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**An Exploratory Study of the Performance
Characteristics of the Property Vehicles Listed on the
New Zealand Stock Exchange (NZX)**

A dissertation
submitted in partial fulfilment
of the requirements for the
Degree of Master of Property Studies

at

Lincoln University

by

Jane H Simpson

Lincoln University

2013

I certify that this dissertation has not already been submitted for any degree and is not being submitted as part of an application for any other degree.

I also certify that this dissertation has been written by me and that any help that I have received in preparing this study and all sources used have been acknowledged in this thesis.

Signature of Candidate

Abstract of a dissertation submitted in partial fulfilment of the requirements for the Degree of Master of Property Studies

An Exploratory Study of the Performance Characteristics of the Property Vehicles Listed on the New Zealand Stock Exchange (NZX)

Jane H Simpson

There are two listed property investment vehicles on the New Zealand Stock Exchange (NZX), namely Listed Property Trusts (LPTs) and Listed Property Investment Companies (LPICs). Historically the proportion of New Zealand LPTs to LPICs has varied over the years due to failures and new listings. More recently a new trend has emerged that has impacted on these proportions, which has been the corporatisation of some of the LPTs. As a result the number of Trusts on the stock exchange (NZX) reduced significantly in 2010 and two other trusts have also been considered following this trend. From the literature it can be seen that there is a lack of empirical evidence that can assist stakeholders in justifying either the immense costs involved in these conversions or the decision not to convert.

The purpose of this exploratory study was to determine whether the LPTs performed differently to the LPICs, in order to justify the choice of adopting a company structure and in the case of conversions to justify the immense costs involved. The objectives of the study were: (1) to reveal the nature and significance of NZ's LPVs in the NZ investment market, (2) to explore the performance characteristics NZ's LPVs, (3) to reveal any reward-to-risk benefits for investors by investing in either LPTs or LPICs, and (4) to reveal any diversification benefits for investors by investing in either LPTs or LPICs. Evidence

The study developed three new separate gross (total) return series indices: the overall LPV sector index, the LPT sub-sector index, and the LPIC sub-sector index. These new indices were created so that the performance characteristics of these indirect property vehicles could be examined over the study period 1994:Q1 to 2011:Q3. The effect of different market conditions on the performance of these vehicles was also assessed by analysing the performance of the LPTs and the LPICs over specified sub-periods: (1) the

pre-Asian crisis, (2) the Asian crisis to pre-Global Financial Crisis, and (3) the Global Financial Crisis (GFC) and post-Global Financial Crisis.

Data to develop the three new indices was sourced from NZX database. Existing gross (total) return indices for stocks (NZX All Gross (Total Return) Index) and Government bonds (ANZ All Government Bond (Gross) Index) were also sourced from the NZX database and for direct property (All Property Total Return (Gross) Index) was sourced from the Property Council of New Zealand/Investment Property Databank (PCNZ/IPD). The risk free rate of return to compute the Sharpe measure was sourced from the Reserve Bank of New Zealand (RBNZ) database.

The results showed that LPTs and LPICs have performed differently over the seventeen year study period and the sub-periods, which suggests there is a relationship between the ownership structure and performance characteristics of New Zealand's Listed Property Vehicles (LPVs). Historically it was found, that overall the LPICs have offered investors' superior risk-reduction and reward-to-risk benefits compare to the LPTs.

The findings, in this study, offer empirical support to the argument presented in previous studies (Korda Mentha, 2010; Grant Samuel, 2010, 2011), that a company structure is the optimal ownership structure to improve performance in a New Zealand context. The practical implications of these findings include assisting investors' by providing empirical evidence to justify their support of future conversions and also assisting stakeholders who are deciding which ownership structure to adopt when setting up a listed property vehicle. From a theoretical viewpoint these findings also suggest that the LPICs and LPTs can be treated as separate asset classes and that further segmentation studies of the NZX Property Sector could be undertaken to better understand the nature of these collective investment vehicles.

Keywords: Listed Property Trust, Listed Property Investment Company, Listed Property Vehicles, Listed Property Sector, Property, Real Estate, Performance, New Zealand.

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Abbreviations

Abbreviation	Full Name/Term
<i>GFC</i>	<i>Global Financial Crisis</i>
<i>IPD</i>	<i>Investment Property Databank</i>
<i>LPIC</i>	<i>Listed Property Investment Company</i>
<i>LPT</i>	<i>Listed Property Trust</i>
<i>LPV</i>	<i>Listed Property Vehicle (NZX Property Sector)</i>
<i>NZX</i>	<i>New Zealand Stock Exchange</i>
<i>NZD</i>	<i>New Zealand Dollars</i>
<i>PCNZ</i>	<i>Property Council of New Zealand</i>
<i>PIE</i>	<i>Portfolio Investment Entity</i>
<i>RBNZ</i>	<i>Reserve Bank of New Zealand</i>
<i>REIT</i>	<i>Real Estate Investment Trust</i>
<i>UK</i>	<i>United Kingdom</i>
<i>US</i>	<i>United States (of America)</i>

Chapter 1: Introduction

This chapter outlines the background (section 1.1) and context (section 1.2) of the research, and its purpose (section 1.3). Next this chapter describes the significance and scope of this research in section 1.4, outlines the remaining chapters of the dissertation in section 1.5, and documents the definitions used in the study in sections 1.6.

1.1 Background

Whether an entity can improve its performance by adopting a certain ownership structure has been widely debated and researched (Pedersen & Thomsen, 1997). According to both agency theory and economic theory there is a link between the ownership structure of a publically owned entity and its performance. Agency theorists (Williamson, 1964; Sorenson, 1974; Jensen & Meckling, 1976) argue that a publically owned entity can improve its stock market performance by improving the entity's financial results: through better governance. This argument is supported by economic theory, which suggests that the performance of an entity is ultimately linked to its ownership structure, which is a key determinant of its corporate governance and behaviour (Shleifer & Vishny, 1986; Pedersen and Thomsen, 1997).

Worldwide the Real Estate Investment Trusts (REITs), after the Global Financial Crisis (GFC), have been focusing on improving governance (CFA-institute 2011) in order to improve their financial performance, so as to maximise shareholder wealth. Based on economic theories better REIT governance can be achieved by adopting or developing an optimal ownership structure. It has been found (CFA Institute, 2011) that the ability of REITs globally to achieve an ideal governance structure, and hence improve the quality of governance, has been influenced by the unique legislation each country develops for the ownership structures they have adopted.

Since the 1960's various countries have adopted REIT structures, which typically include unit trusts, companies (corporation) and stapled securities. In New Zealand

(NZ) the listed property market is comprised of both unit trusts and companies, with the stapled security structure not yet adopted. These Listed Property Vehicles (LPVs), which are considered to be NZ's equivalents of REITs, have followed the global trend and have been focusing on improving their governance structures, in order to ultimately improve their performance (J.A. Simpson, personal communication, 2011; Korda Mentha, 2010; Grant Samuel, 2010, 2011).

This quest to improve LPV governance in NZ appears to explain the more recent conversion of a number of the unit trusts in NZ to companies. These conversions involve significant costs according to three recently completed independent reports (Korda Mentha, 2010; Grant Samuel, 2010, 2011) and therefore it is important to determine whether Listed Property Investment Companies (LPICs) have performed differently to the Listed Property (Unit) Trusts (LPTs) historically: in order to provide investors with empirical evidence that enables them to justify the costs of converting trusts to companies. Hence, the relationship between ownership structure and performance, in a NZ context, is an important phenomenon to study and understanding this relationship will result in implications that are expected to be beneficial for stakeholders and the LPVs.

1.2 Context

Building on the literature the focus of this study is to determine whether, historically in a NZ context, LPICs have outperformed LPTs. Both these ownership structures are grouped by the New Zealand Stock Exchange (NZX) under the Property Sector and it is these Listed Property Vehicles (LPVs) that will be studied to determine the nature of the relationship between the NZ LPV ownership structures and their performance. It is expected that the study will provide empirical evidence that will assist stakeholders to evaluate potential restructuring options and investment opportunities.

The listed property market in New Zealand was established in the early 1980s, due to investor demand. LPVs were seen an alternative to direct property investment for

investors who wanted to gain exposure to real estate assets. Initially LPVs were structured as companies, then after the Stock Market Crash in 1987, unit trusts emerged as the preferred ownership structure, being regarded by investors as more trustworthy because the unit trust structure offered better protection. Nowadays some of the existing LPTs have chosen to restructure as companies (LPICs). The justification for these conversions is explained by three recent independent studies (Korda Mentha, 2010; Grant Samuel, 2010, 2011) which suggested that a company structure provides better governance and ultimately improved.

Adopting the optimal ownership structure has implications for future performance according to the literature. Currently there is a lack of information regarding the relationship between the ownership structures and performance of LPVs in the New Zealand investment market. Information is a tool that investors, entities, and government use to make decisions, such as investing and optimising the ownership structure of LPVs (including the decision to restructure if required). In order to compare the performance of LPTs to the LPICs, in the New Zealand investment market, a study that begins in December 1993 is required to span the period over which they have both ownership structures have been represented in the Property Sector.

1.3 Purpose

The overall purpose of this study is to explore the performance characteristics of the Property Vehicles Listed on the New Zealand Stock Exchange (NZX).

The study seeks to answer the following research questions:

- 1) *What is the relationship between the ownership structure and the performance characteristics of Listed Property Vehicles (LPVs) in the New Zealand investment market?*
- 2) *Do the performance characteristics of New Zealand's Listed Property Investment Companies (LPICs) provide justification for LPVs to structure or restructure as an incorporated company?*

The aim of the study is to determine whether Listed Property Trusts (LPTs) have performed differently to the Listed Property Investment Companies (LPICs) over the study period December 1993 to September 2011.

The objectives of this study are to:

- 1) To reveal the nature and significance of LPVs in the New Zealand investment market.
- 2) To explore the performance characteristics of New Zealand LPVs.
- 3) To reveal any reward-to-risk benefits for investors by investing in LPTs or LPICs.
- 4) To reveal any diversification benefits for investors by investing in either LPTs or LPICs.

1.4 Significance, scope & definitions

Significance

Since the establishment of the New Zealand (NZ) listed property market in 1982 the stature of this asset class has continued to grow over the years and nowadays the NZX Property Sector is a significant asset class. As at the 30 September 2011 the LPVs contributed approximately 8.8% (NZD 4.35 billion market capitalisation) to the value of the NZX (NZD 49.39 billion market capitalisation).

The worldwide trend to improve the performance of listed indirect property investment vehicles, such as REITs, through better governance appears to have influenced the NZ listed property market. More recently listed NZ LPVs have chosen to adopt a company structure and some of the existing LPTs have been restructuring as companies (US=corporations) to provide investors with a reason to invest in them. Due to the immense conversion costs involved in restructuring (Korda Mentha, 2010; Grant Samuel 2010, 2011), an important phenomenon to study is the relationship between the LPV ownership structures and their performances.

Understanding ways to improve the performance of an entity is important to stakeholders. Investors are interested in maximising wealth and hence information is a vital tool that assists them in making restructuring and investment decision (allocation and selection decisions). Hence this study will have practical implications for these stakeholders.

New Zealand LPVs are interested in maximising owners' wealth through investing in and managing a portfolio of commercial property. To survive these entities must give investors a reason to invest in them. Performance is a measure of success and hence knowing whether ownership structure improves performance is important.

Further the New Zealand Government is interested in the efficient use of resources (land, labour and capital) and it is expected a better understanding of the relationship between the ownership structure of NZ LPVs and their performance characteristics will be beneficial to them as it will be for other stakeholders. The expected benefits include a basis for decision making and for further research that could include further segmentation studies of the NZ listed property market.

Scope

From the literature it appears that no previous studies have explored the link between the ownership structures and performance characteristics of the NZ LPVs. In order to examine this link separate gross (total) return indices will be developed for the overall NZX Property Sector and for the NZX Property Sub-sectors, namely Listed Property (Unit) Trusts (LPTs) and Listed Property Investment Companies (LPICs). The study period will be from the 31 December 1993 to the 30 September 2011: this period encompasses the time over which LPTs and LPICs have both contributed to the performance of the NZX Property Sector. The return series data will be analysed so as to determine the performance characteristics of the LPTs and LPICs.

In this study the entities of interest are the indirect property investment vehicles, which have been or are currently listed under the NZX Property Sector. The same

classification (informal) that the NZX adopts for the NZX Property Sector constituents has been adopted for this study. Other listed entities that behave like LPVs or REITs, such as Ryman Healthcare Limited or Seeka Kiwifruit Industries Limited respectively, are beyond the scope of this study. Unlisted indirect property investment vehicles are also not included in this study.

1.5 *Dissertation outline*

This chapter has introduced the study; chapter two will document the review of the relevant literature, chapter three will outline the research design and methodology, chapter four will present the results and discuss the findings, and chapter five will present the conclusion.

1.6 *Definitions*

The Tables on the following two pages document the definitions for key terms used in this study.

Term	Definition	Examples
Ownership Structure	The legal structure of the listed indirect property investment vehicle	e.g. Unit Trust, Company (corporate), and stapled security
Unit Trust	“A collective investment vehicle” ... “constituted under a trust deed” ... “established under law that is made for the purpose of providing facilities for the participation, as beneficiaries under a trust, by purchasers as members of the public, in income or gains (capital or income) arising from the money, investments and other property that are for the time being subject to the trust (Unit Trusts Act, 1960, s 2, p. 4)	e.g. Listed Property Trust (LPT), Stand-Alone Unit Trust
Company	A company is a business established as a corporate structure under law. It is a separate legal entity from the shareholders who have a financial interest in the business and who own all the assets. The members of the company cannot be held personally liable for the company's debts or liabilities and they are taxed separately from the company on the income they receive from it. Public companies have their shares listed on the stock exchange so they're available to be bought by the general public and other companies (Investopedia, 2013; MBIE, 2013).	e.g. limited liability company
Real Estate Investment Trust (REIT)	“A collective investment vehicle that invests in a diversified pool of professionally managed real estate assets” (CFA- Institute, 2011, p. 5). This vehicle tends to be legally structured as a unit trust, company (corporate) or stapled security.	e.g. Unit Trust, Company (corporate), and stapled security
Asset Class	“A group of securities that exhibit similar characteristics, behave in a similar way in the marketplace, and are subject to the same laws and regulations”. Hence each asset class “is expected to reflect different risk and return (performance) investment characteristics, and will perform differently in any given market environment” (Investopedia, 2013)	The three main asset classes are equities (stocks), fixed income (bonds) and cash equivalents (money market instruments). Real estate and commodities are also considered to be separate asset classes.

Term	Definition	Examples
Listed Property Vehicle (LPV)	A collective investment entity, which is legally structured as a Unit Trust or Company. LPVs typically invest in a pool of professionally managed real estate assets that are either sector-specific or diversified. LPV stocks (units or shares) are listed on the Stock Exchange. LPVs investors benefit from regular distributions, which are derived from the steady rental stream from the entities underlying assets, and from capital growth (CFA- Institute, 2011). In New Zealand LPVs fall into the investor/developer category (Fraser, 1993; J.A. Simpson, personal communication, 2010), in that they tend to undertake mostly property investment activity whereby the entity acquires and/or develops property for retention in an investment portfolio. The New Zealand LPVs typically own properties, collect rents and pay dividends according to J.A. Simpson (personal communication, 2010).	
Listed Property Investment Company (LPIC)	A collective investment vehicle that is legally structured as a company (corporate). The LPIC invests in pool of professionally managed real estate assets, which are either a sector-specific or diversified (CFA- Institute, 2011). Companies are commonly used for operating businesses.	
Listed Property Trust (LPT)	A collective investment vehicle that is legally structured as a Unit Trust. The LPT invests in pool of professionally managed real estate assets, which are either a sector-specific or diversified (CFA- Institute, 2011). Trusts are commonly used for owning investment assets rather than for operating businesses.	e.g. Listed Property Trust (LPT), Stand-Alone Unit Trust
NZX Property Sector	The grouping of property vehicles listed on the New Zealand Stock Exchange (NZX).	
Real Estate Investment Vehicle (REIT)	“A collective investment vehicle that invests in a diversified pool of professionally managed real estate assets” (CFA- Institute, 2011, p. 5). REITs are typically structured as a unit trust, company (corporate), or stapled security.	Stand-alone unit trust, stapled security
Stand-alone unit trust (SAUTs)	“A collective investment vehicle that invests in a diversified pool of professionally managed real estate assets” (CFA- Institute, 2011, p. 5). They are used for owning investment assets, not for operating a business: hence they cannot undertake development activities.	
Stapled Security (SSs)	An ownership structure that is created when two or more different securities are contractually bound together so that they cannot be traded separately. There are many different structures with the most common stapling being units in a trusts and shares in a company, which is used by A-REITs.	

Chapter 2: Literature review

This chapter begins by documenting the substantive theories which link ownership structure and performance (section 2.1), next a historical background of the property securities markets is presented (section 2.2), and then section 2.3 reviews literature on LPV performance, which covers the following topics: measurement and analysis (sub-section 2.3.1), the nature and significance of NZ's LPVs (sub-section 2.3.2), and the structural reforms adopted in NZ to improve LPV performance (sub-section 2.3.3). Section 2.4 highlights the implications from the literature and presents the gaps which will guide the study.

2.1 Substantive theories: ownership structure & performance

Economic theory suggests that ownership structure is one of the key determinants of corporate governance and behaviour and ultimately performance (Shleifer & Vishny, 1986; Pedersen and Thomsen, 1997). The importance of improving an entity's overall performance is to maximise shareholder wealth through superior returns and providing diversification benefits. This idea is derived from agency theory, which argues that the main goal for managers should be value creation to maximise shareholder wealth, not profit, through maximising the intrinsic value (the actual value) of the company as opposed to its market or book value.

The ownership structure of an entity is the legal structure of that entity and there are various structures for publically owned entities. The ownership structures typically adopted by Listed Property Vehicles (LPVs) and Real Estate Investment Trusts (REITs) are a company structure (corporation), a unit trust structure (including stand-alone unit trusts), or a stapled security structure. The major issue with these legal structures is the separation of ownership and control due to the principal-agent relationship that exists between the shareholders and management respectively.

According to agency theorist (Williamson, 1964; Sorenson, 1974; Jensen & Meckling, 1976) this relationship, in which the principals (shareholders and unit holders) of

these entities give the agents (management) the authority to manage the entity for the owners' benefit, has caused problems, in terms of performance. In the 1960's it was theorised that differences in motivation between shareholders and managers are likely to occur in publically owned entities and as a result management could pursue policies that compromise shareholders objectives of maximising shareholder wealth (Williamson, 1964). Hence it is important to align management and investor interests in order to mitigate the agency problem,

The link between the ownership structure, governance and performance is an important relationship to understand. Most of the research that has focused on this relationship between governance and performance over the last 30 years is based on Agency theory. This theory provides an understanding of corporate governance, which is "the set of laws and rules and procedures" (Brigham & Ehrhardt, 2009, pg. 538), that ensures managers behave in a way that maximises shareholder wealth.

A number of recent studies (CFA-Institute, 2011; Korda Mentha, 2010; Grant Samuel, 2010, 2011) have focused on ways to reform the governance of listed indirect property investment vehicles in order to decrease the principal-agent problem and hence improve performance. These reforms include: (1) converting to a better ownership structure, (2) adopting best practice governance via guidelines, and (3) adopting management fee structures in order to align management incentives with shareholder interests.

2.2 *Historical background*

This section documents the development of the property securities markets globally (sub-section 2.2.1) and in New Zealand (sub-section 2.2.2), and then documents the focus of previous LPV studies (sub-section 2.2.3).

2.2.1 *The global listed property securities markets*

Listed indirect property ownership emerged as an alternative form of property ownership in 1961 in the United States (US) in response to investor demand for greater exposure to property. Nowadays the US Real Estate Investment Trust (REIT) market is considered to be the largest REIT market globally (CFA-Institute, 2011).

Property securities markets have become a global phenomenon with markets established in countries throughout Asia, Europe, Oceania, Americas, the Middle East and Africa. A study by the CFA-Institute (2011) highlights that the size of these markets are still growing and that other countries, such as India and China, are also considering setting up their own indirect listed property markets.

Worldwide various ownership structures exist for the different indirect listed property vehicles and each country has its own body of legislation to govern these vehicles. Internationally the most commonly known LPV classification is the Real Estate Investment Trusts (REITs) which encompasses a variety of ownership structures including Unit Trusts, Companies and Stapled Securities (contractually bound securities from a Unit Trust and a Company). The Listed Property Trusts (LPTs) are another well-known classification, which historically have included both Unit Trusts and companies. New Zealand's LPV market has two ownership structures, namely Unit Trusts (known as LPTs) and Companies (known as LPICs).

Historically countries adopted specific ownership structures, which they perceived would optimise the performance of property securities. However due to some existing listed property vehicles underperforming, a trend to convert existing ownership structures to other structures has emerged, so as to improve the attractiveness of the LPV. Various factors including globalisation, economic reforms, the changing investment market in which these vehicles exist, and investor demand have meant vehicles and governments have had to overhaul ownership structures, which in turn influence governance, behaviour and performance.

REITs are a “collective investment vehicle that invest in a diversified pool of professionally managed real estate assets” (CFA-Institute, 2011, p. 5). Between 2000 and 2010 REIT legislation was adopted by many countries in the Asia-Pacific region seeking to improve their listed property markets (CFA-Institute, 2011), and more recently South Africa has also proposed that REIT legislation be adopted (Thornton, 2012) for similar reasons. The outcome has been that new entities can to adopt the REIT structure, whilst the existing entities in these listed property markets have been able to convert to the new REIT structure.

Adopting a new ownership structure is a common reform option in many countries. New Zealand has not yet followed the common global trend of adopting REIT legislation. Instead a trend has emerged whereby the property vehicles listed on the NZX have chosen to convert from being Listed Property Trusts (Unit Trusts) to Listed Property Investment Companies (Limited Liability Companies, also recognised as a corporation) in order to improve their performance.

A further approach, to improve the attractiveness of LPVs and REITs has been to introduce or reform the tax treatment of these entities. In October 2007 the New Zealand Government introduced the Portfolio Investment Entity (PIE) regime, which is a tax treatment scheme that has the effect of improving tax benefits for those domestic investors with stocks in NZ LPVs that have PIE status (currently all the LPVs have PIE status). This regime was expected to result in improved returns for investors on a lower marginal tax rate (Korda Mentha, 2010).

2.2.2 The New Zealand listed property securities market

In New Zealand there are the two types of Listed Property Vehicles (LPVs), which comprise the NZX Property Sector, namely Listed Property Trusts (LPTs) and Listed Property Investment Companies (LPICs). LPTs are unit trusts established under the Unit Trusts Act 1960 and LPICs are limited liability companies created under the Companies Act 1993.

Internationally NZ LPVs are recognised as REITs, according to J.A. Simpson (personal communication, 2012). This observation is supported Macquarie's (2011) study, which used the REITs classification for New Zealand's LPVs.

New Zealand LPTs and LPICs tend to undertake mostly property investment activity whereby the entity acquires and/or develops investment quality urban properties for retention in a portfolio, which is professionally managed (externally or internally) over a period of time (Hobbs, 1994; Fraser, 1993). Therefore compared with overseas vehicles, NZ LPVs typically fall into an investor/developer category: in that they own properties (that have been acquired or developed), collect rents and pay dividends according to J.A. Simpson (personal communication, 2010).

Listed Property Vehicles (LPVs) have been established in New Zealand since 1982. The earlier vehicles that listed on the New Zealand Stock Exchange (NZX) were structured as limited liability companies, and it was not until 1993 that the first unit trust structure listed on the NZX reportedly due to investor demand (J.A. Simpson, personal communication, 2012). The failure of companies during and after the Stock Market Crash in 1987 drove investors to invest in alternative vehicles that were less risky, such as unit trusts, which were perceived to offer better governance by means of the trust rules that were set out in the trust deed and the oversight of the trustee (J.A. Simpson, personal communication, 2012). Between December 1993 and September 2011 (the period over which this study was conducted) the number and proportion of LPTs to LPICs has varied. At the 30 September 2011 there were ten LPVs listed on the NZX, consisting of six Listed Property Investment Companies (LPICs) and four Listed Property Trusts (LPTs).

Other ownership structures have not been adopted by the New Zealand government, such as the REIT structure or the stapled securities structure. A review of the literature reveals that there is currently no documented reason for excluding these structures.

However, from the literature (Fraser, 1993; Hobbs, 1994; J.A. Simpson, personal communication, 2010) it can be seen that there are similarities between REITs and NZs' LPVs, which offers a logical explanation for the exclusion of REITs by the Government. NZ LPVs are similar to REITs in the following ways: (1) they are investment vehicles, either structured as a Trust or a Company, that invest in a pool of professionally managed (either externally or internally) property assets and are listed on the Stock Exchange, (2) the entities underlying assets provide capital growth, and the steady rental stream provides investors with income via regular distributions, and (3) the main benefits of LPVs are that they provide investors "with greater diversification and liquidity with a smaller capital outlay than they would achieve if they invested directly in the property market" and high yields (CFA-Institute, 2011). The main difference between NZ LPVs and Asia-Pacific REITs is the tax benefits they use to attract investors. Asia-Pacific REITs investors benefit from flow-through taxation, where in New Zealand, under the Portfolio Investment Entity (PIE) regime, the tax benefits are passed through to LPV investors.

According to J.A. Simpson (personal communication, 2013) it is because of NZ's tax treatment of LPVs (they all have PIE status), that has resulted in the Government not adopting the stapled securities. In Australia Stapled Securities have become increasingly used to preserve the favourable tax treatment of "passive funds" and also to avoid the issues initially faced by some vehicles which had a different mix of shareholders that owned the fund and owned the associated management company: they are essentially a form of internalising the management. By way of further explanation vehicles that combine the fund and the management into one entity are treated less favourably (they are known as active funds) in Australia than in New Zealand, which appears to be the underlying reason for the exclusion of stapled securities in New Zealand: the PIE regime (introduced in New Zealand in October 2007) has essentially the same effect of preserving the favourable tax treatment of LPVs that a stapled security structure does.

Despite the fact NZ does not have legislation/regulations specifically defining a Stapled Security structure for NZ LPVs, Garner (personal communication, 2012)

observed that some companies appear to behave like stapled securities, for example Seeka Kiwifruit Industries Limited. A further exclusion from the NZX Property Sector, according to Radford (personal communication, 2010, as cited in J.H. Simpson 2011, p. 4), is the “listed companies which have major property holdings, for example, Ryman Healthcare Ltd, the port companies and the airport companies.” Both these observations suggest that corporate analysts have tended to rely on the NZX Property Sector’s informal classification of LPVs to analyse New Zealand’s listed property market. Hence a potential gap in the literature, that could be explored, is the impact of this classification approach on the significance and performance of NZ’s LPVs.

2.2.3 Previous studies

Most overseas studies that have focused on listed property (e.g. Newell, Hwa, & Acheampong, 2002; Brockman, French, & Tamm, 2010; Osmadi, 2010; CFA Institute, 2011, Macquarie Research, 2011), in the US, UK, Europe, Asia and Australasia, have researched: (1) the performance of the LPVs, (2) the management structures and activities of LPVs, and (3) the role of property sectors, types and locations, in a LPV’s portfolio. Depending on the country being researched, LPVs have either been classified as Real Estate Investment Trusts (REITs) or Listed Property Trusts (LPTs). The REIT and LPT classifications by definition appear to both include listed property investment companies, and REITs also including stapled securities.

Newell (personal communication, 2010), a prolific researcher in the area of property investment, has reported a lack of scholarly research on the Listed Property Vehicles (LPVs) in New Zealand. Reviewing the relevant literature (e.g. Korda Mentha, 2010; Grant Samuel, 2010, 2011; Craigs Investment Partners, 2011; Forsyth Barr, 2011) revealed that the constituents of the NZX Property Sector have been previously studied at both an aggregate level and an individual level.

The New Zealand’s listed property market has previously been researched by scholars (e.g. Hobbs, 1994; Korda Mentha, 2010; Grant Samuel, 2010, 2011; Stokes,

2000), listed property market corporate researchers (e.g. Forsyth-Barr, 2011; FundSource & NZX-Limited, 2010), and constituents the NZX Property Sector. These researchers have tended to analyse the trends, differences and relative performance of NZ listed property against other major asset classes. It appears that no previous studies have separately analysed the performance characteristics (which includes diversification benefits) of the ownership structures of the constituents, that comprise the NZX Property Sector namely the unit trusts (LPT sub-sector) and the companies (LPIC sub-sector).

2.3 The performance of Listed Property Vehicles

The following sub-sections document the performance assessment methods, measures and analysis techniques previously used to examine LPV performance (2.3.1), the nature and significance of NZ LPVs (2.3.2), and the literature on the structural reforms adopted by NZ LPVs to improve their performance (2.3.3).

2.3.1 Assessing performance: methods, measurement & analysis

Assessing the performance characteristics of LPVs is fundamental to both investment theory (asset allocation, selection, and optimisation) and investment activity (evaluating and estimating asset performance). Stakeholders use a range of performance measures to assist them in making investment decisions (Bodie, Kane, & Marcus, 2011; Brigham & Ehrhardt, 2009). These measures include specific risk and return statistics, which are analysed in order to determine the performance characteristics of different asset classes.

LPV performance can be examined at both an individual and an aggregate level. The financial results of individual NZ LPVs have been used in prior studies (e.g. Forsyth Barr, 2011; Korda Mentha, 2010; Grant Samuel, 2010, 2011) to compare these entities, to provide an explanation for the performance of the entity's stocks, and to offer predictions on future performance. The aggregate performance characteristics

of the NZX Property Sector have previously been analysed (e.g. FundSource & NZX, 2010; Forsyth Barr, 2011) to determine the performance of this asset class, in order to make comparison can be made against other asset classes and to assist in making predictions of expected future performance. Assets that outperform others are of interest to investors and analysts who typically rely on historical measures to predict future returns.

Traditional methods have been predominantly been used to research the performance characteristics of LPVs. The main method used by researchers has been data analysis of return series data from private and public databases (e.g. Newell et al., 2002; Newell, 2005; Newell & Peng, 2006, 2007; FundSource & NZX-Limited, 2010; Osmadi, 2010). Other methods include data analysis of public domain documents such as annual reports (e.g. Forsyth Barr, 2011), surveys via mail, email, or the web (e.g. Hobbs, 1994; Newell & Peng, 2008, Osmadi, 2010), and one-on-one interviews with people directly responsible for the management of the LPVs investment properties (e.g. J.H. Simpson, 2011).

Previous studies (e.g. Newell et al., 2002; Newell, 2005; Newell & Peng, 2006, 2007; Osmadi, 2010) have used various existing return series indices in their performance analysis, including share market indices (for stocks and bonds) and the IPD total return indices (for direct property). According to the NZX (2010), when comparing the returns of the major NZ asset classes it is important to use the Gross (Total Return) Index series for each asset class, as these existing series consider the total returns of the asset when evaluating the historic returns.

Furthermore some of these studies created new return series indices in order to better understand the nature of the relationship between performance and various aspects of constituent groups that comprise the local market: such as the composition (property type and location) of the LPVs underlying portfolio. Currently there appears to be a gap in the literature in regard to New Zealand's LPV market, in that no prior studies have analysed specific segments of the NZX Property Sector.

Two statistics that have been widely used in performance research are the Sharpe measure (to determine the reward-to-risk benefits) and the Pearson's correlation (to determine any diversification benefits). However Campbell, Huisman, & Koedijk (2001), have criticised the use of these measures, along with most main stream financial measures, on the basis that most return series data are not normally distributed and these two measures rest on an assumption of normality (Field, 2011).

Another issue researchers have been concerned with is how to determine the impact of different market conditions on the performance of LPVs. Difficult economic climates can constrain bank funding and reduce institutional investment activity, which impacts on LPV earnings, distributable profit, share price and the value of their property assets. Studies (Korda Mentha, 2010; Grant Samuel, 2010, 2011) of New Zealand's listed property market have found that there are various factors that have impacted on NZ's LPV returns and these include: restructuring initiatives, the economic climate, the current market condition and market interest rates, the demand and supply of commercial space (premium industrial space, retail space, and office accommodation), and the entities financial condition, projected earnings, distributions, and their properties' values and net yields.

In order to examine the impact of market conditions, overseas studies (e.g. Newell, Chau, Wong, & McKinnell, 2007; Osmadi, 2010) have examined the performance characteristics of REITs and LPTs over specific sub-periods. These prior studies used economic crises to create break-points and hence define these sub-periods. The Asian Crisis (1997-1998) and the Global Financial Crisis (2007-2008) are two common crises that these researchers have previously used and these period break points can be adopted by this study.

More recent sub-period studies have highlighted two interesting anomalies, firstly that the performance of listed property entities worldwide has tends to be subdued post-crises before recovering (Herdson, 2010; Grant Samuel, 2010, 2011) and secondly that initially LPVs performed more like stocks but as the market matured

they performed more like their underlying assets, which are direct property (Newell, 2005; Osmadi, 2010).

2.3.2 The nature and significance of New Zealand LPVs

The NZX Property Sector is significant and is considered to be a major NZ asset class (FundSource & NZX, 2010; J.A. Simpson, personal communication, 2011) due to the nature of New Zealand LPVs, which encompasses their following attributes: ownership structures, governance, the underlying property investment portfolio, financing, and operations.

The stature of NZ LPVs has grown over the years in terms of their total assets and their contribution to NZX market capitalisation. Forsyth Barr's (2011) research showed that as at 30 September 2011, the property sector had a total asset value of \$7.8 billion, comprising nine LPVs (CDL Investments New Zealand Limited is excluded in their report as the entity does not hold investment property and is deemed to be purely a residential development company), that hold mostly diversified portfolios with some sector-specific portfolios. Table 1 presents a profile as at the 30 September 2011 of these nine current constituent LPVs, grouped under the NZX Property Sector.

Table 1: Profile of the New Zealand LPVs (excluding CDL Investments) as at 30 September 2011

Listed Property Entity	NZX Code	Property Investment Vehicle*	Total Assets (NZD \$m)	Full Market Capitalisation (NZD \$m)	Effective Date: Annual Report	Year Listed	Sector
AMP NZ Office Limited	ANO	LPIC	\$1,284	\$857	30/06/2010	1997	Office
Argosy Property Trust	ARG	LPT	\$975	\$455	31/03/2010	2002	Diversified
DNZ Property Fund Limited	DNZ	LPIC	\$654	\$312	31/03/2010	2010	Diversified
Goodman Property Trust	GMT	LPT	\$1,618	\$949	31/03/2010	1999	Diversified
Kermadec Property Fund Limited	KPF	LPIC	\$102	\$50	31/03/2010	1993	Diversified
Kiwi Income Property Trust	KIP	LPT	\$2,113	\$1,066	31/03/2010	2006	Diversified
NPT Limited	NPT	LPIC	\$175	\$78	31/03/2010	1996	Diversified
Property For Industry Limited	PFI	LPIC	\$352	\$247	31/12/2009	1994	Industrial
Vital Healthcare Property Trust	VHP	LPT	\$533	\$332	30/06/2010	1999	Health
TOTALS			\$7,806	\$4,346			

Data Sources: (Forsyth-Barr, 2011; NZX, 2011)

Table 1 shows that the LPVs had a full market capitalisation of NZD 4.35 billion, as at the 30 September 2011, which at a local level is significant (8.8%) when compared to the total market capitalisation of total NZX (NZD 49.39 billion). However at a global level, a report by Macquarie Research (2011) highlights that the contribution New Zealand's listed property market makes, as at the 30 September 2011, to both the Global Property Securities Portfolio and the Global REIT Market Portfolio, is relatively small (refer to Table 2 and Table 3).

The findings from Macquarie's Research (2011) are presented in Tables 2 and 3. In terms of the global property securities market composition, shown in Table 2, New Zealand's listed property market (comprised ten LPVs on the NZX, including CDL) contributed only 0.2% towards the total worth of the Global Portfolio. Also presented in Table 2 is the contribution of selected countries for comparative purposes.

Table 2: Global property securities markets composition (September 2011)

Country	Number of Companies	Sector market cap (NZD billion)	% of global listed real estate equity market
US	266	554.5	27.7%
UK	140	72.9	3.6%
Australia	96	97.6	4.9%
Japan	139	159.0	7.9%
Malaysia	79	20.5	1.0%
New Zealand	10	4.3	0.2%
Global	1956	2004.6	

Source: Macquarie Research (2011)

Original Data Source: Bloomberg (2011, as cited by Macquarie Research, 2011)

Table 3: Global REIT market composition (September 2011)

Country	Number of Companies (similar to REITs)	REIT sub-sector market capitalisation* (NZD billion)	* % of local listed Real estate market	% of global REIT market
US	180	490.9	88.5%	55.0%
UK	21	45.7	62.6%	5.1%
Australia	53	88.2	90.3%	9.9%
Japan	34	51.5	32.4%	5.8%
Malaysia	14	4.6	22.1%	0.5%
New Zealand	8	4.0	94.8%	0.4%
Global	510	8,922.8		

Source: Macquarie Research (2011)

Original Data Source: Bloomberg (2011, as cited by Macquarie Research, 2011)

Table 3 shows that the New Zealand listed property market (which includes eight of the ten LPVs: encompassing only the LPVs that are similar to REITs) contributed just 0.4% towards the Global REIT market portfolio, which ranks the local New Zealand market as 13th largest out of the 22 international REIT markets (Macquarie Research, 2011). A selection of countries has been presented in Table 3 again for comparative purposes.

A study by Fund Source and NZX-Limited (2012) found that New Zealand LPVs have been a successful indirect property investment over the last ten years, returning 8.3% to outperform all the other major asset classes in New Zealand. Table 4 shows that the NZX Gross Property Index, over 1, 3, 5 and 7 year investment horizon periods (ending 31 October 2011) has outperformed the NZX50 Gross Index by a considerable margin, particularly over the 7 year period where the NZX Property Sector (57.0%) had almost three times the returns of the NZX50 which produced a total return of just 18.5% (Craigs-Investment-Partners, 2011).

Table 4: Total Returns for the NZX Property Sector and NZX50 Gross Indices

Investment Horizon	1 Year	3 Year	5 Year	7 Year
NZX Gross Property Index	9.0%	27.8%	9.2%	57.0%
NZX 50 Gross Index	0.8%	18.1%	-11.9%	18.5%

Source: Craigs-Investment-Partners (2011).

Original Data Source: NZX (2011, as cited by Craigs-Investment-Partners, 2011)

Note: Returns are shown to period ending 31 October 2011.

Assumption: distributions are reinvested.

From this review it appears that there are four main gaps in the literature on the NZ listed property market, due to lack of longitudinal empirical studies. These gaps have been documented in the following questions:

1. What is the nature of the relationship between NZ's LPV ownership structures and their stock market performance?
2. What are the performance characteristics of NZ LPV's ownership structures?
3. What are the reward-to-risk benefits for investors, in investing in either NZ LPTs or LPICs?
4. What are the diversification benefits for investors, when either the LPTs or LPICs are combined in a mixed asset portfolio?

2.3.3 Structural reforms: improving NZ LPV performance

Fundamentally entities are concerned with increasing their attractiveness as an investment opportunity and improving the performance of an entity through structural reforms is one way of doing that. Hence the purpose of restructuring reforms appears to be universal.

Agency problems (discussed in section 2.1 of this study) have been driving the need for improvements, which have been a protracted issue for entities worldwide. There has been an on-going debate in the corporate world, about which structures (ownership, management, and management fees) are most appropriate when attempting to improve the performance of a LPV. According to the CFA Institute (2011) study the ideal governance structures that have evolved from this debate appear to have similar objectives: (1) to properly incentivise Managers to consistently act in the Investor’s best interests, (2) to ensure greater transparency, control and accountability for Investor’s (3) to minimise conflicts of interests between the Manager and investors, and (4) to uphold good governance standards.

The proposed and completed restructuring initiatives that some LPVs in New Zealand will use or have used to improve their performance are shown in Table 5. Most New Zealand LPVs are externally managed and over the years they have all (except for DNZ who internalised the management function of their portfolio) changed their management fee structure to a tiered structure: a reduced management base fee, a performance fee component and an additional fee component.

Table 5 Restructuring initiatives of New Zealand LPVs

	Code	Corporatisation	Internal Management Structure	Tiered Management Fee Structure
AMP NZ Office Limited	ANO	✓		✓
Argosy Property Trust	ARG	P	P	✓
DNZ Property Fund Limited	DNZ		✓	
Goodman Property Trust	GMT			✓
Kermadec Property Fund Limited	KPF			✓
Kiwi Income Property Trust	KIP			✓
NPT Limited	NPT	✓	✓	
Property For Industry Limited	PFI			✓
Vital Healthcare Property Trust	VHP	P	P	✓

Key: ✓ = completed, P = Proposed

Original Data Source: NZX (2011)

More recently the impact, of adopting various structural reform options, on the performance of New Zealand LPVs has been examined (Korda Mentha, 2010; Grant Samuel, 2010, 2011). These studies found, that in the short term LPVs performance could be expected to improve if they adopt certain proposed structural reforms, which include converting to a company structure and internalising management. They used reference to prior studies and their own limited analysis to argue that theoretically, in the long term, restructured entities would be viewed by investors in the market more favourably.

Grant Samuel's (2010) study of The National Property Trust (NPT) used forecasted results for one year to show that performance improvements would result from adopting these reforms, by contrasting the results for the new structures with the existing structures. Further, in order to judge the impact of restructuring, Grant Samuel's (2010) study assessed the structural options holistically, analysing the fairness of the consideration paid to stakeholders for their interests and the impact of restructuring on the financial results. This study also explored the benefits of restructuring on the financial results by comparing The National Property Trust's financial results for 2010 against adjusted results post-restructuring for the same year and found that the results differed in terms of the earnings per share, net tangible assets per share, gearing (debt to equity ratio), liquidity of shares, and distributions. The differences in the termination payments to the Manager of the Trust were also analysed by comparing management internalisation transactions costs in New Zealand and Australia.

The following sub-sections present the relevant literature on the link between NZ's LPV performance and their structural reform options: ownership structure (2.3.3.1), management structure (2.3.3.2), and management fee structure (2.3.3.3).

2.3.3.1 Ownership structure & performance

New Zealand investors reportedly once perceived that a unit trust structure, which has a trust deed to govern the relationship between the trustee and the manager, offered better governance (J.A. Simpson, personal communication, 2012). Over the years investor expectations have changed and to remain attractive trusts have chosen to amend their trust deeds to provide both a governance structure more aligned with a company's board (allowing investors the chance to appoint or remove independent board members), and the provision for regular meetings (which increases the managers accountability to investors and improves the disclosure of strategies and performance).

The perception in New Zealand nowadays is that a trust structure no longer has a purpose and that the benefits of a company structure best serve stakeholders' interests, as it has a constitution to govern the relationship between the board and the manager, more independent directors, and better takeover flexibility.

Analysts (Korda Mentha, 2010; Grant Samuel, 2010, 2011; J.A. Simpson, personal communication, 2011) expect that the market price for a LPV will not be materially influenced (at the time of conversion) if a unit trust corporatises because the underlying nature of the business will not have changed. In time though, these analysts expect restructuring will result in overall performance improvement benefiting investors through higher returns.

Hence with the expectation of better returns the trend to corporatise seems like an attractive option. However, according to recently completed independent reports converting from a Unit Trust to a Company structure involves significant costs (Korda Mentha, 2010; Grant Samuel, 2010, 2011). Hence it is important to know if there have been any differences in the performance of the two ownership structures in the New Zealand investment market, namely LPTs and LPICs. Currently there is a gap in the literature and a time series study is needed to examine the performance characteristics of these two different types of ownership structures in a NZ context.

2.3.3.2 *Management structure & performance*

Investors have always been concerned with how well externally managed LPVs govern the relationship between the manager and the trustee, or the board. The US studies (Cannon & Vogt, 1995; Capozza & Seguin, 2000; Howe & Shilling, 1990), that examined LPV performance in relation to management structure, found that externally managed REITs, between 1973 and 1992, tended to underperform internally managed REITs. More recent US studies (Brockman et al., 2010) found that, between 1993 and 2007, externally managed REITs were no longer tending to underperform compared with internally managed REITs, which they suggested was due to investors responding to the earlier findings and mitigating the underperformance through how they acted (KordaMentha, 2010). Although a similar study has not yet been conducted in New Zealand, undertaking this research would be difficult due to the limited data set: most NZ LPVs have been externally managed until 2010.

The recent internalisation of the management function by some LPVs in New Zealand, to improve performance, is a shift that mirrors the trend in both the US and Australia over the past decade (KordaMentha, 2010). Grant Samuel (2010, 2011) found that in Australia an internal management structure is preferred because it resolves some of the agency problems associated with externally managed models: internal management eliminates the potential conflict of interest between managers and investors, reduces management costs, and eases the path for takeovers or mergers (CFA-Institute, 2011; J.A. personal communication, 2012). In New Zealand according to J.A. Simpson (personal communication, 2011) the key factors driving the performance of New Zealand LPVs, over the years, has been the quality of the Board and the management contracts, which is an argument supported by economic theories: although it appears this hypothesis has not been empirically tested.

2.3.3.3 *Management fee structure & performance*

Historically most LPVs in New Zealand were externally managed. The reasons for this common practice differed for both property companies and trusts. According to J.A. Simpson (personal communication, 2011) property company's preferred to use external management contracts due to the offering lucrative prospects for the managers. Trusts used an external manager because they were required to externalise the management function of the portfolio under the Unit Trusts Act (J.A. Simpson, personal communication, 2012).

A common issue for investors, arising from LPVs with external management contracts, has been the leakage of fees: as a result of management charging additional fees for extra services, such as development, buying and selling assets, and leasing. Nowadays this issue continues to be one of the major concerns for LPV investors in New Zealand because of the reduced returns.

Due to investor pressure over the years, some vehicles have chosen to adopt a new management fee structure to resolve the issue, while more recently other vehicles have chosen to internalise their management. The management fee structure adopted by the externally managed LPVs comprises the following three components: (1) a tiered base management service fee, to reduce the base management fee originally set, (2) a performance fee, to further align the manager's and investors' interests, and (3) additional fees which can cover a range of extra services the Manager provides.

The performance fee component, in this tiered structure, achieves alignment by rewarding the manager when the LPV performance is comparatively superior, linking returns of the manager and investors more closely, and strengthening the manager's incentives to optimise the portfolio. It appears that there is no New Zealand listed property market research that compares LPV performance prior to and after the introduction of this fee change. For some investors and stakeholders the only area of concern in this tiered structure left to resolve has been the additional fee

component which impacts on investor returns. Korda Mentha (2010) found that additional fees can be a significant proportion of the overall Management fee and that typically these fees are poorly disclosed in terms of unit costs and the additional services provided.

2.4 Summary & implications

A review of the relevant literature has revealed the substantive economic theories and empirical evidence, which underpin the conjectured relationship between the ownership structures of LPVs and their performance. The review established that currently academics and practitioners agree on the idea of maximising investor wealth via improved governance: either by adopting or converting to an optimal ownership structure.

Despite there being international agreement, it appears that this conjectured relationship has not yet been tested in the New Zealand listed property market and from the literature, there appeared to be a number of gaps (refer to Table 6) to be explored. It is these gaps that have formed the foundation for the research questions for this study, which are:

- 1) *What is the relationship between the ownership structure and the performance characteristics of Listed Property Vehicles (LPVs) in the New Zealand investment market?*
- 2) *Do the performance characteristics of New Zealand's Listed Property Investment Companies (LPICs) provide justification for LPVs to structure or restructure as an incorporated company?*

The conceptual framework that will guide the study has been developed from the literature, which focused on the relationship between the ownership structures of publically owned entities, such as REITs, and their performance.

Table 6: Literature Gap Summary

Gap 1	There appears to be no empirical studies that reveal the nature of the relationship between NZ's LPV ownership structures and their stock market performance. Further evidence is needed to support a LPV's justification for specifying an optimal ownership structure in any future conversions or for creating any new property funds.
Gap 2	There appears to be no empirical studies that examine the performance characteristics of NZ LPV's ownership structures as separate asset classes. Therefore no evidence exists as to whether LPICs have performed differently to LPTs.
Gap 3	There appears to be no empirical studies that examine the reward-to-risk benefits for investors, in investing in either NZ LPTs or LPICs. Therefore no evidence exists as to the performance benefits that potentially could be achieved by investing in a particular ownership structure, namely LPTs or LPICs.
Gap 4	There appears to be no empirical studies that examine the diversification benefits for investors, in combining either NZ LPTs or LPICs in a mixed asset portfolio. Therefore no evidence exists as to the role that potentially either LPTs or LPICs could play in a mixed asset portfolio.

Four objectives have been developed from both the research questions and the identified gaps. These research objectives are documented below:

- 1) *To reveal the nature and significance of LPVs in the New Zealand investment market.*
- 2) *To explore the performance characteristics of New Zealand LPVs*
- 3) *To reveal any reward to risk benefits for investors by investing in LPTs or LPICs*
- 4) *To reveal any diversification benefits for investors by investing in either LPTs or LPICs*

In order to examine the conjectured relationship, between the performance of NZ LPVs and their ownership structures, hypotheses have been developed (refer to sub-section 3.1.2.2). In considering the literature (*Korda Mentha, 2010; Grant Samuel, 2010, 2011*), the following two assumptions were used to develop those hypotheses:

- 1) *That NZ's LPTs and LPICs have performed differently.*
- 2) *That NZ's LPICs have outperformed NZ LPTs.*

The economic theory underpinning this study is that the ownership structure of an LPV is ultimately a key determinant of its stock market performance (Williamson, 1964; Sorenson, 1974; Jensen & Meckling, 1967; Pedersen & Thomsen, 1997). Previous studies (e.g. CFA-Institute, 2011; Pedersen & Thomsen, 1997; Korda Mentha, 2010; Grant Samuel, 2010, 2011), that have explored this relationship, appear to all agree that the stock market performance of publically owned vehicles is linked to their corporate governance, behaviour, and financial results (performance), which in turn is linked to their ownership structure.

The stature of the NZX Property Sector has grown since it was established in 1982. As at the 3rd September 2011 this Sector had total assets of NZD7.8 billion (Forsyth Barr, 2011) and contributed approximately 9% (\$4.3 billion) to total worth of the NZX (\$49.3 billion). The study by FundSource & NZX (2011) recognises the NZX Property Sector as a major asset class in the New Zealand Investment market.

Based on the literature, understanding the nature of the relationship between the ownership structures of NZ's LPVs and their stock market performance is an important phenomenon to study. It is expected the study will determine whether the two types of LPVs in New Zealand, namely LPTs and LPICs, have performed differently. The performance of these two LPV asset classes will be measured in terms of their gross (total) returns, which will enable both their reward-to-risk benefits and their diversification benefits to be examined. As a result the nature of the conjectured relationship between the two variables of interest, namely the ownership structure of NZ LPVs and their performance, will be revealed.

There are both practical and theoretical implications for understanding the conjectured relationship. The practical implications include: (1) assisting investors in making investment decisions, such as asset allocation and selection, (2) assisting investors in making restructuring decisions in entities they have an interest in, for example voting to convert an existing trusts to a company structure, (3) assisting LPV management in developing strategies to improve performance (including corporate re-structuring), and (4) assisting Government in the development of legislation that impacts the ownership of LPVs. The theoretical implications include: (1) encouraging future studies to explore the segmentation of other listed property markets by ownership structure, (2) encouraging researchers of NZ's investment market to further segment the listed property market and determine whether further benefits can be obtained by investors, and (3) assisting other stakeholders in understanding the nature of the relationship between ownership structure and performance in a New Zealand context.

Chapter 3: Research Design

This chapter describes the design adopted by this research to achieve the objectives stated in section 1.3 (refer to chapter one). Chapter 3 begins by discussing the methodology and the research design (section 3.1), then provides details of the data, population and sample in the study (section 3.2), lists and justifies all the instruments that were used in the research (section 3.3), outlines the procedure used for collecting and recording data in the study, and discusses how the data was analysed (section 3.5).

3.1 Methodology & research design

Section 3.1 begins by discussing the methodology that was used in the study and the stages by which the methodology was implemented (sub-section 3.1.1), then sub-section 3.1.2 outlines the research design, the independent and dependent variables (sub-section 3.1.2.1), and states the research hypotheses to be tested (sub-section 3.1.2.2).

3.1.1 Methodology

This exploratory study utilised gross (total) return methodology to solve the research problem. Performance and correlation analysis techniques used in prior studies were also adopted to determine the performance characteristics of the LPVs in the New Zealand investment market.

The first stage of the research involved building the new separate LPT and LPIC gross (total) return quarterly indices, using the data collected from the NZX Property Sector. The base period for these new indices is 1994:Q1 (base = 1000) and any existing indices for the NZ share market and bond market have been rebased to this first quarter in 1994.

The second stage of the research involved using the gross (total) return indices to analyse the contributions (based on market capitalisation) that the listed property sub-sectors (LPTs and LPICs) have made to the overall listed property sector (LPVs) and the contributions that these separate LPV sub-sectors and the overall LPV sector have made to the New Zealand Share market.

The final stage of the research involved using the gross (total) return indices to examine the performance trends, differences, and relationships of these two separate sub-sectors, over the study period, relative to each other and to the other asset classes (the overall LPV market, stocks, direct property, and bonds). Further sub-period analysis was used in the study to examine the impact of market conditions on these indirect property vehicles. The three sub-periods were divided by key economic crises identified from the literature reviewed and these sub-periods are named as follows: pre-Asian crisis (1994:Q2 to 1998:Q2), Asian crisis to pre-GFC (1998:Q3 to 2008:Q3), GFC and post GFC (2008:Q4 to 2011:Q3). The break-points for the study period are July 1998 for the Asian Crisis and October 2008 for the GFC.

During this final stage the performance of all the asset class were graphed over the study period (1994:Q1 to 2011:Q3), in order to reveal any performance trends. The quarterly returns were also used to determine the performance characteristics (risk-return profiles and the diversification benefits) of the asset classes over the period 1994:Q2 to 2011:Q3 and over the sub-periods. The reason the study period has been reduced by one quarter is due to the conversion process (recalculating returns from index numbers). The quarterly return series were used to analyse the risk-return profiles of each asset class which enabled the assets to be ranked according to their Sharpe measure.

The performance research during this stage also involved determining any diversification benefits derived by combining the LPV sub-sectors with the other major asset classes. Inter-asset correlation matrices were constructed to determine any risk-reduction benefits. These matrices were constructed from the return series, over both the study period and the sub-periods.

3.1.2 Research design

This quantitative study used a number of measurable variables to solve the research questions, which are restated below:

- 1) *What is the relationship between the ownership structure and the performance characteristics of Listed Property Vehicles (LPVs) in the New Zealand investment market?*
- 2) *Do the performance characteristics of New Zealand's Listed Property Investment Companies (LPICs) provide justification for LPVs to structure or restructure as an incorporated company?*

If the LPV ownership structure leads to a difference in the performance characteristics, then this variable can be explored further as predictor of these phenomena.

3.1.2.1 The nature of the relationship

This study explored the influence that “ownership structure” has on the “performance characteristics” of LPVs within the New Zealand investment market. Initially a review of the relevant literature was undertaken to better understand the relationships between these variables of interest.

In terms of the nature of the relationship between these variables the literature (e.g. Cannon & Vogt; 1995; Pedersen & Thomsen; 1997) suggests that the dependent variable (the LPV performance characteristics) is influenced by the independent variable (the ownership structure). The review of the literature also revealed that there appears to be limited knowledge of the direction of this relationship in a New Zealand context. The literature also suggested that the conjectured relationship between these variables is further influenced by market conditions.

To answer the research question this study has used two-tailed hypotheses to test the relationship between the variables of interest and used structural breaks in the return series to determine the impact of market conditions on the performance characteristics.

3.1.2.2 *The hypotheses*

Hypotheses are regarded as testable statements. The following two-tailed research hypotheses document the conjectured relationship, derived from the literature, between ownership structures and performance characteristics.

The null hypothesis is:

H1₀ There is no relationship between the ownership structure and performance characteristics of New Zealand's Listed Property Vehicles (LPVs)

The alternative hypothesis is:

H1_A There is a relationship between the ownership structure and performance characteristics of New Zealand's Listed Property Vehicles (LPVs)

For the purpose of testing these non-directional hypotheses, the LPVs under the NZX Property Sector (except NZX:CDI, refer to sub-section 2.3.2) were grouped by ownership structures into separate asset classes, namely LPTs and LPICs, and their performance characteristics, as investment vehicles, were considered. This analysis involved comparing the performance of these vehicles against other asset classes and comparing their diversification benefits, when combined with those major NZ asset classes.

Exploring this relationship for other listed entities that behave like LPVs is beyond the scope of this report for the purposes of this study. The NZX Property Sector classification of the LPVs has been adopted in this study.

3.2 Population & sample

For this study the population is defined as all the property vehicles listed on the New Zealand Stock Exchange (NZX), which are or have been grouped in the NZX Property Sector between 31 December 1993 and 30 September 2011. Only a single LPV was excluded from the sample for this study: CDL Investments New Zealand Limited (NZX: CDI) was excluded as the entity does not hold investment property and is deemed to be purely a residential development company.

The constituents of the NZX Property Sector have been categorised in this study into two types of ownership structures, namely the listed property Unit Trusts and the Companies. Between 1993 and 2011 the total number of constituents that have contributed to the NZX Property Sector, at various times, is seventeen: eleven companies and six trusts. Although it is noted that annually the number of constituents only varied between nine and fourteen LPVs in total.

The population samples in this study are defined as the gross (total) return series data for the three LPV asset classes (LPVs, the LPTs, and the LPICs) and for the three major NZ asset classes. The return sample size for the overall study was 70 ($n=70$), with reduced sample sizes for the sub-period analysis: sub-period one $n=17$, sub-period two $n=41$, and sub-period three $n=12$. The data was tested for normality (refer to sub-section 3.5.1) due to the size of these samples.

3.3 Data

A convenience sampling approach was used to gather the monthly return data for each LPV asset class: the end of month adjusted opening price and last price were gathered and the distributions per share for the month was the total distributions for that month. This monthly data formed the basis for the three newly created quarterly LPV, LPT, and LPIC gross (total) return indices: the Gross Index Formula is shown in sub-section 3.4.1.

The analysis in this study also used secondary data in the form of gross (total) return indices: three benchmark indices for the major New Zealand asset classes (stocks, direct property, and bonds) and three new gross return indices. The procedure used to collect this data for the seventeen year study period from the 31 December 1993 to 30 September 2011 is outlined in this section.

The secondary data was sourced from: the New Zealand Stock Exchange (NZX), the Reserve Bank of New Zealand (RBNZ), and from the Property Council of New Zealand/IPD (NZPC/IPD). The LPV data sourced from the NZX included: end of month adjusted opening price and last price, monthly distributions, and the number of indexed shares at the end of each month. The benchmark performance index for stocks was the NZX All Gross (Total Return index) which was sourced from the NZX. The benchmark performance index for bonds was the ANZ All Government Bond (Gross) Index also sourced from the NZX. The benchmark performance index for direct property was the All Property Total Return (Gross) Index which was sourced from the IPD.

3.4 The Research Instrument

This study developed three separate gross (total) return indices (sub-section 3.4.1), for the three LPV asset classes, namely the overall LPV sector, the LPT sub-sector and the LPIC sub-sector. These new gross (total) indices are the instruments used in this study to measure the performance (returns, risks, risk-adjusted returns), and the diversification benefits (correlation coefficients) of the NZ LPVs in the NZ investment market over the study period. Further the research employed the market capitalisation data, used to build these indices, to determine the significance of the LPV asset classes.

In order to carry out both the comparative performance analysis and the correlation analysis, the study also used existing performance benchmark market indices, for stocks, direct property, and bonds, these are shown in Table 7. Previous studies

(e.g. FundSource & NZX-Limited, 2010; Craig-Investment Partners, 2010; Forsyth Barr, 2011) of the NZ investment market have used similar benchmarks in order to reveal the performance of different asset classes. These benchmark indices provide a broad measure of performance for New Zealand Shares, New Zealand Government Bonds and New Zealand Commercial Property (Real Estate).

Table 7 New Zealand asset class gross (total return) indices used in the study

Asset Class	Database	Performance Series	Frequency
Stocks	NZSX	NZX All Gross (Total Return) Index, Property Sector Gross Index	Quarterly
Bonds	NZDX	ANZ All Government Bond (Gross) Index	Quarterly
Direct Property	NZPC/IPD	All Property Total Return (Gross) Index	Quarterly (De-smoothed)

To calculate the risk-adjusted returns using the Sharpe measure (refer to sub-section 3.5.2) the New Zealand 90-Day Bill rate and the 10-Year Government Bond Rate (quarterly frequency) were also collected from the Reserve Bank of New Zealand (RBNZ) database.

Prior to analysis the smoothed direct property total returns (recalculated from the NZPC/IPD index) were de-smoothed, using the standard Geltner (1993b) procedure (refer to sub-section 3.4.2). This quarterly NZPC/IPD (total return) property index is the performance benchmark for directly owned commercial property in New Zealand. In September 2011 the IPD (2011b) report showed that the total property index portfolio for New Zealand comprises 574 commercial properties, which were valued at NZD 10 billion.

3.4.1 Creating new gross (total) return indices: LPVs, LPTs and LPICs

The separate performance series developed for the LPV sector, the LPT sub-sector, the LPIC sub-sector are quarterly Gross (Total Return) Indices, which encompasses the period 1994:Q1 to 2011:Q3, and uses monthly return series data. Table 8 shows the constituent data collected to create these separate indices.

Table 8 Constituent Data Collected

Database	New Indices created	Total Return Series Data Collected	Frequency
NZX*	<ul style="list-style-type: none"> • LPT Sub-Sector Gross Index • LPIC Sub-Sector Gross Index • Overall LPV Sector Gross Index 	<ul style="list-style-type: none"> • Last price (end of month) • Adjusted opening price (end of month) • Dividends per share (total per month) • Indexed shares (full and free float: end of month) 	Quarterly

The following formulae were used to calculate the index values from the data collected. These two equations are the same formulae used by the NZX to create their Equity Indices, such as the NZX50 Gross Index and the NZX All Gross Index. Definitions for the term or symbol used in these equations are shown below.

Gross Index Formula

$$GI_t = \frac{\sum [Indexed\ Shares \times Last\ Price] + \sum [Indexed\ Shares \times Distributions\ per\ Share]}{\sum [Indexed\ Shares \times Adjusted\ Opening\ Price]} \times GI_{t-1}$$

Or :

$$GI_t = \frac{[Latest\ Index\ Market\ Cap] + [Total\ Distributions\ Ex\ Today]}{[Index\ Market\ Capitalisation\ at\ Start\ of\ Day]} \times GI_{t-1}$$

Term or symbol used in the equations	Definition
GI_t	The current Gross Index level
GI_{t-1}	The previous trading day's closing Gross Index level
\sum	Sum across each index constituent security
Indexed Shares	The number of shares for each security included in the index
Last Price	Price from most recent price-setting trade for each security. If there is no price setting trading in a security on a given trading day, the adjusted opening price will be used for index calculation.
Adjusted Opening Price	Previous trading day's closing price for each security, adjusted for pro-rata corporate actions such as capital reconstructions, share splits and rights issues, but not distributions.
Distributions per Share	Distribution amount per share, for dividends (or other distributions) that have gone ex on the current trading day, converted to New Zealand dollars and rounded to \$0.001.
Market Cap	Full Market Cap and the free float market cap (which is the Free float portion of shares of a security)

Original Data Source: NZX (2011)

Historically the New Zealand Stock Market (NZX) “has paid an unusually high dividend yield, the highest of any developed market”, which means “the Capital Index series tends to understate the historic returns of the market by several

percentage points” (NZX-Limited, 2010, p. 9). Therefore the performance of the NZX is measured using the Gross Index series.

The Gross Index series mathematical formula adopts the NZX Capital Index series formula (which is based on the Paasche formula), but includes in the numerator reference to distributions, such as dividends. The new indices developed, mirror the NZX All Gross Index method over the study period, adopting the variations to the formula, which are shown in Table 9. The first variation adopted was the change to the weighting method for the Gross Index and the second variation was to the change to the return method for calculating the dividends.

Table 9 NZX All Gross Index method changes during the analysis period (1994:Q1 to 2011:Q3)

Effective Date	New Method	Old Method
1 January 2004	Free float market capitalisation weighting	Full market capitalisation weighting
1 October 2005	Dividends excluded NZ tax credits, such as imputation credits	Dividends included NZ tax credits, such as imputation credits

Original Data Source: NZX (2011)

3.4.2 De-Smoothing the NZPC/IPD All Property Total Return Index

According to Newell & MacFarlane (1998) previous studies (Hartzell & Webb, 1988; Lusht, 1988; Geltner, 1989, 1993a, 1993b; Ross & Zisler, 1991) have found that valuation-based property returns series tend to understate the risk of unsecuritised (direct) property. These earlier studies found that this understated risk was due to the effect of appraisal-smoothing, temporal aggregation, and revaluation seasonality. The general consensus that emerged from these studies was that prior to using valuation-based property data (such as the NZPC/IPD property index used in this study), to compute the risk characteristics of property returns, it is important that the analyst corrects the property returns for these three identified issues.

Geltner’s (1993b) study proposed a procedure to correct for the presence of the three issues identified in appraisal-based data: appraisal smoothing, temporal aggregation, and the seasonality. His procedure, which was based on the assumption that there are underlying inefficiencies in the property market, applied a

de-smoothing equation (see below) to the publicly reported appraisal-based index returns series in order to recover an estimate of the underlying market return (Geltner, 1993b). Compared to appraisal-based data, Geltner (1993b) found that the de-smoothed property returns series data displayed a higher return and volatility.

The de-smoothing equation is defined as:

$$R_t = (R^*_t - (1-\alpha) R^*_{t-1}) / \alpha$$

Where:

R_t = de-smoothed property return at time t

R^*_t = observed smoothed valuation-based property return at time t

R^*_{t-1} = observed smoothed valuation-based property return at time t-1

α = smoothing parameter

Geltner's de-smoothing equation (shown above), includes both a smoothing parameter (α), which lies between 0 and 1, and a lag structure. According to Geltner (1993b) a smoothing parameter value (α) of 1 indicates there is no smoothing in the appraisal-based data, whereas a parameter of 0 implies the data is totally smoothed. To compute the smoothing parameter the returns of the appraised index can be regressed on its past values, "when the smoothing occurs at only one lag" (Blundell & Ward, 1987, as cited in Constantinescu & Francke, 2012 p. 5).

A number of recent studies (e.g. Nartea & Eves, 2010; Newell & Lee, 2011a, 2011b; MacDonald, Bianchi & Drew, 2012) have used the standard Geltner procedure (1993b) to de-smooth appraisal-based series return data. Following these previous studies, the Geltner procedure was used in this study to recover an estimate of the underlying market returns from the NZPC/IPD All Property Total Return Index. This study assumed that the NZPC/IPD All Property Total Return Index is affected by all three issues: appraisal-smoothing, temporal aggregation, and revaluation seasonality. This assumption was based on the observation that the nature of the NZPC/IPD property index is similar, both at the disaggregate level and the aggregate levels, to the other benchmark property series (in the US, Canada, UK, and Australia), which were all found (Newell & MacFarlane, 1998) to be affected by these three issues. Similarities between the indices include: the timing and seasonality of the

revaluations, the construction of the indices, and the underlying inefficiencies in the relevant property markets. According to the IPD (2011a) the NZPC/CPI property Index is constructed using the individual property performance appraisal-based data, most of the revaluations for the individual properties are carried out annually, almost all (90%) the revaluations are carried out in the third quarter, and the reporting period for the index is quarterly with the properties that are not reappraised during any quarter having their values reported as being unchanged in the following reporting periods until they are revalued.

By de-smoothing the NZPC/IPD property index this study aimed to improve the accuracy of the estimates of direct property risk. The adopted lag structure used in this study, to compute the smoothing parameter, was one quarter: this is based on the frequency that the IPD data series is reported. A smoothing parameter (α) of 0.2 was computed by regressing the IPD index on its previous values, based on the lag structure of one quarter: using this smoothing parameter roughly corresponds to a two-fold increase in variance. Newell (personal communication, 2012), a prolific researcher of the performance characteristics of various asset classes, confirmed that both the specific smoothing parameter and the lag structure used in this study are justified based on prior studies.

3.5 Analysis

This section documents the tests for normality (sub-section 3.5.1), the measures used to determine the performance characteristics (sub-section 3.5.2), and the analytical steps taken to achieve the research objectives (sub-section 3.5.3).

3.5.1 Tests for normality

From the Central Limit Theorem we know three things: (1) “that if the sample (return series) data are approximately normal then the sampling distribution will be also”, (2) “that in big samples the sampling distribution tends to be normal, regardless of

the shape of the data collected”, and (3) that “the sampling distribution will tend to be normal regardless of the population distribution in samples of 30 or more” (Field, 2011, p. 134).

In this study the normality of the smaller return samples was questionable: for the overall study period $n=70$, for sub-period one $n=17$, for sub-period two $n=41$, and for sub-period three $n=12$. Hence the return samples used in the study was tested for normality, using the Kolmogorov-Smirnov test. The importance of testing for normality is to ensure the validity of the findings: as certain statistical tests used in the study assume normality, namely the Sharpe measure and Pearson’s correlation coefficient.

Normality was tested by: (1) downloading the LPV return series data into SPSS, and (2) applying a conventional normality test to the LPV return series data set, known as the Kolmogorov-Smirnov test. This test examined how well the data set used in the study seemed to be adequately approximated by a normal distribution. The results of the normality tests are presented in Tables 10 to 13.

Despite the Kolmogorov-Smirnov test for normality revealing that there is evidence (the significance level was less than 0.05, $p<0.05$) to suggest that some of the returns samples are not normally distributed, based on the Central Limit Theorem, normality has been assumed for the larger return samples ($n>30$).

Table 10: Test of Normality for the overall study period

	Tests of Normality					
	Kolmogorov-Smirnov ^a			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
LPT	.121	70	.012	.947	70	.005
LPIC	.144	70	.001	.934	70	.001
LPV	.094	70	.200 [*]	.973	70	.136
Stocks	.062	70	.200 [*]	.985	70	.571
Direct Property	.150	70	.000	.900	70	.000
Govt Bonds	.049	70	.200 [*]	.990	70	.848

*. This is a lower bound of the true significance.

Original Data Sources: NZX (2011), IPD (2011)

a. Lilliefors Significance Correction

Table 11: Test of Normality for the first sub-period

Tests of Normality						
	Kolmogorov-Smirnov ^a			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
LPT	.163	17	.200 [*]	.948	17	.432
LPIC	.240	17	.010	.829	17	.005
LPV	.165	17	.200 [*]	.910	17	.098
Stocks	.183	17	.132	.960	17	.624
Direct Property	.283	17	.001	.810	17	.003
Govt Bonds	.146	17	.200 [*]	.933	17	.243

*. This is a lower bound of the true significance.

Original Data Sources: NZX (2011), IPD (2011)

a. Lilliefors Significance Correction

Table 12: Test of Normality for the second sub-period

Tests of Normality						
	Kolmogorov-Smirnov ^a			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
LPT	.094	41	.200 [*]	.969	41	.320
LPIC	.095	41	.200 [*]	.973	41	.434
LPV	.159	41	.010	.938	41	.028
Stocks	.090	41	.200 [*]	.984	41	.822
Direct Property	.153	41	.017	.929	41	.014
Govt Bonds	.077	41	.200 [*]	.982	41	.738

*. This is a lower bound of the true significance.

Original Data Sources: NZX (2011), IPD (2011)

a. Lilliefors Significance Correction

Table 13: Test of Normality for the third sub-period

Tests of Normality						
	Kolmogorov-Smirnov ^a			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
LPT	.252	12	.034	.833	12	.023
LPIC	.168	12	.200 [*]	.942	12	.520
LPV	.279	12	.011	.850	12	.037
Stocks	.120	12	.200 [*]	.966	12	.866
Direct Property	.184	12	.200 [*]	.864	12	.055
Govt Bonds	.139	12	.200 [*]	.963	12	.830

*. This is a lower bound of the true significance.

Original Data Sources: NZX (2011), IPD (2011)

a. Lilliefors Significance Correction

Testing for normality informed the study as to which measures to use in the analysis. For the parametric test statistic to be valid the data set must have a normal distribution, whereas this assumption of normality is relaxed when using the non-parametric test statistic.

To improve the validity of the risk-reduction analysis and to make it possible to compare the results with other studies, both the Pearson's correlation coefficient (parametric test statistic) and the Spearman's correlation coefficient (non-parametric test statistic) have been analysed.

3.5.2 Performance characteristics: measures

Common statistical measures were used in the study, to determine the performance characteristics of the asset classes: LPTs, LPICs, LPVs, stocks, direct property, and bonds. The formulae for these statistics are presented later in this sub-section.

From the literature the performance characteristics of an asset class include: the average (geometric) annual returns (\bar{x}), the annual risk (standard deviation = σ), the risk-adjusted returns and the risk-reduction benefits (of combining two asset classes in a mixed asset portfolio). The two risk-adjusted return measures that were used in the study, to calculate the reward-to-risk ratio for each of the asset classes, are the return-to-risk measure and the Sharpe measure. Excel software (Microsoft) was used to compute these measures. The risk free rate of return used to calculate the excess annual returns in the Sharpe measure was the best obtainable rate of return of a risk free security (i.e. the 90 day bill rate).

The two risk-reduction benefit measures used in the study, to compute the bivariate correlations between the combined assets are: the Pearson's correlation coefficient and the Spearman's correlation coefficient. Pearson's correlation coefficient assumes the returns are normally distributed, whilst the Spearman's correlation coefficient, relaxes this assumption of normality. The strength, direction and the

significance of correlations were determined using SPSS software, which produced an inter-asset correlation matrix for each period being analysed: the overall study period and three sub-periods.

The average (geometric) annual return is defined as:

$$\bar{x} = \prod_{i=1}^n (1 + x_i)^{1/n} - 1$$

Where:

- \bar{x} = the average (geometric) annual rate of return of asset x
- x_i = represents each return data value from i=1 to i=n
- n = the sample size

The annual risk (standard deviation) is defined as:

$$\sigma = \frac{\sqrt{(x_i - \bar{x})^2}}{n - 1}$$

Where:

- σ = the annual risk (standard deviation)
- x_i = represents each return data value from i=1 to i=n
- \bar{x} = the average (geometric) annual rate of return of asset x
- n = the sample size

The return-to-risk Measure is defined as:

$$\text{Return to risk ratio} = R_x / \sigma$$

Where:

- R_x = the expected average (geometric) annual rate of return of asset x (the proxy for the R_x , used by previous studies, is the historical average (geometric) annual rate of return)
- σ = the annual risk (standard deviation)

The Sharpe Measure is defined as:

$$\text{Sharpe Ratio} = (R_x - R_f) / \sigma$$

Where:

- R_x = the average (geometric) annual rate of return of asset x
(the proxy for the R_x , used by previous studies, is the historical average (geometric) annual rate of return)
- R_f = the risk free rate of return
- σ = the annual risk (standard deviation)

The Pearson's (product-moment) correlation coefficient is defined as:

$$r = \frac{\sum_{i=1}^n (X_i - \bar{X})(Y_i - \bar{Y})}{\sqrt{\sum_{i=1}^n (X_i - \bar{X})^2} \sqrt{\sum_{i=1}^n (Y_i - \bar{Y})^2}}$$

Where:

- r = the Pearson's correlation coefficient
- X_i = represents each data value for asset x from $i=1$ to $i=n$
- \bar{X} = the annual (geometric) average rate of return
- Y_i = represents each data value for asset y from $i=1$ to $i=n$
- \bar{Y} = the annual average rate of return

The Spearman's (rank) correlation coefficient is defined as:

$$\rho = \frac{\sum_i (x_i - \bar{x})(y_i - \bar{y})}{\sqrt{\sum_i (x_i - \bar{x})^2} \sqrt{\sum_i (y_i - \bar{y})^2}}$$

Where:

- ρ = the Pearson's correlation coefficient
- x_i = represents each data value for asset x from $i=1$ to $i=n$
- \bar{x} = the annual (geometric) average rate of return
- y_i = represents each data value for asset y from $i=1$ to $i=n$
- \bar{y} = the annual average rate of return

3.5.3 Analytical steps to achieve the research objectives

Recall that the objectives of this study are to:

- 1) To reveal the nature and significance of LPVs in the New Zealand investment market.
- 2) To explore the performance characteristics of New Zealand LPVs
- 3) To reveal any reward to risk benefits for investors by investing in LPTs or LPICs
- 4) To reveal any diversification benefits for investors by investing in either LPTs or LPICs

To achieve these overarching objectives the analysis involved a number of steps, which have been documented in this sub-section. However prior to undertaking any analysis, the return series data for each asset class was tested for normality: using the Kolmogorov-Smirnov test (refer to sub-section 3.5.1).

Objective 1: To reveal the nature and significance of LPVs in the New Zealand investment market

- Step 1: The relevant literature was reviewed (sub-section 2.1.3) to reveal the nature of the New Zealand LPVs.
- Step 2: The relevant literature was reviewed to determine the appropriate method and measures to use in order to reveal the significance of the New Zealand LPVs in the investment market.
- Step 3: Market capitalisations, for the overall LPV sector and for two sub-sectors, namely the LPTs and the LPIC, were analysed to determine trends by comparing, firstly the contribution of the overall LPV asset class to the NZX and secondly the contribution of the LPTs and the LPICs to the overall LPV sector.
- Step 4: The findings were fully discussed, interpreted and evaluated with reference to the literature. Their contribution to the body of knowledge was outlined in the conclusion.

Objective 2: To explore the performance characteristics of New Zealand LPVs

- Step 1: The literature was reviewed to determine which methods and measures were appropriate to explore the performance characteristics of LPVs.
- Step 2: Excel software (Microsoft) was used, to create three new quarterly return series indices; for the LPV sector, the LPT sub-sector and the LPIC sub-sector. The study period was from the 31 December 1993 (base = 1000) to 30 September 2011.
- Step 3: Existing gross (total) return benchmark indices for stocks, direct property and bonds were sourced and re-based using Excel software (Microsoft) to the 31 December 1993 (base = 1000).
- Step 4: The six return series indices were used to explore the performance of New Zealand LPVs: comparative performance analysis was carried out which involved measuring the geometric returns, the risk, and the risk adjusted returns then ranking the performance of each asset class based on their computed Sharpe ratios. As the year for the indices was 1993:Q3 analysis begins in 1994:Q1 and finishes 2011:Q3.
- Step 5: Bivariate correlation analysis (parametric and non-parametric) was used to explore the role of LPVs in a mixed asset portfolio and to determine whether LPTs and LPICs had performed differently over the study period.
- Step 6: The findings were fully discussed, interpreted and evaluated with reference to the literature. Their contribution to the body of knowledge was outlined in the conclusion.

Objective 3: To reveal any reward-to-risk benefits for investors by investing in either LPTs or LPICs

- Step 1: The literature was reviewed to determine which reward-to-risk measures were appropriate to use in this study.

- Step 2: For each asset class the annual (geometric) mean and standard deviation (risk) was computed from the return series data using Excel software (Microsoft).
- Step 3: The risk-adjusted returns for each asset class were computed (return-to-risk ratio and the Sharpe ratio) using Excel software (Microsoft). The excess return for the Sharpe measure was calculated using the best obtainable risk free rate (90 day bill rate).
- Step 4: The asset classes were ranked based on their Sharpe measure to determine any diversification benefits.
- Step 5: The findings were fully discussed, interpreted and evaluated with reference to the literature. Their contribution to the body of knowledge was outlined in the conclusion.

Objective 4: To reveal any diversification benefits for investors by investing in either LPTs or LPICs

- Step 1: Relevant literature was reviewed to determine the risk-reduction measure and level of significance that were appropriate to use in the study. The correlation coefficient was the measure used to examine the diversification benefits of combining two asset classes in a mixed asset class portfolio and the correlation was significant at the 0.05 level ($p < 0.05$). The asset classes were: the LPV sector (LPVs), the LPTs, the LPICs, NZ stocks, NZ direct property, an NZ Government bonds.
- Step 2: SPSS software was used to produce bivariate inter-asset correlation matrices for the six asset classes over the study period (1994:Q1 to 2011:Q3) and the three sub-periods. Both the Pearson's method and the Spearman's methods were used to compute the pair wise coefficients: due to the normality of some of the return data samples being questionable, especially in the sub-periods with the small sample sizes.
- Step 3: The pair wise coefficients were analysed to explore role of LPVs in a mixed asset portfolio, the diversification benefits, and hence provide

further evidence as to the performance characteristics of the LPV sector and the two sub-sectors, namely the LPTs and the LPICs.

Step 4: The findings were fully discussed, interpreted and evaluated with reference to the literature. Their contribution to the body of knowledge was outlined in the conclusion.

Chapter 4: Results and Discussion

This chapter presents and discusses the results from the analysis of the NZX Property Sector. Sections 4.1 and 4.2 present the findings from the segmentation analysis of this sector, which revealed both the growth and stature of NZ LPVs. Sections 4.3 and 4.4 present the findings from the analysis of the performance characteristics of the LPVs in relation to the other major NZ asset classes: stocks, direct property, and Government bonds.

4.1 The nature of NZ LPVs

This section aims to accomplish the following objective for this study, which has been documented previously:

Objective 1: To reveal the nature and significance of LPVs in the New Zealand investment market.

From the literature, the nature of New Zealand LPVs can be described using their following attributes: ownership structures, governance, the underlying property investment portfolio, financing, and operations. Based on economic theories the ownership structure is the key determinant of these other aspects: in New Zealand LPVs are structured as companies or unit trusts.

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The literature has revealed that New Zealand's LPVs are considered globally to be similar to REITs (sub-section 2.2.2). These LPVs are regarded as collective

investment vehicles, where by each LPV invests in a pool (either a sector-specific or diversified) of professionally managed property assets (CFA-Institute, 2011). Since 1982, investing in New Zealand LPVs has been a way for investors to gain exposure to property indirectly and as such these property funds have existed to generate returns for investors. According to J.A. Simpson (personal communication, 2011) it is both the characteristics of the LPV assets (e.g. low unit costs, liquidity) and their returns (a mix of relatively high yields, low risk and perceived diversification benefits), which has attracted investors to invest in them.

Due to the nature of NZ's LPVs researchers (e.g. FundSource & NZX, 2010, Forsyth Barr, 2011; Craigs Investment Partners, 2011) have historically treated them as a single asset class. Traditionally asset classes have been defined as groups of securities that show similar performance characteristics, and behave in a similar way under certain market conditions (Investopedia, 2013). As such New Zealand's LPVs have been grouped together based on their perceived similarities under the NZX Property Sector.

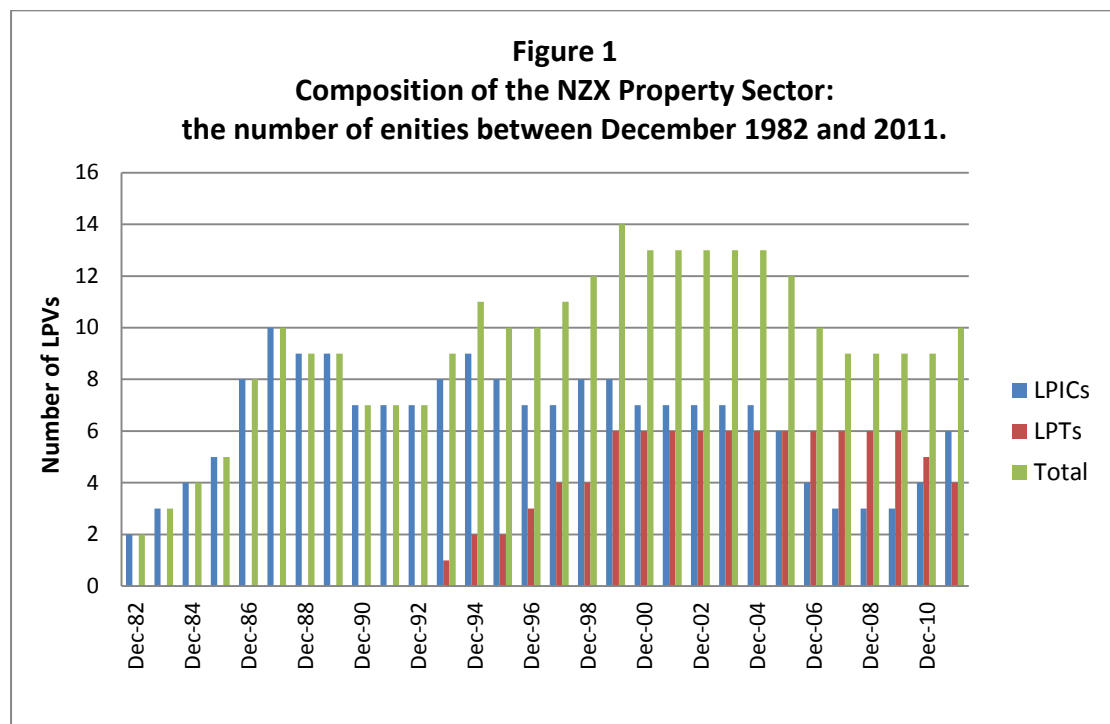
In New Zealand, from the literature (Korda Mentha, 2010, Grant Samuel, 2010, 2011), it appeared that due to the more recent adoption of and conversions to a company structure by LPVs, there was a need for further analysis of the relationship between the ownership structure of LPVs performance. The results of this time series segmentation study of the NZ listed property market, has revealed more about the ownership structures (sub-section 4.1.1), the significance (section 4.2), and the benefits of investing in either LPTs or LPICs (sections 4.3 and 4.4).

4.1.1 The NZ LPV ownership structures

The NZX Property Sector was established in 1982 and Figure 1 reveals the composition of this Sector's constituents, based on their ownership structure. Companies were the first property investment vehicle to list on the NZX in 1982. The number of LPICs grew quickly between 1982 and 1987 (two to ten respectively).

Between the 1987 Stock Market Crash and 1993 company numbers dropped back slightly to eight due to the failure of some entities (J. H. Simpson, 2011). In December 1993 the first Unit Trust listed under the NZX Property Sector.

Figure 1 illustrates that between December 1993 and September 2011, the number of LPTs and LPICs has varied, with the number of LPICs peaking at nine in 1994, before dropping back to seven by 1996. The number of LPICs has remained steady, oscillating between six and seven companies until 2004, at which point the numbers began to reduce dwindling to only three LPICs in 2009, but more recently due to trend to corporatise LPTs there are now six LPICs as at the 30 September 2011. It is expected (J.A. Simpson, personal communication, 2011) the trend to corporatise will continue with two further LPTs now considering this option, which would increase the number of LPICs to eight and reduce the number of LPTs down to two.



Original Data Source: NZX (2011)

The number of LPTs, which are structured as unit trusts, also grew between 1993 and 1999 (from one to six), as illustrated in Figure 1, then remained steady at this number between 2000 and 2009. Figure 1 also shows that more recently the

number of trusts has reduced (six down to four trusts), after 2009. This reduction is a result of the recent trend for trusts to convert to company structures, as discussed in the literature review. Furthermore it is expected that post-September 2011 further reductions will be observed, according to J.A. Simpson (personal communication, 2011): two further Trusts (Argosy Property Trust, AHP and Vital Healthcare Property Trust, VHP) announced that they too are considering this potential conversion, subject to unit holders' approval.

Between 1982 and 2011 the total number of constituents that contributed at various time to the NZX Property Sector was twenty-nine, which can be segmented into twenty-one companies and seven trusts. Between 1982 and 2011, at any one time the maximum number of constituents was fourteen and the minimum has been two.

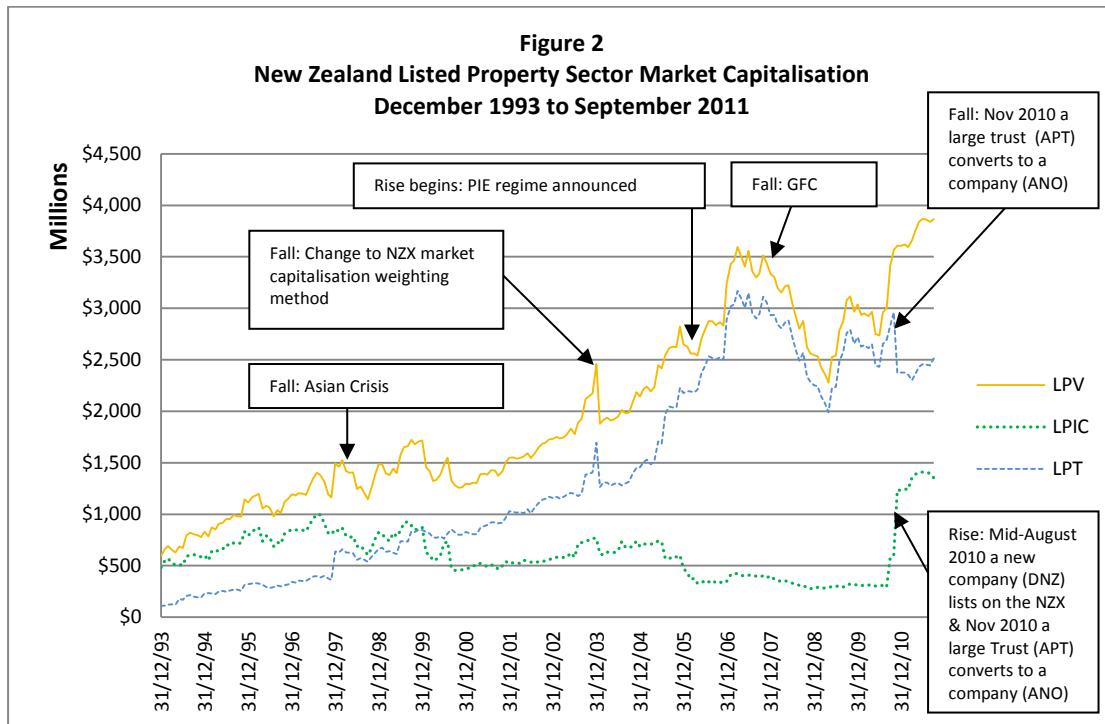
Between 1993 and 2011 the total number of constituents that contributed at various time to the NZX Property Sector was seventeen, which can be segmented into eleven companies and six trusts. Between 1993 and 2011, at any one time the maximum number of constituents was fourteen and the minimum has been nine.

4.2 *The significance of NZ LPVs: market capitalisation analysis*

This section also aims to achieve the following objective for this study, which was documented previously:

Objective 1: To reveal the nature and significance of LPVs in the New Zealand investment market.

The results show that the market capitalisation of New Zealand LPVs has tended to trend upwards over the 17 year study period as illustrated in Figure 2. This line graph encompasses the period from December 1993 to September 2011, in order to show the entire period over which the NZX property sector has included both LPTs and LPICs.



Original Data Source: NZX (2011)

The impact of both the Asian Crisis and the Global Financial Crisis (GFC), on the LPV sector's and sub-sectors' market capitalisation, is revealed in Figure 2. This graph shows that there are two noticeable shifts in the market capitalisations of these indirect property asset classes: 2004 and 2006. The sharp fall in the market capitalisation in January 2004 was due to the change to the equity indices method used by the NZX, moving from full market capitalisation weighting to free float market capitalisation weighting: free float is the portion of indexed shares that are freely tradeable. The sharp increase in the market capitalisation in December 2006 was reportedly due to increased investor interest after the Government announced its intention to introduce the PIE regime in October 2007, which was expected to result in improved returns for investors on a lower marginal tax rate (KordaMentha, 2010).

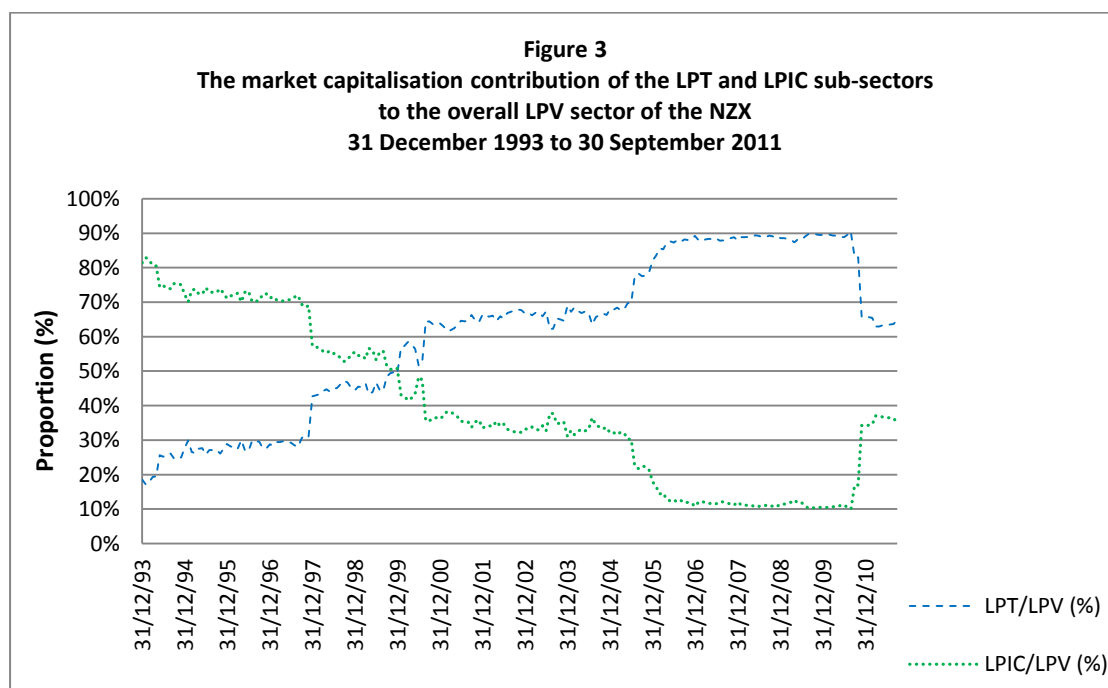
The results (Figure 2) show two further trends, post-2004 and post-2009, which are the result of the changing number of trusts or companies contributing to the NZX property sector. Between December 2004 and December 2007 the number of companies reduced by over 50% (from seven to three), whilst the number of trusts

remained steady at six (refer to Figure 1). The impact of this reduction in the number of LPICs is clearly shown in Figure 2, by the dwindling market capitalisation for this sub-sector, whereas the market capitalisation for the LPT sub-sector grew steeply, as a function of the market boom prior to the GFC.

Furthermore, towards the end of 2010 Figure 2 reveals two more trends (also illustrated in Figure 3). Between 2011:Q3 and 2011:Q4 the free float market capitalisation of the LPIC sub-sector rises steeply (NZD 631 million), whilst the free float market capitalisation of the LPT sub-sector falls steeply (NZD 588 million). The upward trend of the LPICs' market capitalisation is the result of two events, firstly the new listing of the DNZ Property Fund Limited on the NZX, mid-August 2010 (this company's free float market capitalisation grew steadily from NZD 272 million in 2011:Q3 to NZD 293 million in 2010:Q4), and secondly the restructuring of AMP NZ Office Trust (APT) to an incorporated company (ANO) on the 1 November 2010 due to pressure post-GFC: APT was the third largest LPV in the NZX Property Sector with a full market capitalisation of NZD 794 million at the time of conversion. It was this second event that led to the downward trend of the LPTs' market capitalisation.

Additional proportional analysis (Figure 3) of the market capitalisation data highlights that the contributions of the LPT sub-sector and the LPIC sub-sector to the overall LPV Sector sector (also known as the NZX Property sector) have varied over the 17 year study period. Figure 3 reveals that in December 1993, the LPICs were the major contributor (approximately 80%) to the market capitalisation of the overall LPV sector. This line graph shows that between 1993 and the end of 1999 the contribution of the LPTs surpassed that of the LPICs, which was due to the growth in the number and maturity of LPTs. Further the results show that since January 2000 the LPTs have been the major contributor to the value of the LPV Sector, peaking between August 2008 and 2009 at 90%. These results also highlight the significant reduction (approximately 80%) in the contribution that the LPTs made to the overall LPV sector, due to the previously documented events, namely the corporatisation of AMP NZ Office Trust (APT) & the listing of DNZ. In early 2011, the graph also shows that the contribution made by LPTs reduced further, which was the result of a

second trust conversion: the National Property Trust (NAP) converted to NPT Limited (NPT). By September 2011, it can be seen (Figure 3) that the four remaining LPTs were making a contribution of 65% to the value of the NZX Property Sector, whilst the six LPICs were only making a contribution of 35%.



Original Data Source: NZX (2011)

Table 14 presents the contributions LPTs and LPICs have made to the overall LPV Sector market capitalisation. Value contribution ratios are also shown in this table, for critical end of month dates during the study period.

Table 14 Market Capitalisation Proportions: LPT sub-sector to the LPIC sub-sector

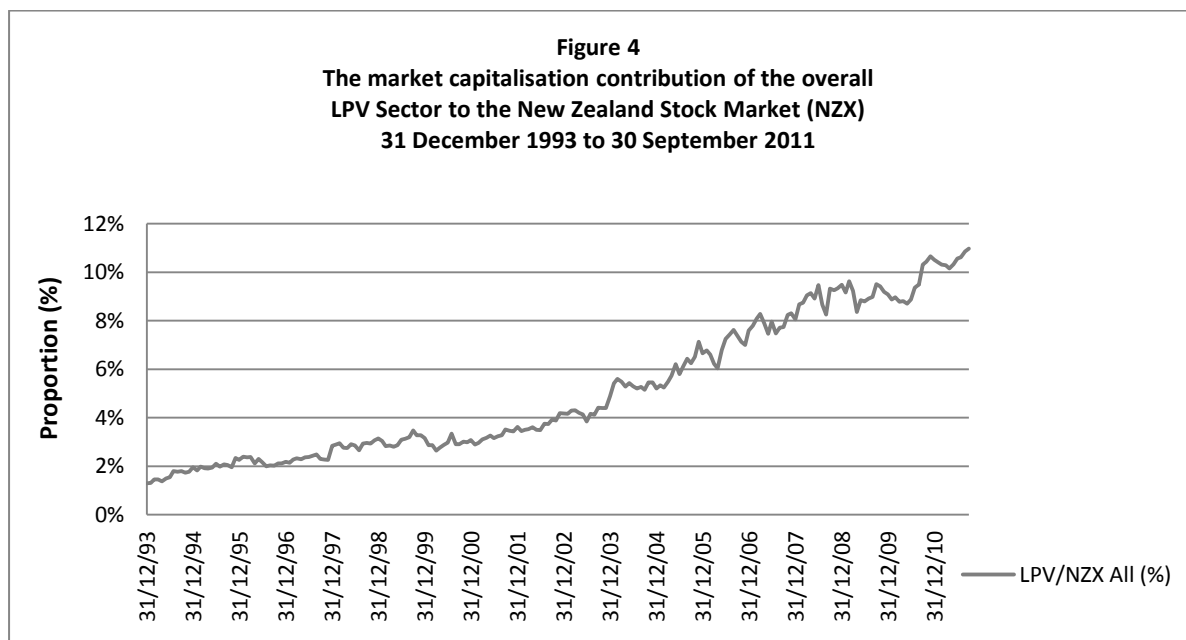
As At	Market Capitalisation		LPV Sector	
	LPT Sub-Sector	LPIC Sub-Sector	LPT %	LPIC %
31-Dec-93	\$110,120,542	\$483,373,665	19%	81%
31-Mar-94	\$126,120,962	\$526,385,195	19%	81%
30-Jun-98	\$558,603,194	\$686,396,679	45%	55%
30-Sep-08	\$2,568,115,087	\$307,642,549	89%	11%
30-Sep-11	\$2,512,070,559	\$1,353,475,227	65%	35%

Original Data Source: NZX (2011)

The dates in Table 14 represent the following critical points: 31 December 1993 (the first month that both LPTs and LPICs contributed to the NZX Property Sector, which is the start of the study period), 31 March 1994 (the base for both the new and

existing return series indices used in the study), 30 June 1998 (the structural break for the first sub-period), 30 September 2008 (the structural break for the second sub-period), and 30 September 2011 (the end of the study period). These findings clearly show that prior to the recent conversion of the Trusts, over the period 2009 to 2011, the LPT subsector contributed the majority of the value (NZD \$2.6 billion) to the overall LPV sector.

Further proportional analysis (see Figure 4) reveals the growing contribution that the LPV sector (NZX Property Sector) has made to the market capitalisation of the New Zealand Stock Market (NZX All), climbing from 1% to approximately 9%, over the 17 year period, 31 December 1993 to 30 September 2011. This analysis shows that the overall LPV Sector is a significant asset class in New Zealand’s investment market.



Original Data Source: NZX (2011)

The significant market capitalisation contributions that the overall LPV sector (NZX Property Sector) made to the NZ Stock Market (NZX All), is shown in NZD in Table 15: as at the 31 December 1993, as at the 31 March 1994, and as at the end of each of the key economic sub-periods.

Table 15 Market Capitalisation Contribution: LPV Sector to the NZX All

As At	Market Capitalisation		NZX All
	LPV Sector	NZX All	LPV %
31-Dec-93	\$593,494,207	\$45,804,995,220	1%
31-Mar-94	\$652,506,157	\$44,711,546,807	1%
30-Jun-98	\$1,244,999,873	\$43,560,263,786	3%
30-Sep-08	\$2,875,757,637	\$30,834,929,515	9%
30-Sep-11	\$3,865,545,786	\$35,213,075,382	11%

Original Data Source: NZX (2011)

4.3 Reward-to-risk benefits: comparative performance analysis

This section aims to accomplish the following two objectives for this study, which have been documented previously:

Objective 2: To explore the performance characteristics of New Zealand LPVs.

Objective 3: To reveal any reward-to-risk benefits for investors by investing in LPTs or LPICs.

According to the literature (refer to Chapter three), the performance characteristics of an asset class are described by using certain measures: the average annual return and risk, the risk-adjusted returns, and the bivariate correlation coefficient. Each asset class is expected to have different performance (investment) characteristics and also in any given market conditions each asset class is expected to perform differently (Investopedia, 2013).

In the study quarterly gross (total) return series indices were used to compute the various measures average (geometric) annual return and risk (standard deviation) for each of the six asset class: LPVs, LPTs, LPICs, stocks, direct property, and Government bonds. These return and risk measures were then used to calculate two risk-adjusted return measures, namely the return-to-risk ratio and the Sharpe ratio, which have been used to describe the reward-to-risk benefits. In order to analyse these performance characteristics the returns were recalculated from the indices, hence the analysis is based on returns between 1994:Q2 and 2011:Q3.

Figure 5 compares the Gross (Total Return) Indices series of the asset classes and clearly illustrates the higher volatility of the LPIC sub-sector and the stocks (NZX All) compared to the lower volatility of the other markets. This also illustrates that over the three sub-periods, LPTs and LPICs have both typically outperformed stocks and bonds (ANZ All Government Bond Index) and that these sub-sectors performed strongly against direct property (commercial real estate). The Asian crisis appears to have negatively impacted on stocks and LPICs, as illustrated in the downward trend in performance after 30 June 1998, whereas the LPT sub-sector and commercial property market both seem to be unaffected showing a slight upward trend.

These results also show that after 2000:Q1 there was a rapid improvement in the performance of the LPIC sub-sector, which resulted in the overall LPV sector outperforming the other major asset classes during this period. Furthermore, these findings suggest that the GFC had a negative impact on stocks, the LPT sub sector, and the overall LPV sector, with an approximate 1 year lagged impact on direct property and the LPIC sub-sector.

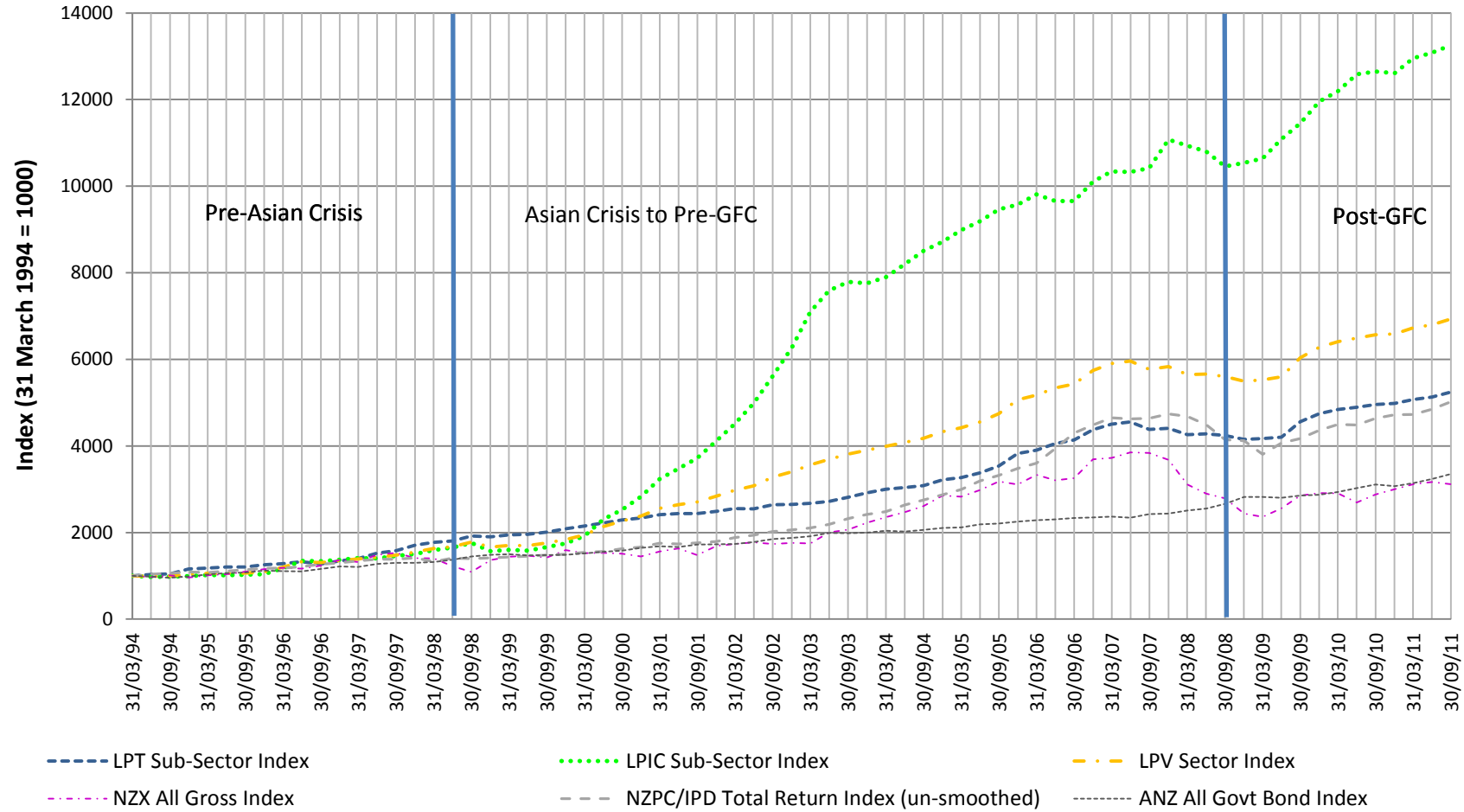
Table 16 presents the comparative performance analysis for the various asset classes for the 17 year study period. These findings reveal that the LPV sector's average annual returns (11.07%) over this period were superior to direct property (9.22%), bonds (6.39%), and stocks (6.49%). During this period the LPICs (14.77%) outperformed the LPTs (9.47%) and the other asset classes. These results suggest that investing solely in the LPT sub-sector would have provided lower returns than investing in either the LPIC sub-sector or the overall LPV sector.

Table 16 Comparative Performance Analysis from 1994:Q2 to 2011:Q3 (Overall Study Period)

Asset Classes	Average annual Return (%)	Annual Risk (%)	Return-to-Risk Ratio	Sharpe Index	Risk Adjusted Ranking
LPTs	9.47	10.62	0.892	0.290	3
LPICs	14.77	19.19	0.770	0.437	1
LPVs	11.07	11.63	0.952	0.402	2
Stocks	6.49	27.93	0.232	0.004	5
Direct Property	9.22	12.34	0.747	0.229	4
Bonds	6.39	n/a	n/a	n/a	n/a

Original Data Sources: NZX (2011), IPD (2011)

Figure 5
The Performance of New Zealand's Major Asset Classes Compared to Listed Property
Quarterly Indices (1994:Q1 to 2011:Q3)



Original Data Sources: NZX (2011), IPD (2011)

Table 16 also shows that between 1994:Q2 and 2011:Q3 the volatility of stocks (27.93%) and LPICs (19.19%) were significantly above other asset classes (ranging from 6.39% to 11.07%) over the study period. The annual risk for the overall LPV sector (11.63%) was similar to the risk for LPTs (10.62%) but lower than the risk for the LPIC sub-sector (19.19%). On a risk-adjusted basis, stocks were the least performed (Sharpe measure = 0.004) of the asset classes over the study period, whilst the LPICs (0.437) topped the rankings. When comparing the listed property sub-sectors, the LPICs (0.437) had the strongest risk-adjusted performance compared to the LPTs (0.290).

Tables 17, 18, and 19 present the comparative performance analysis for the asset classes over the following three sub-periods; the Pre-Asian Crisis period (1994:Q2 to 1998:Q3), the Asian Crisis to Pre-GFC period (1998:Q4 to 2008:Q3), and the GFC and Post-GFC period (2008:Q4 to 2011:Q3). These sub-periods, which are divided by key dates of economic crises, show that the different market conditions did have an impact on the performance of LPTs and LPICs.

These results highlight that pre-Asian crisis, LPT returns (13.87%) outperformed the other asset classes, which range from 4.78% to 12.12%, but between 1998 and 2008 LPT returns significantly dropped (8.34%), before reducing further post-GFC (7.09%). By comparison LPIC returns (11.85%), pre-Asian crisis, performed slightly below both the LPT sub-sector and the overall LPV sector (12.12%), after which they increased significantly (17.99%) between 1998 and 2008, outperforming all the other asset classes (range = 6.67% to 11.78%), before dropping back considerably post-GFC (7.92%), whilst still managing to outperform the other classes. Overall in all three sub-periods the results show that LPTs, LPICs and the overall LPV sector outperformed New Zealand share returns, and that the overall LPV sector also performed strongly against the major asset classes in each sub-period.

Over the three sub-periods Tables 17, 18, and 19 show that the volatility of stocks (annual risk = 26.22%, 29.35%, and 27.20%) remained significantly above other asset classes which. The annual risk for the LPTs (13.73%, 9.02%, and 9.83%) and the LPICs

(16.89%, 21.97%, and 6.02%) was relatively similar ($\pm 3\%$) prior to the Asian crisis and after the GFC, but between these crises the results support investor perceptions that LPTs were significantly less risky than LPICs (J.A. Simpson, personal communication, 2012).

Table 17 Comparative Performance Analysis: 1994:Q2 to 1998:Q2 (Pre-Asian Crisis)

Asset Classes	Average annual Return (%)	Annual Risk (%)	Return-to-Risk Ratio	Sharpe Index	Risk Adjusted Ranking
LPTs	13.87	13.73	1.011	0.418	1
LPICs	11.85	16.89	0.701	0.220	3
LPVs	12.12	12.51	0.969	0.319	2
Stocks	4.78	26.22	0.182	-0.128	5
Direct Property	8.03	11.13	0.721	-0.010	4
Bonds	8.14	n/a	n/a	n/a	n/a

Original Data Sources: NZX (2011), IPD (2011)

Table 18 Comparative Performance Analysis: 1998:Q3 to 2008:Q3 (Asian Crisis to Pre-GFC)

Asset Classes	Average annual Return (%)	Annual Risk (%)	Return-to-Risk Ratio	Sharpe Index	Risk Adjusted Ranking
LPTs	8.34	9.02	0.925	0.185	4
LPICs	17.99	21.97	0.819	0.515	1
LPVs	11.78	11.90	0.990	0.429	2
Stocks	8.03	29.35	0.274	0.046	5
Direct Property	10.54	12.25	0.860	0.316	3
Bonds	6.67	n/a	n/a	n/a	n/a

Original Data Sources: NZX (2011), IPD (2011)

Table 19 Comparative Performance Analysis: 2008:Q4 to 2011:Q3 (GFC and Post-GFC)

Asset Classes	Average annual Return (%)	Annual Risk (%)	Return-to-Risk Ratio	Sharpe Index	Risk Adjusted Ranking
LPTs	7.09	9.83	0.721	0.391	3
LPICs	7.92	6.02	1.315	0.776	1
LPVs	7.12	9.21	0.774	0.421	2
Stocks	3.67	27.20	0.135	0.015	5
Direct Property	6.40	14.57	0.439	0.216	4
Bonds	3.24	n/a	n/a	n/a	n/a

Original Data Sources: NZX (2011), IPD (2011)

Across the three sub-periods there was an overall reduction in the LPTs annual risk from 13.73% to 9.83%, with the biggest reduction (of 4.71%) occurring after the Asian crisis resulting in a standard deviation of 9.02%. Pre-GFC, the volatility of the

LPIC's returns remained higher in the first two sub-periods (16.89%, and 21.97% respectively) compared to LPT's returns, before dropping to 6.02% post-GFC, which was below the annual risk of LPTs during this same sub-period. This analysis shows that over the first two sub-periods the volatility of returns for both the LPTs and the LPICs differed, but in the third sub-period the level of risk became more aligned.

On a risk-adjusted basis stocks remained the least performed of all the asset classes during the two pre-GFC sub-periods (Sharpe = -0.128 and 0.046 respectively) before reducing slightly (0.015) post-GFC. By comparison LPTs topped the rankings in the first sub-period (0.418) then toppled to fourth place (0.185) in the second sub-period, before improving one position to third place in the final sub-period (0.391). The LPICs moved from third place (0.220) pre-Asian Crisis up to first place for the remaining two sub-periods (0.515 and 0.776 respectively), which confirms the earlier findings (Figure 5) that LPICs and LPTs performed differently. The risk-adjusted returns for the overall LPV sector remained steady holding onto second place over the three sub-periods (0.319 to 0.429 to 0.421).

Analysis of the third sub-period (GFC and post-GFC), shows that the returns of the two LPV sub-sectors have become more aligned (LPTs = 7.02% and LPICs = 7.92%), although due to lower level of risk associated with the LPICs in this sub-period, there is still a noticeable difference in the risk-adjusted returns of the LPTs (Sharpe = 0.391) and the LPICs (Sharpe = 0.776).

Based on the literature and the findings in section 4.1 of this study, a reasonable assumption would be that LPTs should perform more like the LPICs, due to their similar nature. However, the results in this section have revealed that LPTs and LPICs performed differently, during the overall study period and during the sub-periods: based on their average annual returns, their annual risks, and their risk-adjusted returns. These findings support the alternative hypothesis for this study that the performance characteristics of the LPTs and LPICs have differed during the study period and over the sub-periods.

In the first sub-period LPTs (Sharpe = 0.418) offered investors almost twice the reward-to-risk benefits than the LPICs (Sharpe = 0.220). But between 1998:Q3 and 2011:Q3 (Asian Crisis to post-GFC), the results of the sub-period analysis show LPICs outperformed the LPTs: LPICs offered almost three times (Sharpe = 0.515) more reward-to-risk benefits than LPTs (Sharpe = 0.185) in the second sub-period, and LPICs (Sharpe = 0.776) offered approximately twice the benefits that LPTs (Sharpe = 0.391) did in the third sub-period. Furthermore this dominance by the LPICs is reflected in the results for the overall study period analysis, which revealed that the LPICs (Sharpe = 0.437) had provided investors with almost twice the reward-to-risk benefits compared to the LPTs (Sharpe = 0.290).

In conclusion these results suggest that historically LPICs have offered investors superior reward-to-risk benefits (based on the Sharpe measure). This finding is important in that they provide empirical evidence for stakeholders who are considering the option of restructuring a property trust or listing a new indirect property investment vehicle.

4.4 Diversification benefits: bivariate correlation analysis

This sub-section aims to accomplish the following two objectives for this study, which have been documented previously:

Objective 2: To explore the performance characteristics of New Zealand LPVs.

Objective 4: To reveal any diversification benefits for investors by investing in either LPTs or LPICs.

Standard correlation methods, adopted from the literature, were used to examine the associations between the return series data sets of the six asset classes being examined in this study: LPVs, LPTs, LPICs, stocks, direct property, and bonds. The results of this bivariate correlation analysis are presented and discussed in the following sub-sections: inter-asset correlation analysis of the three LPV asset classes

(4.4.1) and the inter-asset correlation analysis of combining the major asset classes with the three LPV asset classes (4.4.2). Each sub-section presents the significant relationships first then the non-significant relationships.

SPSS software was used to compute both the Pearson and the Spearman correlation coefficients, along with their significance levels. The strength and direction of the correlations were used to examine the assets' performance characteristics to be examined and any diversification benefits, from combining pairs of assets in a mixed asset portfolio, identified.

Tables 20 to 23 present the inter-asset Pearson's correlation matrices for the Pearson coefficients and Tables 24 to 27 present the inter-asset Spearman's correlation matrices.

Tables 20 and 24 presented the findings for the overall study period (1994:Q2 to 2011:Q3), Tables 21 and 25 present the findings for sub-period one (Pre-Asian Crisis, 1994:Q2 to 1998:Q3), Tables 22 and 26 present the findings for sub-period two (Asian Crisis to pre-GFC, 1998:Q4 to 2008:Q3), and Tables 23 and 27 present the findings for sub-period three (GFC and post-GFC, 2008:Q4 to 2011:Q3).

The notes to these Tables explain that coefficients which are shown bolded with an asterisk (*) indicate correlations that are significant at the 0.05 level ($p < 0.05$) for a two tailed test. Also notes to Tables 20 to 23 (Pearson's coefficients) explain that the coefficients that are highlighted with a hash mark (#) indicate correlations between asset classes, which have return data that is not normally distributed, according to the results of the Kolmogorov-Smirnov test (refer to sub-section 3.5.1). Therefore the corresponding Spearman's coefficients (Tables 24 to 27) have been used to firstly check the validity of the Pearson's coefficients and secondly to identify any additional significant correlations (indicated by way of *italics*).

Table 20 Inter-asset Pearson's Correlation Matrix: the overall study period (1994:Q2 to 2011:Q3)

	LPTs	LPICs	LPVs	Stocks	Direct Property	Bonds
LPTs	1.000					
LPICs	0.124 [#]	1.000				
LPVs	0.599^{#*}	0.797^{#*}	1.000			
Stocks	0.133 [#]	-0.103 [#]	0.005	1.000		
Direct Property	0.246^{#*}	0.089 [#]	0.195 [#]	0.231 [#]	1.000	
Bonds	0.003 [#]	-0.034 [#]	-0.103	-0.145	-0.080 [#]	1.000

Notes: (1) ***Correlation is significant at the 0.05 level (2-tailed)**, (2) [#]correlation is based on non-normally distributed return data, and (3) sample size (n = 70).

Original Data Sources: NZX (2011), IPD (2011)

Table 21 Inter-asset Pearson's Correlation Matrix: Pre-Asian Crisis (1994:Q2 to 1998:Q3)

	LPTs	LPICs	LPVs	Stocks	Direct Property	Bonds
LPTs	1.000					
LPICs	-0.032	1.000				
LPVs	0.284 [#]	0.948^{#*}	1.000			
Stocks	-0.107	-0.181 [#]	-0.189	1.000		
Direct Property	-0.095 [#]	-0.307 [#]	-0.325 [#]	-0.190 [#]	1.000	
Bonds	0.117	-0.313 [#]	-0.262	0.349 [#]	0.110 [#]	1.000

Notes: (1) ***Correlation is significant at the 0.05 level (2-tailed)**, (2) [#]correlation is based on non-normally distributed return data, and (3) sample size (n = 17).

Original Data Sources: NZX (2011), IPD (2011)

Table 22 Inter-asset Pearson's Correlation Matrix: Asian Crisis to Pre-GFC (1998:Q4 to 2008:Q3)

	LPTs	LPICs	LPVs	Stocks	Direct Property	Bonds
LPTs	1.000					
LPICs	0.217	1.000				
LPVs	0.739^{#*}	0.799^{#*}	1.000			
Stocks	0.148	-0.136	-0.057 [#]	1.000		
Direct Property	0.470^{#*}	0.143 [#]	0.355^{#*}	0.277 [#]	1.000	
Bonds	-0.058	0.142	0.048 [#]	-0.302	-0.199 [#]	1.000

Notes: (1) ***Correlation is significant at the 0.05 level (2-tailed)**, (2) [#]correlation is based on non-normally distributed return data, and (3) sample size (n = 41).

Original Data Sources: NZX (2011), IPD (2011)

Table 23 Inter-asset Pearson's Correlation Matrix: GFC and Post-GFC (2008:Q4 to 2011:Q3)

	LPTs	LPICs	LPVs	Stocks	Direct Property	Bonds
LPTs	1.000					
LPICs	0.492 [#]	1.000				
LPVs	0.996^{#*}	0.558 [#]	1.000			
Stocks	0.640^{#*}	0.262	0.639^{#*}	1.000		
Direct Property	0.285 [#]	0.383	0.292 [#]	0.501	1.000	
Bonds	-0.230 [#]	-0.166	-0.228 [#]	-0.587*	-0.032	1.000

Notes: (1) ***Correlation is significant at the 0.05 level (2-tailed)**, (2) [#]correlation is based on non-normally distributed return data, and (3) sample size (n = 12).

Original Data Sources: NZX (2011), IPD (2011)

Table 24 Inter-asset Spearman's Correlation Matrix: the overall study period (1994:Q2 to 2011:Q3)

	LPTs	LPICs	LPVs	Stocks	Direct Property	Bonds
LPTs	1.000					
LPICs	0.194	1.000				
LPVs	0.670*	0.776*	1.000			
Stocks	0.144	-0.023	0.028	1.000		
Direct Property	0.352*	0.050	0.201	0.240*	1.000	
Bonds	-0.030	-0.070	-0.049	-0.110	-0.062	1.000

Notes: (1) ***Correlation is significant at the 0.05 level (2-tailed)**; additional significant coefficients are shown in *italics*, and (2) sample size (n = 70)

Original Data Sources: NZX (2011), IPD (2011)

Table 25 Inter-asset Spearman's Correlation Matrix: Pre-Asian Crisis (1994:Q2 to 1998:Q3)

	LPTs	LPICs	LPVs	Stocks	Direct Property	Bonds
LPTs	1.000					
LPICs	0.118	1.000				
LPVs	0.461	0.890*	1.000			
Stocks	-0.086	-0.355	-0.400	1.000		
Direct Property	-0.238	-0.493*	-0.505*	-0.164	1.000	
Bonds	0.225	-0.211	-0.189	0.517*	0.169	1.000

Notes: (1) ***Correlation is significant at the 0.05 level (2-tailed)**; additional significant coefficients are shown in *italics*, and (2) sample size (n = 17)

Original Data Sources: NZX (2011), IPD (2011)

Table 26 Inter-asset Spearman's Correlation Matrix: Asian Crisis to Pre-GFC (1998:Q4 to 2008:Q3)

	LPTs	LPICs	LPVs	Stocks	Direct Property	Bonds
LPTs	1.000					
LPICs	0.139	1.000				
LPVs	0.675*	0.742*	1.000			
Stocks	0.195	-0.028	-0.013	1.000		
Direct Property	0.558*	0.108	0.343*	0.268	1.000	
Bonds	-0.099	0.116	0.140	-0.282	-0.132	1.000

Notes: (1) ***Correlation is significant at the 0.05 level (2-tailed)**, and (2) sample size (n = 41)

Original Data Sources: NZX (2011), IPD (2011)

Table 27 Inter-asset Spearman's Correlation Matrix: GFC and Post-GFC (2008:Q4 to 2011:Q3)

	LPTs	LPICs	LPVs	Stocks	Direct Property	Bonds
LPTs	1.000					
LPICs	0.601	1.000				
LPVs	0.965*	0.713*	1.000			
Stocks	<i>0.329**</i>	0.231	0.357	1.000		
Direct Property	0.482	0.420	0.406	0.517	1.000	
Bonds	0.063	-0.196	-0.028	-0.573	-0.126	1.000

Notes: (1) ***Correlation is significant at the 0.05 level (2-tailed)**, (2) ****Correlation is no longer significant**, and (3) sample size (n = 12)

Original Data Sources: NZX (2011), IPD (2011)

Each of the following sub-sections begins by documenting the results and arising discussion from the bivariate correlation analysis of the performances of the overall LPV sector and each of the LPV sub-sectors, namely the LPTs or the LPICs. Next these sub-sections present the results and discussion from the bivariate correlation analysis of combining each of the major NZ asset classes (stocks, direct property, or bonds) with the LPTs or the LPICs or the overall LPV sector.

4.4.1 *The performance of the three LPV asset classes*

The constituents that comprise the overall LPV sector (NZX Property Sector) can be classified further into two sub-sectors, namely the LPTs and the LPICs. Due to this functional relationship it was expected that both the performance of LPTs and LPICs would be significantly strongly correlated with the overall LPV sector. From the literature (e.g. Korda Mentha, 2010; Grant Samuel, 2010, 2011), however, it was also expected that LPTs would perform differently to the LPICs.

In order to examine how the three LPV asset classes (LPVs, LPTs, and LPICs) performed in relation to each other, during the overall study period and the three sub-periods, the bivariate correlations were analysed. The resulting coefficients, shown in Tables 20 to 27 have been summarised in Table 28 to focus on these three LPV asset classes: the significant coefficients ($p < 0.05$) are shown bolded with an asterisk.

Table 28 Summary Table: Pearson (r_p) and Spearman (r_s) coefficients for the LPV asset classes

LPTs		Sub-Period 1	Sub-Period 2	Sub-Period 3	Overall Period
LPVs	r_p	0.284 [#]	0.739^{#*}	0.996^{#*}	0.599^{#*}
	r_s	0.461	0.675[*]	0.965[*]	0.670[*]
LPICs	r_p	-0.032	0.217	0.492 [#]	0.124 [#]
	r_s	0.118	0.139	0.601	0.194
LPICs		Sub-Period 1	Sub-Period 2	Sub-Period 3	Overall Period
LPVs	r_p	0.948^{#*}	0.799^{#*}	0.558 [#]	0.797^{#*}
	r_s	0.890[*]	0.742[*]	0.713[*]	0.776[*]

Notes: (1) ***Correlation is significant at the 0.05 level (2-tailed)**: additional significant coefficients are shown in *italics* and (2) [#] Correlation is based on non-normally distributed return data.

Original Data Sources: NZX (2011), IPD (2011)

Significant Relationships

From these results (Table 28) it can be seen that over the three sub-periods LPTs have increased their correlation with the LPV sector, whereas LPICs have decreased their association with the LPV sector. During the overall study period, it can also be seen in Table 28, that even though the LPTs had a strong significant positive correlation with the LPV sector ($r_p = 0.599$ & $r_s = 0.670$), the LPICs had a stronger significant positive correlation ($r_p = 0.797$ & $r_s = 0.776$) with the LPV sector.

Non-Significant Relationships

The LPTs appear (the associations measures are non-significant) to be mostly weakly positively correlated with the LPICs during the overall study period ($r_p = 0.124$ & $r_s = 0.194$), and over the first ($r_p = -0.032$ & $r_s = 0.118$) and second sub-periods ($r_p = 0.217$ & $r_s = 0.139$). Furthermore, it also appears that this association between the LPTs performance and the LPICs performance improved ($r_p = 0.492$ & $r_s = 0.601$) during the third sub-period (GFC & post-GFC period), suggesting additional differences in the movement of the returns for these two asset classes.

From these results it can be seen, that despite the expected functionality the association of LPTs with LPVs was weaker than the relationship that LPICs had with LPVs and this is possibly explained by the weak correlation between the performance of the LPTs and the LPICs. These results reveal that LPICs and LPTs have performed differently and hence these findings support the prior expectations derived from the literature: that ownership structure is related to performance.

4.4.2 Combining the major NZ asset classes and the three LPV asset classes

The correlation coefficients (shown in Tables 20 to 27), that resulted from combining one of the major NZ asset classes (stocks, direct property, and bonds) with one of the LPV asset classes (LPV sector, LPTs, and LPICs), are summarised in Table 29.

Table 29 Summary Table: Pearson (r_p) and Spearman (r_s) coefficients for the major asset classes

STOCKS		Sub-Period 1	Sub-Period 2	Sub-Period 3	Overall Period
LPVs	r_p	-0.189	-0.057 [#]	0.639^{#*}	0.005
	r_s	-0.400	-0.013	0.357	0.028
LPTs	r_p	-0.107	0.148	0.640^{#*}	0.133 [#]
	r_s	-0.086	0.195	0.329 ^{**}	0.144
LPICs	r_p	-0.181 [#]	-0.136	0.262	-0.103 [#]
	r_s	-0.355	-0.028	0.231	-0.023
DIRECT PROPERTY		Sub-Period 1	Sub-Period 2	Sub-Period 3	Overall Period
LPVs	r_p	-0.325 [#]	0.355^{#*}	0.292 [#]	0.195 [#]
	r_s	-0.505[*]	0.343[*]	0.406	0.201
LPTs	r_p	-0.095 [#]	0.470^{#*}	0.285 [#]	0.246^{#*}
	r_s	-0.238	0.558[*]	0.482	0.352[*]
LPICs	r_p	-0.307 [#]	0.143 [#]	0.383	0.089 [#]
	r_s	-0.493[*]	0.108	0.420	0.050
BONDS		Sub-Period 1	Sub-Period 2	Sub-Period 3	Overall Period
LPVs	r_p	-0.262	0.048 [#]	-0.228 [#]	-0.103
	r_s	-0.189	0.140	-0.028	-0.049
LPTs	r_p	0.117	-0.058	-0.230 [#]	0.003 [#]
	r_s	0.225	-0.099	0.063	-0.030
LPICs	r_p	-0.313 [#]	0.142	-0.166	-0.034 [#]
	r_s	-0.211	0.116	-0.196	-0.070

Notes: (1) ***Correlation is significant at the 0.05 level (2-tailed)**: additional significant coefficients are shown in *italics*, (2) ******Correlation is no longer significant, and (3) [#] Correlation is based on non-normally distributed return data.

Original Data Sources: NZX (2011), IPD (2011)

From the literature (e.g. Newell, 2005; Osmadi, 2010) it was expected that to begin with the overall LPV sector would be correlated with stocks and then possibly later have a stronger association with direct property, as the market matured. There appeared to be no literature that indicated what diversification benefits to expect from pairing the major NZ asset classes, and as such the results from this study provide new insights for stakeholders.

Significant relationships

Table 29 shows that only a few of the bivariate correlations between the asset classes were significant (presented bolded with an asterisk). Based on the

associations in Table 29 that were significant the following results show that:

- During the overall study period direct property had a weak positive correlation ($r_p = 0.246$ & $r_s = 0.352$) with LPTs.
- Over the first sub-period direct property was moderately to strongly negatively correlated with both the LPVs ($r_s = -0.505$) and with the LPICs ($r_s = -0.493$).
- Over the second sub-period direct property was moderately positively correlated with the LPVs ($r_p = 0.355$ & $r_s = 0.343$) and moderately to strongly positively correlated with the LPTs ($r_p = 0.470$ & $r_s = 0.558$)
- Over the third sub-period it appears that the performance of stocks was strongly positively correlated with both the LPVs ($r_p = 0.639$), and the LPTs ($r_p = 0.640$ & $r_s = 0.558$), although both associations were not validated using the Spearman's method, with stocks showing a weak positive non-significant association with both the LPVs ($r_s = 0.357$) and with the LPTs ($r_s = 0.329$).
- Of further interest though is a significantly strong negative association found between bonds and stocks ($r_p = -0.587$) in the third sub-period.

These empirical findings provide some support for the earlier studies showing that in the second sub-period LPVs behaved more like direct property before apparently behaving more like stocks in the third sub-period. These results appear to support previous studies (Newell, 2005; JLL, 2007, as cited in Newell, 2008) which found that the New Zealand LPV market has matured: although as this study ends in 2011:Q3, further analysis will need to be carried out over a longer period to confirm these finding.

Additionally these findings reveal that diversification benefits would have resulted, in a mixed asset portfolio, by pairing either direct property with the overall LPV sector or pairing direct property with the LPTs. The other risk reduction options between the major NZ asset classes and the three LPV asset classes are not significant and hence are discussed later in this sub-section.

Non-Significant Relationships

As discussed based on the literature (e.g. FundSource & NZX, 2010; Korda Mentha, 20120; Grant Samuel 2010, 2011) reviewed it was expected that relationships would exist between certain asset classes, however the results (Table 29) revealed that a number of these potentially useful associations were statistically not significant. The purpose of discussing these non-significant correlations alongside the significant correlations is to reveal any patterns or trends that appear to be revealed by these association measures and also comment on any possible diversification benefits.

Firstly the bivariate correlation analysis of pairing stocks with either the LPV sector, the LPTs or the LPICs in a mixed asset portfolio revealed that:

- During the overall study period it appears that stocks had almost no association with the LPV sector ($r_p = 0.005$ & $r_s = 0.028$), had a weak positive association with the LPTs ($r_p = 0.133$ & $r_s = 0.144$), and had a very weak negative correlation with the LPICs ($r_p = - 0.103$ & $r_s = - 0.023$).
- In the first sub-period it seemed that stocks had a moderate negative correlation with the LPV sector ($r_p = - 0.189$ & $r_s = - 0.400$), had a weak negative association with the LPTs ($r_p = - 0.107$ & $r_s = - 0.086$), and had a moderate negative correlation with the LPICs ($r_p = - 0.181$ & $r_s = - 0.355$).
- In the second sub-period it appears that stocks became very weakly negatively correlated to the LPVs ($r_p = - 0.057$ & $r_s = - 0.013$), became more aligned with LPTs having a weak positive association ($r_p = 0.148$ & $r_s = 0.195$), and had a reduced negative association with the LPICs ($r_p = - 0.136$ & $r_s = - 0.028$).
- In the third sub-period it appears that all three of the LPV asset classes improved their alignment with stocks. LPVs appear to have had a strong positive significant* association with stocks, although Spearman's shows only a moderate correlation ($r_p = \mathbf{0.639^*}$ & $r_s = 0.357$: refer to sub-section 4.4.1), the LPTs also appear to have had a similar association with stocks ($r_p = \mathbf{0.640^*}$ & $r_s = 0.329$: refer to sub-section 4.4.1), whilst LPICs appear to have had a slightly weaker positive relationship ($r_p = 0.262$ & $r_s = 0.231$) with stocks.

Next looking at the association between direct property and either the LPV sector, the LPTs, or the LPICs showed that:

- During the overall study period it appears that direct property had a weak positive correlation to the LPV sector ($r_p = 0.195$ & $r_s = 0.201$), definitely had a significant* weak positive association with the LPTs ($r_p = \mathbf{0.246^*}$ & $r_s = \mathbf{0.352^*}$: refer sub-section 4.4.1), but apparently had a very weak positive association with the LPICs ($r_p = 0.089$ & $r_s = 0.050$).
- In the first sub-period direct property had a strong significant* negative association ($r_p = -0.325$ & $r_s = -\mathbf{0.505^*}$: refer sub-section 4.4.1) with the LPV sector (according to the Spearman coefficient, which is given more weight due to the non-normally distributed return series), had an apparently weak negative association the LPTs ($r_p = -0.095$ & $r_s = -0.238$), but had an apparently moderate negative association ($r_p = -0.307$ & $r_s = -0.493$) with the LPICs.
- In the second sub-period direct property now had a positive correlation with all three LPV asset classes, and the association with the LPVs was both significant* and moderate in strength ($r_p = \mathbf{0.355^*}$ & $r_s = \mathbf{0.343^*}$: refer sub-section 4.4.1), the correlation with LPTs was stronger and also was statistically significant* ($r_p = \mathbf{0.470^*}$ & $r_s = \mathbf{0.558^*}$: refer sub-section 4.4.1), whilst it appears that LPICs had a weak positive association ($r_p = 0.143$ & $r_s = 0.108$).
- In the third sub-period it appears that direct property continued to have a positive relationship with the LPV asset classes although in this period none of the coefficients were statistically significant. Direct property appears to have had a weaker correlation ($r_p = 0.292$ & $r_s = -0.406$) with the LPV sector, have had a weaker association with the LPTs ($r_p = 0.285$ & $r_s = 0.482$), and have had an improved association with the LPICs ($r_p = -0.383$ & $r_s = 0.420$).

Subsequently, looking at the correlation between bonds and either the LPV sector, the LPTs or the LPICs reveals that:

- During the overall study period it appears that bonds had a very weak negative relationship the LPV sector ($r_p = -0.103$ & $r_s = -0.049$), had almost no relationship

with the LPTs ($r_p = 0.003$ & $r_s = -0.030$), and had a very weak association with the LPICs ($r_p = -0.034$ & $r_s = -0.070$).

- In the first sub-period bonds seem to have had a weak negative association with the LPV sector ($r_p = -0.262$ & $r_s = -0.189$), appear to have had a weak positive correlation with the LPTs ($r_p = 0.117$ & $r_s = 0.225$), and have seemingly had a moderate to weak negative association with the LPICs ($r_p = -0.313$ & $r_s = -0.211$).
- In the second sub-period it appears that bonds reversed the direction of association with the three LPV asset classes, becoming very weakly positively correlated to the LPVs ($r_p = 0.048$ & $r_s = 0.140$), becoming very weakly negatively associated with the LPTs ($r_p = -0.058$ & $r_s = -0.099$), and becoming weakly positively correlated to the LPICs ($r_p = 0.142$ & $r_s = 0.116$).
- In the third sub-period bonds yet again appear to have reversed the direction of the correlation. Bonds seem to have had a weak to very weak negative association with the LPV sector ($r_p = -0.228$ & $r_s = -0.028$), have had a weak positive correlation with the LPTs ($r_p = -0.230$ & $r_s = 0.063$) according to the Spearman coefficient, and have had a weak negative association with the LPICs ($r_p = -0.166$ & $r_s = -0.196$).

These findings appear to show that in the first sub-period none of the three LPV asset classes performed like either direct property or stocks, and as such it seems that they offered risk reduction benefits for investors. In the second sub-period the overall LPV sector and the LPTs performed more like direct property and less like stocks, which based on the literature (e.g. Newell, 2005; Osmadi, 2010), was expected. Whilst the LPICs, on the other hand, had a weak positive association with direct property: which does not support the empirical evidence from these previous overseas studies.

The third sub-period has a small return sample ($n=12$) and as a consequence the distribution of this data was questionable, hence the Spearman's coefficient has been given more weight as evidence in the following discussion. The findings from this sub-period appear to show that all three of the LPV asset classes have

performed more like both direct property and stocks in the third sub-period (GFC and post-GFC). During this sub-period the correlation between direct property and the LPICs appears to be similar to the associations of direct property with either the overall LPVs or the LPTs. However when stocks are combined with the LPTs there only an apparent weak association, compared to the moderate correlation that both either the LPV sector or the LPTs have with stocks. During the overall study period these apparent differences in terms of the correlation of LPTs or LPICs with stocks or direct property are reflected in the coefficients. The association of stocks with the LPTs appears to be weakly positively correlated whilst the LPICs had an apparently negatively association. Again with direct property the LPTs appeared to have a moderate association whereas the LPICs had almost no association.

Previously in this study (section 4.3) the performance of bonds were compared to listed property (see Figure 5), and this analysis revealed that the gross returns of bonds had a relatively low level of movement compared to the three LPV asset classes. Based on these earlier findings it is therefore not surprising to discover, that when bonds were combined with each of the three LPV asset classes there seemed to be a lack of correlation or a weak negative correlation. The results of the bivariate correlation analysis in this section suggest that bonds may have potentially offered some diversification benefits over the study period.

Overall these findings have revealed further evidence as to the performance characteristics of New Zealand LPVs. The results of this bivariate correlation analysis shows firstly that the LPTs and the LPICs performed differently when paired with stocks, direct property or bonds, and also that secondly that LPICs offered investors with better risk-reduction benefits when combined with each of these major asset classes.

Chapter 5: Conclusion

This chapter begins by presenting a brief summary of the study and documenting the conclusions, then section 5.1 outlines the implications of the research, section 5.2 discusses the limitations of the research, and section 5.3 identifies the opportunities for further research that have arisen out of the study.

In chapter one an introduction to this study was presented, which included the background, context, purpose, significance, and the scope of the study, as well as the definitions. Chapter two documented a review of the relevant literature, which had been used to inform the study. In the third chapter the research design and methodology were outlined, after which the results and discussion were presented in chapter four.

From the literature (Williamson, 1964, Sorenson, 1974; Jensen & Meckling, 1976; Shleifer & Vishny, 1986; Pedersen & Thomsen, 1997) it was argued that ownership structure was a key determinant of stock market performance. Hence an important ongoing global issue for LPV stakeholders has been making sure that LPVs adopt optimal ownership structures: in order to improve their governance and ultimately their performance.

Historically, due to investor demand, New Zealand LPVs (which are similar to REITs) have adopted either a unit trust structure or a company structure. More recently in New Zealand the vehicles structured as trusts have been converting to an incorporated company structure, so as to remain in favour with investor preferences. Despite the immense conversion costs, independent researchers (Korda Mentha, 2010; Grant Samuel, 2010, 2011) have found, that both governance and performance benefits will result from these conversions.

In order to assist LPV stakeholders in justifying their decision to either structure or restructure LPVs as an incorporated company, the overall purpose of this study was

to explore the performance characteristics of New Zealand LPVs so as to determine whether the ownership structure of the NZ LPV's has mattered. Another important implication for stakeholders is that the evidence from this study provides further justification (Korda Mentha, 2010; Samuel, 2010, 2011), that despite the immense costs to convert a unit trust to an incorporated company, the optimal ownership structure for LPVs in a New Zealand context is an incorporated company.

A seventeen year study period was chosen for this research, from 31 December 1993 to 30 September 2011, to encompass the time over which the two types of ownership structures, namely the LPTs and the LPICs, have been contributing to the NZX Property Sector. To reveal the impact of market conditions on the performance of these two types of ownership structures further sub-period analysis was undertaken using the Asian Crisis and the GFC as break-points to define the three sub-periods.

To determine the nature of the relationship between the LPV ownership structures and the performance characteristics of these Vehicles (LPVs) in the New Zealand investment market, the study developed two non-directional hypotheses (refer to sub-section 3.1.2.2), which were then tested. The study found that there was a relationship between the ownership structure and performance characteristics of New Zealand's Listed Property Vehicles (LPVs). The results revealed that despite the nature of the LPTs and LPICs appearing to be similar (collective investment vehicles, tax treatment), these two types of LPVs differed in terms of their significance and their performance characteristics: their risk-adjusted returns and their risk-reduction benefits.

Between 1993 and 2011, market capitalisation analysis showed (Figure 2) that the NZX Property Sector has grown in stature. However, these results also showed that the significance of NZ LPTs and LPICs, in relation to the overall NZX Property Sector, has varied proportionally. Initially it was found that the LPICs contributed more to the value of the NZX Property Sector. However after January 2000 the LPTs began to

dominate this Sector, with their contribution peaking at approximately 90% between 2006 and 2010, before falling back to 65% in 2011, with two trusts converting to companies.

The results from the analysis of the performance characteristics of NZ's LPVs, which are the return and risk investment characteristics of these two ownership structures, are revealed in chapter four. This chapter presented the findings from both the comparative (risk-adjusted return) analysis and the correlation analysis.

The study found that LPICs offered investors between two to three times the reward-to-risk benefits that the LPTs have over the study period and during both the second and third sub-periods, which suggests that there are significant differences in the risks and returns of these two ownership structures.

Furthermore the study found that the LPTs and the LPICs performed differently when combined with the other major NZ asset classes: stocks, direct property or bonds. The results showed that the LPICs offered investors superior risk-reduction benefits compared to the LPTs, based on the pair-wise correlations with these major asset classes. In addition bivariate correlations, between the returns series data of the LPTs and of the LPICs, revealed almost no association between the performances of these two ownership structures.

In conclusions, these findings revealed that LPTs and LPICs have performed differently. The study suggests there is a relationship between the ownership structure and performance characteristics of New Zealand's Listed Property Vehicles (LPVs) and hence the null hypothesis can be discarded. The superior risk-reduction and reward-to-risk benefits historically offered by LPICs provide empirical support for the argument presented in previous studies (Korda Mentha, 2010; Grant Samuel, 2010, 2011) that to improve performance a company structure is the optimal ownership structure for LPVs, in a New Zealand context.

5.1 Implications

The findings from this study provide new insights into the nature of the relationship between the ownership structure of NZ's LPV and their performance, which was defined by their significance and their performance characteristics. As such these findings both extend the body of knowledge and indicate a number of important implications for stakeholders.

The practical implications include: (1) assisting investors in making investment decisions, such as asset allocation and selection, (2) helping investors in making and justifying restructuring decisions in entities they have an interest in, for example voting to convert an existing trusts to a company structure, (3) ensuring LPV's select an ownership structure which will meet investor demands, (4) assisting LPV management in developing strategies to improve performance, and (5) assisting Government in the development of legislation that impacts the ownership of LPVs.

The theoretical implications include: (1) researchers potentially segmenting other listed property markets by ownership structure in order to provide further insights, (2) encouraging researchers of NZ's investment market to further segment the listed property market and determine whether investors can obtain any further benefits, and (3) assisting other stakeholders in understanding the nature of the relationship between ownership structure and performance in a New Zealand context.

5.2 Limitations

Return series data collection was limited by the availability and cost of this required data. Initial exploration for key data using the DataStream database revealed that not all current and past New Zealand LPVs were available through this database, a problem previously experienced by other researchers (Ince & Porter, 2006, cited by Wu, personal communication, 2011). Hence the required data was therefore sourced directly and indirectly from; the NZX database and from the IPD.

The size of the population and the return samples presented further limitations for this study. Following previous studies (e.g. Newell et al., 2002; Osmadi, 2010) the significance of the listed property market in New Zealand was established to justify researching the small number of LPVs that comprise the population for this study. The small return sample sizes, especially during the first and third sub-period of the study, meant the distribution of the data was questionable and to ensure the validity of the results Osmadi's (2010) approach was followed in this study with both parametric and non-parametric statistics adopted to analyse the data.

Another limitation in the study was the use of quarterly indices: Shi (2008, cited in MacDonald, Bianchi & Drew, 2012) found that quarterly indices smoothed the volatility in prices, more than indices that measure prices on a more frequent basis. Despite this limitation, the study was restricted to using quarterly indices for stocks, bonds, and the three LPV asset classes, as the reporting frequency of the NZPC/IPD data for the NZ commercial property market was quarterly.

Lastly the reliance by this study on this NZX Property Sector classification for LPVs presents a further limitation. The findings in this study are solely based on the NZX Property Sector classification of LPVs, with the research encompassing only the constituents of the Property Sector. However, as observed by both Radford (personal communication, 2010, cited in J.H. Simpson, 2011), and Garner (personal communication, 2012), the NZX Property Sector classification excludes other entities listed on the NZX, which have major property holdings or that behave like stapled securities, and as such they argue that this exclusion limits the size of LPV population and that further research could incorporate a wider classification.

5.3 Further research

The findings, in this study, have offered empirical support to the argument presented in previous studies (Korda Mentha, 2010; Grant Samuel, 2010, 2011), that a company structure is the optimal ownership structure to improve LPV performance

in a New Zealand context. However, further research needs to be undertaken to better understand the listed property market in New Zealand.

To provide further insights, future studies could possibly examine the cause of the performance differences, look to determine why the NZ's listed property market has outperformed the other major NZ asset classes, and maybe assess the classification of LPVs in New Zealand. To determine a framework for these future studies researchers will need to review the relevant literature and possibly interview key stakeholders in the market. It is anticipated that any future studies will need to use both qualitative and quantitative analysis to provide these additional insights into NZ's listed property market.

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