpha_i + 26.8 (IOWN_{it}) - 128.38(IOWN_{it})^2 + 135.61 (IOWN_{it})^3 + 0.15 (LN(S)_{it}) - 0.17 (LEV_{it}) + 0.07(GDP\ GROWTH\ _t)$$

The first derivative will be:

$$WACC' = 26.8 - 128.38*2 (IOWN) + 135.61*3 (IOWN)^2$$

Roots of this equation are the maximum and minimum of primary equation. These roots will be calculated as below:

The roots (zeroes) of the quadratic function:

$$f(x) = ax^2 + bx + c$$

When the coefficients a , b , and c , are real or complex, the roots are

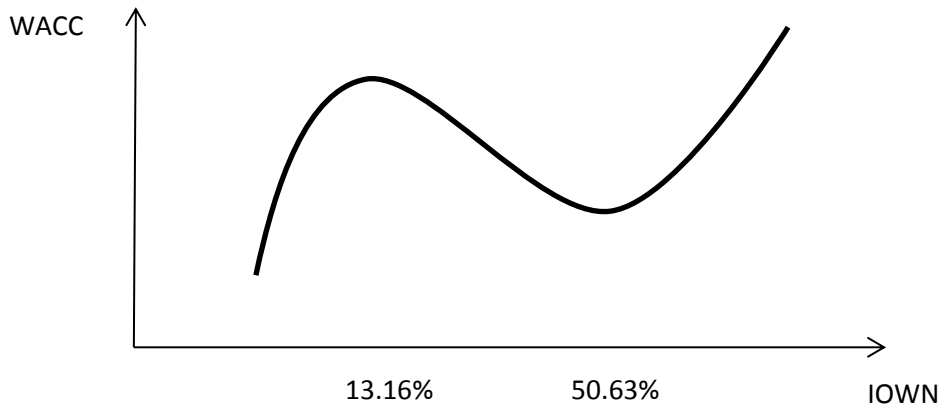
$$x = \frac{-b \pm \sqrt{\Delta}}{2a},$$

where the discriminant is defined as

$$\Delta = b^2 - 4ac.$$

According to these estimations these two values are 13.16% and 50.63%. Therefore, an increase in IOWN up to 13.16% positively affects the cost of capital. After 13.16% and up to 50.63% of IOWN there is negative relationship between IOWN and cost of capital. After 50.63% of insider ownership there is a positive relationship between IOWN and WACC. The exact relationship between these variables is illustrated in the Figure 4.1 below:

Figure 4.1: IOWN and WACC Pattern



The

This figure indicates that when IOWN is less than 13.16% there is a positive relationship between IOWN and WACC. According to agency theory, opportunistic behaviour of insiders may cause this relationship.

4.4.1 Robustness test

The unit root of variables were checked and no significant issue was detected. In order to ensure that the results were not affected by the negative effects of heteroskedasticity white cross-section and diagonal standard errors & covariance method robust to heteroskedasticity was employed in this estimation. Generalized Least Square Method, robust to heteroskedasticity, and abnormally distributed data was also employed in this study. Endogeneity was checked through the Hausman test with no significant amount detected. The results are reported in Table 4.6 below:

Table 4.6: Hausman test results for endogeneity

Variable	Fixed	Random	Prob.
IOWN	-13.771	9.938	0.15
IOWN²	138.735	-46.875	0.17
IOWN³	-308.038	46.064	0.22
LN(S)	-0.215	-0.037	0.68
LEV	-0.33	-0.231	0.39
GDP GROWTH	0.015	-0.001	0.39

As described in Table 4.6, the acceptance of null hypothesis indicates the rejection of the endogeneity problem. The Null hypothesis suggests the similar coefficients in two different fixed and random effects models.

4.5 OLS Regression of WACC on Block Ownership (BOWN) to find the pattern of their relationship

Table 4.7 documents the outcomes of OLS and GLS methods. In order to find the pattern of the relationship between BOWN and WACC, square and cubic forms of BOWN has been entered into the equation below. The equation employed to track this relationship is:

$$WACC_{it} = \alpha_i + \beta_1(BOWN_{it}) + \beta_2(BOWN_{it})^2 + \beta_3(BOWN_{it})^3 + \beta_4(LN(S)_{it}) + \beta_5(LEV_{it}) + \beta_6(GDP\ GROWTH_t) + \varepsilon_{it} \quad (4.2)$$

Signs of BOWN, BOWN² and BOWN³ indicate the pattern of relationship between BOWN and WACC. If the signs of BOWN and BOWN³ are negative and the sign of BOWN² is positive, it means that this relationship is a down/up/down relationship. If the signs of BOWN and BOWN³ are positive and sign of BOWN² is negative it means there is an up/down/up relationship. In the case of statistically non meaningful coefficients for BOWN² and BOWN³, the cubic version of

BOWN will be removed from the model and another model estimated without cubic version in order to track a square pattern. In the case of statistically non meaningful coefficient for $BOWN^2$, the square version of BOWN will be removed from the model and a new model will be estimated in order to track a linear pattern.

The results of employing OLS and GLS methods in estimating the above-mentioned equation indicate statistically significant and negative coefficients for BOWN and $BOWN^3$ and a statistically significant and positive coefficient for $BOWN^2$. The coefficient of BOWN is statistically significant at the 5% level while other coefficients are significant at the 1% level. The outcomes of OLS method indicate a statistically significant and negative coefficient for leverage. The results of the OLS and the GLS are different in some parts.

First, the coefficient of LN(S), firm size, is statistically significant in the GLS method while it is not significant in the OLS method. Coefficient of BOWN is statistically significant at the 1% level in the GLS method while statistically significant at the 5% level in the OLS method. The GLS method reveals a higher R^2 which is 0.45 rather than 0.29 in the OLS method.

The signs of BOWN, $BOWN^2$ and $BOWN^3$ document a cubic pattern between block ownership and cost of capital. The negative signs of BOWN and $BOWN^3$ and the positive sign of $BOWN^2$ indicate a down/up/down pattern between block ownership and cost of capital. Critical values where the direction of this relationship changes will be calculated by the existing coefficients. As the coefficients of OLS and GLS are slightly different, they would be expected to have slightly different critical values. According to OLS coefficients, the critical

values of block ownership and cost of capital are 32.42% and 66.14%, respectively. These values, according to GLS, are 31.19% and 67.00%, respectively.

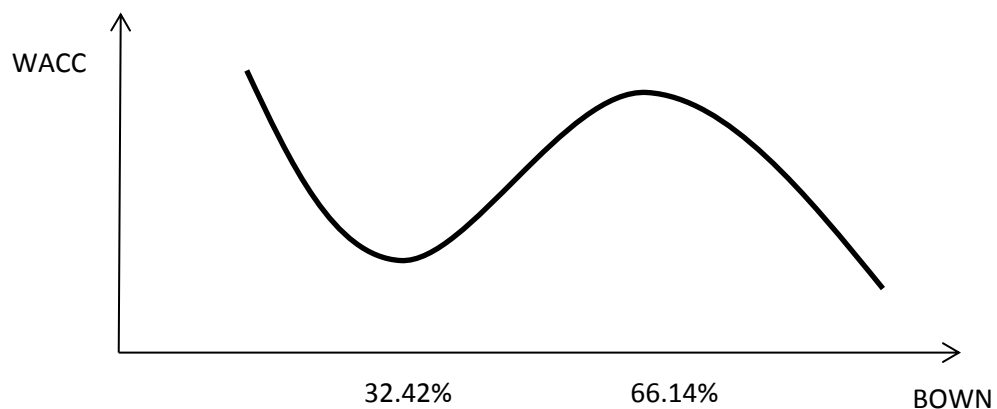
Table 4.7: OLS and GLS Regression of WACC on BOWN

	OLS	GLS
	WACC	WACC
Variable	Coefficient	Coefficient
C	13.609*** (4.34)	16.406*** (7.02)
BOWN	-41.357** (-2.58)	-57.242*** (-4.64)
BOWN²	95.040*** (2.88)	134.449*** (5.39)
BOWN³	-64.287*** (-3.11)	-91.277*** (-5.93)
LN(S)	-0.113 (-0.79)	-0.213** (-2.11)
LEV	-0.195*** (-7.67)	-0.183*** (-8.58)
GDP GROWTH	-0.029 (-0.33)	0.019 (0.31)
F	12.985*** (0.00)	25.355*** (0.00)
Adjusted R²	0.27	0.43
N	195	195

***denotes correlation is significant at 0.01 level (2-tailed); **denotes correlation is significant at 0.05 level (2-tailed); * denotes correlation is significant at 0.1 level (2-tailed). Standard errors are also provided for each variable.

According to the OLS estimation method, the cost of capital decreases when block ownership is less than 32.42%. When block ownership is more than 32.42% and less than 66.14%, the cost of capital increases. When block ownership is more than 66.14%, cost of capital decreases again. Based on the agency theory, block owners' interests and company interests align in the primary levels of block ownership. Thus, while block ownership is less than 32.42%, block owners are concerned about the company's performance and do their best to improve it. This behaviour persists till block owners own more than 32.42%. After this level of ownership, expropriation effect negatively affects block owners' behaviour and block owners put their efforts on opportunistic behaviour and expropriating the company's wealth. The pattern of this relationship and critical values are reflected in the Figure 4.2 below:

Figure 4.2: BOWN and WACC Pattern



This attitude of block holders persists in a company until their percentage of ownership reaches 66.14%. Therefore, a positive relationship exists between block holders and cost of capital between the range of 32.42% and 66.14% of block ownership. This attitude of block holders changes when they own more than 66.14% of the company.

Based on the agency theory, when block holders own 66.14% of ownership they start to have concerns about the company's performance again. At this level of ownership, block owners feel that their interests are tied to the company's wealth. Thus, there is a negative relationship between block owners and cost of capital when block owners own 66.14% or more.

4.5.1 Robustness test

Unit root test was checked and no significant issues were detected. In order to prevent the negative effects of the heteroskedasticity problem when applying OLS, white cross-section standard errors and covariance method robust to heteroskedasticity were employed. The Generalized Least Square Method which is robust to heteroskedasticity and abnormally distributed data was also employed. Endogeneity was checked through the Hausman test and no significant value was detected. The results are reported in Table 4.8 below:

Table 4.8: Hausman test results for endogeneity

Variable	Fixed	Random	Prob.
BOWN	-32.79	-32.4663	0.98
BOWN²	91.68554	80.95667	0.83
BOWN³	-70.6271	-57.6751	0.75
LNS	0.040186	-0.08634	0.6
LEV	-0.32533	-0.22999	0.1
GDP GROWTH	-0.01922	-0.02383	0.73

The probabilities in this test indicate the acceptance of a null hypothesis which implies there is no endogeneity problem in these variables.

4.6 OLS Regression of WACC on Board Size (BDS) to find the pattern of their relationship

A unique equation that contains board size variables and some control variables is employed in order to investigate the pattern and direction of the relationship between board size and cost of capital in New Zealand companies. As used earlier for investigating the role of ownership structure on cost of capital, square or cubic relationship of board size on cost of capital will be explored by entering square and cubic forms of board size into the equation. The possibility of cubic relationship between board size and firm performance has been indicated in prior studies (mentioned in chapter 2). In case the cubic relationship is rejected, an alternative scenario will explore the possibility of a square relationship between board size and cost of capital. If the square relationship coefficients are insignificant, the possibility of a linear relationship will be examined. The related equation will be:

$$\begin{aligned} WACC_{it} = & \alpha_i + \beta_1(BDS_{it}) + \beta_2(BDS_{it})^2 + \beta_3(BDS_{it})^3 + \beta_4(LN(S)_{it}) + \beta_5(LEV_{it}) + \\ & \beta_6(GDP\ GORWTH_t) + \varepsilon_{it} \end{aligned} \quad (4.3)$$

As informed in previous sections regarding relationship between ownership structure and cost of capital; signs of BDS , BDS^2 and BDS^3 indicate the pattern between board size and coats of capital. Larger boards are more easily controlled by the CEO and these boards bring more skill to the company. The conflicting effects of board size on cost of capital indicate the presence of one or two changes in pattern between board size and cost of capital. There is a cubic up/down/up relationship when coefficients of BDS and BDS^3 are positive and coefficient of BDS^2 is negative. This cubic relationship will be down/up/down when the

coefficients of BDS and BDS³ are negative and coefficient of BDS² is positive. The results of exploring the pattern between board size and cost of capital through two different, OLS and GLS, methods are reported in table 4.9.

Table 4.9: OLS and GLS Regression of WACC on BDS (Cubic Relationship)

	OLS	GLS
	WACC	WACC
Variables	Coefficient	Coefficient
C	0.085 (0.01)	1.974 (0.39)
BDS	3.107 (1.07)	(2.492) (1.12)
BDS²	-0.333 (-0.81)	(-0.256) (-0.8)
BDS³	0.011 (0.59)	0.008 (0.57)
LN(S)	-0.153 (-1.13)	-0.209* (-1.74)
LEV	-0.206*** (-7.9)	-0.194*** (-8.63)
GDP GROWTH	-0.004 (-0.05)	0.072 (1.02)
F	11.457*** (0.00)	13.650*** (0.00)
Adjusted R²	0.25	0.28
N	195	195

***denotes correlation is significant at 0.01 level (2-tailed); **denotes correlation is significant at 0.05 level (2-tailed); * denotes correlation is significant at 0.1 level (2-tailed). Standard errors are also provided for each variable.

None of the coefficients of BDS, BDS² and BDS³ are statistically significant as shown in Table 4.9. The results of employing OLS and GLS methods indicate a negative relationship between leverage and cost of capital. Firm size is also statistically significant in the GLS method at the 10% level. Along with

statistically insignificant coefficients, endogeneity problem exists in independent variables. Therefore, the alternative scenario, that is, assessing the square relationship will be explored. The related equation for square relationship is:

$$WACC_{it} = \alpha_i + \beta_1(BDS_{it}) + \beta_2(BDS_{it})^2 + \beta_3(LN(S)_{it}) + \beta_4(LEV_{it}) + \beta_5(GDP \text{ GROWTH}_t) + \varepsilon_{it} \quad (4.4)$$

There is an up/down relationship when coefficient of BDS^2 is negative and a down/up relationship when the coefficient of BDS^2 is positive. Results of assessing square relationship through OLS and GLS methods are reported in Table 4.10 below:

Table 4.10: OLS and GLS Regression of WACC on BDS (Square Relationship)

	OLS	GLS
	WACC	WACC
Variable	Coefficient	Coefficient
C	3.776 (1.48)	4.801** (2.41)
BDS	1.431** (2.17)	1.21** (2.37)
BDS²	-0.091** (-2.01)	-0.07* (-1.95)
LN(S)	(-0.157) (-1.16)	-0.213* (-1.77)
LEV	-0.209*** (-8.09)	-0.197*** (-8.80)
GDP GROWTH	-0.0004 (-0.004)	0.075 (1.07)
F	13.725*** (0.00)	16.355*** (0.00)
Adjusted R²	0.25	0.30
N	195	195

***denotes correlation is significant at 0.01 level (2-tailed); **denotes correlation is significant at 0.05 level (2-tailed); * denotes correlation is significant at 0.1 level (2-tailed). Standard errors are also provided for each variable.

OLS and GLS methods were employed in order to check the presence of a square relationship between board size and cost of capital. Statistically significant coefficients were documented based on these estimations. These estimations support the presence of a square relationship between board size and cost of capital. The pattern of this relationship is up/down. Coefficients of this estimation are statistically significant at the 5% level and 10% level. The negative sign of BDS^2 indicates an inverse U-shape relationship between board size and cost of capital. According to the coefficients of OLS and GLS, the critical value where the direction of this pattern changes is 8.

This means that boards of directors positively affect cost of capital when the number of directors is less than 8. There is a negative relationship between the number of directors and cost of capital when boards of directors include 8 or more members. The pattern of relationship between the number of directors on the board and cost of capital is shown in Figure 4.3 below:

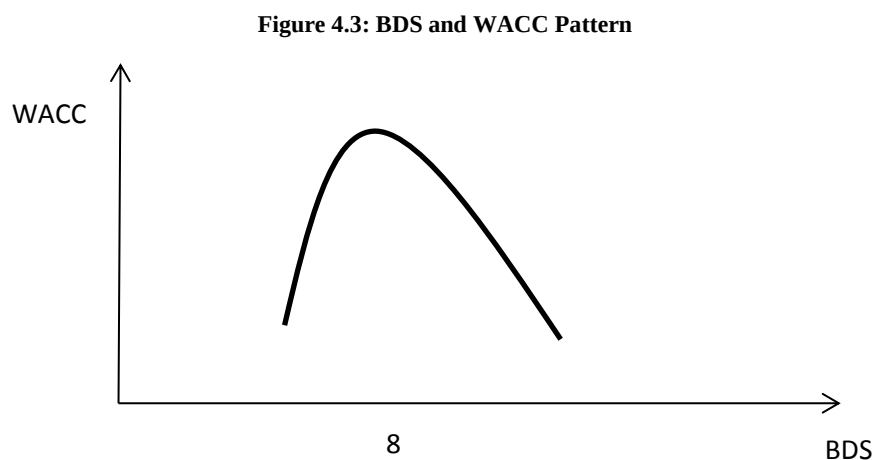


Figure 4.3 is based on the values in Table 4.10. Figure 4.3 indicates that while the number of directors is less than 8 there is a positive relationship between cost of capital and number of directors. So, small boards negatively affect company performance.

4.6.1 Robustness test

Unit root test was checked and no significant issue was detected. In order to prevent the negative effects of heteroskedasticity, white cross-section standard errors and covariance method that is robust to heteroskedasticity were employed. The Generalized least square method robust to heteroskedasticity and abnormally distributed data was employed. Endogeneity was checked and no significant value detected. The results are presented in the Table 4.11 below:

Table 4.11: Hausman test results for endogeneity

Variable	Fixed	Random	Prob.
BDS	0.005	0.661	0.2
BDS²	0.001	-0.039	0.22
LN(S)	-0.087	-0.136	0.85
LEV	-0.333	-0.237	0.1
GDP GROWTH	0.001	-0.001	0.71

In Table 4.11 the values of probabilities are above the 10% level which indicates the acceptance of null hypothesis. This means that the estimations of model are not biased because of endogeneity problems. The coefficients of explanatory variables in fixed and random models are similar. Thus, Hausman test documents no endogeneity problem.

4.7 OLS Regression of WACC on Non-Executive Directors (NED) to find the pattern of their relationship

Non-executive independent directors play an important role in monitoring and controlling managers and companies. Therefore, the pattern and direction of the relationship between non-executive directors (NED) and cost of capital (WACC) are interesting issues for academics and practitioners. Finding the pattern between NED and WACC requires the specific equation presented below. According to prior studies, in the first step, the presence of a cubic relationship between the number of non-executive/independent directors and cost of capital should be assessed. In case of the rejection of a cubic relationship, assessing square and linear relationships is the alternative scenario.

$$WACC_{it} = \alpha_i + \beta_1(NED_{it}) + \beta_2(NED_{it})^2 + \beta_3(NED_{it})^3 + \beta_4(LN(S)_{it}) + \beta_5(LEV_{it}) + \beta_6(GDP\ GROWTH_t) + \varepsilon_{it} \quad (4.5)$$

Results of estimating the above equation through OLS and GLS method are reported in Table 4.12. Investigating the pattern between non-executive/independent directors and cost of capital documents a cube pattern. As mentioned in previous sections of this chapter, signs of NED , NED^2 and NED^3 indicate whether the pattern is up/down/up or down/up/down.

Signs of coefficients in Table 4.12 show an up/down/up relationship between NED and WACC. Thus, at the primary level of non-executive/independent directors' presence on boards, there is a positive relationship between NED and WACC. This positive relationship indicates the negative role of outside directors on company performance. When the presence of non-executive/independent directors is more than a specific level, there is a negative relationship between

NED and WACC. This negative relationship exists while the number of non-executive/independent directors is increasing. But, when the number of non-executive/independent is too large, there is a positive relationship between NED and WACC again.

Table 4.12: OLS and GLS Regression of WACC on NED

	OLS	GLS
	WACC	WACC
Variable	Coefficient	Coefficient
C	3.198 (1.04)	0.681 (0.26)
NED	3.757* (1.88)	6.06*** (3.77)
NED²	-0.854* (-1.91)	-1.431*** (-4.07)
NED³	0.058* (1.87)	0.102*** (4.21)
LN(S)	-0.071 (-0.53)	-0.1 (-1.02)
LEV	-0.2*** (-7.18)	-0.194*** (-8.42)
GDP GROWTH	-0.013 (-0.14)	0.05 (0.76)
F	11.164*** (0.00)	16.597*** (0.00)
Adjusted R²	0.24	0.33
N	195	195

***denotes correlation is significant at 0.01 level (2-tailed); **denotes correlation is significant at 0.05 level (2-tailed); * denotes correlation is significant at 0.1 level (2-tailed). Standard errors are also provided for each variable.

OLS coefficients are statistically significant at the 10% level and the GLS coefficients are statistically significant at the 1% level. R-squares of these estimations are different. The R-square in the OLS method is 0.26 and the R-

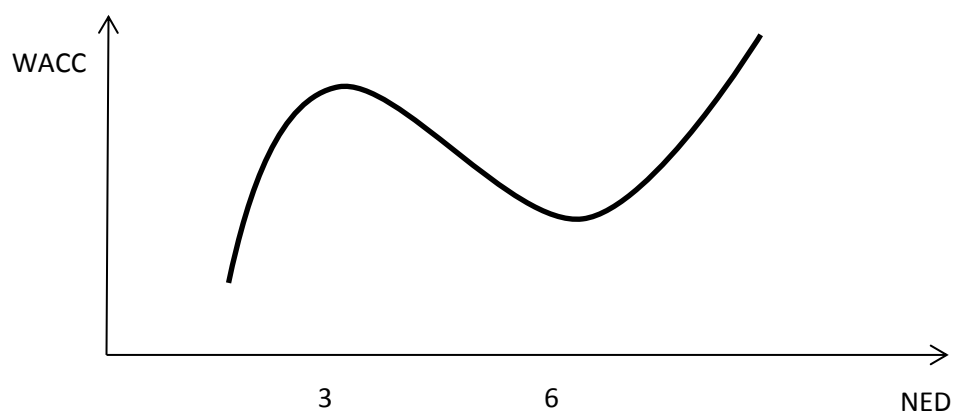
square of GLS is 0.35. Coefficients in Table 4.12 indicate the critical values where the direction of pattern between NED and WACC changes.

Table 4.12 shows that while the number of non-executive/independent directors is less than three, there is a positive relationship between NED and WACC. This means that presence of one or two non-executive/independent directors on boards will positively affect and increase the cost of capital.

On the other hand, the presence of three or more non-executive/independent directors on boards will negatively affect the cost of capital. This means that the presence of three or more non-executive independent directors positively affect firm performance by diminishing the cost of capital. However positive role of non-executive/independent directors does not continue forever.

Based on the findings of this study, the positive role of non-executive/independent directors ceases when the number of non-executive/independent directors exceeds 8 in the OLS method and 6 in the GLS method. The different limits of the NED are due to different coefficients for NEDs in OLS and GLS. The pattern between NED and WACC is presented in Figure 4.4 below:

Figure 4.4: NED and WACC Pattern



It is evident that the presence of non-executive/independent directors on boards brings more control and monitoring to companies. This type of director also brings a wider pool of expertise and skills that positively affect companies by decreasing the cost of capital. However the positive roles of non-executive/independent directors exist only if their presence is acknowledged and the boards are not dominated by them.

4.7.1 Robustness test

Unit root test was checked and no significant issue detected. In order to prevent the negative effects of heteroskedasticity when applying OLS, white diagonal standard errors and covariance method, which is robust to heteroskedasticity, was employed. The Generalized Least Square Method which is robust to heteroskedasticity and abnormally distributed data was employed. Endogeneity was checked through the Hausman test and no significant value detected. The results are reported in the Table 4.13 below:

Table 4.13: Hausman test results for endogeneity

Variable	Fixed	Random	Prob.
NED	-0.27165	1.150721	0.27
NED²	-0.03831	-0.31007	0.28
NED³	0.008861	0.024555	0.32
LN(S)	-0.10233	-0.09486	0.98
LEV	-0.34628	-0.24207	0.1
GDP GROWTH	0.010961	-0.00156	0.3

In Table 4.13 the values of probabilities are above the 10% level which indicates the acceptance of null hypothesis. This means that the estimations of model are

not biased because of endogeneity problems. The Coefficients of explanatory variables in fixed and random models are similar. Thus, the Hausman test documents no endogeneity problem.

4.8 OLS Regression of WACC on Number of Female Directors (FMD)

to find the pattern of their relationship

The role of female directors in companies is an important issue needing more investigation. Prior research reveals that appointing more female directors increases the monitoring and controlling power of boards (Adams, 2009). Therefore, a linear positive relationship would be expected between female directors and company performance. The existence of cube pattern between female directors and cost of capital will be assessed. In case of rejecting a cubic relationship between female directors and cost of capital, the possibility of square and linear relationships will be second and third scenarios. The equation related to cube pattern is:

$$\begin{aligned} WACC_{it} = & \alpha_i + \beta_1(FMD_{it}) + \beta_2(FMD_{it})^2 + \beta_3(FMD_{it})^3 + \beta_4(LN(S)_{it}) + \beta_5(LEV_{it}) + \\ & \beta_6(GDP\ GROWTH_t) + \varepsilon_{it} \end{aligned} \quad (4.6)$$

The results of employing OLS and GLS method in estimating the above equation are reported in Table 4.14 below:

Table 4.14: OLS and GLS Regression of WACC on FMD (Cubic Relationship)

	OLS	GLS
	WACC	WACC
Variable	Coefficient	Coefficient
C	7.592*** (8.43)	8.3*** (8.4)
FMD	-2.177 (-0.36)	-0.078 (-0.01)
FMD²	-10.794 (-0.26)	-30.695 (-0.64)
FMD³	39.128 (0.68)	73.235 (1.09)
LN(S)	-0.028 (-0.44)	-0.104 (-1.48)
LEV	-0.19*** (-7.17)	-0.169*** (-7.99)
GDP GROWTH	-0.017 (-0.86)	0.046 (1.79)
F	10.987*** (0.00)	14.461*** (0.00)
Adjusted R²	0.24	0.3
N	195	195

***denotes correlation is significant at 0.01 level (2-tailed); **denotes correlation is significant at 0.05 level (2-tailed); * denotes correlation is significant at 0.1 level (2-tailed). Standard errors are also provided for each variable.

Results of the estimations reported in Table 4.14 indicate that coefficients of FMD, FMD² and FMD³ are not statistically significant either in the OLS method or the GLS method. Therefore, there is a cube pattern between female directors and cost of capital. The equation evaluating square relationship is:

$$WACC_{it} = \alpha_i + \beta_1(FMD_{it}) + \beta_2(FMD_{it})^2 + \beta_3(LN(S)_{it}) + \beta_4(LEV_{it}) + \beta_5(GDP GROWTH_t) + \varepsilon_{it} \quad (4.7)$$

The sign of FMD^2 indicates the pattern between female directors and cost of capital. If the sign of FMD^2 is positive there is a U-shape pattern between female directors and cost of capital. If the sign of FMD^2 is negative there is an inverse U-shape pattern between female directors and cost of capital. Results of estimating the above equation through OLS and GLS methods are reported in Table 4.15.

Table 4.15: OLS and GLS Regression of WACC on FMD (Square Relationship)

	OLS	GLS
	WACC	WACC
Variable	Coefficient	Coefficient
C	7.474*** (7.75)	8.06*** (5.58)
FMD	-5.715*** (-3.94)	-6.62** (-2.36)
FMD²	14.857*** (3.01)	17.41** (2.17)
LN(S)	-0.017 (-0.25)	-0.083 (-0.74)
LEV	-0.192*** (-7.63)	-0.172*** (-8.03)
GDP GROWTH	-0.017 (-0.79)	0.037 (0.52)
F	13.180*** (0.00)	17.621*** (0.00)
Adjusted R²	0.24	0.3
N	195	195

***denotes correlation is significant at 0.01 level (2-tailed); **denotes correlation is significant at 0.05 level (2-tailed); * denotes correlation is significant at 0.1 level (2-tailed). Standard errors are also provided for each variable.

Coefficients in the Table 4.15 are statistically significant at the 1% level and the 5% level. The positive sign of the FMD^2 coefficient indicates a U-shape relationship between female directors and cost of capital. This relationship is

down/up which means as the number of female directors increases in primary levels, the cost of capital will decrease to a specific level. When the proportion of female directors on boards is more than that specific number, the pattern between female directors and cost of capital will change. This means that 19% of boards are dominated by female directors. The Figure below shows this relationship.

Figure 4.5: FMD and WACC pattern

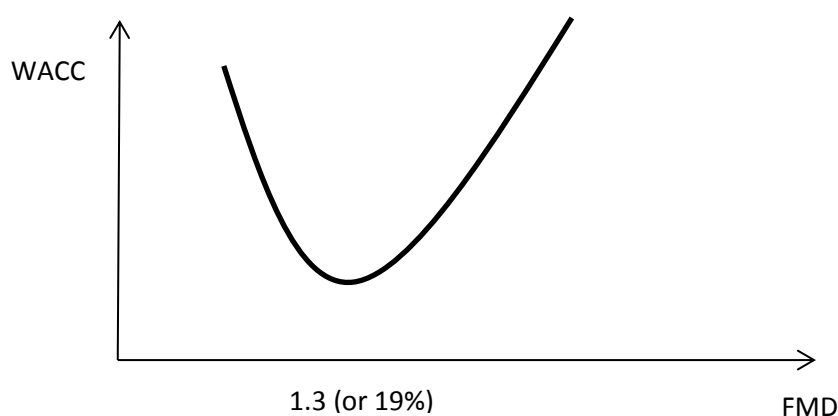


Figure 4.5 indicates that at primary levels of presence of female directors on boards, cost of capital decreases. This means that female directors positively affect company performance when their presence is not too high.

4.8.1 Robustness test

Unit root test was checked and no significant issues were detected. In order to prevent the negative effects of heteroskedasticity problem when applying OLS, white cross-section standard errors and covariance method that is robust to heteroskedasticity were employed. The Generalized least square is robust to heteroskedasticity and abnormally distributed data were employed. Endogeneity was checked through the Hausman test and no significant value detected. Results of the Hausman tests are reported in the Table 4.16 below:

Table 4.16: Hausman test results for endogeneity

Variable	Fixed	Random	Prob.
FMD	8.91648	1.338681	0.36
FMD²	-4.11856	2.973723	0.79
LN(s)	-0.20957	-0.09749	0.39
LEV	-0.33995	-0.24106	0.1
GDP GROWTH	0.017592	-0.00333	0.1

In Table 4.16 the values of probabilities are above the 10% level. These values indicate the acceptance of null hypothesis in Hausman test. This means that the estimations of model employed to assess the relationship between FMD and WACC are not biased because of endogeneity problems. The coefficients of explanatory variables in fixed and random models are similar. Thus, the Hausman test documents no endogeneity problem. Related results are reported in Table 4.16.

4.9 OLS Regression of WACC on CEO Tenure (TENURE) to find the pattern of their relationship

Investigating the relationship between CEO tenure and cost of capital reveals a cubic pattern. The related equation in this regard that evaluates the existence of a cubic relationship is:

$$WACC_{it} = \alpha_i + \beta_1(TENURE_{it}) + \beta_2(TENURE_{it})^2 + \beta_3(TENURE_{it})^3 + \beta_4(LN(S)_{it}) + \beta_5(LEV_{it}) + \beta_6(GDP\ GROWTH_t) + \varepsilon_{it} \quad (4.8)$$

Signs of $TENURE_{it}$, $TENURE_{it}^2$ and $TENURE_{it}^3$ indicate the pattern between CEO tenure and cost of capital. Related results of estimating the above equation through OLS and GLS methods are reported in Table 4.17.

Table 4.17: OLS and GLS Regression of WACC on TENURE

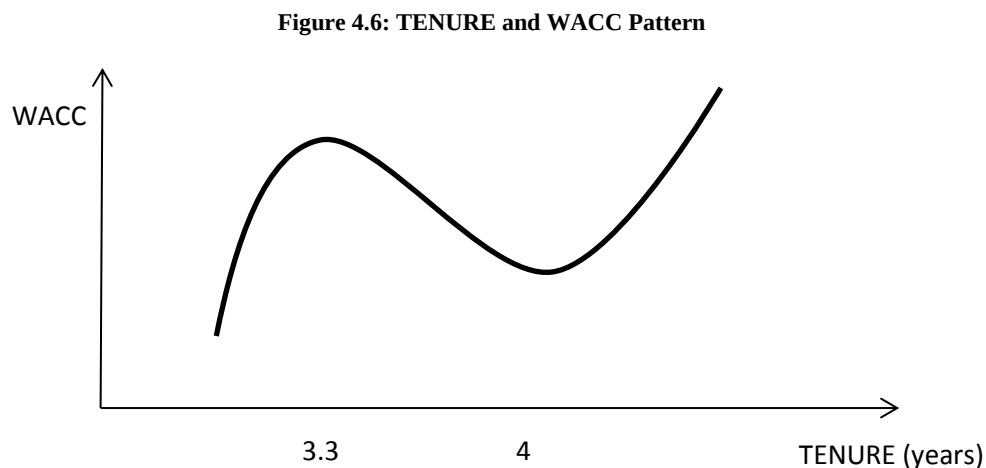
	OLS	GLS
	WACC	WACC
Variable	Coefficient	Coefficient
C	6.668*** (5.14)	6.630*** (4.6)
TENURE	0.600 (0.59)	1.015*** (3.28)
TENURE²	-0.580 (-0.9)	-0.788*** (-5.29)
TENURE³	0.174 (1.56)	0.203*** (6.65)
LN(S)	0.0001 (0.00)	-0.029 (-0.32)
LEV	-0.196*** (-8.55)	-0.179*** (-8.33)
GDP GROWTH	-0.014 (-0.65)	0.055* (1.67)
F	11.761 (0.00)	14.002 (0.00)
Adjusted R²	0.25	0.29
N	195	195

***denotes correlation is significant at 0.01 level (2-tailed); **denotes correlation is significant at 0.05 level (2-tailed); * denotes correlation is significant at 0.1 level (2-tailed). Standard errors are also provided for each variable.

Estimations based on OLS and GLS reveal different results. Both of these methods indicate a cubic relationship between CEO tenure and cost of capital. Relationship between CEO tenure and cost of capital has an up/down/up pattern. The Figure 4.6 below shows the relationship between CEO tenure and cost of capital.

According to results of this study CEOs should remain in their positions for between 3.3 years and 4 years to negatively affect the cost of capital. As indicated

in the Figure 4.6 below, when CEOs stay less than 3.3 years in their positions they positively affect the cost of capital. When CEOs stay more than 4 years in their positions, there is a positive relationship between CEO tenure and cost of capital. The related pattern between CEO tenure and cost of capital is presented in the Figure 4.6 below.



The results of this study support the presence of a cubic relationship between CEO tenure and cost of capital. When CEOs are newly appointed or when they spend a long time in their positions, there is a positive relationship between CEO tenure and cost of capital. When CEOs are mid-term in their career there is a negative relationship between them.

4.9.1 Robustness test

Unit root test was checked and no significant issue was detected. In order to prevent the negative effects of heteroskedasticity problem when applying OLS, white cross-section standard errors and covariance method, which is robust to heteroskedasticity, were employed. The Generalized Least Square which is robust to heteroskedasticity and abnormally distributed data were employed. Endogeneity was checked through Hausman test and no significant issue detected. Results of Hausman tests are reported in the Table 4.18 below:

Table 4.18: Hausman test results for endogeneity

Variable	Fixed	Random	Prob.
TENURE	1.995783	1.63708	0.52
TENURE²	-1.99658	-1.59926	0.51
TENURE³	0.456235	0.377173	0.59
LN(S)	-0.01008	-0.0622	0.83
LEV	-0.31454	-0.23058	0.15
GDP GROWTH	0.001414	-0.00486	0.46

In Table 4.18 the values of probabilities are above 10% level. These values indicate the acceptance of null hypothesis in the Hausman test. This means that the estimations of model employed to assess the relationship between CEO tenure and WACC are not biased because of endogeneity problem. The coefficients of explanatory variables in fixed and random models are similar. Thus, Hausman test documents no endogeneity problem.

4.10 OLS Regression of WACC on CEO DUALITY to find the pattern of their relationship

CEO duality is banned by New Zealand authorities (Code of Best Practice of Corporate Governance in New Zealand in 2003). But some companies still employ the same person as chairman and CEO. The variables of CEO duality are entered as a dummy variable in related equation.

$$\begin{aligned}
 \text{WACC}_{it} = & \alpha_i + \beta_1(\text{DUALITY}_{it}) + \beta_2(\text{LN(S)}_{it}) + \beta_3(\text{LEV}_{it}) + \beta_4(\text{GDP GROWTH}_i) \\
 & + \varepsilon_{it}
 \end{aligned}
 \tag{4.9}$$

Results of this estimation are reported in the Table 4.19.

Table 4.19: OLS and GLS Regression of WACC on CEO DUALITY

	OLS	GLS
	WACC	WACC
Variable	Coefficient	Coefficient
C	-5.847*** (-33.86)	-5.774*** (-53.18)
DUALITY	0.188*** (3.04)	0.153* (1.86)
LN(S)	6.605*** (78.09)	6.547*** (124.93)
LEV	0.312*** (17.73)	0.310*** (21.4)
GDP GROWTH	0.027*** (3.37)	0.002 (0.40)
F	1363.684*** (0.00)	2121.649*** (0.00)
Adjusted R²	0.97	0.98
N	195	195

***denotes correlation is significant at 0.01 level (2-tailed); **denotes correlation is significant at 0.05 level (2-tailed); * denotes correlation is significant at 0.1 level (2-tailed). Standard errors are also provided for each variable.

The positive sign of DUALITY coefficient in estimations indicates a positive linear relationship between CEO duality and cost of capital. This means that CEO duality increases the cost of capital. Conversely, companies who do not have CEO duality experience a decrease in their cost of capital.

Estimations of this study checked through different tests. Unit root test was checked and no significant issues detected. In order to prevent the negative effects of heteroskedasticity problem when applying OLS, white cross-section standard errors & covariance method, which is robust to heteroskedasticity, were employed. The Generalized Least Square robust to heteroskedasticity and abnormally distributed data were employed.

4.11 Summary of Chapter

Relationship between corporate governance and cost of capital in large listed companies in New Zealand has been investigated in this chapter. The first part of this chapter has documented the descriptive statistics of variables. The next section of this chapter investigated the relationship between all of the corporate governance variables and cost of capital. The pattern between each corporate governance variable and cost of capital was investigated in the last part. Important questions addressed in this chapter were:

1) Whether corporate governance practices affect cost of capital in large listed companies in New Zealand? 2) What is the pattern of relationship between insider ownership and cost of capital in large listed companies in New Zealand? 3) What is the pattern between block ownership and cost of capital in large listed companies in New Zealand? 4) What is the pattern between board size and cost of capital in large listed companies in New Zealand? 5) What is the pattern between non-executive/independent directors and cost of capital in large listed companies in New Zealand? 6) What is the pattern between board diversity (female directors) and cost of capital in large listed companies in New Zealand? 7) What is the pattern between CEO tenure and cost of capital in large listed companies in New Zealand? 8) What is the pattern between CEO duality and cost of capital in large listed companies in New Zealand?

The findings of this study indicate the important role of corporate governance practices on cost of capital in large listed companies. It has been shown that insider ownership and block ownership negatively affect cost of capital. In this

relationship the coefficient of insider ownership is statistically significant but, the coefficient of block ownership is not statistically significant.

Results of this study support the findings of prior studies about the positive role of non-executive/independent directors and female directors on company performance. This study also shows a negative role for female directors and non-executive/independent directors and cost of capital. Beside that a positive relationship between board size and cost of capital is indicated while its coefficient is not statistically significant. This study also finds that a positive relationship is evident between CEO tenure, CEO duality and cost of capital in large listed companies in New Zealand.

Findings of this study reveal a cube pattern between insider ownership and cost of capital. This cubic relationship is an up/down/up relationship. In this pattern, cost of capital increases while insider ownership is less than 13.16%. But, when insider ownership is more than 13.16% the cost of capital starts to decrease. This decrease lasts until the insider ownership is less than 50.63%. So, when insider ownership is more than 50.63%, cost of capital starts to increase again. According to descriptive statistics in this chapter, the average insider ownership is 8.2% which is less than 13.16%. Thus, it was expected to see a positive relationship between insider ownership and cost of capital. But, estimations of this study indicate a negative relationship between insider ownership and cost of capital. As mentioned in descriptive statistics, insider ownership data is not normally distributed and has a fat-tailed shape. This means that data in tails of distribution are important and they are not easily excludable.

This study reveals a cubic (down/up/down) pattern between block ownership and cost of capital. In this pattern, cost of capital decreases while block ownership is less than 32.42%. But when block ownership is more than 32.42% and less than 66.14%, the cost of capital starts to increase. This positive relationship changes when block ownership passes the 66.14% level.

The pattern indicated in this study regarding the relationship between board size and cost of capital is an up/down. This means that the cost of capital increases while the board size is less than 8. But when boards have more than 8 members, the relationship between board members and cost of capital is negative. Descriptive statistics document 7 members as the average board size in this study. So there is a positive relationship between board size and cost of capital which is supported by findings of Table 4.3.

A cube (up/down/up) pattern between non-executive/independent directors and cost of capital reveal in this study. In this pattern, while the number of non-executive/independent directors is less than 3, the cost of capital increases. But, when the number of non-executive/independent directors is more than 3 and less than 8, there is a positive relationship between non-executive/independent directors and cost of capital. And finally when the number of outside directors is more than 8, there is a positive relationship between non-executive/independent directors and cost of capital. The average number of non-executive/independent directors was reported to be 5 in descriptive statistics. Thus, the relationship between non-executive/independent directors and cost of capital is in negative part. Table 4.3 supports this pattern.

A quadratic pattern was revealed by this study between the number of female directors and cost of capital. This pattern shows a negative relationship between female directors and cost of capital while the percentage of female directors is below 19%. When the number of female directors passes 1.3 (or 19%), there is a positive relationship between female directors and cost of capital. As the average of female directors is 0.73% in descriptive statistics, female directors negatively affect the cost of capital. Findings of the Table 4.3 support this pattern.

This study reveals a cube (up/down/up) pattern between CEO tenure and cost of capital. This pattern shows that there is a positive relationship between CEO tenure and cost of capital when CEO tenure is less than 3.3 years. But, when the CEO tenure is between 3.3 and 4 years, there is a negative relationship between CEO tenure and cost of capital. And there is a positive relationship between CEO tenure and cost of capital again when CEO tenure exceeds 4 years. The descriptive statistics report that the average CEO tenure in large listed companies in New Zealand is 6.39 years which is more than 4 years. Thus, it is expected to have a positive relationship between CEO tenure and cost of capital.

Although duality is prohibited by New Zealand authorities, existence of duality in some companies guides this study to take this variable into consideration. Table 4.3 documents a positive relationship between CEO duality and cost of capital. This study reveals a positive relationship between CEO duality and cost of capital.

Chapter 5 CORPORATE GOVERNANCE AND COST OF CAPITAL IN SINGAPORE: AN EMPIRICAL INVESTIGATION

5.0 Introduction

Results of the empirical study about the relationship between corporate governance mechanisms and cost of capital in large listed companies in Singapore are documented in this chapter. Required descriptions of corporate governance cost of capital and sample size were provided in Chapter 3. This chapter consists of three sections: description of descriptive statistics, results of data analyses and estimations and at last, conclusion.

5.1 Empirical results

5.1.1 Descriptive statistics

The sample of the Singapore Stock Market comprised 30 large listed companies (Straight Time Index) during the period 2006 to 2010. Companies that did not prepare the required information were removed from the sample and a final sample of 27 companies remained. Therefore, 90% of the companies in the sample remained in the estimation.

A summary of descriptive statistics for pooled data of Singapore's large listed companies is presented in Table 5.1. These statistics include: means, medians, minimum, maximum, standard deviation, skewness, kurtosis and number of observations. The mean and median of the cost of capital (WACC) are 4.49% and 4.85%, respectively. Thus, costs of capital of large listed companies in Singapore were distributed normally around 4% to 5%.

The mean and median of insider ownership (IOWN) are 1.88% and 0.13%, respectively which means insider ownership in half of the Singapore sample is less than 1%. Mak and Li (2001) indicate that mean and median of insider ownership in all listed companies in Singapore are 22% and 4%, respectively. Their findings indicate that insider ownership is high in medium and small sized companies in Singapore. Minimum and maximum of insider ownership in Singapore's large listed companies are 0% and 27.8%, respectively. This means that insider ownership in these companies range from 0 to 27.8%.

Difference in the values of mean and median which presented in table 5.1 indicates that the distribution of insider ownership data is not statistically normal. High levels of skewness and kurtosis values also document the possibility of presence of fat-tailed distribution. Presence of fat-tailed distribution checked through the Grubbs test. Fat-tailed distribution includes data whose omission could damage the estimation. Comparing the Grubbs test values and its critical values detect the difference between true outliers and outliers in fat tails that include important information.

Table 5.1: Descriptive Statistics in Singapore

Variables	Mean	Median	Maximum	Minimum	Std. Dev.	Skewness	Kurtosis	Observations
Dependent								
WACC	4.75	4.9	17.31	0.21	2.68	0.83	5.55	135
Governance								
IOWN	1.88	0.13	27.80	0	6.20	3.49	13.59	135
BOWN	71.87	75.37	93.23	39.39	14.47	-0.52	2.07	135
BDS	10.70	11	14	8	1.58	-0.02	2.39	135
FMD	0.50	0	2	0	0.70	1.03	2.74	135
NED	8.21	8	12	1	2.34	-0.53	3.02	135
DUALITY	0.13	0	1	0				135
Tenure	6.13	5	30	1	4.74	1.40	6.48	135
Control								
LN(S)	15.80	15.78	17.97	12.09	1	-0.58	4.59	135
LEV	2.54	0.87	32.2	-2.80	4.11	3.67	22.50	135
GDP Growth (%)	6.64	8.80	14.80	-1	5.66	0	1.68	135

The mean and median of block ownership in large listed companies in Singapore are 71.87% and 75.37% respectively. Mak and Li (2001) indicated that the mean and median of block ownership in all listed companies in Singapore are 62% and 63% respectively. Higher block ownership in this study is due to different block ownership structures between large listed companies and other listed companies. Maximum and minimum of block ownership in large listed companies in Singapore are 93.23% and 39.39%, respectively. Median of 75.37% and maximum of 93.23% indicate that block owners in half of the companies own between 75.37% and 93.23%.

The mean and median of board size in large listed companies in Singapore are 10.7 and 11, respectively. Mak and Li (2001) find that the mean and median of board size in all listed companies in Singapore are 8.04 and 8 respectively. Comparison between this study and Mak and Li's study reveals an increase in company board size in Singapore. Maximum and minimum numbers of directors on boards of large listed companies in Singapore are 14 and 8, respectively. Fama (1980) documents that appropriate board size is between six and eight. Thus, based on the findings of this study, average board size in large listed companies in Singapore is higher than the range of board size indicated in prior studies.

The mean and median of non-executive/independent directors in large listed companies in Singapore are 8.21 and 8, respectively. Thus, almost 80% of boards consist of non-executive/independent directors. The mean and median of female directors on boards are 0.5 and 0, respectively which means that almost 5% of boards consist of female directors. Different countries and authorities recommend that at least one third of boards should be allocated to female directors. But, female directors in Singapore play a minor role in large listed companies.

Maximum and minimum of female directors range between 0 and 2 which indicates their low presence on boards.

CEO duality as another factor in this study which is not recommended in large companies, existence of duality in some companies in Singapore guided this study to mention duality as one of the factors affecting corporate governance. The mean and median of CEO tenure in large listed companies in Singapore are 6.13 and 5 years, respectively. Thus, CEOs are in their positions for almost 6 years on average.

The mean and median of company size are 15.8 and 15.78, respectively. Comparing firm size in New Zealand and Singapore indicates the presence of larger companies in Singapore. The Mean and median of Gross Domestic Product growth (GDP growth) of the Singapore economy are 6.64 and 8.8 percent. And the mean and median of leverage found in this study are 2.54 and 0.87. This reflects the significant employment of debt in large listed companies in Singapore. Therefore, a sizable proportion of cash flows are employed to service the debt.

High standard deviation and difference between mean and median of some variables (especially ownership variables) indicate that the distributions of these variables are not normal. Along with high standard deviation, skewness of variables documents that variables have tails on their right or left hand side. The high kurtosis distribution reported in some variables indicates that the distribution of these variables has a sharper peak and longer fat tails.

Dealing with unbalanced data requires some consideration. Excluding outliers in the presence of fat tails may lead some effective variables are not considered. This study employed Grubbs test to halt the exclusion of significant variables in fat

tails. Difference between true outliers and outliers in fat tails include important information, is detectable through comparing the Grubbs test and its critical value. Thus, the presence of a high standard deviation beside skewness and Kurtosis distribution of data in this study does not lead to exclusion of more data because the Grubbs test reveals that all of the data in fat tails are important.

5.2 Correlation between independent variables

Table 5.2 provides the correlation matrix of independent and control variables. The highest correlation between independent variables relates to NED and DUALITY which is -0.51. This means that companies with CEO duality tend to employ less non-executive/independent directors. Next high correlation is between BDS and NED which is 0.40. This means that larger boards tend to employ more non-executive/independent directors. Correlations between other independent variables are between -0.30 and 0.33. As the highest pair wise correlation between independent variables is -0.51, low likelihood of multicollinearity issues is expected when applying OLS regressions. This study employed the Generalized Least Square Model (GLS) in order to cover the shortcomings of employment of abnormally distributed data.

Table 5.2: Pairwise Correlation Matrix for Independent Variables

	IOWN	BOWN	BDS	NED	FMD	DUALITY	TENURE	SIZE	LEV	GDP GROWTH
IOWN	----- -----									
BOWN	-0.302*** (-3.659)	----- -----								
BDS	0.023 (0.266)	-0.006 (-0.072)	----- -----							
NED	-0.224*** (-2.646)	0.178** (2.083)	0.401*** (5.053)	----- -----						
FMD	-0.193** (-2.267)	0.146* (1.705)	-0.117 (-1.354)	0.191** (2.240)	----- -----					
DUALITY	-0.011 (-0.124)	-0.147* (-1.712)	-0.252*** (-3.006)	-0.512*** (-6.882)	-0.146* (-1.702)	----- -----				
TENURE	-0.008 (-0.094)	0.031 (0.354)	-0.141 (-1.638)	0.028 (0.328)	-0.052 (-0.599)	0.334*** (4.093)	----- -----			
SIZE	0.285*** (3.426)	-0.036 (-0.418)	0.060 (0.693)	-0.048 (-0.556)	0.064 (0.742)	-0.057 (-0.661)	0.008 (0.093)	----- -----		
LEV	0.239*** (2.843)	-0.116 (-1.347)	0.282*** (3.392)	0.315*** (3.822)	-0.100 (-1.162)	-0.132 (-1.539)	0.023 (0.260)	0.110 (1.273)	----- -----	
GDP GROWTH	-0.006 (-0.066)	-0.022 (-0.253)	0.095 (1.104)	0.043 (0.494)	0.006 (0.069)	0.017 (0.202)	0.053 (0.613)	0.068 (0.790)	0.026 (0.305)	----- -----

***denotes correlation is significant at 0.01 level (2-tailed); **denotes correlation is significant at 0.05 level (2-tailed); *denotes correlation is significant at 0.1 level (2-tailed)

The following section will present the relationship between corporate governance factors and cost of capital.

5.3 Regression of WACC on Corporate Governance Variables

Outcomes of regression regarding the relationship between cost of capital and corporate governance mechanisms through OLS and GLS methods are presented in Table 5.3. The GLS (Generalized Least Square) method is employed in order to control the shortcomings of heteroskedasticity and abnormally distributed data.

OLS method documents negative coefficients for independent variables such as: IOWN, BDS, NED, TENURE, LN(S) and LEV. This means that they negatively affect the cost of capital (WACC). Among these variables, NED, TENURE, LN(S) and LEV are statistically significant at 10%, 5% and 1% levels, respectively. Thus non-executive/independent directors in Singapore's large listed companies decrease the cost of capital and help companies to perform better. Another factor which is CEO tenure negatively affects the cost of capital. This means longer tenured CEOs helps companies decrease the cost of capital. Outcomes of this study show a negative relationship between firm size and cost of capital which means bigger companies have a lower cost of capital. This study also finds a negative relationship between leverage and cost of capital which indicates that companies that employ more debt to equity, have lower costs of capital.

Outcomes of estimations indicate positive coefficients for BOWN, FMD, Duality and GDP growth rate through OLS method. Among these variables BOWN and DUALITY are statistically significant. The statistically significant and positive relationship between BOWN (block ownership) and cost of capital indicates that

higher levels of block ownership positively affect the cost of capital. Beside block ownership, the positive and statistically significant coefficient of CEO duality shows that appointing the same person as CEO and chairman increases the cost of capital.

Although the coefficients of IOWN (insider ownership), BDS (number of directors) and FMD (female directors) are statistically insignificant, the negative sign of IOWN means that higher levels of insider ownership decrease the cost of capital. The negative sign of board size coefficient also indicates that larger boards decrease the cost of capital. Although the coefficient of female directors is statistically insignificant, its positive sign indicates the positive role of female directors on the cost of capital. GDP growth and cost of capital have a positive and statistically insignificant relationship which means that higher levels of GDP growth increase the cost of capital in Singapore's companies.

Slightly different results were tracked through the GLS method. Most of the coefficients are statistically meaningful at 1% and 5% and 10% levels. IOWN has a negative but statistically insignificant relationship with cost of capital. The exact role of insider ownership will be discussed in the next section of this chapter. Beside insider ownership, BDS (number of directors on board) has a negative and statistically significant relationship with cost of capital. This means that larger boards decrease the cost of capital in Singapore's large listed companies. The exact relationship between board's size and cost of capital will be assessed in the following sections of this chapter.

NED has a negative relationship with cost of capital. This relationship is statistically significant at 1% level. This means that more non-

executive/independent directors negatively affect cost of capital. Another important factor of boards which is FMD (female directors) has a negative but statistically insignificant relationship with cost of capital. GDP growth also has a positive but statistically insignificant effect on cost of capital through the GLS method. Leverage has a negative and statistically significant relationship with cost of capital in this method. In GLS method, longer tenured CEOs decrease the cost of capital just like the size of company. This implies that larger firms have lower costs of capital.

Independent variables such as: BOWN and Duality have positive relationships with cost of capital in GLS method. Higher levels of block ownership positively affect cost of capital and increase it. Beside block ownership, positive and statistically significant coefficient of DUALITY indicates the negative role of duality on company performance by increasing the cost of capital.

Table 5.3: OLS and GLS Regression of WACC on Corporate Governance and Control Variables

	OLS	GLS
	WACC	WACC
Variable	Coefficient	Coefficient
Const.	12.792*** (9.390)	9.466*** (5.093)
IOWN	-0.610 (-0.204)	-0.308 (-0.115)
BOWN	2.944*** (4.347)	3.200*** (4.870)
BDS	-0.055 (-0.939)	-0.084* (-1.769)
NED	-1.866* (-1.715)	-1.500*** (-3.104)
FMD	1.665 (1.345)	-0.451 (-0.472)
DUALITY	2.138*** (4.923)	2.893*** (6.251)
TENURE	-0.068** (-2.549)	-0.114*** (-4.295)
LN(S)	-0.468*** (-6.672)	-0.252** (-2.239)
LEV	-0.335*** (-5.417)	-0.376*** (-9.523)
GDP GROWTH	2.969 (1.502)	2.265 (1.594)
F	14.283 (0.00)	43.9 (0.00)
Adjusted R²	0.5	0.76
N	135	135

***denotes correlation is significant at 0.01 level (2-tailed); **denotes correlation is significant at 0.05 level (2-tailed); * denotes correlation is significant at 0.1 level (2-tailed). Standard errors are also provided for each variable.

Based on Table 5.3 there is a no significant relationship between insider ownership and cost of capital. This is inconsistency with prior studies in

Singapore (Phan, 2000) and that could be because of very low insider ownership in large listed companies in Singapore. This estimation finds significant positive relationship between block ownership and cost of capital which is consistent with the prior studies in Singapore (Y. T. Mak, Li, Y, 2001). Significant negative relationship was found between board size, outside directors and cost of capital. These findings are inconsistent with prior studies in Singapore (Phan, 2000). Based on table above, there is no significant relationship between board diversity and cost of capital. Table above indicates significant and positive relationship between CEO duality and cost of capital. Based on above table there is significant negative relationship between CEO tenure, company size, leverage and cost of capital. This is consistent with prior studies (Murphy, 1986). This means employing more debt in Singapore companies leads to lower cost of capital. Findings of this estimation also suggest that DGP growth has no significant role on cost of capital.

The exact relationship between each of these explanatory variables and cost of capital will be assessed in the coming parts of this chapter. Some of these variables have quadratic or cubic relationships with cost of capital. Thus, correct understanding of the relationship between each of these variables and cost of capital needs a separate estimation. Through different equations and estimation models, the exact relationship of these explanatory variables with cost of capital will be assessed. The role of these variables will be clarified in the following parts.

5.3.1 Robustness Test

Unit root test was checked and no significant issue was detected (Appendix F). The endogeneity of independent variables was checked through the Hausman Test

and no significant figure was found. Results of the Hausman test are reported in the Table 5.4 below:

Table 5.4: Hausman test results for endogeneity

Variable	Fixed	Random	Prob.
IOWN	16.917	5.207	0.277
BOWN	15.846	9.463	0.121
BDS	-0.349	-0.344	0.934
NED	0.945	-1.335	0.158
FMD	-4.494	-3.029	0.291
DUALITY	0.776	1.174	0.263
TENURE	-0.105	-0.120	0.255
LN(S)	-0.486	-0.612	0.261
LEV	-0.128	-0.177	0.134
GDP GROWTH	4.634	4.367	0.277

Similar values of independent variables in the fixed effect model and random effect model imply the fact that these variables are not subject to endogeneity. Probabilities of variables indicate the acceptance of null hypothesis which indicates the presence of similar coefficients in fixed and random effect model. The Generalized least square method which is robust to heteroskedasticity and abnormally distributed data was employed in this study.

5.4 Regression of WACC on Insider Ownership (IOWN) to find the pattern of their relationship

The results of estimating the relationship between insider ownership and cost of capital are reported in Table 5.5. Different equations were checked in order to track the pattern of the relationship between insider ownership and cost of capital. These patterns could be in linear, quadratic and cubic formats. The equation employed to track this relationship is:

$$WACC_{it} = \alpha_i + \beta_1(IOWN_{it}) + \beta_2(IOWN_{it})^2 + \beta_3(IOWN_{it})^3 + \beta_4(LN(S)_{it}) + \beta_5(LEV_{it}) + \beta_6(GDP\ GROWTH_t) + \varepsilon_{it} \quad (5.1)$$

Signs of $IOWN$, $IOWN^2$ and $IOWN^3$ reveal the pattern of relationship between $IOWN$ and $WACC$. The coefficients of $IOWN$ and its square and cubic versions are statistically significant at the 10% level in both OLS and GLS methods. The coefficients of $IOWN$ and $IOWN^3$ are statistically significant and negative and coefficient of $IOWN^2$ is statistically significant and positive. These positive and negative signs show a cubic pattern for the relationship between $IOWN$ and $WACC$ which is a down/up/down relationship.

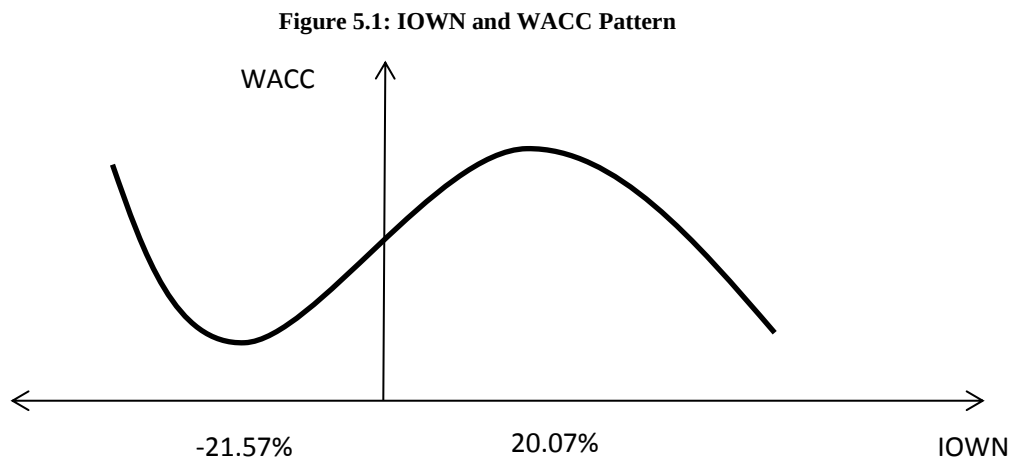
Table 5.5: OLS and GLS Regression of WACC on IOWN

	OLS	GLS
	WACC	WACC
Variable	Coefficient	Coefficient
C	13.506*** (5.592)	8.425*** (4.434)
IOWN	-0.260* (-1.770)	-0.212* (-1.789)
IOWN²	0.015* (1.762)	0.012* (1.762)
IOWN³	-0.0002* (-1.960)	-0.0002* (-1.916)
LN(S)	-0.493*** (-3.126)	-0.161 (-1.352)
LEV	-0.387*** (-4.575)	-0.490*** (-13.339)
GDP GROWTH	0.029 (1.442)	0.006 (0.294)
F	17.552 (0.00)	39.39 (0.00)
Adjusted R²	0.43	0.63
N	135	135

***denotes correlation is significant at 0.01 level (2-tailed); **denotes correlation is significant at 0.05 level (2-tailed); * denotes correlation is significant at 0.1 level (2-tailed). Standard errors are also provided for each variable.

The coefficients of IOWN indicate the levels of insider ownership where the directions of the pattern change. Although the coefficients of two different methods were slightly different, the limits they revealed were almost the same. Based on the estimations' outcomes, two limits where the directions of relationship between insider ownership and cost of capital change are -21.57% and 20.07%.

Based on this pattern, when insider ownership is less than -21.57%, there is a negative relationship between insider ownership and cost of capital. When insider ownership is more than -21.57% and less than 20.07%, there is a positive relationship between insider ownership and cost of capital. In a case where insider ownership is more than 20.07% there is a negative relationship between insider ownership and cost of capital. It is obvious, that negative values for insider ownership are not logical. The exact relationship between these variables is presented in the Figure 5.1 below:



This figure shows that when IOWN is less than -21.57%, there is a negative relationship between IOWN and WACC. Parts of this pattern that include the positive values of insider ownership are acceptable but negative values for insider ownership are not acceptable. Therefore, it is logical to assume a quadratic relationship between insider ownership and cost of capital. This pattern shows a positive relationship between insider ownership and cost of capital when insider ownership is less than 20.07%. A possible reason for the presence of this pattern could be the low levels of insider ownership in large listed companies in Singapore. The average insider ownership in these companies is less than 2%.

When insiders own more than 20.07% of ownership, the figure shows a negative relationship between IOWN and WACC. Based on agency theory, alignment of interests between insiders and company may be the reason. Thus, 20.07% of insider ownership is the minimum amount of ownership where the interests of insiders and companies are in line. The pattern between insider ownership and cost of capital in the Singapore market indicates the low level of insider ownership in companies. When the average insider ownership is 1.88% and the median is 0.13%, it is not surprising to detect a negative relationship between insider ownership and company performance.

5.4.1 Robustness test

Unit root test of variables was checked and no significant issue was detected. In order to prevent the negative effects of the heteroskedasticity problem when applying OLS, White cross-section and diagonal standard errors & covariance method, which are robust to heteroskedasticity, were employed. The Generalized least square method which is robust to heteroskedasticity and abnormally distributed data were employed. Endogeneity was checked through the Hausman test and no significant value was detected. Results are reported in the Table 5.6 below:

Table 5.6: Hausman test results for endogeneity

Variable	Fixed	Random	Prob.
IOWN	-0.197	-0.267	0.639
IOWN²	0.014	0.014	0.985
IOWN³	0.000	0.000	NA
LN(S)	-0.957	-0.759	0.219
LEV	-0.156	-0.266	NA
GDP GROWTH	0.031	0.030	0.951

The NA (No Answer) mentioned for IOWN³ and LEV is because of the negative variance of these variables. The coefficients of fixed effect and random effect models are almost similar in these variables so the null hypothesis is accepted. The null hypothesis states that coefficients in fixed and random effects are similar. As described in Table 5.6, the acceptance of null hypothesis of similar coefficients in fixed and random models indicate the rejection of endogeneity problem.

5.5 Regression of WACC on Block Ownership (BOWN) to find the pattern of their relationship

In order to find the pattern of relationship between block ownership (BOWN) and cost of capital (WACC) in Singapore companies, a unique equation containing block ownership variables and some control variables was employed. The related equation is:

$$\text{WACC}_{it} = \alpha_i + \beta_1(\text{BOWN}_{it}) + \beta_2(\text{BOWN}_{it})^2 + \beta_3(\text{BOWN}_{it})^3 + \beta_4(\text{LN}(S)_{it}) + \beta_5(\text{LEV}_{it}) + \beta_6(\text{GDP GROWTH}_t) + \varepsilon_{it} \quad (5.2)$$

Signs of BOWN, BOWN² and BOWN³ indicate the pattern of the relationship between block ownership and cost of capital. According to agency theory, alignment of interest and entrenchment effect influences the role of ownership on company. So, it is expected to find one or two extremes in the relationship of block ownership and cost of capital where the direction of their relationship changes. Results of exploring the pattern between block ownership and cost of capital through two different methods (OLS and GLS regression methods) are reported in Table 5.7.

Table 5.7: OLS and GLS Regression of WACC on BOWN (Cubic Relationship)

	OLS	GLS
--	-----	-----

	WACC	WACC
Variable	Coefficient	Coefficient
C	25.335 0.981	4.253 0.370
BOWN	-150.276 -1.263	-17.783 -0.314
BOWN ²	269.445 1.502	52.969 0.595
BOWN ³	-151.938* -1.724	-37.146 -0.814
LN(S)	0.397 1.664	0.050 0.424
LEV	-0.365*** -6.222	-0.391*** -11.564
GDP GROWTH	0.002 0.039	0.022 1.584
F	8.155*** 0.000	119.786*** 0.000
Adjusted R ²	0.24	0.84
N	135	135

***denotes correlation is significant at 0.01 level (2-tailed); **denotes correlation is significant at 0.05 level (2-tailed); * denotes correlation is significant at 0.1 level (2-tailed). Standard errors are also provided for each variable.

As described in Table 5.7, none of the coefficients of BDS, BDS² and BDS³ are statistically significant except BOWN³ in OLS which is significant at 10%. OLS and GLS results indicate that the relationship between leverage and cost of capital is negative. Along with statistically insignificant coefficients, endogeneity problem exists in independent variables. Therefore, this study moves toward the alternative scenario which is square relationship. The related equation for square relationship is:

$$WACC_{it} = \alpha_i + \beta_1(BOWN_{it}) + \beta_2(BOWN_{it})^2 + \beta_3(LN(S)_{it}) + \beta_4(LEV_{it}) + \beta_5(GDP GROWTH_{it}) + \varepsilon_{it} \quad (5.3)$$

Related results of assessing square relationship through OLS and GLS are presented in the Table 5.8 below:

Table 5.8: OLS and GLS Regression of WACC on BOWN (Square Relationship)

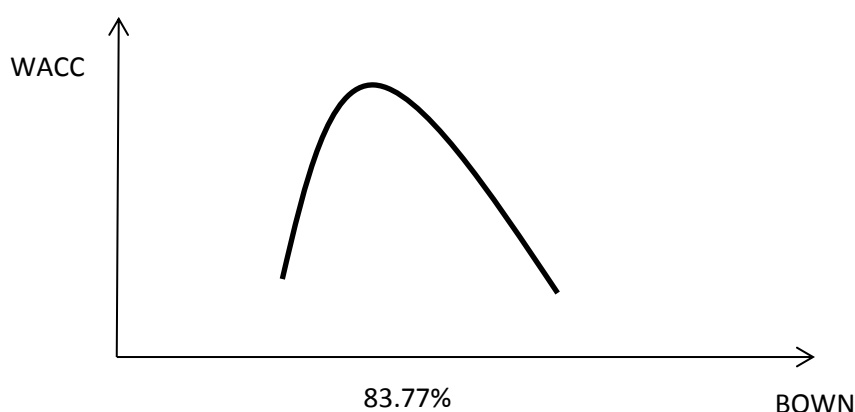
	OLS	GLS
	WACC	WACC
Variable	Coefficient	Coefficient
C	-17.741*** -2.681	-9.615*** -3.477
BOWN	52.771*** 3.016	41.594*** 6.071
BOWN²	-39.116*** -3.057	-29.755*** -5.690
LN(S)	0.390 1.622	0.064 0.523
LEV	-0.347*** -5.967	-0.360*** -13.114
GDP GROWTH	0.007 0.159	0.019 1.179
F	9.052*** 0	89.283*** 0
Adjusted R²	0.23	0.77
N	135	135

***denotes correlation is significant at 0.01 level (2-tailed); **denotes correlation is significant at 0.05 level (2-tailed); * denotes correlation is significant at 0.1 level (2-tailed). Standard errors are also provided for each variable.

Investigating the square relationship between block ownership and cost of capital, through OLS and GLS methods, shows statistically significant coefficients. These coefficients support the presence of a square relationship with an up/down pattern. The coefficients of this estimation are statistically significant at the 1% level. According to the coefficients of OLS and GLS, the critical value of block ownership where the direction of this pattern changes is 83.77%. This means that

the block ownership positively affects the cost of capital since the block owners own less than 83.75%. When block owners own 83.77% or more, there is a negative relationship between block owners and cost of capital. The pattern of relationship between block owners and cost of capital is presented in the Figure 5.2 below:

Figure 5.2: BOWN and WACC Pattern



Average block ownership in large listed companies in Singapore is 71.57%. This level of block ownership shows that block owners are not interested in getting involved into company issues when they own less than 83.77% or they prefer to focus on expropriation activities instead of improving company performance. But, when block owners own more than 83.77%, they get interested in company performance and cost of capital starts to decrease.

5.5.1 Robustness test

Unit root test was checked and no significant issue was detected. The Generalized least square method robust to heteroskedasticity and abnormally distributed data were employed. Endogeneity is another issue that was checked through the

Hausman test and no significant value was detected. The results are reported in the Table 5.9 below:

Table 5.9: Hausman test results for endogeneity

Variable	Fixed	Random	Prob.
BOWN	117.311	99.063	0.2
BOWN²	-97.221	-78.262	0.1
LN(S)	1.150	1.290	0.43
LEV	-0.069	-0.118	0.16
GDP GROWTH	-0.004	-0.004	0.95

In the Table 5.9, the values of probabilities are above 10%. These values indicate the acceptance of null hypothesis of the Hausman test. This means that the estimations of the model which was employed to assess the relationship between BOWN and WACC are not biased because of endogeneity problem. The coefficients of explanatory variables in fixed and random models are similar. Thus, the Hausman test shows no endogeneity problem.

5.6 Regression of WACC on Board Size (BDS) to find the pattern of their relationship

In order to find the pattern of relationship between board size and cost of capital in large listed companies in Singapore, a unique equation containing board size variables and some control variables was employed. Prior studies found a cubic pattern between board size and firm performance. In case of cubic relationship rejection, the alternative scenario will be exploring the square relationship. And if the coefficients of square relationship were insignificant, a linear relationship would be explored. The related equation will be as below:

$$WACC_{it} = \alpha_i + \beta_1(BDS_{it}) + \beta_2(BDS_{it})^2 + \beta_3(BDS_{it})^3 + \beta_4(LN(S)_{it}) + \beta_5(LEV_{it}) + \beta_6(GDP\ GROWTH_t) + \varepsilon_{it} \quad (5.4)$$

The same as previous sections regarding the relationship between ownership and cost of capital, signs of BDS, BDS² and BDS³ indicate the pattern of relationship between board size and cost of capital. Results of exploring the pattern between board size and cost of capital through two different OLS and GLS method are reported in Table 5.10.

Table 5.10: OLS and GLS Regression of WACC on BDS (Cubic Relationship)

	OLS	GLS
	WACC	WACC
Variable	Coefficient	Coefficient
C	33.362 (0.518)	30.829 (1.089)
BDS	-8.854 (-0.489)	-6.990 (-0.870)
BDS²	0.685 (0.406)	0.525 (0.695)
BDS³	-0.017 (-0.326)	-0.013 (-0.537)
LN(S)	0.541** (2.123)	0.270* (1.932)
LEV	-0.343*** (-5.416)	-0.445*** (-10.458)
GDP GROWTH	0.001 (0.034)	0.008 (0.404)
F	5.995*** (0.00)	27.055*** (0.00)
Adjusted R²	0.18	0.54
N	135	135

***denotes correlation is significant at 0.01 level (2-tailed); **denotes correlation is significant at 0.05 level (2-tailed); * denotes correlation is significant at 0.1 level (2-tailed). Standard errors are also provided for each variable.

None of the coefficients of BDS, BDS² and BDS³ are statistically significant as described in Table 5.10. OLS and GLS results indicate a negative relationship between leverage and cost of capital. The coefficient of firm size is also statistically significant at the 10% and 5% levels.

Along with statistically insignificant coefficients, an endogeneity problem exists in independent variables. Therefore, the alternative scenario which is square relationship between board size and cost of capital will be investigated. The related equation for square relationship is:

$$\text{WACC}_{it} = \alpha_i + \beta_1(\text{BDS}_{it}) + \beta_2(\text{BDS}_{it})^2 + \beta_3(\text{LN}(S)_{it}) + \beta_4(\text{LEV}_{it}) + \beta_5(\text{GDP GROWTH}_t) + \varepsilon_{it} \quad (5.5)$$

There is an up/down pattern between board size and cost of capital when coefficient of BDS² is negative. This relationship has a down/up pattern when the coefficient of BDS² is positive. The related results of investigating the square relationship through OLS and GLS methods are presented in Table 5.11 below:

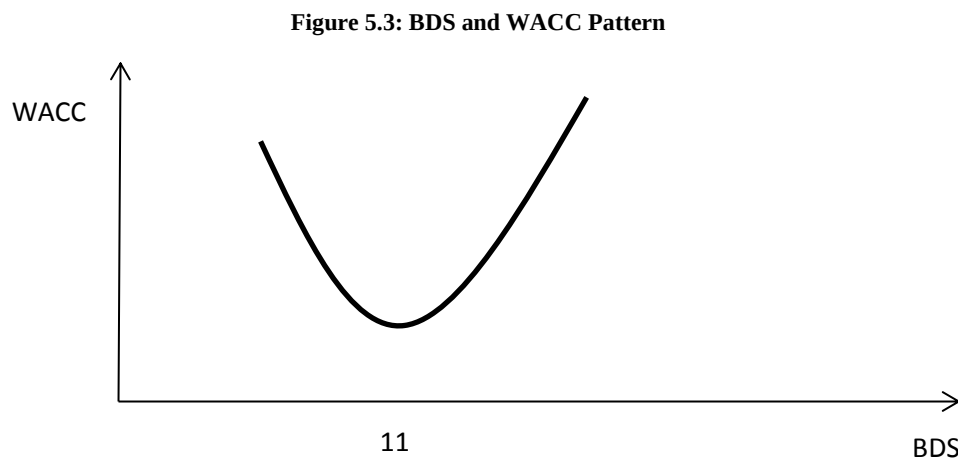
Table 5.11: OLS and GLS Regression of WACC on BDS (Square Relationship)

	OLS	GLS
	WACC	WACC
Variable	Coefficient	Coefficient
C	12.629* (1.894)	14.594*** (4.452)
BDS	-2.982*** (-3.703)	-2.451*** (-5.681)
BDS²	0.136*** (3.525)	0.109*** (5.506)
LN(S)	0.551 (0.985)	0.269*** (3.001)
LEV	-0.344*** (-4.258)	-0.444*** (-6.991)
GDP GROWTH	0.002 (0.071)	0.006 (0.553)
F	7.223*** (0.00)	28.886*** (0.00)
Adjusted R²	0.19	0.51
N	135	135

***denotes correlation is significant at 0.01 level (2-tailed); **denotes correlation is significant at 0.05 level (2-tailed); * denotes correlation is significant at 0.1 level (2-tailed). Standard errors are also provided for each variable.

Statistically significant coefficients are documented by investigating the square relationship between board size and cost of capital. These coefficients are estimated through OLS and GLS methods. The results of this estimation support the presence of a square relationship between board size and cost of capital. This square relationship has a down/up pattern.

Coefficients of this estimation are statistically significant at 5% level and 10% level. The positive sign of BDS^2 indicates the U-shape relationship between board size and cost of capital. According to the coefficients of OLS and GLS, the critical value where the direction of this relationship changes is 10.96. This means that there is a negative relationship between board size and cost of capital while the number of directors on the boards is less than 11. When a board of directors includes 11 or more directors, there is a positive relationship between board size and cost of capital. The pattern of relationship between board size and cost of capital is presented in the Figure 5.3 below:



The average board size in large listed companies in Singapore is 11. Companies with more than 11 members on their boards positively affect their cost of capital. Based on the average board size of large listed companies in Singapore and the minimum board size of 5.3, the existing board size seems optimal.

5.6.1 Robustness test

Unit root test was checked and no significant issue was detected. In order to prevent the negative effects of heteroskedasticity when applying OLS, White cross-section standard errors and a covariance method robust to heteroskedasticity were employed. The Generalized least square method which is robust to

heteroskedasticity and the abnormally distributed data were employed. Endogeneity is another issue that was checked through the Hausman test and no significant value was detected. The related results are presented in the Table 5.12 below:

Table 5.12: Hausman test results for endogeneity

Variable	Fixed	Random	Prob.
BDS	2.586	0.271	0.491
BDS²	-0.091	0.002	0.496
LN(S)	2.118	1.783	0.479
LEV	-0.012	-0.106	NA
GDP GROWTH	-0.048	-0.031	0.510

Values of probabilities are above 1% that shows the acceptance of null hypothesis in the Hausman test. The Null hypothesis assumes that the coefficients of dependent variables in fixed and random models are similar. If the coefficients are similar, there is no endogeneity problem. Probability of leverage variable is not specified because of negative variance of this variable. But, almost all similar coefficients of this variable in fixed and random effects document the acceptance of null hypothesis. This means that the estimations of model are not biased because of an endogeneity problem

5.7 Regression of WACC on Non-Executive Directors (NED) to find the pattern of their relationship

Non-executive/independent directors play an important role in monitoring and controlling managers and companies. The pattern of relationship between non-executive/independent directors (NED) and cost of capital (WACC) is an

interesting topic for academics and practitioners. Investigating the pattern between NED and WACC requires a specific equation which is presented below.

$$WACC_{it} = \alpha_i + \beta_1(NED_{it}) + \beta_2(NED_{it})^2 + \beta_3(NED_{it})^3 + \beta_4(LN(S)_{it}) + \beta_5(LEV_{it}) + \beta_6(GDP\ GROWTH_t) + \varepsilon_{it} \quad (5.6)$$

Results of estimating the above equation through OLS and GLS methods are reported in the Table 5.13. Investigating the relationship between non-executive/independent directors and cost of capital documents a cubic pattern between them. Signs of NED, NED² and NED³ coefficients indicate whether the pattern between non-executive/independent directors and cost of capital has an up/down/up or a down/up/down pattern.

Signs of coefficients in Table 5.13 show that there is an up/down/up relationship between NED and WACC. This means that when non-executive/independent directors have a low presence on boards, there is a positive relationship between NED and WACC. There is a negative relationship between NED and WACC when non-executive/independent directors are neither in minority nor majority. And finally when boards are dominated by non-executive/independent directors, there is a positive relationship between NED and WACC again.

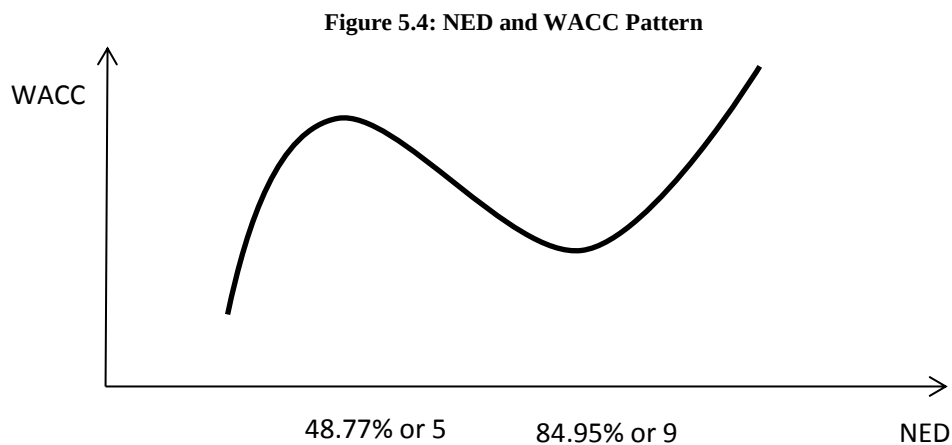
Table 5.13: OLS and GLS Regression of WACC on NED

	OLS	GLS
	WACC	WACC
Variable	Coefficient	Coefficient
C	-23.572*** (-5.390)	-14.437*** (-2.806)
NED	139.906*** (6.702)	89.874*** (4.068)
NED²	-225.735*** (-6.001)	-140.087*** (-4.056)
NED³	112.791*** (5.425)	67.415*** (3.840)
LN(s)	0.216 (1.012)	0.192 (1.488)
LEV	-0.355*** (-6.926)	-0.451*** (-12.010)
GDP GROWTH	0.013 (0.368)	0.016 (0.881)
F	17.484*** (0.00)	45.670*** (0.00)
Adjusted R²	0.43	0.67
N	135	135

***denotes correlation is significant at 0.01 level (2-tailed); **denotes correlation is significant at 0.05 level (2-tailed); * denotes correlation is significant at 0.1 level (2-tailed). Standard errors are also provided for each variable.

The OLS and GLS coefficients are statistically significant at 1%. R-squares of these estimations are different. R-square of OLS method is 0.45 and R-square of GLS is 0.68. The values of NED where the direction of pattern between NED and WACC changes can be calculated through the coefficients presented in Table 5.13. Based on these values, when there are less than 5 non-executive directors (48.77% of boards) on boards, there is a positive relationship between NED and WACC. This means that presence of one to five non-executive/independent

directors on boards will positively affect and increase the cost of capital. But presence of 5 or more non-executive/independent directors on boards negatively affects the cost of capital. The negative relationship between non-executive/independent directors and cost of capital will change when boards are dominated by non-executive/independent directors. According to findings of this study, the negative relationship between non-executive/independent directors and cost of capital changes when there are 9 or more non-executive/independent directors on boards. The pattern between NED and WACC is presented below:



When non-executive/independent directors are a minority, they do not have enough power to effectively monitor managers or they are not interested in becoming involved in company issues. So, non-executive/independent directors cannot positively affect performance. When boards are dominated by non-executive/independent directors, they have high monitoring power but they may focus on opportunistic behaviour. This behaviour could negatively affect companies and raise the cost of capital again.

5.7.1 Robustness test

Unit root test was checked and no significant relation was detected. In order to prevent the negative effects of heteroskedasticity problem when applying OLS,

White diagonal standard errors and covariance method which is robust to heteroskedasticity were employed. The Generalized least square method which is robust to heteroskedasticity and abnormally distributed data were employed. Endogeneity is another issue that was checked through the Hausman test and no significant value was detected. The related results are presented in the Table 5.14 below:

Table 5.14: Hausman test results for endogeneity

Variable	Fixed	Random	Prob.
NED	157.13	151.52	0.70
NED²	-210.89	-231.49	0.32
NED³	92.82	111.51	0.11
LN(S)	0.78	0.82	0.85
LEV	-0.06	-0.14	0.11
GDP GROWTH	0.00	0.00	0.90

The values of probabilities are above the 1% level. This indicates the acceptance of null hypothesis in the Hausman test. This means that the estimations of the model that investigates the relationship between NED and WACC are not biased because of endogeneity problem.

5.8 OLS Regression of WACC on Number of Female Directors (FMD) to find the pattern of their relationship

The role of female directors in companies is an important issue. Prior studies document that female directors raise the monitoring and controlling power of boards.

Existence of a cubic pattern between female directors and cost of capital will be investigated in the first step. Investigating square and linear relationships will be

second and the third scenario. The equation related to cubic pattern is presented below:

$$WACC_{it} = \alpha_i + \beta_1(FMD_{it}) + \beta_2(FMD_{it})^2 + \beta_3(FMD_{it})^3 + \beta_4(LN(S)_{it}) + \beta_5(LEV_{it}) + \beta_6(GDP\ GROWTH_t) + \varepsilon_{it} \quad (5.7)$$

Results of employing OLS and GLS methods indicate that there is no cubic relationship between the number of female directors and cost of capital in large listed companies in Singapore. The proportion of female directors on boards and the number of female directors were employed separately as independent variables. The presence of a square relationship was investigated after rejection of cubic relationship. The square relationship between female directors (board diversity) and cost of capital in large listed companies in Singapore was checked through the equation below:

$$WACC_{it} = \alpha_i + \beta_1(FMD_{it}) + \beta_2(FMD_{it})^2 + \beta_3(LN(S)_{it}) + \beta_4(LEV_{it}) + \beta_5(GDP\ GROWTH_t) + \varepsilon_{it} \quad (5.8)$$

Sign of FMD^2 indicates the pattern between female directors and cost of capital. Results of estimating the above equation through OLS and GLS methods indicate that there is no quadratic relationship between board diversity and cost of capital in large listed companies in Singapore.

Linear relationship between female directors and cost of capital was investigated as the third scenario. Presence of linear relationship between female directors and cost of capital was investigated through the equation below:

$$WACC_{it} = \alpha_i + \beta_1(FMD_{it}) + \beta_2(LN(S)_{it}) + \beta_3(LEV_{it}) + \beta_4(GDP\ GROWTH_t) + \varepsilon_{it} \quad (5.9)$$

The equation above reveals statistically insignificant coefficients for female directors. Thus, there is no linear relationship between board diversity and cost of capital in large listed companies in Singapore.

The insignificant role of female directors in large listed companies in Singapore is not strange as long as the presence of female directors on boards is very low. Based on Table 5.1, the mean and median of female directors in large listed companies in Singapore are 0.5 and 0 respectively. Descriptive statistics indicate that each board has less than one female director on average. Participation of female directors in Singapore's large listed companies seems to be dramatically low after the enactment of laws that require a specific proportion of female directors on boards.

Large board size in large listed companies in Singapore diminishes the percentage of female directors on boards. The proportion of female directors in Singapore large listed companies is 4.67% based on average board size of 10.7. The presence of 4.67% of female directors on boards in Singapore's large listed companies does not affect company performance and cost of capital.

5.9 OLS Regression of WACC on CEO Tenure (TENURE) to find the pattern of their relationship

Prior studies revealed different ideas about the premium number of years that a CEO should be at his/her position. It is argued that newly appointed CEOs need time to settle in and become familiar with company procedures. Some studies believe that long tenured CEOs become more interested in expropriation behaviour. In these cases CEOs have a negative effect on company performance. This relationship may have cubic or square patterns. The equation that will

investigate the existence of a cubic relationship between CEO tenure and cost of capital is:

$$WACC_{it} = \alpha_i + \beta_1(TENURE_{it}) + \beta_2(TENURE_{it})^2 + \beta_3(TENURE_{it})^3 + \beta_4(LN(S)_{it}) + \beta_5(LEV_{it}) + \beta_6(GDP\ GROWTH_t) + \varepsilon_{it} \quad (5.10)$$

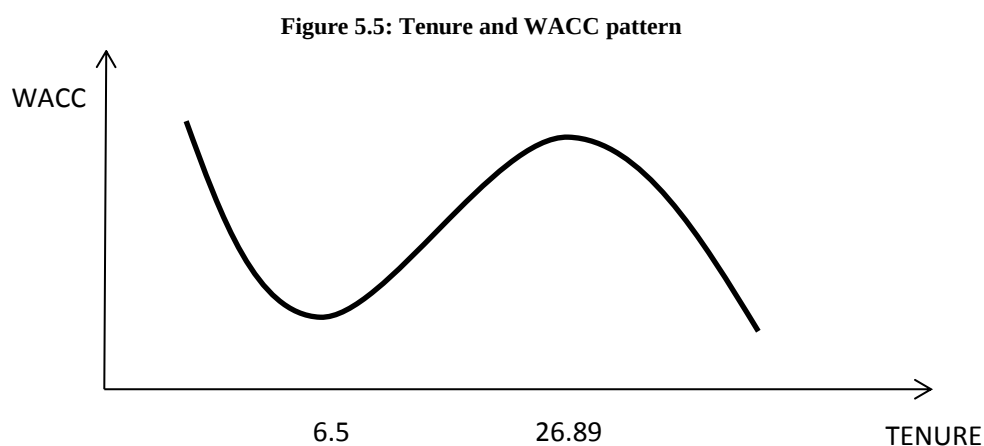
The signs of $TENURE$, $TENURE^2$ and $TENURE^3$ reveal the pattern between CEO tenure and cost of capital. Related results of estimating the above equation through OLS and GLS methods are presented in the Table 5.15.

Table 5.15: OLS and GLS Regression of WACC on TENURE

	OLS	GLS
	WACC	WACC
Variable	Coefficient	Coefficient
C	14.207*** (4.902)	9.830*** (5.444)
TENURE	-0.518** (-2.357)	-0.364** (-2.486)
TENURE²	0.050** (2.312)	0.034** (2.288)
TENURE³	-0.001** (-2.238)	-0.001** (-2.163)
LN(S)	-0.479*** (-2.627)	-0.216** (-2.050)
LEV	-0.396*** (-9.016)	-0.479*** (-14.171)
GDP GROWTH	0.035 (1.099)	0.019 (0.998)
F	17.151*** (0.00)	36.584*** (0.00)
Adjusted R²	0.42	0.62
N	135	135

***denotes correlation is significant at 0.01 level (2-tailed); **denotes correlation is significant at 0.05 level (2-tailed); * denotes correlation is significant at 0.1 level (2-tailed). Standard errors are also provided for each variable.

OLS and GLS methods reveal almost similar results. Both of these methods indicate a cubic relationship between CEO tenure and cost of capital. This cubic relationship has a down/up/down pattern. This means that when CEOs are newly appointed, there is a negative relationship between CEO tenure and cost of capital. When CEOs gain more experience in their positions there is a positive relationship between CEO tenure and cost of capital. And finally CEOs negatively affect the cost of capital when they have long background in that company. This relationship is presented in Figure 5.5.



The best period for CEOs is when they have tenure of less than 6.5 years or when they have tenure of more than 26.89 years based on the coefficients above. As indicated in the Figure 5.5 below, there is a negative relationship between CEO tenure and cost of capital when the CEO's tenure is less than 6.5 years. Thus, it is logical to track a positive relationship between CEO tenure and company performance considering that the CEO has less than 6.5 years tenure. When a CEO has more than 6.5 years and less than 26.89 years tenure, there is a positive relationship between CEO tenure and cost of capital.

The results of this study support the cubic relationship between CEO and cost of capital. This can be explained through agency theory. Although a newly appointed CEO needs time to get familiar with the company, new expertise and skills that he/she brings to the company will positively affect the company and reduce its cost of capital.

After some years, the opportunistic behaviour of the CEO leads him/her to focus on his/her interests and start to expropriate company wealth. Therefore, opportunistic behaviour of the CEO can negatively affect company performance. Based on the findings of this study, when the CEO spends a long time in the company (more than 26.89 years), he/she gets involved in company issues enough to care about company performance. In this situation, he/she has more than enough experience to run the company. Consequently, they will positively affect company performance and reduce the cost of capital.

5.9.1 Robustness test

Unit root test was checked and no significant relation was detected. In order to prevent the negative effects of heteroskedasticity problem when applying OLS, White cross-section standard errors and covariance method which is robust to heteroskedasticity were employed. The Generalized least square method which is robust to heteroskedasticity and not normally distributed data was employed. Endogeneity is another issue that was checked through the Hausman test and no significant value was detected. Related results are presented in the Table 5.16 below:

Table 5.16: Hausman test results for endogeneity

Variable	Fixed	Random	Prob.
TENURE	-0.293	-0.407	0.169
TENURE²	0.015	0.031	0.105
TENURE³	0.000	-0.001	0.093
LN(S)	-0.928	-0.776	0.173
LEV	-0.181	-0.282	0.12
GDP GROWTH	0.036	0.037	0.685

Values of probabilities are above 1% in the Table 5.16 above. This indicates the acceptance of null hypothesis in the Hausman test. This means that the estimations of the model employed to assess the relationship between CEO tenure and WACC are not biased because of endogeneity problem.

5.10 OLS Regression of WACC on CEO DUALITY to find the pattern of their relationship

Although it is not common in large companies, some companies still appoint the same person as chairman and CEO. This study will investigate the effect of CEO duality on cost of capital. Through this investigation, companies that obey the academic theories and separate CEO and chairperson can check whether their decision on separating CEO and chairperson was correct or not. CEO duality enter as a dummy variable, the related equation will be:

$$\begin{aligned} \text{WACC}_{it} = & \alpha_i + \beta_1(\text{DUALITY}_{it}) + \beta_2(\text{LN(S)}_{it}) + \beta_3(\text{LEV}_{it}) + \beta_4(\text{GDP GROWTH}_t) \\ & + \varepsilon_{it} \end{aligned} \quad (5.11)$$

The results of this estimation are reported in the Table 5.17.

Table 5.17: OLS and GLS Regression of WACC on CEO DUALITY

	OLS	GLS
	WACC	EACC
Variable	Coefficient	Coefficient
C	12.755*** (4.665)	7.983*** (4.340)
DUALITY	2.076*** (4.003)	1.715*** (6.839)
LN(S)	-0.473*** (-2.726)	-0.163 (-1.393)
LEV	-0.376*** (-8.916)	-0.473*** (-15.066)
GDP GROWTH	0.026 (0.844)	0.012 (0.726)
F	30.567*** (0.00)	112.314*** (0.00)
Adjusted R²	0.47	0.77
N	135	135

***denotes correlation is significant at 0.01 level (2-tailed); **denotes correlation is significant at 0.05 level (2-tailed); * denotes correlation is significant at 0.1 level (2-tailed). Standard errors are also provided for each variable.

A positive sign of DUALITY coefficient in these estimations indicates the positive linear relationship between CEO duality and cost of capital. This means that CEO duality increases cost of capital.

Unit root test was checked and no significant problem was detected. In order to prevent the negative effects of heteroskedasticity problem when applying OLS, White cross-section standard errors and covariance method which is robust to heteroskedasticity were employed. The Generalized least square method which is robust to heteroskedasticity and abnormally distributed data were employed. Endogeneity is another issue that was checked through the Hausman test and no significant value was detected.

5.11 Summary of Chapter

The relationship between corporate governance practices and cost of capital in large listed companies in Singapore has been investigated in this chapter. Descriptive statistics of corporate governance variables and cost of capital in large listed companies in Singapore were presented in the first part of this chapter. Second part of this chapter described the relationship between corporate governance practices and cost of capital in large listed companies in Singapore. And the pattern between each of these corporate governance variables and cost of capital was presented in the third part of this chapter.

The important questions that were investigated in this chapter are: 1) whether corporate governance practices affect cost of capital in large listed companies in Singapore? 2) What is the pattern of relationship between insider ownership and cost of capital in large listed companies in Singapore? 3) What is the pattern of relationship between block ownership and cost of capital in large listed companies in Singapore? 4) What is the pattern of relationship between board size and cost of capital in large listed companies in Singapore? 5) What is the pattern of relationship between non-executive/independent directors and cost of capital in large listed companies in Singapore? 6) What is the pattern of relationship between board diversity (female directors) and cost of capital in large listed companies in Singapore? 7) What is the pattern of relationship between CEO tenure and cost of capital in large listed companies in Singapore? 8) What is the pattern of relationship between CEO duality and cost of capital in large listed companies in Singapore?

The findings of this study indicate the important role of corporate governance practices on cost of capital in large listed companies. Outcomes of this study indicate a negative relationship between insider ownership and cost of capital and a positive relationship between block ownership and cost of capital. While the coefficient of insider ownership is not statistically significant, the coefficient of block ownership is statistically significant.

Results of this study also reveal a negative relationship between the number of directors and number of non-executive/independent directors and cost of capital. OLS estimation indicates a positive relationship between female directors and cost of capital. But estimation through GLS method indicates a negative relationship between female directors and cost of capital. Coefficients of CEO tenure and CEO duality in estimations are negative and positive, respectively.

Findings of this study indicate a cube pattern between insider ownership and cost of capital. This cubic relationship is a down/up/down relationship where cost of capital decreases while insider ownership is less than -21.57%. Cost of capital starts to increase when insider ownership is more than -21.57%. This increase in cost of capital exists while insider ownership is less than 20.07%. When insider ownership is more than 20.07%, cost of capital starts to decrease again. Based on the descriptive statistics in this chapter, average insider ownership is 1.88% which is less than 20.07%. Negative values of insider ownership are not meaningful. Therefore, it is logical to accept a square (up/down) relationship between insider ownership and cost of capital.

Estimations of this study indicate a negative relationship between insider ownership and cost of capital. As mentioned in the descriptive statistics, the data

of insider ownership are not normally distributed. This study works with not normally distributed data because of fat-tailed distribution. This means the data on tails are not excludable. Therefore, the real average of insider ownership is not 1.88%.

Findings of this study reveal a quadratic pattern between block ownership and cost of capital which is an up/down relationship. In this relationship when block ownership is less than 83.77% cost of capital increases. When block ownership is more than 83.77%, there is a negative relationship between block ownership and cost of capital. Fat-tail distribution problem exists in block ownership estimations as well. The mean and median of block ownership in Singapore's large listed companies are 71.87% and 75.37%, respectively.

A down/up pattern between board size and cost of capital emerged in this study. Therefore, cost of capital decreases when board size is less than 11. When board size is more than 11, a positive relationship between board size and cost of capital was indicated. Descriptive statistics document that the average board size is 10.7 members. Therefore, when boards have more than 11 members, there is a negative relationship between board size and firm performance.

Findings of this study indicate a cubic relationship between non-executive/independent directors and cost of capital. This cubic relationship is an up/down/up relationship where cost of capital increases while the number of non-executive/independent directors is less than 5 (or 48.77% of board). When the number of non-executive/independent directors is more than 5 and less than 9, there is a negative relationship between non-executive/independent directors and cost of capital. And finally when more than 9 outside directors (or 84.95% of

boards) exist on boards, there is a positive relationship between non-executive/independent directors and cost of capital. Based on the descriptive statistics, the average number of non-executive/independent directors on boards is 8 which is between 5 and 9. Thus, the relationship between non-executive/independent directors and cost of capital is negative. The finding in Table 5.3 supports this pattern.

The findings of this study reveal no significant role for female directors on cost of capital in Singapore large listed companies. Mean and median of female directors are 0.5 and zero, respectively. Based on descriptive statistics in Table 5.1, the average number of female directors on boards is 4.67%. Thus, the limited number of female directors on relatively large boards of Singapore's large listed companies restricts their effectiveness on boards. Consequently no significant relationship was detected between female directors and cost of capital.

The pattern between CEO tenure and cost of capital is a cube pattern which is a down/up/down relationship. This means that while the tenure of CEOs is less than 6.5 years, there is a negative relationship between CEO tenure and cost of capital. When CEO tenure is more than 6.5 years and less than 26.89 years, there is a positive relationship between CEO tenure and cost of capital. And finally, when CEO tenure passes 26.89 years, there is a negative relationship between CEO tenure and cost of capital again. Descriptive statistics in this study indicate that the average CEO tenure in Singapore large listed companies is 6.13 years which is less than 6.5 years. Thus a negative relationship exists between CEO tenure and cost of capital which is supported by Table 5.3. The kurtosis value of CEO tenure shows that there is a long tail in distribution of this data. This kurtosis value indicates that the real average of CEO tenure is something more than 6.13 years.

Although the duality is not recommended by academics and authorities, existence of duality in some companies leads this study to take this variable into consideration. The pattern between CEO duality and cost of capital and Table 5.3 document a positive relationship between CEO duality and cost of capital. This study supports the findings of other studies about the negative effect of CEO duality in companies. This negative effect on companies is presented as a positive relationship between CEO duality and cost of capital.

Chapter 6 SUMMARY AND CONCLUSION

6.0 Introduction

This chapter provides a summary of findings regarding the relationship between corporate governance practices and cost of capital in large listed companies in New Zealand and Singapore. The empirical studies reported in chapters 4 and 5 will also be interpreted to provide guides for any area in which governance practices play an important role such as policy makers and authorities. Finally, some possible suggestions for future governance research are provided in this chapter.

6.1 Focus of this study

Corporate governance changes are often the response to exogenous factors. Low changes regulates in response to a perceived need. High profile corporate failure and scandals (Enron (US), Tyco (US), WorldCom (US), British & Commonwealth (UK), Maxwell (UK), OneTel (Australia), Parmalat (Italy)) occurred internationally arousing practitioners and academics interest in managing the situation by focusing on corporate governance practices all around the world. The necessity for greater accountability and transparency in controlling and managing corporations play a significant role in company performance.

Therefore, various laws, rules and regulations were passed in different countries in order to control corporate governance. In recent years, adoption of ‘soft laws’ (Morth, 2004) or ‘soft regulations’ (Sahlin-Andersson, 2004) in the form of codes, principles and guidelines have attracted much attention. Weil & Manges (2003) define these codes, principles and regulations as ‘a non-binding set of principles and guidelines, standards or best practices, issued by a collective body and related to the internal governance of corporations’. The main idea was that governance

practices based on these codes and principles help companies and/or industries to manage better development.

Authorities in New Zealand and Singapore also defined principles and guidelines for corporate governance in order to improve efficiency, transparency and accountability. Nine high-level statements or principles were issued by the NZSC in 2004 for New Zealand's market. These statements and principles were accompanied by suggestions as to how these should be implemented. Achieving better corporate governance practices along with controlled cost of capital and were assumed to be the result of adopting these principles and guidelines in New Zealand. For example, the important role of board of directors as one of the internal governance mechanisms in controlling cost of capital has been recognized in these principles and guidelines. In this regard, NZSC recommends a higher presence of independent directors and managers by having an independent chairman and more non-executive/independent directors.

The Monetary Authority of Singapore (MAS) also released an updated version of the Singapore code of corporate governance. This guideline includes six principles with each of these principles has a number of strategies and statements for implementation. The Monetary Authority of Singapore believes that implementing these governance performance guidelines will improve companies' performance. Similar to the NZSC in New Zealand, the MAS in Singapore emphasizes that more independent boards and managers along with a large number of independent and non-executive directors in boards will improve financial performance based on MAS guidelines.

As a first step, this study explored the outcomes of compliance with principals and guidelines of corporate governance practices in companies. In this thesis, relationship between corporate governance practices and cost of capital was investigated in large listed companies in New Zealand and Singapore. Secondly, the pattern of relationship between each corporate governance variable and cost of capital was investigated in this thesis.

Different corporate governance variables have been employed in this thesis. These variables were presented by prior studies as effective factors in mitigating agency problems. These variables include: insider ownership, block ownership, board size, board independency, board gender diversity, CEO duality and CEO tenure. The size of companies, leverage and economic growth rate were employed as control variables in this study.

6.2 Summary of Empirical Results

Findings of this study indicate that large listed companies have complied with corporate governance practice guidelines. This study reveals that large listed companies in New Zealand and Singapore have good governance practices such as separation of board and management and employing non-executive/independent directors.

Different theories can explain the present situation of corporate governance in these two countries. Agency theory, stakeholder theory and resource dependency theory believe that separation of ownership and control is required in companies. Differing number of directors on boards, presence of non-executive independent directors along with separation of CEO and chairman of the board are characteristics of the boards in these countries that comply with present theories. Insider ownership in companies reflects the interpretation of stewardship theory

that emphasizes the similar interests between managers and owners. A high proportion of non-executive/independent directors in these companies protect boards from domination by one party. Empirical results of this study reveal different outcomes in different markets and economies. Different corporate governance conditions in New Zealand and Singapore may be the reason for differing empirical results. Difference in board size, block ownership and insider ownership are examples of difference in corporate governance situations.

Different theories, such as Agency Theory, Resource Dependency Theory and Stakeholder Theory, each offer a different view on structuring the most efficient/best boards in companies. But prior studies believe that larger companies require more supervision of control and monitoring (Coles, 2008; Guest, 2008; Linck, 2008). Therefore, a suggestion for large companies is to have large boards along with more independent directors. Based on Tables 4.1 and 5.1, the average board size in New Zealand is 7 while this number is 11 in Singapore.

Boone et al. (2007) mention that company size and diversity are effective factors in board size and board independency. The descriptive statistics presented in Tables 4.1 and 5.1 indicate that companies in Singapore are larger than companies in New Zealand. Tables 4.2 and 5.2 also indicate a positive correlation between board size and firm size in both countries. Some other factors such as ownership concentration, state ownership, rules and regulations, debt and firm age were also presented by prior studies as affecting factors on board size (Chen, 2012).

Tables 4.1 and 5.1 indicate that large companies in Singapore have higher leverage. Therefore, the rate of debt usage in these companies is higher. Also block owners have a higher percentage of ownership in Singapore in compare

with New Zealand. This could be another reason of having larger boards. Abundant percentage of state ownership in Singapore is another issue that could affect board structure (Ang, 2006; Y. T. Mak, Li, Y, 2001). The empirical results of examination of the hypotheses are presented below.

6.2.1 Board characteristics and cost of capital

6.2.1.1 Board Size

Results of this study indicate that board size does not have a statistically significant effect on cost of capital in large listed companies in New Zealand. Although small and efficient boards have been highly recommended in prior studies, the average board size of seven in large listed companies in New Zealand seems inefficient (Lipton, 1992). The potential pattern between board size and cost of capital was extracted in this thesis. Results of this thesis reveal a square (inverse U-shape) relationship between board size and cost of capital. Based on this inverse U-shape relationship, when a board of directors includes less than 8 members, there is a positive relationship between board of directors and cost of capital.

Findings of this study indicate that there is a negative relationship between board size and cost of capital when there are more than 8 board members. According to descriptive statistics, average board size in large listed companies in New Zealand is seven. Thus, larger boards are required in companies in order to have a negative relationship between board size and cost of capital. Therefore, the monitoring power of larger boards is required in large listed companies of New Zealand.

Outcomes of this study about the relationship between board size and cost of capital in large listed companies in Singapore indicate that board size has statistically significant and negative effect on cost of capital. Results of this study

reveal a U-shape pattern between board size and cost of capital in large listed companies in Singapore. Based on this U-shape relationship, as long as a board of directors has less than 11 members, there is a negative relationship between board of directors and cost of capital. When the board of directors has more than 11 members there is a positive relationship between board size and cost of capital. Based on descriptive statistics, the average board size in large listed companies in Singapore is 11. Thus, it is recommended to have smaller boards in Singapore. Boards with less than 11 members can negatively affect cost of capital.

Comparing two different sets of companies in two different economies reveals interesting results. New Zealand is a relatively smaller economy with a unique geographical situation. Companies in New Zealand have small boards with an average of seven directors. Although smaller boards have different benefits such as flexibility, it seems that larger boards could help companies to diminish the cost of capital.

In contrast to New Zealand's market, where larger boards are recommended, Singapore is experiencing a different situation. Singapore is a larger economy compared to New Zealand and contains larger companies. Boards of directors in large listed companies in Singapore average 11 members. Results of this study indicate that boards of directors with more than 11 members could harm companies through increasing cost of capital.

Therefore, smaller boards of directors that include less than 11 members are recommended for Singapore's large listed companies. Higher supervision and support and different ideas on boards were mentioned respectively by agency theory, resource dependency theory and stakeholder theory. These benefits are

achievable through smaller boards in Singapore and larger boards in New Zealand.

6.2.1.2 Board Independency

Results of this thesis indicate that there is a statistically significant and negative relationship between board independency and cost of capital in large listed companies in New Zealand. This negative relationship indicates that the NZSC's recommendation of appointing at least one third of board members from non-executive/independent directors has positive effects on companies. The average of non-executive/independent directors is 5 members which is equal to 70% of boards in large listed companies in New Zealand.

This much independency of boards makes them more efficient and effective in controlling the cost of capital. Investigating the pattern of relationship between non-executive/independent directors and cost of capital in this study reveals a cubic pattern which is an up/down/up relationship. Based on this pattern, when boards include less than 3 non-executive/independent directors, there is a positive relationship between non-executive/independent directors and cost of capital. The small proportion of independent directors may be the reason for this positive relationship.

There is a negative relationship between number of non-executive/independent directors and cost of capital when there are more than 3 and less than 8 non-executive/independent directors on boards. So, as long as the number of non-executive/independent directors is between 3 and 8, this type of directors positively affects their company. When more than 8 non-executive/independent directors are on boards there is a positive relationship between non-executive/independent directors and cost of capital. Thus, the efficient range of

non-executive/independent directors in New Zealand large listed companies is between 3 to 8 directors. As the present number of non-executive/independent directors in large listed companies in New Zealand is 5, it is sensible to expect positive roles for them.

Results of this thesis, regarding the effect of non-executive/independent directors on cost of capital in Singapore's large listed companies, reveal statistically significant and negative relationship between non-executive/independent directors and cost of capital. This means that the present level of board independency in large listed companies in Singapore helps companies to diminish their cost of capital. Average board size of large listed companies in Singapore is relatively large which leads to appointing larger numbers of non-executive/independent directors on their boards.

In large listed companies in Singapore, the pattern between non-executive/independent directors and cost of capital was found to be a cubic pattern with an up/down/up shape. When less than 5 non-executive/independent directors are on boards, there is positive relationship between non-executive/independent directors and cost of capital. When the number of non-executive/independent directors is more than 5 and less than 9, there is a negative relationship between non-executive/independent directors and cost of capital. When more than 9 non-executive/independent directors are on boards, there is a positive relationship between non-executive/independent directors and cost of capital. Thus, the efficient range of non-executive/independent directors is between 5 and 9 members. As the present number of non-executive/independent director on boards is 8, it is reasonable to expect positive roles from non-executive/independent directors on company performance.

New Zealand, as a relatively smaller economy with unique geographical situation, has small boards with an average of 5 non-executive/independent directors. Although boards are relatively smaller in New Zealand, the proportion of boards occupied by non-executive/independent directors is high. The high proportion of non-executive/independent directors positively affects company performance. While there are more than 3 and less than 8 non-executive/independent directors on boards, there is a negative relationship between non-executive/independent directors and cost of capital. However, in Singapore, this range is more than 5 and less than 9 non-executive/independent directors where there is a negative relationship between non-executive/independent directors and cost of capital. Results of this study indicate that the existing number of outside directors on boards in large listed companies in New Zealand and Singapore is efficient and staying in the range mentioned, which will guarantee efficiency.

6.2.1.3 Board Diversity

Outcomes of this study indicate that there is no statistically significant relationship between board diversity and cost of capital in New Zealand, although prior studies pointed out that board diversity will improve company efficiency. Any negative role of board diversity on cost of capital is not obvious (Adams, 2009). Relatively small boards in large listed companies in New Zealand limit the opportunity for female directors to sit on boards.

Average employment of female directors on boards of large listed companies in New Zealand is less than one. The ineffective role of female directors on boards may be the result of this low presence. Investigating the pattern between board diversity and cost of capital in large listed companies in New Zealand indicate that there is a U-shape pattern between board diversity and cost of capital. Based

on this pattern, when there are less than 2 female directors on boards, there is negative relationship between board diversity and cost of capital. Boards with more than 2 female directors positively affect cost of capital. Regarding the ineffective role of female directors or the harmful effect of board diversity, the situation in New Zealand's large listed companies is in line with the findings of prior studies such as Adams (2007) and Almazan (2003).

Outcomes of this study indicate that there is no statistically significant relationship between board diversity and cost of capital in large listed companies in Singapore. Relatively large boards in Singapore's companies may be one of the reasons for this insignificant relationship. On average, every two boards have one female director which reflects the limited board diversity in Singapore's companies. Investigating the pattern between board diversity and cost of capital in large listed companies in Singapore shows no pattern. The small proportion of female directors on boards may be one possible reason for this ineffectiveness while no obvious pattern indicates that an ineffective role is likely for board diversity on cost of capital.

Comparing two different countries, along with prior studies regarding effectiveness of board diversity, indicates that diversity in large listed companies in New Zealand and Singapore plays no effective role in companies' cost of capital. Along with the positive role of board diversity on company performance, some studies reveal that female directors negatively affect company performance. This study documents that board diversity cannot add value to companies through affecting cost of capital.

6.2.2 Ownership and cost of capital

6.2.2.1 Block Ownership

Results of this study indicate that there is no statistically significant relationship between block ownership and cost of capital in large listed companies in New Zealand. Based on prior studies, the positive role of block ownership was expected to be tracked in companies' efficiency. Investigating the pattern between block ownership and cost of capital reveals a cubic pattern. This cubic pattern is in the form of a down/up/down relationship.

Prior studies named two different effects regarding the role of block ownership on companies (Gugler, 2004). These two effects are alignment of interests and entrenchment effect. The pattern between block ownership and cost of capital in large listed companies in New Zealand supports the presence of alignment and entrenchment effects. Based on the findings of this study, block owners negatively affect cost of capital in large listed companies while they have less than 32% of ownership. In such a situation, block owners' interests and companies' interests are in line.

When block owners own more than 32%, the entrenchment effect and opportunistic behaviour of block owners negatively affect companies. This happens as long as block owners have less than 66% of ownership. Finally, the interests of block owners and companies will be in line again when block owners have more than 66% of ownership. Thus, there is a negative relationship between block ownership and cost of capital when block owners own more than 66%. Findings of this thesis suggest that when block owners own less than 32% and more than 66%, they can positively affect companies through decreasing cost of capital.

Based on the findings of this thesis, block owners have statistically significant and positive effects on cost of capital in large listed companies in Singapore. Singapore has a unique situation in block ownership. In this country, block ownership in large listed companies seems relatively too high. The average block ownership in these companies is 72%. Assessing the pattern between block ownership and cost of capital reveals an inverse U-shape pattern.

Relatively high levels of block ownership in these companies limit the probability of tracking cubic relationship. Based on the findings of this study, there is a positive relationship between block ownership and cost of capital when block owners have less than 84% of ownership. Agency theory can explain this situation through entrenchment effect. Block owners either are not interested in company issues or prefer to focus on expropriation behaviour rather than becoming involved in company issues. When block owners have 84% of ownership or more, they negatively affect cost of capital. So, when block owners own more than 84% of shares, they positively affect their companies. Based on agency theory, they feel that their interests are in line with company interests. Therefore, a block ownership of more than 84% is recommended in Singapore.

Comparing the situation between New Zealand and Singapore reveals different aspects of block ownership. Average block ownership is not relatively high in New Zealand. It is assumed to track a cubic pattern where alignment of interests exists in primary and at a high level of block ownership. But in the medium level, entrenchment effect leads block holders to negatively affect companies. Findings of this study indicate that when block owners hold a relatively high proportion of ownership in companies, it is hard to track various changes in their behaviour. Consequently, Singapore's large listed companies have experienced a square

pattern between block ownership and cost of capital. Block owners positively affect cost of capital at primary levels but at a relatively high level of block ownership, they start to negatively affect the cost of capital.

6.2.2.2 Insider Ownership

Results of this thesis reveal statistically significant and negative relationship between insider ownership and cost of capital in large listed companies in New Zealand. The average insider ownership is 8% in New Zealand. This insider ownership encourages insiders to get involved in company's issues and positively affect their companies.

Agency theory explains this behaviour through alignment of interests between insiders and the company. Investigating the pattern between insider ownership and cost of capital reveals a cubic pattern between them. Based on the outcomes of this study, while insiders own less than 13.16% of ownership, there is a positive relationship between insider ownership and cost of capital. Entrenchment effect in this range of ownership negatively affects insiders' performance.

When insiders own more than 13.16% up to 50.63%, there is a negative relationship between insider ownership and cost of capital. Based on agency theory, interests of insiders are in line with the company's interests during this range. When insiders own more than 50.63% of ownership, they start to positively affect cost of capital again. Findings of this study indicate that when insiders own more than 50.63% of ownership, the opportunistic behaviour of insiders negatively affects their performance and leads to negative role of insiders on company's interests. The average insider ownership in New Zealand is reported to be 8% in Table 5.1. It was expectable to track positive relationship between insider ownership and cost of capital but abnormal distribution of data leads to

high skewness and kurtosis values. High positive values of these statistical variables indicate that these variables have long and fat tail distribution. Thus, it is sensible to accept that the real average of this variable is not 8% and that it should be more.

Results of this study reveal complicated relationship between insider ownership and cost of capital in large listed companies in Singapore. Based on the results of this study, there is no significant relationship between insider ownership and cost of capital. Relatively low percentage of insider ownership in large listed companies in Singapore may be the reason of this ineffectiveness. 2% ownership was reported as the average insider ownership in Singapore's large listed companies where high values of skewness and kurtosis statistics represent abnormal distribution of this variable.

Investigating the pattern between insider ownership and cost of capital reveals a cubic pattern between these variables. This cubic pattern is in the form of a down/up/down relationship. Dramatically small insider ownership affects the pattern between insider ownership and cost of capital. Almost half of the pattern of relationship stays in negative parts of ownership which is not acceptable. Ignoring that part, the remaining parts indicate an inverse U-shape relationship. Based on the acceptable part, when insiders own less than 20.07%, there is a positive relationship between insider ownership and cost of capital.

In fact, insiders are not interested in company's issues when they own less than 20.07%. They prefer to focus on opportunistic behaviour rather than involving in company's issues while they own less than 20.07%. Results of this study show that insiders negatively affect cost of capital when they own more than 20.07%.

Therefore insiders' interests and company's interests are in line above 20.07% of insider ownership.

In New Zealand, where insider ownership is relatively higher than Singapore, a cubic pattern exists between insider ownership and cost of capital. Based on this cubic pattern, insider ownership positively affects companies when they own more than 13.16% and less than 50.63%. The situation in Singapore, where insiders own a small proportion of ownership, is different. In Singapore, insiders positively affect their companies when they own more than 20.07% of shares. In fact in primary levels of ownership, insiders are not interested in company's issues. They prefer to focus on opportunistic behaviour rather than getting involved in company's issues because they believe that the present level of ownership is not high enough to result in improvement of the company.

6.2.3 CEO characteristics and cost of capital

6.2.3.1 CEO tenure

Results of this thesis reveal statistically significant and positive relationship between CEO tenure and cost of capital in large listed companies in New Zealand. This means that CEOs who stay in their position for longer periods negatively affect their companies and increase the cost of capital. A cubic relationship is documented between CEO tenure and cost of capital based on the results of this study. Based on this cubic pattern, newly appointed CEOs positively affect the cost of capital during their first 3.3 years of employment. It is obvious that newly appointed CEOs need time to become familiar with company procedures and time to settle down.

CEOs with more than 3.3 years tenure positively affect their company by decreasing cost of capital. Based on the data obtained from large listed companies

in New Zealand, CEOs who are in the third year of their tenure negatively affect cost of capital. CEOs that stay longer than 4 years in their jobs start to negatively affect their company. Results of this study indicate that CEOs with more than 4 years tenure, positively affect the cost of capital. Focusing on opportunistic behaviour and expropriation of company wealth may be reasons for this behaviour from CEOs.

Through investigating large listed companies in Singapore, the results of this thesis reveal different insights to CEO tenure. Based on the results of this study, there is a statistically significant and negative relationship between CEO tenure and cost of capital in Singapore. Thus, longer tenured CEOs positively affect companies. Results of this study indicate a cubic relationship between CEO tenure and cost of capital. Based on this pattern, CEOs negatively affect cost of capital while they have less than 6.5 years tenure. When CEOs have more than 6.5 years tenure, they start to positively affect the cost of capital. After a while, they start to expropriate company wealth and negatively affect their company. CEOs continue to increase company cost of capital when they pass their 27th year of career. After spending long periods in their position, they negatively affect the cost of capital again. Therefore, CEOs who have long tenures finally take care of their company and positively affect their company by diminishing cost of capital.

The average number of years that CEOs stay in their position is almost the same in New Zealand and Singapore (both around 6 years). Median, maximum, minimum and other statistics are almost the same in the two countries. It is assumed that size and other characteristics of their companies lead to these different results.

The best period of CEO performance in New Zealand is between 3.3 and 4 years while in Singapore this period is before 6.5 years and after 27 years. Results of this study indicate that CEOs perform better while they have less than 6.5 years tenure in relatively large and more internationalized companies. CEOs in these companies perform better after spending more than 27 years in their job. But, in a relatively smaller economy, CEOs perform to their best after spending 3.3 years at the job. Capability of big companies in employing experienced and well-known CEOs may be the reason for these varying time spans. Small economies have a smaller pool of expertise and companies should select from these pools. So, in small economies, it is more likely that CEOs spend more time becoming familiar with company procedures and business issues.

6.2.3.2 CEO duality

Although appointing the same person as CEO and chairman of the board is not recommended by authorities in both New Zealand and Singapore, presence of CEO duality in some companies guides this thesis to investigate the effect of this duality on cost of capital. Regarding the relationship between CEO duality and cost of capital in large listed companies in New Zealand, results of this thesis reveal a statistically significant and positive effect. This study indicates that appointing the same person as CEO and chairman of the board in large listed companies in New Zealand increases the cost of capital. Assessing the role of CEO duality in Singapore's large listed companies reveals a statistically significant and positive effect on cost of capital. Thus, CEO duality in Singapore's large listed companies is not recommended. Appointing same person as CEO and chairman of the board increases the cost of capital and negatively affects company performance in Singapore.

Therefore, comparing the situation of New Zealand as a relatively smaller economy and Singapore as a larger and more internationalized economy reveals the same role for CEO duality. In both economies CEO duality negatively affects the large listed companies' efficiency through raising their cost of capital.

6.3 Contributions

The major contributions to this study involving new knowledge are presented below.

This research investigates the relationship between corporate governance practices and cost of capital. There is a clear indication in the findings that components of corporate governance do impact the cost of capital. As an example in both New Zealand and Singapore non-executive/independent directors impact the cost of capital favourably. Lower cost of capital provides better opportunities for companies to empower themselves and increase their profit. Therefore, implementing corporate governance guidelines based on relevant empirical research will assist companies to lower cost of capital and increase the value of the businesses. This in turn contributes positively to GDP growth.

Investigating the pattern between corporate governance practices and cost of capital in New Zealand and Singapore prepare good opportunity for academics and practitioners to understand the role of corporate governance principles in economies which are apart from big economies such as US, UK and other European countries. For example, optimally seven to eight board members suggested by prior studies (Jensen, 1993). Findings of this research indicate that more than eight board members required to negatively affecting cost of capital in New Zealand.

Comparing an isolated economy with an open economy indicate that an agricultural base economy with high geographical distance from the world such as New Zealand experienced less harmful effects of financial crisis. A more internationalized economy like Singapore that well-known as the financial hub of its region experienced great effects of financial crisis on its economy during and after financial crisis.

Results of this research indicate different recommendations in an open economy like Singapore which include larger companies in compare with local economy like New Zealand. For example, 11 or less board members required in large listed companies in Singapore while large listed companies in New Zealand require 8 or more board members. Results of this study recommend lower number of non-executive/independent directors in boards in Singapore while the present number of these directors in New Zealand seems optimal. Different recommendations suggested while the presence of non-executive/independent directors is almost similar in both countries (71% in New Zealand and 77% in Singapore).

Outcomes of this study indicate the best method of calculating cost of capital. Three different methods such as CAPM, FF3F and Momentum model were investigated in this study. Outcomes of this study document that the Momentum model has a better explanatory power than CAPM and FF3F in New Zealand and Singapore.

6.4 Implications

The findings of this study have policy implications in New Zealand and Singapore, for larger listed companies. Companies should be able to foresee the effects of their decisions on cost of capital when they are modifying or changing

corporate governance characteristics. A summary of suggestions drawn from the findings of this study are listed in table 6.1 below:

Table 6.1: Summary of recommendations by this study

	New Zealand	Singapore
	It is recommended to ...	
IOWN	Increase	Increase
BOWN	Increase/Decrease	Increase
BDS	Increase	Maintain/Decrease
NED	Maintain	Maintain/Decrease
FMD	Maintain	N.A.
TENURE	Decrease	Decrease/Increase severely
DUALITY	NO Duality	NO Duality

Outcomes of this study have implications for education, Institute of Directors (IODs), Stock exchange market, investor and managers. Distinct recommendations of this study determine that academics need high investigations in this area. Insider ownership more than 13% and 20% recommended in New Zealand and Singapore respectively. Based on this recommendation academics understand that insiders need more incentives to get involve with a company's issues. The present form of insider ownership does not motivate insiders and potential methods to enhance the attractiveness of expanding insider activity should be investigated by academics. No significant role of diversity in boards is another issue that is not completely in line with what gender balance advocates

would wish to see. Diversity on boards is not positively correlated with the cost of capital.

The need for more qualified directors which should positively impact the cost of capital suggests there is a key role for the IOD in developing professional skills. Policies of increasing or decreasing the number of directors in companies are important for IOD members because of numerous demands of professional directors. The small pool of directors in New Zealand and an indicated need to increase board size signals a higher demand for professional directors in the future.

Outcomes of this study indicate the importance of the stock market in disclosure of information. Based on the outcomes of this research a relatively small and isolated economy can offer a smaller pool of directors to companies compared with larger and more internationalised economies. The stock market should focus on training more directors and editing rules and regulations.

Institutional and larger investors appraise their holding in companies and look to their future positions in a structured manner. Investors may alter their perspective after considering the findings in Table 6.1 about the role of insider ownership and block ownership. There is an issue about the international flow of funds with lenders and owners wanting boards to have sound policy for cost of capital and capital structure. Higher levels of control over management require building larger block ownerships in both Singapore and New Zealand. Higher levels of insider ownership, in both countries, are positively related to the cost of capital.

6.5 Limitation of Research

There are various limitations impacting this research arising from data availability.

- 1) The statistical distribution of some data reflects significant skewness and long tails. Statistical estimations need an acceptable number of observations in order to lead to unbiased results. Elimination of outliers was not an even process which could be applied to all data uniformly. It became necessary in the case of some companies and just some variables.
- 2) Missing data which result from limited transactions of companies in small economies were another limitation affected this study. Many companies in New Zealand have a transaction on just some days of a week. Therefore, this study faced a thin market with sporadic of transactions in New Zealand market.
- 3) The renaming of companies and changes to reporting periods result in gaps in the data set.
- 4) The time period for the study commenced in 2006 due primarily to the non-availability of data in New Zealand prior to this date. A longer series would have provided the opportunity to have experienced more boom and bust events and more changes to the regulatory environment impacting corporate governance.
- 5) Only large listed companies are investigated in this research. Clearly it is perilous to generalise the outcomes of this study to all listed or unlisted companies in these countries or other countries but it nevertheless build understanding based on robust findings.

6.6 Directions for future research

Further studies could focus on extending this research in various directions. Some of these are identified as follow.

Firstly, the focus of this study was on the outcome when complying with New Zealand and Singapore authorities' recommendations and guidelines about corporate governance practices in large listed companies. Although large listed companies play important roles in each economy, the role of other companies can't be ignored. Future studies could clarify these effects in small, medium and public companies.

Secondly, undertaking similar studies in other economies could help to clarify the exact role of corporate governance characteristics on cost of capital. Each economy has its own characteristics, so it is hard to inscribe standard guidelines for all companies and countries. Recommendations and guidelines should rely on the particular characteristics of each economy and country. Therefore, each economy should undertake its own studies and investigations.

Thirdly, further studies could focus on evaluating the ethical and moral behaviour of board members. Comparing the behaviour of non-executive independent directors with other directors could clarify the difference between directors.

Fourthly, employing more specific periods in future studies could help them to develop an insight into corporate governance. Focusing on crisis periods and tracking the performance of boards, established according to guidelines during those periods, and comparing their performance with other times could better clarify board dimensions

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Appendices

Appendix A

Granger Causality Tests in New Zealand Market

Lags		2		20	
Null Hypothesis	Obs.	Chi-sq.	Prob.	Chi-sq.	Prob.
IOWN does not Granger Cause Cost of capital	193	1.210	0.546	32.993	0.033
Cost of capital does not Granger Cause IOWN		0.538	0.763	14.195	0.82
BOWN does not Granger Cause Cost of capital	193	2.881	0.236	32.697	0.036
Cost of capital does not Granger Cause BOWN		0.374	0.829	39.038	0.007
BDS does not Granger Cause Cost of capital	193	4.801	0.09	35.894	0.016
Cost of capital does not Granger Cause BDS		0.017	0.991	56.446	0
NED does not Granger Cause Cost of capital	193	8.294	0.015	33.762	0.028
Cost of capital does not Granger Cause NED		0.623	0.732	27.689	0.117
FMD does not Granger Cause Cost of capital	193	1.531	0.465	44.418	0.001
Cost of capital does not Granger Cause FMD		3.981	0.136	34.783	0.021
Tenure does not Granger Cause Cost of capital	193	2.703	0.258	42.998	0.002
Cost of capital does not Granger Cause TENURE		1.863	0.394	16.533	0.683
Duality does not Granger Cause Cost of capital	193	3.379	0.184	42.18	0.003
Cost of capital does not Granger Cause Duality		0.62	0.733	33.609	0.029

Appendix B

Granger Causality Tests in Singapore Market

Lags		2		6	
Null Hypothesis	Obs.	Chi-Sq.	Prob.	Chi-Sq.	Prob.
IOWN does not Granger Cause Cost of capital	133	9.791	0.00	23.05	0.01
Cost of capital does not Granger Cause IOWN		3.62	0.16	5.69	0.45
BOWN does not Granger Cause Cost of capital	133	1.088	0.58	5.46	0.48
Cost of capital does not Granger Cause BOWN		0.622	0.73	2.619	0.85
NED does not Granger Cause Cost of capital	133	2.621	0.26	2.614	0.85
Cost of capital does not Granger Cause NED		0.352	0.83	10.657	0.1
BDS does not Granger Cause Cost of capital	133	2.357	0.30	5.534	0.47
Cost of capital does not Granger Cause BDS		0.454	0.79	6.177	0.40
FMD does not Granger Cause Cost of capital	133	1.934	0.38	12.754	0.04
Cost of capital does not Granger Cause FMD		0.25925	0.87	2.569	0.86
Duality does not Granger Cause Cost of capital	133	0.022	0.98	8.097	0.23
Cost of capital does not Granger Cause Duality		3.191	0.20	11.876	0.06
Tenure does not Granger Cause Cost of capital	133	1.314	0.51	6.425	0.37
Cost of capital does not Granger Cause Tenure		1.504	0.47	4.596	0.59

Appendix C

Results of employing Wald test reported in separate tables as below:

Wald Test Results, Fama-French Three Factor and Fama-French Four Factor

(New Zealand)

Name	SMB	HML	Prob.
AIA	-0.4091	-0.105	0
AIR	-0.8214	1.0669	0
AMP	0.1556	0.5271	0.09
ANO (PCT)	0.3575	0.1212	0
ARG	0.327	0.2399	0
CAV	0.4395	0.1243	0.01
CEN	-0.1355	0.015	0.24
EBO	0.252	-0.0157	0.01
FBU	-0.1077	-0.008	0.49
FPA	1.2734	1.2157	0
FPH	-0.6395	-0.4741	0
FRE	0.509	-0.1217	0
GMT	0.2954	0.0992	0
HLG	0.3151	-0.1623	0
IFT	0.0401	0.0395	0.84
KIP	0.1714	0.1008	0.02
MFT	0.2825	0.1376	0.03

Name	SMB	HML	WML	Prob.
AIA	-0.4091	-0.105	-0.0103	0
AIR	-0.8214	1.0669	0.0048	0
AMP	0.1556	0.5271	-0.1183	0.11
ANO (PCT)	0.3507	0.1165	-0.0373	0
ARG	0.3317	0.2431	0.0257	0
CAV	0.4577	0.1367	0.1003	0
CEN	-0.1295	-0.0109	0.033	0.26
EBO	0.259	-0.0108	0.0388	0.02
FBU	-0.099	-0.002	0.048	0.36
FPA	1.2652	1.21	-0.0456	0
FPH	-0.6462	-0.4787	-0.0367	0
FRE	0.5103	-0.1208	0.0071	0
GMT	0.2903	0.0957	-0.0283	0
HLG	0.322	-0.1576	0.0382	0
IFT	0.0312	0.0335	-0.0489	0.55
KIP	0.1685	0.0988	-0.0161	0.05
MFT	0.2868	0.1405	0.0236	0.06

MHI	0.4306	0.0429	0	MHI	0.4343	0.0455	0.0207	0.01
NPX	0.6301	1.2575	0	NPX	0.6023	1.2385	-0.1533	0
NZO	0.7794	0.1859	0	NZO	0.7843	0.1892	0.0267	0
NZR	-0.274	-0.3619	0.01	NZR	-0.2752	-0.3627	-0.0066	0.03
NZX	0.4435	-0.0181	0	NZX	0.4495	-0.014	0.0327	0
PFI	0.3849	0.2132	0	PFI	0.3884	0.2156	0.0195	0
PGW	1.4323	0.3323	0	PGW	1.465	0.3553	0.1846	0
POT	0.186	0.1711	0.02	POT	0.1871	0.1719	0.0061	0.06
RBD	0.2869	-0.2063	0	RBD	0.2987	-0.1982	0.0653	0
RYM	0.5353	0.0356	0	RYM	0.5373	0.037	0.011	0
SKC	-0.325	-0.28	0	SKC	-0.3178	-0.275	0.0401	0
SKL	0.5999	0.3367	0	SKL	0.6342	0.3602	0.1896	0
SKT	-0.0846	-0.1964	0.01	SKT	-0.0831	0.1974	0.0085	0.02
STU	0.5326	-0.149	0	STU	0.5505	-0.1367	0.09889	0
TEL	-0.1578	-0.0474	0.17	TEL	-0.1626	-0.0507	-0.0266	0.24
TPW	0.0409	0.0258	0.87	TPW	0.0389	0.0244	-0.0111	0.94
TWR	0.7257	0.3745	0	TWR	0.7192	0.3701	-0.0356	0
VHP	0.2222	0.096	0.01	VHP	0.2185	0.0935	-0.0201	0.02
WHS	-0.6887	-0.6152	0	WHS	-0.6832	-0.6114	0.0302	0
MVN	0.7047	0.1454	0	MVN	0.7087	0.148	0.0298	0
PPL	0.8948	-0.4299	0	PPL	0.9018	-0.4256	0.0389	0
VCT	-0.4017	0.2327	0	VCT	-0.4023	0.2325	-0.003	0

Probability of rejecting null hypotheses are as below:

FF3F	P<0.1%	87.1794 9
	P<0.05 %	84.6153 8

Momentum model	P<0.1 %	84.6153 8
	P<0.05 %	76.9230 8

In FF3F variables which are SMB and HML, almost 85 percent of sample reject the null hypothesis at 5% level and 87 percent of them reject the null hypothesis at 10% level. In Momentum model variables which are SMB, HML and WML almost 77 percent of sample rejects the null hypothesis at 5% level while almost 85 percent of sample rejects the null hypothesis at 10% level.

So the null hypotheses are rejected and the coefficients of FF3F and Momentum model have explanatory power to explain the firm's excess return in New Zealand market.

Wald Test Results, Fama-French Three Factor and Fama-French Four

Factor (Singapore)

Name	SM B	HM L	F- Prob.
Capitaland	0.36	0.06	0
CapitaMall	0.15	0.09	0.01
CITYDEV	0.41	0.07	0
ComfortDel Gro	0.39	0.11	0
DBS	-	0.10	0.18

Name	SM B	HM L	WM L	F- Prob.
Capitaland	0.47	0.16	0.26	0
CapitaMall	0.25	0.18	0.24	0
CITYDEV	0.52	0.03	0.26	0
ComfortDel Gro	0.45	0.05	0.15	0
DBS	0.02	0.16	0.15	0

	0.04							
F&N	0.52	- 0.08	0	F&N	0.60	0.00	0.20	0
GoldenAgr	0.58	- 0.13	0	GoldenAgr	0.76	0.04	0.44	0
HKLand US\$	0.24	0.18	0	HKLand US\$	0.32	0.25	0.19	0
Jardine C&C	0.53	- 0.11	0	Jardine C&C	0.64	0.01	0.25	0
JMH 400US\$	- 0.67	0.72	0	JMH 400US\$	- 0.58	0.81	0.22	0
JSH 500US\$	- 0.48	0.51	0	JSH 500US\$	- 0.39	0.60	0.24	0
Kep Corp	- 0.14	- 1.14	0	Kep Corp	0.11	- 0.90	0.61	0
Noble Grp	1.18	- 0.29	0	Noble Grp	1.37	- 0.12	0.43	0
NOL	0.61	- 0.22	0	NOL	0.77	- 0.07	0.38	0
OCBC Bk	0.03	0.07	0.13	OCBC Bk	0.10	0.14	0.18	0
Olam	1.29	- 0.61	0	Olam	1.32	- 0.57	0.09	0
Semb Corp	0.76	- 0.32	0	Semb Corp	0.83	- 0.25	0.17	0
SembMar	0.95	-	0	SembMar	1.08	-	0.31	0

		0.46				0.34		
SGX	0.57	- 0.27	0	SGX	0.67	- 0.17	0.24	0
SingTel	- 0.04	- 0.04	0.26	SingTel	- 0.08	- 0.07	- 0.08	0.08
SIA	0.02	0.09	0.07	SIA	0.08	0.14	0.14	0
SIA Engg	0.39	- 0.24	0	SIA Engg	0.44	- 0.19	0.12	0
SPH	0.14	- 0.06	0.07	SPH	0.12	- 0.08	- 0.03	0.1
StarHub	0.39	- 0.20	0	StarHub	0.39	- 0.20	0.01	0
ST Engg	0.35	0.17	0	ST Engg	0.37	- 0.16	0.04	0
UOB	0.06	0.05	0.18	UOB	0.12	0.11	0.15	0
Wilmar	0.75	- 0.47	0	Wilmar	0.90	- 0.34	0.35	0

Probability of rejecting null hypothesises are as below:

FF3F	P<0.1	85.1851
		8
	P<0.05	77.7777
		7

Momentum model	P<0.1	100
		96.2962
	P<0.5	9

Consistent with prior studies and findings in New Zealand market, FF3F and Momentum model risk factors cannot be omitted from estimations because they have explanatory power. FF3F Wald's results imply that almost 78 percent of sample rejects the null hypothesis at 5% level and 85 percent of sample rejects the null hypothesis at 10% level. Momentum model Wald's results imply that almost 96 percent of sample rejects the null hypothesis at 5% level while 100 percent of sample rejects the null hypothesis at 10% level. These results confirm the existing literature about the explanatory power of FF3F and Momentum model in estimating cost of capital even though their effects are not significant(Grandes, 2010).

Appendix D

Wald coefficient test for second and third degree form of dependent variables which added into the models.

		New Zealand				Singapore	
	F-statistic	Prob.	Related Table		F-statistic	Prob.	Related Table
BDS ²	3.809	0.0525	Table 4.10	BDS ²	8.400	0.0044	Table 5.11
NED ²	97.075	0	Table 4.12	NED ²	36.037	0	Table 5.13
NED ³	97.075	0	Table 4.12	NED ³	36.037	0	Table 5.13
FMD ²	4.332	0.0388	Table 4.15	Tenure ²	19.503	0	Table 5.15
Tenure ²	3.332	0.0378	Table 4.17	Tenure ³	19.503	0	Table 5.15
Tenure ³	3.332	0.0378	Table 4.17	BOWN ²	9.422	0.0002	Table 5.8
BOWN ²	6.253	0.0023	Table 4.7	IOWN ²	2.653	0.0743	Table 5.5
BOWN ³	6.253	0.0023	Table 4.7	IOWN ³	2.653	0.0743	Table 5.5
IOWN ²	3.401	0.0354	Table 4.5				
IOWN ³	3.401	0.0354	Table 4.5				

Appendix E

Unit Root tests results for New Zealand sample.

Pool unit root test: Summary		
Series: I_AIR, I_AMP, I_ANO, I_ARG, I_AIA, I_CAV, I_CEN, I_EBO, I_FBU,		
I_FPA, I_FPH, I_FRE, I_GMT, I_HLG, I_IFT, I_KIP, I_MFT, I_MHI, I_NZO,		
I_NZR, I_NPX, I_NZX, I_PFI, I_PGW, I_POT, I_RBD, I_RYM, I_SKC,		
I_SKL, I_SKT, I_STU, I_TEL, I_TPW, I_TWR, I_VHP, I_WHS, I_MVN,		
I_PPL, I_VCT, L_AIR, L_AMP, L_ANO, L_ARG, L_AIA, L_CAV, L_CEN,		
L_EBO, L_FBU, L_FPA, L_FPH, L_FRE, L_GMT, L_HLG, L_IFT, L_KIP,		
L_MFT, L_MHI, L_NZO, L_NZR, L_NPX, L_NZX, L_PFI, L_PGW, L_POT,		
L_RBD, L_RYM, L_SKC, L_SKL, L_SKT, L_STU, L_TEL, L_TPW,		
L_TWR, L_VHP, L_WHS, L_MVN, L_PPL, L_VCT, BN_AIR, BN_AMP,		
BN_ANO, BN_ARG, BN_AIA, BN_CAV, BN_CEN, BN_EBO, BN_FBU,		
BN_FPA, BN_FPH, BN_FRE, BN_GMT, BN_HLG, BN_IFT, BN_KIP,		
BN_MFT, BN_MHI, BN_NZO, BN_NZR, BN_NPX, BN_NZX, BN_PFI,		
BN_PGW, BN_POT, BN_RBD, BN_RYM, BN_SKC, BN_SKL, BN_SKT,		
BN_STU, BN_TEL, BN_TPW, BN_TWR, BN_VHP, BN_WHS, BN_MVN,		
BN_PPL, BN_VCT, OD_AIR, OD_AMP, OD_ANO, OD_ARG, OD_AIA,		
OD_CAV, OD_CEN, OD_EBO, OD_FBU, OD_FPA, OD_FPH, OD_FRE,		
OD_GMT, OD_HLG, OD_IFT, OD_KIP, OD_MFT, OD_MHI, OD_NZO,		
OD_NZR, OD_NPX, OD_NZX, OD_PFI, OD_PGW, OD_POT, OD_RBD,		
OD_RYM, OD_SKC, OD_SKL, OD_SKT, OD_STU, OD_TEL, OD_TPW,		
OD_TWR, OD_VHP, OD_WHS, OD_MVN, OD_PPL, OD_VCT, FD_AIR,		
FD_AMP, FD_ANO, FD_ARG, FD_AIA, FD_CAV, FD_CEN, FD_EBO,		
FD_FBU, FD_FPA, FD_FPH, FD_FRE, FD_GMT, FD_HLG, FD_IFT,		
FD_KIP, FD_MFT, FD_MHI, FD_NZO, FD_NZR, FD_NPX, FD_NZX,		

FD_PFI, FD_PGW, FD_POT, FD_RBD, FD_RYM, FD_SKC, FD_SKL,				
FD_SKT, FD_STU, FD_TEL, FD_TPW, FD_TWR, FD_VHP, FD_WHS,				
FD_MVN, FD_PPL, FD_VCT, DU_AIR, DU_AMP, DU_ANO, DU_ARG,				
DU_AIA, DU_CAV, DU_CEN, DU_EBO, DU_FBU, DU_FPA, DU_FPH,				
DU_FRE, DU_GMT, DU_HLG, DU_IFT, DU_KIP, DU_MFT, DU_MHI,				
DU_NZO, DU_NZR, DU_NPX, DU_NZX, DU_PFI, DU_PGW, DU_POT,				
DU_RBD, DU_RYM, DU_SKC, DU_SKL, DU_SKT, DU_STU, DU_TEL,				
DU_TPW, DU_TWR, DU_VHP, DU_WHS, DU_MVN, DU_PPL,				
DU_VCT, CT_AIR, CT_AMP, CT_ANO, CT_ARG, CT_AIA, CT_CAV,				
CT_CEN, CT_EBO, CT_FBU, CT_FPA, CT_FPH, CT_FRE, CT_GMT,				
CT_HLG, CT_IFT, CT_KIP, CT_MFT, CT_MHI, CT_NZO, CT_NZR,				
CT_NPX, CT_NZX, CT_PFI, CT_PGW, CT_POT, CT_RBD, CT_RYM,				
CT_SKC, CT_SKL, CT_SKT, CT_STU, CT_TEL, CT_TPW, CT_TWR,				
CT_VHP, CT_WHS, CT_MVN, CT_PPL, CT_VCT				
			Cross-	
Method	Statistic	Prob.**	sections	Obs.
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t	-542.691	0	140	560
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-46.8486	0	140	560
ADF - Fisher Chi-square	359.905	0.0009	140	560
PP - Fisher Chi-square	400.155	0	137	548

Appendix F

Unit root tests results for Singapore sample.

Pool unit root test: Summary		
Series: I_CAPITALAND, I_CAPITAMALL, I_CITYDEV, I_COMFORTDELGRO,		
I_DBS, I_FN, I_GOLDENAGR, I_HKLAND_US, I_JARDINE_CC,		
I_JMH_400US, I_JSH_500US, I_KEP_CORP, I_NOBLE_GRP, I_NOL,		
I_OCBC_BK, I_OLAM, I_SEMB_CORP, I_SEMBMAR, I_SGX,		
I_SINGTEL, I_SIA, I_SIA_ENGG, I_SPH, I_STARHUB, I_ST_ENGG,		
I_UOB, I_WILMAR, L_CAPITALAND, L_CAPITAMALL, L_CITYDEV,		
L_COMFORTDELGRO, L_DBS, L_FN, L_GOLDENAGR,		
L_HKLAND_US, L_JARDINE_CC, L_JMH_400US, L_JSH_500US,		
L_KEP_CORP, L_NOBLE_GRP, L_NOL, L_OCBC_BK, L_OLAM,		
L_SEMB_CORP, L_SEMBMAR, L_SGX, L_SINGTEL, L_SIA,		
L_SIA_ENGG, L_SPH, L_STARHUB, L_ST_ENGG, L_UOB, L_WILMAR,		
BN_CAPITALAND, BN_CAPITAMALL, BN_CITYDEV,		
BN_COMFORTDELGRO, BN_DBS, BN_FN, BN_GOLDENAGR,		
BN_HKLAND_US, BN_JARDINE_CC, BN_JMH_400US,		
BN_JSH_500US, BN_KEP_CORP, BN_NOBLE_GRP, BN_NOL,		
BN_OCBC_BK, BN_OLAM, BN_SEMB_CORP, BN_SEMBMAR,		
BN_SGX, BN_SINGTEL, BN_SIA, BN_SIA_ENGG, BN_SPH,		
BN_STARHUB, BN_ST_ENGG, BN_UOB, BN_WILMAR,		
OD_CAPITALAND, OD_CAPITAMALL, OD_CITYDEV,		
OD_COMFORTDELGRO, OD_DBS, OD_FN, OD_GOLDENAGR,		
OD_HKLAND_US, OD_JARDINE_CC, OD_JMH_400US,		
OD_JSH_500US, OD_KEP_CORP, OD_NOBLE_GRP, OD_NOL,		
OD_OCBC_BK, OD_OLAM, OD_SEMB_CORP, OD_SEMBMAR,		

OD_SGX, OD_SINGTEL, OD_SIA, OD_SIA_ENGG, OD_SPH,				
OD_STARHUB, OD_ST_ENGG, OD_UOB, OD_WILMAR,				
FD_CAPITALAND, FD_CAPITAMALL, FD_CITYDEV,				
FD_COMFORTDELGRO, FD_DBS, FD_FN, FD_GOLDENAGR,				
FD_HKLAND_US, FD_JARDINE_CC, FD_JMH_400US,				
FD_JSH_500US, FD_KEP_CORP, FD_NOBLE_GRP, FD_NOL,				
FD_OCBC_BK, FD_OLAM, FD_SEMB_CORP, FD_SEMBMAR,				
FD_SGX, FD_SINGTEL, FD_SIA, FD_SIA_ENGG, FD_SPH,				
FD_STARHUB, FD_ST_ENGG, FD_UOB, FD_WILMAR,				
DU_CAPITALAND, DU_CAPITAMALL, DU_CITYDEV,				
DU_COMFORTDELGRO, DU_DBS, DU_FN, DU_GOLDENAGR,				
DU_HKLAND_US, DU_JARDINE_CC, DU_JMH_400US,				
DU_JSH_500US, DU_KEP_CORP, DU_NOBLE_GRP, DU_NOL,				
DU_OCBC_BK, DU_OLAM, DU_SEMB_CORP, DU_SEMBMAR,				
DU_SGX, DU_SINGTEL, DU_SIA, DU_SIA_ENGG, DU_SPH,				
DU_STARHUB, DU_ST_ENGG, DU_UOB, DU_WILMAR,				
CT_CAPITALAND, CT_CAPITAMALL, CT_CITYDEV,				
CT_COMFORTDELGRO, CT_DBS, CT_FN, CT_GOLDENAGR,				
CT_HKLAND_US, CT_JARDINE_CC, CT_JMH_400US,				
CT_JSH_500US, CT_KEP_CORP, CT_NOBLE_GRP, CT_NOL,				
CT_OCBC_BK, CT_OLAM, CT_SEMB_CORP, CT_SEMBMAR,				
CT_SGX, CT_SINGTEL, CT_SIA, CT_SIA_ENGG, CT_SPH,				
CT_STARHUB, CT_ST_ENGG, CT_UOB, CT_WILMAR				
			Cross-	
Method	Statistic	Prob.**	sections	Obs
Null: Unit root (assumes common unit root process)				

Levin, Lin & Chu t	-183.227	0	105	420
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-20.6932	0	105	420
ADF - Fisher Chi-square	312.565	0	105	420
PP - Fisher Chi-square	348.681	0	104	416