Factors that impact on South African REITs trading at a discount or premium to their NAV

by

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Abstract

This research investigates the factors that impact on South African Real Estate Investment Trusts (REITs) listed on the JSE trading at a discount or premium to their net asset value (NAV), known as the NAV spread.

Globally, REITs have become an increasingly popular means for investing in real estate representing 41% of the global listed property industry and reaching a total market capitalisation of US$ 1.3 trillion as at June 2017 (EPRA, 2017). In South Africa, as at November 2017, there were 31 SA REITs listed on the JSE, representing a market capitalisation of over R422 billion (PropertyWheel, 2017).

There are broadly two approaches to understanding and explaining the NAV spread, namely, the rational approach and the irrational approach (Morri *et al.*, 2005; Mueller and Pfnuer, 2013). Factors under each approach were identified and discussed in the literature review.

A quantitative research methodology was adopted in which 12 REITs were investigated between 1 July 2012 and 30 June 2017. A regression analysis using a linear mixed effects model was carried out in order to test whether the factors identified in the literature impacted on the NAV spread of SA REITs. Five rational and four irrational factors were regressed against two versions of NAV discount, namely, using a Traditional NAV Discount formula and an Unlevered NAV Discount formula which accounts for the effect of debt on the discount. Model diagnostics were carried out on two regressions and an outlying observation was found for each NAV Discount formula and hence each model was run twice, namely, the regression was run with the Traditional NAV Discount formula using the full set of observations (Model 1) and with one outlying observation removed (Model 2). Thereafter the regression was run with the Unlevered NAV Discount formula using the full set of observations (Model 3) and with one outlying observation removed (Model 4).

The results of the regression analysis found only one factor, Dividend Yield (DY), to have a statistically significant impact on REITs trading at a discount or premium to their NAV in all four models employed. Sector Average Discount (SAD) was found to be statistically significant in Models 2, 3 and 4. Size (SIZE) was found to be statistically significant in Models 1 and 2. Return on Equity (ROE) was found to be statistically significant in Models 3 and 4. Consumer Confidence Index (CCI) was found to be statistically significant in Model 4. The SA Property Index (SAPI) was found to be marginally statistically significant in Model 1. Based on the model diagnostics Models 2 and 4 showed a better fit with the regression model and hence were the preferred models. The statistically significant variables in Model 2 were DY, SIZE and SAD; and in Model 4 were DY, SAD, ROE and CCI.

This suggests that both rational factors (DY, ROE and SIZE) and irrational factors (SAD, CCI and SAPI) impact on South African REITs trading at a discount or premium to their NAV, however, the factors are dependent on whether debt is accounted for or not in the NAV Discount Formula. The results also suggest that the factors are partly influenced by the outlying observations, as was the case for SAD, CCI and SAPI.

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Abbreviations

ALBI	All Bond Index
ALSI	All Share Index
AMEX	American Stock Exchange
BER	Bureau of Economic Research
CCI	Consumer Confidence Index
CGT	Capital Gains Tax
DY	Dividend Yield
EU	European Union
FNB	First National Bank
IPO	Initial Public Offering
IVSC	International Valuation Standards Council
JSE	Johannesburg Stock Exchange
LME	Linear Mixed Effects
NAV	Net Asset Value
NOI	Net Operating Income
NPV	Net Present Value
NTM	Noise Trader Model
NYSE	New York Stock Exchange
OLS	Ordinary Least Squares
PLS	Property Loan Stock
PUT	Property Unit Trust
REITs	Real Estate Investment Trusts
RICS	Royal Institution of Chartered Surveyors
ROE	Return on Equity
SA	South Africa
SAD	Sector Average Discount
SAPI	South African Property Index
SEO	Seasoned Equity Offering
SES	Stock Exchange of Singapore
UK	United Kingdom
US	United States

1. Introduction

1.1. Introduction

Globally, Real Estate Investment Trusts (REITs) have become an increasingly popular means for investing in real estate representing 41% of the global listed property industry and reaching a total market capitalisation of US$ 1.3 trillion as at June 2017 (EPRA, 2017). In South Africa, as at November 2017, there were 31 South African REITs listed on the Johannesburg Stock Exchange (JSE), representing a market capitalisation of over R422 billion (PropertyWheel, 2017).

One would expect the value of REIT shares to reflect their fundamental value or net asset value per share (NAV), however, in reality REIT share prices are generally valued higher (at a premium) or lower (at a discount) than their NAV, and this discount or premium differs greatly between REITs and over time (Capozza and Lee, 1995; Liow and Li, 2006; Ke, 2015). The purpose of this research is to identify what factors impact on South African REITs trading at a discount or premium to their NAV.

This chapter identifies the two forms that real estate investment takes, namely, direct and indirect investment, explains how real estate is valued and identifies the discrepancy between the underlying value of REITs' assets (NAV) and their share price. The factors which impact on and may explain why there is a difference between the share price and the NAV, in particularly in the REIT sector and a review of research carried out on REITs in a number of international countries are discussed.

The research problem, question, aim and objectives of the research and the appropriate methodology and research method are stated. The limitations to the research and a structure for the research report are identified.

1.2. Background

1.2.1. Real Estate Investment

Real estate investment takes two forms: Direct Investment and Indirect Investment.

Direct Investment in real estate refers to investments made in "real" and "tangible" property assets where the investor enjoys a steady cash flow from the rental income generated by the property and is responsible for all expenses and management of the property (Chin *et al.*, 2007).

Indirect Investment refers to investment in companies which invest in and own real estate. These companies can either be listed on the stock exchange or remain unlisted, and are responsible for the management of the properties. The investor in this instance is not directly involved in the properties, but rather holds shares in a company with a portfolio of properties and receives dividends based on the performance of the portfolio of properties. The

advantages of this type of investment are that it provides investors with liquidity, sector divisibility and diversification with low transaction costs (Chin *et al.*, 2007).

It is estimated that global real estate (covering commercial, agricultural and residential properties) was valued at US$217 trillion in 2015. This was 2.7 times the world's GDP and accounted for 60% of all mainstream global assets at the time. Around one third (US$72.5 trillion) of global real estate was considered readily investable and publicly traded, that is, listed real estate. The remaining two thirds (US$145 trillion) was not being publicly traded in any meaningful way and was primarily owner–occupied or owned by small and private entities (Barnes *et al.*, 2016). In 2017 it was reported that the global real estate value grew to US$228 trillion, an increase of 5% in real terms (McGuire, 2017).

To put the above figures into a local, South African perspective, as of 2017, the total market capitalisation (the market value of all outstanding shares) of the South African listed property sector was approximately R400 billion or around US$30 billion. The growth in the sector has followed a steep upward trajectory, from around R10 million in 1998 to approximately R400 billion in 2017 (SAREIT, 2017b).

1.2.2. Real Estate Investment Trusts (REITs)

One of the vehicles for indirect real estate investment is Real Estate Investment Trusts (REITs), which are an internationally recognised financial structure.

REIT legislation was introduced in 1960 in the United States (US) and by 2016 REIT or REIT-like structures had been adopted in 36 countries globally. The global REIT market capitalisation was approximately US$1.3 trillion as at 2017, up from US$734 billion in 2010 (Roth and Kaspar, 2016; EPRA, 2017).

Historically in South Africa property investment companies operated as Property Unit Trusts (PUT) and Property Loan Stocks (PLS). Although similar to REITs they lacked consistent regulatory legislation and tax structures which made them more risky and less attractive to investors, especially foreign investors (Ungerer, 2013). As of 1 April 2013 REIT Tax Legislation was introduced in South Africa, bringing property investment companies and their structures in line with international principles. For a company to qualify as a South African REIT it must be a tax resident in South Africa, be listed as a REIT on the Johannesburg Stock Exchange (JSE) and abide by its listing requirements (Ungerer, 2013).

REITs invest in various sectors of real estate including retail, industrial, office and residential properties and specialised properties such as hotels and medical facilities. They can focus on a specific category or a combination of categories and concentrate in a specific location / region or have a wide foot print (SAREIT, 2014).

Apart from being an internationally recognised structure, there are numerous reasons why REITs have been adopted in so many countries and why they are a popular vehicle for investors to invest in the Real Estate industry. These include:

REITs offer a lower cost alternative to obtaining a diversified portfolio of assets, they are a liquid means of investing in the real estate market and they reduce risk because the individual

is investing in a portfolio of properties rather than a single property. Risk is also reduced as most commercial properties have long-term leases in place so the rental generated is predictable. They are likely to outperform inflation through capital growth of the underlying assets and through rental income growth by contractual rental escalations and market rental growth (SAREIT, 2014).

REITs are also less sensitive to changes in inflation rates (which other bonds can be sensitive to) as rental income is adjusted in line with changes in the cost of living. A review of US REIT dividend yields and US inflation rates from 1989 to 2013 showed the dividend yield consistently higher than the inflation rate (Atchison and Yeung, 2014).

Investors are taxed as if they were investing directly in the underlying property assets, that is, the dividends investors receive are taxed as income tax and is exempt from dividend tax. In the case of foreign investors the opposite holds true: they will be subjected to dividend tax but be exempt from income tax. Another benefit is that REITs do not pay Capital Gains Tax (CGT) when they dispose of property assets (Ungerer, 2013).

However, in the short term REITs can be more volatile, as with other shares on the stock market, compared to the underlying property asset's value which is more stable. Over the long term REITs tend to be more stable (UBS, 2014).

1.2.3. Valuation of Real Estate and REITs

The underlying asset in direct real estate and REITs is property.

According to the Royal Institution of Chartered Surveyors (Royal Institution of Chartered Surveyors (RICS), 2014: 8) the market value of a property is "the estimated amount for which a property should exchange on the date of valuation between a willing buyer and a willing seller in an arm's-length transaction after proper marketing wherein the parties had each acted knowledgeably, prudently, and without compulsion".

When considering a portfolio of properties, such as those held by REITs, one method of valuing the portfolio is by considering the NAV of all the properties held by the REIT. NAV is the net market value of all the assets of the REIT after deducting all its liabilities and other obligations (such as the debt associated with the properties) (Brueggeman and Fisher, 2011). Because REITs assets are primarily the properties they own, one would expect the value of REIT shares to reflect their market value and to equal their net asset value per share (NAV). If the NAV is higher than the share price then the share is trading at a discount, conversely, if the NAV is lower than the share price then the share is trading at a premium. (Capozza and Lee, 1995; Liow and Li, 2006; Ke, 2015).

In reality REIT share prices are generally valued higher or lower than their NAV, and this discount or premium differs greatly between REITs and over time (Ke, 2015). Even though their underlying asset is property, REITs are traded in the equity market and hence they not only display the characteristic of the underlying physical asset, but also exhibit characteristics similar to other shares traded in the equity market and are influenced by current market conditions and investor sentiment (Ke, 2015).

Whether a REIT trades at a discount or premium to its NAV is of importance to investors for a number of reasons. Investors are most likely to buy REIT shares when a REIT trades at a significant discount to their NAV (when shares are considered undervalued and it is expected that they will increase in time to be more in line with the NAV) and are most likely to sell when shares trade at a large premium to their NAV (when shares are thought to be overvalued and expected to decrease in time to be more in line with the NAV) (Mayer, 2017; Kim and Wiley, 2018). If REITs are trading at a premium to their NAV indicating that the market is willing to pay a premium for properties, more private companies may decide to go public. Conversely if REITs are trading at a discount to their NAV private companies may see the opportunity to add value and buy out the REITs making them private companies (Brueggeman and Fisher, 2011). Research conducted by Green Street Advisors found that REIT premiums and discounts to NAV by sector over the long-term were predictive of future changes in private market values. They found that private markets lag public markets suggesting that if investors track both markets and act on signals in the public market they can make investments with favourable returns in the private market. They also suggest that investing in assets that trade at significant premiums to NAV in the public market should result in favourable returns for private investors as sectors that trade at a high premium to NAV tend to show superior private-market property price appreciation in the near term (Lachance, 2017).

It is not only REIT shares that trade at a discount or premium to their NAV (also referred to as NAV spread), but a phenomenon that occurs in many closed-end funds and has perplexed economists for many years. This is because it is contrary to the law of one price, which postulates that the same asset cannot be traded at different prices in different markets and the theory that markets are efficient, namely that share prices should quickly reflect all publicly available information and therefore provide the best estimate of the value of the shares. It has come to be known as the closed-end fund puzzle (Malkiel, 1977; Morri *et al.*, 2005; Ke, 2015).

1.2.4. Closed-end Fund Puzzle

A closed-end fund issues a fixed number of publicly traded shares in order to raise a certain amount of capital. Unlike open-end funds they do not issue new shares nor redeem outstanding ones. Once the shares are issued they are traded on the stock exchange (Malkiel, 1977).

The puzzle is that, unlike open-end funds and efficient market theories, which state that share prices reflect all publicly available information and trade at the present value of the shares, the share price of closed-end funds is determined by supply and demand rather than their NAV and can trade at a discount or premium to their NAV (Malkiel, 1977).

REITs can be viewed as a special case of a closed-end fund however, with the following difference; closed-end funds invest in other publicly traded shares whereas REITs invest in both direct real estate and other publicly traded real estate funds. The NAV discount / premium in REITs is the difference between the share price and the value of the underlying real estate assets whereas the NAV spread in closed-end funds is the difference between the share price of the traded shares and the closed-end fund (Mueller and Pfnuer, 2013).

There are broadly two approaches to try understand and explain the closed-end fund puzzle, namely, the rational approach and the irrational or market sentiment or noise trader approach (Morri *et al.*, 2005; Mueller and Pfnuer, 2013).

1.2.5. Rational Approach

This examines market fundamentals and their impact on the pricing of shares, that is, how investors interpret the effect of company specific factors such as size, leverage, liquidity, risk and returns on the share price and if this results in a discount or premium to their NAV (Mueller and Pfnuer, 2013).

Malkiel (1977) investigated closed-end investment companies and found that discounts to NAV were related to unrealised capital appreciation and capital gains tax liability (the larger the unrealised appreciation of the fund's portfolio, the greater the discount to NAV), the distribution policy which can influence the attractiveness of a share and the proportion of holdings in foreign stock. Barkham and Ward (1999) examined 30 listed UK property companies and found that contingent capital gains, size, holdings of trading stock and historic monthly returns appeared to explain 15% of the cross-sectional variance in property company discounts to NAV. They also found that market-wide sentiment influences the NAV spread.

Morri *et al.* (2005) conducted a study of 26 UK listed companies in the property sector of the London Stock Exchange. The study introduces an ungeared discount to NAV, which aims to clean out the accounting effect of debt and allows a more effective approach to evaluating the impact of other variables on the NAV spread. The authors found that gearing had a significant impact on NAV spread but that it could be positively or negatively related, depending on market conditions. They also found that director performance remuneration, return on equity and annual returns were negatively related to NAV discount and that dividend yield and systematic risk were positively related. A study of 22 retail funds listed on the Italian stock exchange, conducted by Morri and Benedetto (2009) found that institutional ownership, investment activity, type of funds and management expenses where negatively related to NAV discount and that market sentiment and time to expiry were positively related.

Ke (2015) investigated 41 UK-listed property companies and found that liquidity, firm size, trading stock held and focused property portfolio were negatively related to the level of discount to NAV and that debt to asset ratio, tax, risk and market sentiment were positively related. In a study of 29 REITs in the UK, France and the Netherlands, Morri and Baccarin (2016) found that size, liquidity, leverage, operational risk, performance, investment activity and market sentiment impacted on the NAV spread, however, the significance of their impact and whether they result in a discount or premium depended on the country being studied.

1.2.6. Irrational Factors

Due to the inability of rational factors to accurately predict and explain the NAV spread, researchers explored other, irrational factors to try identify better alternatives to those discussed in Section 1.2.5.

Malkiel (1977) found that rational factors only explain a small part of the NAV spread and that market psychology has a significant impact on the level and structure of NAV spread.

De Long *et al.* (1990) developed a model termed the Noise Trader Model (NTM) which asserts that markets comprise rational, sophisticated investors and irrational investors or 'noise traders' who incorrectly believe that they have special information about the future prices of assets. The irrational behaviour of noise traders introduces an additional risk in the asset price leading to volatility of the price and a large divergence between market prices and fundamental value.

Lee *et al.* (1991) tested the Noise Trader Model by examining 20 US listed closed-end funds and found that shares subject to non-fundamental risks will trade, on average, at a discount from their fundamental value and that movements in share prices may be attributable to movements in investor sentiment. Barkham and Ward (1999) found that changing investor sentiment increased the risk of funds compared to the portfolios they hold and therefore resulted in the under-pricing of the funds relative to their fundamental values. Lee *et al.* (2013) investigated 23 REITs listed on the Singapore Stock Exchange and found that there is a significant and negative correlation between NAV spread and trading volume, thus showing that market sentiment irrationally drives up REIT share prices. Mueller and Pfnuer (2013) investigated the Noise Trader Model's implications concerning European Union-based REITs and found that they comply with the model, in particular that NAV spreads generally recorded a negative average over the long-term, were mean reverting, showed a high correlation with each other and with other indicators of sentiment, however, that international NAV spreads may diverge from each other due to national differences in sentiment.

It is clear from the aforementioned research that no one single factor can explain the NAV spread and that different factors have a greater or lesser or even opposite effect depending on the country investigated and on market conditions.

1.2.7. South African REIT Market

In South Africa, as at 1 April 2013, when the new REIT tax legislation was introduced to bring South African listed property companies in line with international standards, there were 27 South African PLS companies listed on the JSE (including A and B linked units) with a combined market capitalisation of approximately R160 billion (SAREIT, 2013). By September 2017 there were 28 South African REITs listed on the JSE (including A and B linked units) with a combined market capitalisation of approximately R400 billion (SAREIT, 2017b). This represents an increase in market capitalisation of 250% in four and a half years illustrating the increase in popularity of REITs in South Africa. According to data recorded by Catalyst Fund Managers on the SA Listed Property Sector (which includes REITs and non-REITs), as at

January 2017, 21 of the 45 listed property companies reported on traded at a discount to their NAV. The NAV spread ranged from a discount of -31.27% to a premium of 56.58% (Catalyst Fund Managers, 2017). Despite the growth and value of the industry and the significant range of the NAV spread, there is limited, if any research, available on the factors that impact on the NAV spread of South African REITs. Therefore, the following research problem, question and proposition emerged:

1.3. Problem Statement

The problem to be examined in this research is:

There is limited information on what factors impact on South African REITs trading at a discount or premium to their NAV.

1.4. Research Question

The research question that will be answered by this research is:

What factors impact on South African REITs trading at a discount or premium to their NAV?

1.5. Research Hypothesis

The research hypothesis is:

There are multiple factors that impact South African REITs trading at a discount or premium to their NAV.

1.6. Aim

The aim of the research is:

To identify what factors impact on South African REITs trading at a discount or premium to their NAV.

1.7. Objectives

The objectives of the research are:

a. *To identify key rational and irrational factors that may impact on the NAV spread based on research conducted locally and internationally;*

b. *To establish which South African REITs were listed on the JSE over the five year sample period (1 July 2012 to 30 June 2017); and*

c. *To test for any statistically significant relationships between the factors identified and the NAV spread of South African REITs included in the sample.*

1.8. Methodology

The following steps were taken in order to achieve the aim and objectives of the research:

a. Literature review of studies undertaken internationally and in South Africa with a particular focus on identifying factors which have impacted on the NAV spread of REITs in South Africa and other countries;

b. Identification of South African REITs listed on the JSE for the period 1 July 2012 to 30 June 2017 and a compilation of publicly available data on the factors identified under point (a) on the relevant REITs;

c. Statistical analysis of the impact of the factors identified in point (a) on the NAV spread of REITs identified in point (b);

d. Detailed interpretation of the findings; and

e. Conclusions and recommendations presented.

A quantitative approach was adopted for this research based on the nature of the data being analysed and the research method adopted by other research conducted on the topic.

1.9. Limitations

There are a number of limitations to the research:

a. The sample size. As at 30 June 2017 there were 28 REITs listed on the JSE however, only 12 REITs were listed for the five year sample period from 1 July 2012 to 30 June 2017 (SAREIT, 2017c). It was decided that only REITs listed on the JSE for the entire sample period be included in the sample. If a larger sample was to be used then a shorter sample period would have needed to be chosen, similarly if a longer sample period had been chosen then the sample size would have needed to be smaller; and

b. Only certain information is reported in the REITs financial statements and some only annually as opposed to every six months. Therefore, the research was limited to those variables reported in the financial statements of the REITs and to those variables reported bi-annually.

1.10. Structure of Report

The report is structured as follows:

Chapter Two examines the literature available on the research topic both internationally and within the South African context. It looks at a number of areas including the real estate investment environment, REITs, how real estate is valued, and what factors impact on REITs trading at a discount or premium to their NAV.

Chapter Three establishes the most appropriate methodology of study to be used for the research based on the methodology employed in previous studies. It identifies the South African REITs to be included in the research sample as well as which factors that impact on REITs' NAV spread to include in the research. Details are provided on the statistical analysis carried out in order to test the aim and objectives of the research.

Chapter Four presents the findings of the statistical analysis and analyses and interprets the findings, in particular, the statistically significant relationships between the factors tested and the NAV spread are identified and discussed.

Chapter Five presents conclusions based on the results of the statistical analysis in terms of what factors impact on the NAV spread of South African REITs. These are briefly compared to results found in other countries to establish whether any similarities exist and whether to accept or reject the research hypothesis. Suggestions for future research are made.

2. Literature Review

2.1. Introduction

The literature review examines the existing literature pertinent to what factors impact on South African REITs trading at a discount or premium to their NAV. It is divided into two main sections: firstly, it gives an overview of real estate investment, with particular attention to REITs and the valuation of real estate and REITs and identifies the tendency for listed property shares to trade at a discount or premium to their NAV (referred to as NAV spread) and secondly, it examines current explanations for NAV spread, including rational and irrational approaches.

2.2. Real Estate Investment

Real estate investment can take the form of investing directly in property or investing in shares of listed property companies. This duality results in two markets, each with its own set of characteristics (Morri and Baccarin, 2016).

The direct property market comprises property assets traded privately and is characterised by a lack of liquidity, high transaction costs, market valuations based on past transactions which are not updated regularly and often based on limited information as transactional data is usually not public, and heterogeneous property attributes, that is, no two properties are exactly the same, making direct comparison difficult. On the positive side, direct real estate investments provide diversification benefits in portfolios containing shares (Hoesli and Oikarinen, 2012; Morri and Baccarin, 2016).

In order to address the weaknesses of the direct property market, the indirect / listed real estate market was developed providing investors an alternative to investing in direct real estate. Both direct and indirect real estate have real estate as the underlying asset and are therefore expected to provide the same diversification benefits in the long-term in a mixed-asset portfolio. However, indirect real estate, more specifically the shares of listed property companies, are traded on the equity / stock market and display characteristics of other shares. They have much higher liquidity because shares are publicly traded daily by individual and institutional investors, shares are valued based on cash flow expectations and the share price is public and therefore is certain and updated on an ongoing basis, however, it can also be sensitive to market noise or sentiment not related to fundamental factors influencing real estate performance, and hence may be unpredictable and not provide the diversification benefits of direct real estate (Hoesli and Oikarinen, 2012; Morri and Baccarin, 2016).

The implication of the two markets is that REITs, whose shares trade on the stock market and underlying assets operate in the direct property market, are subject to dual valuation. The first value is the NAV which is calculated by determining the appraised value of the underlying assets, referred to as the net present value (NPV) and subtracting any liabilities. The second

value, is the value of the REITs shares, which is determined by equity market dynamics and is updated daily (Morri and Baccarin, 2016).

The relationship (and difference) between the two values is the focus of this research, which attempts to identify what factors influence this relationship and result in a difference between the NAV and REIT share price.

2.2.1. Real Estate Investment Trusts

Globally, REITs have become an increasingly popular means for investing in real estate. Based on market capitalisation, the US REIT market increased by 147% between 2010 and 2016 and non-US REITs by 100% in US Dollar terms. As at August 2017, the aggregate market capitalisation of listed US REITs was US$ 1.126 trillion (Case, 2017). As at November 2017, there were 31 SA REITs listed on the JSE, representing a market capitalisation of over R422 billion (PropertyWheel, 2017).

REITs, as an asset class, have exhibited strong performance in South Africa over the past thirteen years. For the period 2004 to 2016, the SA Listed Property Index (SAPI), which comprises the top 20 liquid companies, by full market capitalisation, in the Real Estate Investment & Services Sector and Real Estate Investment Trusts Sector, with a primary listing on the Johannesburg Stock Exchange (JSE), outperformed the All Share Index (ALSI), which represents 99% of the full market capitalisation of all eligible equities listed on the Main Board of the JSE, in 10 of the 13 years. Similarly, the SAPI outperformed the Composite All Bond Index (ALBI), a composite index containing the top 20 vanilla bonds (i.e. those with a fixed, even if zero, semi-annual coupon and excluding bonds with a term less than one year) ranked dually by liquidity and market capitalisation, in 11 of the 13 years. On a risk adjusted basis, the SAPI was the top performing asset class over 3, 5 and 10 years (Johannesburg Stock Exchange (JSE), 2017a; 2017b; 2017c; Tilly and Nana, 2017) .

Figure 2-1 shows the total returns for the SAPI, ALSI and ALBI for the period 1999 to 2016 (SAREIT, 2017a). It is clear from the graph that the SAPI (blue line) outperformed both the ALSI (red line) and ALBI (green line) in terms of overall total return.

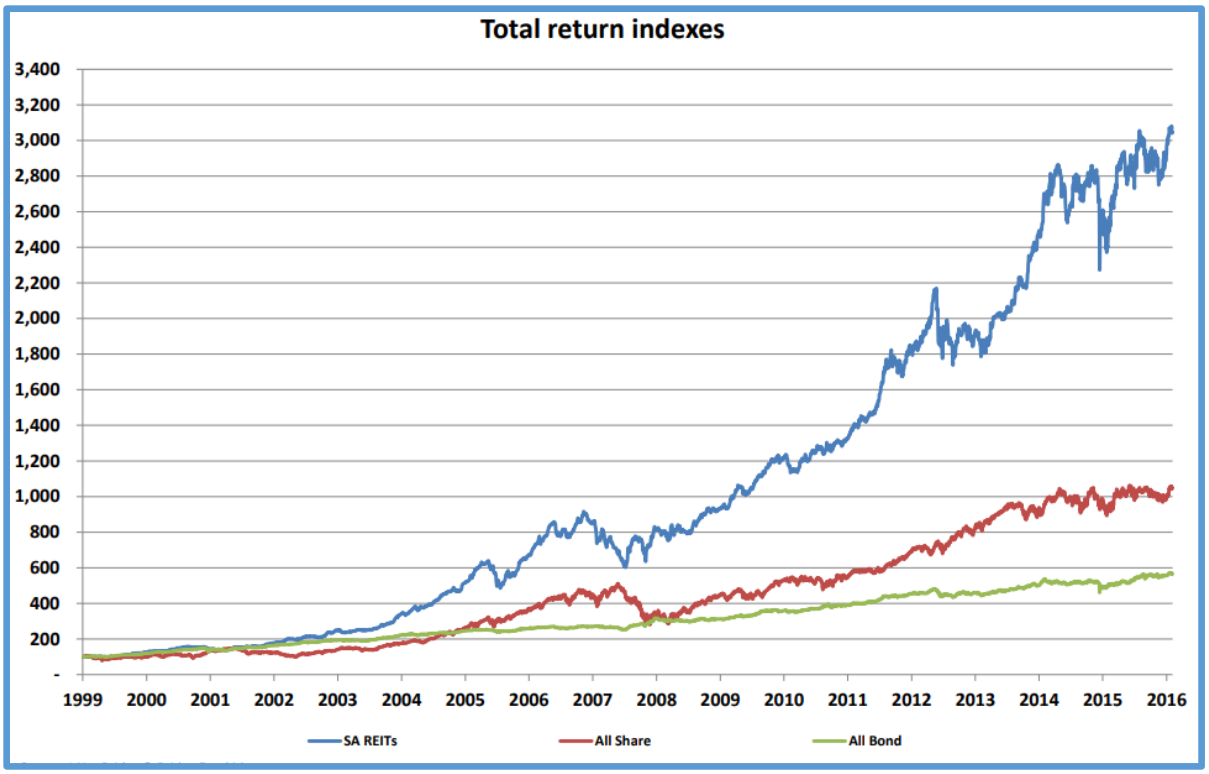

Figure 2-1 – Total Return for SAPI, ALSI and ALBI for the period 1999 to 2016 (SAREIT, 2017a)

REITs, on paper, appear to be a superior investment option to direct real estate, because of their superior liquidity, lower transaction cost, diversification and other benefits as discussed in Chapter One, however, they often tend to trade at a discount, rather than a premium, to their NAV (Morri *et al.*, 2005).

2.2.2. Closed-End Funds

Stock markets are thought of as highly efficient and that share prices should quickly reflect all publicly available information pertinent to the companies' future performance and therefore share prices should provide the best available estimate for the present value of the shares. However, this is not often the case with closed-end funds, which usually sell at discounts from the actual value of the portfolio of shares they hold (Malkiel, 1977).

Closed-end funds are companies that invest in a portfolio of shares, just as open-end funds, however, the difference is that the shares of open-end funds are bought and sold directly from the fund whereas the shares of closed-end funds are traded between investors on the stock market at prices determined by demand and supply, rather than the NAV of the company (Malkiel, 1977).

REITs can be considered a special case of closed-end funds as both are investment trusts and both can determine their fundamental value by valuing the underlying assets, in the case of REITs the underlying asset is real estate. Closed-end funds hold publicly traded shares whose NAV's are published weekly yet their share prices exhibit discounts or premiums to

their NAV (Gentry *et al.*, 2004). If an investor wishes to liquidate his holding in a closed-end fund, he needs to sell his shares to another investor, at typically a price different from the per share market value of the assets the fund holds, whereas in an open-end fund the investor can redeem the shares with the fund itself for the NAV per share (Lee *et al.*, 1991).

However, there are some differences between closed-end funds and REITs, most notably, closed-end funds operate exclusively in stock markets, whereas REITs underlying assets are in the real estate market making the assets less liquid compared to securities held by closed-end funds. This lack of liquidity poses a barrier to entry for some traders. Generally investors in real estate markets hold a long term position whereas investors in the stock market can hold long and short term positions. The majority shareholders of REITs are generally institutional investors, especially in the emerging markets, whereas closed-end funds are mostly owned by individual investors. Institutional investors are less likely to react to market sentiment and noise and hence, the impact of the sentiment of institutional owners on the mispricing of REITs is likely to be less. Informed investors could earn extraordinary returns with a trading strategy that buys stocks traded at a discount to NAV and short stocks traded at a premium to NAV (Gentry *et al.*, 2004; Lee *et al.*, 2013; Mueller and Pfnuer, 2013).

2.2.3. Valuation of Real Estate and REITs

2.2.3.1. Valuation of Real Estate

The International Valuation Standards Council (IVSC) (2017) specifies three approaches for the valuation of real estate, namely, the Market Approach whereby the price of other comparable real estate is considered to derive at a market value; the Income Approach where the value of the real estate is based on an actual or estimated income that is or could be generated by the asset (i.e. in real estate the rental received) and employs various methods of discounted cash flow models (whereby the cash flow for a defined future period is adjusted to a present value using a discount rate, the sum of the present values represents an estimate of the capital value); and the Cost Approach which is generally through the depreciated replacement cost method and is used where there is either no evidence of transaction prices or no identifiable income stream (International Valuation Standards Council (IVSC), 2017).

The Income Approach should be applied when the income-producing ability of the property is the critical element affecting value and / or when there are reasonable projections pertaining to the future income (rental) streams for the property but there are few, if any, relevant market comparables (International Valuation Standards Council (IVSC), 2017). Both instances are applicable to REITs, that is, properties held by REITs are by the very nature of a REITs business income-producing properties with long-term leases with generally predictable income streams and there are often limited, if any, market comparables of recently traded properties, thus the Income Approach is usually the preferred method of valuation.

The Market Approach may be used if there are sufficient recent transactions and as a secondary method of valuation in support of the Income Approach, however, it is important to keep in mind that the real estate market is not a perfectly efficient market in that information is not always readily and timeously available and the market is slower to incorporate

information. It is generally backward looking and because valuations are influenced by past transactions, they generate smoothed valuations (Morri and Baccarin, 2016).

This is partly due to the infrequency of properties trading, the lack of a centralised exchange for such transactions and the representativeness of the sales price, that is, whether the transaction was a typical arm's length one (as opposed to a distressed sale or through related parties), thus making market-determined prices of real estate not readily available (Gyourko and Keim, 1992).

2.2.3.2. Valuation of Shares and REITs

In contrast to the real estate market, equity markets are far more efficient in that new information is readily available, timeous and continuously assimilated into the share price, which is determined by supply and demand. Equity markets are forward looking and tend to generate valuations that are more volatile and are influenced by market sentiment (Venmore-Rowland, 1990; Morri and Baccarin, 2016).

There are a number of ways to value shares depending on the nature of the firm's business and analysts' preference, for example, one approach is to calculate the present value of a shares future dividends, another is to consider valuation models which focus on corporate performance variables such as future earnings or the value of the firm's individual assets and liabilities (i.e. NAV) (Liow and Li, 2006).

Real estate shares are valued in the stock market whereas the underlying properties are valued in the real estate market and hence it can be argued that the company valuation should generally be related to the value of the underlying properties (i.e. NAVs) and less to the earnings and dividends and that real estate shares are likely to provide a return that should be similar to the return on the underlying real estate assets over the long term. The main justification for a NAV basis of valuation, rather than an earnings or dividend basis, rests on the growth potential of the assets (real estate) held (Liow and Li, 2006).

Ratios are another popular equity valuation approach as they can often be calculated relatively quickly and are often updated and published by media houses and financial websites, and include the price-to-earnings (P/E), price-to-book (P/B), price-to-sales (P/S) and price-to-cash flow (P/CF) ratios amongst many others. However, they are not always useful when valuing REITs. For example, the price-to-book ratio should not be used because the book value of an asset attracts depreciation over its lifespan however, generally the assets of REITs, being property, increase in value over time. The NAV per share is a far better estimate of market value as it takes into account the operating income of the property (revenue less operating income) less any liabilities outstanding on the property and divides the figure by the total number of shares issued (Mayer, 2017).

This sentiment is shared by Ke (2015) who notes that one of the important ways of valuing the shares of property companies is their net asset value, which is the value of the company's property assets and other assets, adjusted for liabilities and other claims against the company, thus reflecting the investment value of its property holdings. This is in contrast to other types of companies which may be valued based on the profit stream generated by their operations and considering the price-to-earnings ratio to arrive at the company's share price (Ke, 2015).

One would therefore expect the NAV of property companies to closely align with their share price, however, this is not usually the case. For example, for the period 2005 to 2013 property companies in the UK generally traded at a discount to their NAV indicating that investors do not always value property companies based on their fundamental value. Another phenomena observed is that the discount or premium to NAV changes over time and between companies. In broad terms, a discount to NAV infers that properties held indirectly via shares in a property company are less valuable than if they were held directly, and vice versa (Ke, 2015).

Historically, the discount to NAV, in UK property companies, was explained as the additional tax burden of corporation tax on realised capital gains, that is, if a property was sold shareholders would not necessarily achieve the NAV for the property because of the capital gains tax liability. In 2007 the REIT regime was introduced which aimed to address the tax burden, however, property companies who converted to REIT status still traded at a discount to their NAV (Ke, 2015).

Even though a REITs underlying assets are valued annually, its share price is determined in the equity market. Investors looking to invest in a REIT will first and foremost, in the short term, consider the equity market and share price, which are positively correlated to current market conditions and broader investor sentiment. However, in the long term, direct property investment and indirect property investment are a substitute for each other. Stock market and property returns are also related since common factors can influence returns in both markets (Ke, 2015).

The notion that direct property investment and indirect property investment are a substitute has been researched extensively in the past and has found that there is a correlation between the two and that direct real estate pricing lags indirect real estate pricing. For example, Gyourko and Keim (1992) analysed the risk and return of various types of real-estate related companies traded on the New York and American stock exchanges (NYSE and AMEX) and found that lagged values of traded real estate portfolio returns can predict returns on appraisal-based indices. This suggests that stock markets reflect information about real estate markets that is later assimilated in less frequent property appraisals.

Fisher *et al.* (1994) attempted to explain the history of commercial property values and to compare the various methods of constructing commercial property value indices and return series. The authors examined three types of indices:

i) Indices that attempt to reconstruct property market values by 'unsmoothing' appraisal-based indices;

ii) Indices that trace average ex post transaction prices of commercial properties over time; and

iii) An index based on unlevering REIT share prices.

Under the three types, five indices of the historical value of commercial property were quantified. They found that all the indices showed greater volatility than the appraisal-based index, with the transaction price index and REIT share price index showing visibly greater volatility than the other indices. This shows that transactions have an influence on volatility, and contain more 'noise' than the other indices. They also found that the appraisal-based index lagged behind the REIT share price index by approximately two years, indicating that

the listed property market is quickest at assimilating information, although subject to noise, and that direct property markets are slower at assimilating information. Transaction prices appeared to lag slightly behind appraised values suggesting that institutional investors hold onto properties until they can sell them for a price at least equal to the current appraised value, in effect trading off liquidity for reduced volatility (Fisher *et al.*, 1994).

Liow (1996) investigated the relationship between share price discount / premium and property market return of 16 property companies listed on the Stock Exchange of Singapore (SES) over the period 1980 to 1994 and found that over 47 quarters the sector average discount was accompanied by a negative all-property return and the sector average premium by a positive all-property return, suggesting that there are common pure property factors that influences both indirect and direct property. A significant implication for property investment is that listed property share prices reflect economically important, timely and subsequently embedded information about changing property market fundamentals and that investors may be able to capture a moderate portion of property market returns by investing in property equities. It was also found that changes in property company ratings led changes in the all-property, residential, commercial and industrial property returns by up to a maximum of six months and that property stocks may be regarded as the leading indicator for real estate in Singapore (Liow, 1996).

Hoesli and Oikarinen (2012) examined the variance decompositions of securitised (listed) real estate and direct real estate returns and general stock market returns for four US and two UK real estate sectors and the Australian overall real estate market. Their results suggest that the long-term REIT market performance is substantially more tightly related to direct real estate performance than to general stock market returns and that the substitutability of REITs and direct real estate over the long term is relatively good. The converse is true in the short term, that is, that the co-movement between REITs and stocks is stronger than between REITs and direct real estate. Based on their findings, it could be expected that in the long term REITs share prices should be closely related to their NAV, but that in the short term some divergence could be expected (Hoesli and Oikarinen, 2012).

Yunus *et al.* (2012) evaluated the long term and short term associations between the private (direct) and public (listed) real estate markets in Australia, Netherlands, the UK and US and found a long term relationship suggesting the two are substitutable over the long term. They also found that in the short term price discovery occurred in the listed real estate market, which is more informationally efficient and liquid, and that it leads the direct real estate market (Yunus *et al.*, 2012).

From the above research one would expect that in the long term REITs share prices should correspond with their underlying NAV. If a REIT and its underlying assets are priced efficiently, a discount to NAV implies that the properties held indirectly through the REIT are less valuable than if they were held directly, conversely, a premium to NAV implies that the properties held indirectly are more valuable than if they were held directly (Venmore-Rowland, 1990).

Put another way, in an ideal efficient market, one would expect REIT prices to be mean reverting and that the average share price to NAV ratio be one, that is, the share price to be equal to NAV (Gentry *et al.*, 2004). However, there are a number of possible explanations for a ratio that differs from one, as proposed by Gentry *et al.* (2003). In the one instance, a REIT's share price could be less than its NAV if the tax basis of its properties is below market value

and if there are additional costs associated with operating the REIT compared to other organisational means of investing in real estate, including the costs of potential conflicts of interest between investors and managers. Conversely, a REIT's share price could be above one if a REIT has good management and therefore, investors are willing to push the share price up above the NAV or if the costs of capital are lower in public markets, for example due to the benefits of liquidity, then prices might be above NAV. These and other explanations of why the ratio of share price to NAV deviates from one are the focus of this research and are elaborated on in section 2.3.

2.2.4. NAV Spread

Property companies value their property assets annually and report the aggregate value of their assets in their annual financial statements, usually as the NAV. Based on the law of one price, which postulates that an asset cannot trade at different prices in different markets, and on the evidence that in the long term listed and direct real estate are substitutable, one would expect the NAV per share to be similar to the share price (Ke, 2015).

However, this is rarely the case as is evidenced in the following research studies. Research carried out by Capozza and Lee (1995) investigated the sources of premiums/discounts from NAV in US equity REITs from 1985 to 1992 (their sample increases from 33 to 75 REITs during the period) and found that retail REITs traded at a significant premium relative to the average REIT whereas warehouse/industrial REITs traded at discounts and small REITs traded at significant discounts compared to large REITs which traded at premiums. However, on average, the REITs traded at a discount of 8%.

Liow (1996) investigated 16 listed property companies which trade on the Stock Exchange of Singapore over the period 1980 to 1994 and noted that the shares of the majority of Singapore property companies traded at an average 64 percent premium to their underlying NAVs. It was suggested that the premium may be due to investors expecting rentals and capital values to increase translating into a strong demand in the property market and hence driving the share prices up. The research also found that the average quarterly discount/premium varied over time and that individual property companies' discount/premium fluctuated in the short term, but tended to move together in the long run (Liow, 1996).

According to Barkham and Ward (1999) the average UK listed property sector traded at a discount to NAV from 1977 to 1994 and varied between a discount of 53% and a premium of 29%. Clayton and MacKinnon (2000) show that throughout most of the 1990s REITs traded at significant premiums to NAV, however, from 1999 most REITs traded at a discount to NAV. Morri *et al.* (2005) analysed 26 UK property companies listed on the London Stock Exchange for the period 2000 to 2003 and found a substantial sector discount to NAV over the period without any significant variation at the aggregate level.

Liow and Li (2006) examined eight Asian-Pacific securitized real estate markets (Australia, Hong Kong, Japan, Singapore, Malaysia, Indonesia, Philippines and Thailand) for the period 1995 to 2003 and found that 52.6% of the real estate firms traded mostly or consistently at a discount, 30.6% traded mostly or consistently at a premium and the remaining 18.2% fluctuated between both premiums and discounts. The average quarterly performance of the

Hong Kong securitized real estate market traded at a 32.1% discount and the remaining seven markets reported an average quarterly premium of between 2.2% (Singapore) and 970.8% (Thailand). The results show considerable variations over time and across companies and countries.

Mueller and Pfnuer (2013) cite research by the European Public Real Estate Association (2010) showing the NAV spread of European REITs and Green Street Advisors (2011) showing the NAV spread of REITs in the United States over the period 1990 to 2010 as generally trading at a discount and ranging from a discount of almost 50% to a premium of just above 30%. Their own research of a sample of Western European REITs, covering approximately 75% of all REITs within the EU, found that the NAV spread ranged from a premium of 24.5% at the end of 2006 to a discount of 36.3% at the end of 2008, with an average discount of 4.6%.

Ke (2015) found that over the period 2005 to 2013 property companies in the UK generally traded at a discount to their NAV suggesting that the stock market does not always value property companies based on their fundamental value. It was also found that the discount (premium) to NAV changed over time and between companies, ranging from a discount of 42.27% to a premium of 19% and an average discount of 11.9%.

Figure 2-2 shows how the premium/discount of the NAV of the FTSE NAREIT All REITs Index (a US based REIT index) has differed over time. The index is made up of 53 REITs. The line "LT Average" shows the long term average of the NAV discount/premium (Mayer, 2017).

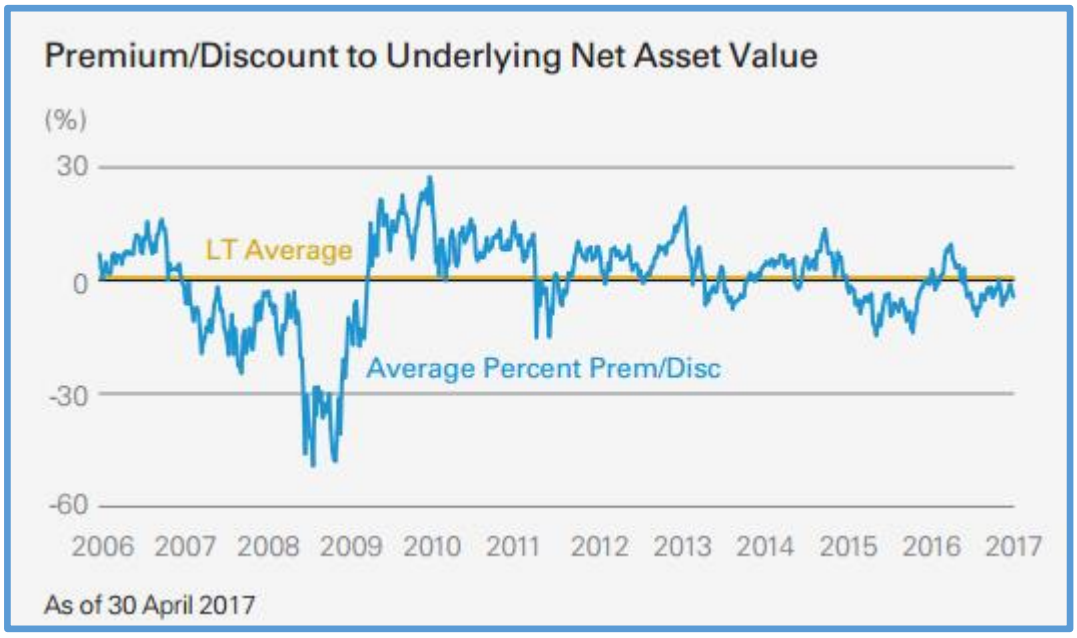

Figure 2-2 Premium / Discount to Underlying NAV of the FTSE NAREIT All REITs Index as at 30 April 2017 (Mayer, 2017: 1)

According to data recorded by Catalyst Fund Managers on the SA Listed Property Sector (which includes REITs and non-REITs), as at January 2017, 21 of the 45 listed property companies reported on traded at a discount to their NAV. The NAV spread ranged from a discount of -31.27% to a premium of 56.58% (Catalyst Fund Managers, 2017).

It is evident that the premium/discount to NAV of REITs and listed property companies has varied considerably over time and between companies and countries. There are a number of reasons why this would be significant for REIT investors and shareholders. Investors are most likely to buy REIT shares when a REIT trades at a significant discount to their NAV (when shares are considered undervalued and it is expected that they will increase in time to be more in line with the NAV) and are most likely to sell when shares trade at a large premium to their NAV (when shares are thought to be overvalued and expected to decrease in time to be more in line with the NAV) (Mayer, 2017; Kim and Wiley, 2018). If REITs are trading at a premium to their NAV indicating that the market is willing to pay a premium for properties, more private companies may decide to go public. Conversely if REITs are trading at a discount to their NAV private companies may see the opportunity to add value and buy out the REITs making them private companies (Brueggeman and Fisher, 2011). Research conducted by Green Street Advisors found that REIT premiums and discounts to NAV by sector over the long-term were predictive of future changes in private market values. They found that private markets lag public markets suggesting that if investors track both markets and act on signals in the public market they can make investments with favourable returns in the private market. They also suggest that investing in assets that trade at significant premiums to NAV in the public market should result in favourable returns for private investors as sectors that trade at a high premium to NAV tend to show superior private-market property price appreciation in the near term (Lachance, 2017).

In order to explain the reason for the NAV spread and why NAV spreads vary between REITs various rational and irrational (behavioural) explanations have been put forward (Morri and Baccarin, 2016) and are examined in section 2.3.

2.3. Current Explanations for NAV spread

2.3.1. Rational Approaches

Rational approaches attempt to explain the NAV spread as being caused by internal company specific factors (Morri and Baccarin, 2016). These include:

2.3.1.1. Diversification

The effect of diversification on NAV discount is uncertain. The proponents for diversification, such as general economic theory, suggest that diversification reduces risk, and accordingly lowers the NAV discount. However, modern economic theories support the notion that more specialised REITs develop critical skills in the market they operate in, and hence suggest that diversification is a negative feature. If one considers international diversification, the risks associated with exchange rate fluctuations, different tax systems, the information disadvantages of lack of local knowledge, political risk and transaction costs outweigh the benefits of diversification (Ke, 2015; Morri and Baccarin, 2016).

Research conducted by Capozza and Lee (1995) investigated the effect of diversification in terms of property type on premiums/discounts to NAV in US equity REITs from 1985 to 1992 and found mixed results. Clayton and MacKinnon (2000) explored the causes of both the level of and changes in premiums to NAV in REIT pricing over the period 1996 to 1999 and found no significant relationship between focus and NAV spread. Brounen and Laak (2005) analysed 72 property companies from the UK, Sweden, France and the Netherlands with portfolios spread across geographic regions and across property types and found a significant negative relationship between NAV discount and a firm's focus on property type. This implies that portfolios concentrating in one or a few property types reduces a firm's discount to NAV. Lee *et al.* (2013) tested for diversification by sector by considering REITs investing in properties in only one sector and those investing in more than one sector and found a significant negative relationship between discount to NAV and focused REITs. They also tested for diversification along regional lines by considering REITs holding properties in only one country and those in more than one country but found no significant relationship.

Ke (2015) investigated geographic concentration (whether the firm had international holdings or not) and found a statistically significant positive relationship between discount and geographic diversification suggesting firms with an international component to their property portfolio have a higher level of discount. Ke (2015) also examined spread across property type, measured using the Herfindahl index and found a negative relationship between discount and property type. The Herfindahl Index is a widely used measure of market concentration/diversification. It adds the sum of the squares of the proportion of, for example, property types for a company to obtain a value which ranges from close to zero, indicating widespread diversification to 1, indicating complete focus in one property type (Brounen and Laak, 2005).

2.3.1.2. Dividend Yield offered by REITs

Most international tax law requires REITs to pay out most of their taxable income as dividends each year, and hence their dividend policy is more restricted than that of other corporations. The same holds true for South African REITs, where Income Tax legislation requires that REITs must pay at least 75% of their gross income as a dividend (Gentry *et al.*, 2003; SAREIT, 2014).

Research into the effect of dividend policy on discounts to NAV show mixed results. For example, Cici *et al.* (2011) find that both REITs offering high yields and offering low yields outperform the overall REIT index. This may at first seem contradictory, however, funds which target dividend income will focus on REITs with generous dividend pay-out policies, often above a level required by regulations, similarly funds which target capital appreciation will focus on REITs with lower dividend pay-out policies and that prefer to retain income for development and acquisition strategies designed to promote share growth.

2.3.1.3. Financial Leverage

Leverage is usually estimated as the ratio of long term debt to total assets. The relationship of leverage to NAV is not straightforward. Higher levels of leverage are expected to discipline managers and lower agency cost and hence, lower the NAV discount. However, leverage increases risk, volatility of earnings and sensitivity to market condition changes and interest rates, reduces financial and strategic flexibility and therefore increases the NAV discount (Barkham and Ward, 1999; Morri and Benedetto, 2009; Morri and Baccarin, 2016).

There have been mixed results as to the impact of leverage on NAV discounts. A number of studies have found a significant positive relationship such as Morri and Benedetto (2009) investigated a sample of Italian Real Estate Investment Fund's over a five year period (2003-2007) and found a significant positive relationship between leverage and NAV discount suggesting that the higher the debt, the riskier the fund and the higher the discount. Boshoff and Cloete (2012) investigated the relationship between listed property share prices and the property values in seven PLS companies listed on the JSE. Their analysis investigated a number of financial ratios in relation to the share price performance over a 10 year period from 2000 to 2009. They found a significant negative relationship between share price and debt-asset ratio and therefore a larger discount to NAV, indicating investors view higher debt as riskier and are not prepared to pay more for shares as debt increases. Ke (2015) investigated 41 UK-listed property companies between 2005 and 2013 and found a statistically significant positive relationship between discount and debt-to-asset ratio. Morri and Baccarin (2016) analysed 29 Dutch, French and UK REITs over the period 2003 to 2014 and found that the French and UK REITs showed a positive relationship between leverage and discount to NAV and inferred that REITs with higher levels of debt are perceived negatively by the market and hence have higher discounts to NAV.

Other studies have found either no relationship, such as Barkham and Ward (1999) and Lee *et al.* (2013) or a significant negative relationship. Clayton and MacKinnon (2000) found that the level of premium to NAV is positively related to the debt to equity. Brounen and Laak (2005) analysed 72 property companies in 2002 from the UK, Sweden, France and the Netherlands with portfolios spread across geographic regions and across property types and found a significant negative relationship between NAV discount and leverage, measured as the ratio of long term debt to total balance sheet value. Morri *et al.* (2005) analysed UK companies for the period 2000 to 2003 and found that gearing (leverage) had a negative relationship to NAV discount. However, they note that gearing is an ambiguous variable, which depending on the market conditions, could have a negative or positive relationship to NAV discount. Morri and Baccarin (2016) in their study of 29 Dutch, French and UK REITs over the period 2003 to 2014, found that Dutch REITs with higher levels of debt traded at a lower NAV discount, that is, a significant negative relationship.

2.3.1.4. Performance

Performance can be measured using a number of variables such as the return on equity (ROE), dividend yield, the average monthly total return or the daily mean stock return. In

general, it is expected that the higher the return the lower the discount, however, consideration needs to be given to the variable being used to measure performance. For example, even though a particular market may prefer high dividend yield, it may translate into a lower share price and therefore a higher discount (Morri and Benedetto, 2009; Ke, 2015).

Except for a study carried out by Malkiel (1977) which did not find a significant relationship between performance and NAV discount, evidence from previous research generally found a negative relationship. For example, Barkham and Ward (1999) found that historic stock return, measured as the mean monthly return for the three calendar years prior to each balance sheet date, was negatively related to the discount to NAV. Morri *et al.* (2005) found a negative correlation between NAV discount and ROE and average monthly total return, but found a positive one between discount and dividend yield, suggesting investors prefer their money to be reinvested in the property assets rather than receiving a higher dividend and being required to reinvest it in a rising property market. Lee *et al.* (2013) found a significant and negative relationship between NAV discount and gross earnings (earnings before interest, taxes, depreciation and amortisation calculated as operating income plus provision for loan losses plus depreciation expense plus interest expense). They explain that due to the high mandatory distribution requirements imposed on REITs, high earning REIT shares are associated as value shares and are therefore expected to be priced close to the NAV. Ke (2015) found the daily mean stock return to have a negative significant relationship with discount to NAV. Morri and Baccarin (2016) found a significant negative relationship in French, Dutch and British REITs between performance, that is, profitability and NAV discount using their Traditional model, however, when they adjust for leverage, profitability becomes insignificant.

2.3.1.5. Size

Size has an uncertain effect on the NAV discount and has been measured in a number of different ways such as the total asset market value or the market value of equity. Larger companies are complex, less flexible, have lower liquidity and are difficult to value hence one could expect a greater discount, but they also have broader access to capital markets, and are more likely to acquire higher value properties, earning superior returns hence one could expect a lower discount. Moreover, achieving a critical mass in a certain geographical area or property type can also generate economies of scale for REITs in terms of synergies and deeper knowledge of the market (Morri and Benedetto, 2009).

Several studies have found a negative relationship between size and NAV discount, for example, research carried out by Capozza and Lee (1995) investigated the effect of size on premiums/discounts to NAV in US equity REITs from 1985 to 1992 and found an increase in the premium in larger REITs and that small REITs are discounted 33% more than large REITs. Similarly, Clayton and MacKinnon (2000) explored the causes of both the level of and changes in premiums to NAV in REIT pricing over the period 1996 to 1999 and found that larger REITs traded at a much higher premium/lower discount to the smaller REITs , that is, that discounts are negatively related to firm size. They suggest that the link between size, premium/discount to NAV and liquidity is due to larger REITs having smaller liquidity premiums and hence higher prices relative to NAV. Brounen and Laak (2005) found a significant negative relationship between discounts and firm size. This suggests that the largest firms had the lowest discounts,

which may be explained by increased popularity and higher transparency associated with larger firms.

Lee *et al.* (2013) found a significant positive correlation between NAV premiums and market capitalisation, that is, a negative relationship between NAV discount and size showing that the greater the market capitalisation, the lower the discount or higher the premium. This was explained by larger REITs benefiting from economies of scale and operational efficiency in their acquisitions and asset enhancing activities.

Lux (2014) examined 24 UK and European real estate companies from 2002 to 2012 and divided them into large, medium and small firms based on market capitalisation and daily liquidity in the shares as measured by value traded. They found the medium sized companies were trading at a premium since 2009 and the large and small companies were trading at a discount. They also found that the smaller the company, the larger the discount to NAV. Ke (2015) investigated firm size, measured as a natural logarithm (ln) of total asset value, and found a statistically significant negative relationship between discount and firm size, implying larger firms have a lower discount.

Morri and Baccarin (2016) tested the effect of size on NAV discount using two models; the first model used a Traditional NAV Discount formula defined as (NAV – Market capitalisation)/NAV and the second model used an Unlevered NAV Discount formula which adjusts for debt and where NAV discount is defined as (NAV – Market capitalisation)/(NAV+ Debt). They found that Dutch REITs showed a significant negative relationship between size and NAV discount when tested against both the Traditional and Unlevered models, suggesting that Dutch investors view size and thus economies of scale positively.

However, Barkham and Ward (1999) argue that if a company was required to sell all its property assets it would result in the market being flooded with a considerable amount of stock, creating abnormal market conditions, and would most likely lead to the assets trading at a lower value than if they had been traded individually. They therefore hypothesise that the larger a company's property portfolio, the less liquid their holdings and the greater the discount. As expected, their research found that company size had a positive relationship to NAV discount, however, not at a statistically significant level, a finding which needs to be viewed with caution when compared to other findings which are statistically significant.

Morri and Baccarin (2016) found that size is not significant in French REITs when examining discount to NAV using a Traditional NAV Discount model, however, when they use the Unlevered NAV Discount formula and adjust for debt, the relationship became significant and positive suggesting French investors view size and thus complexity negatively. Size was not significant in UK REITs.

2.3.2. Irrational Approach / Market Sentiment

The results of studies carried out on rational factors to explain NAV discount, as discussed in section 2.3.1 provide mixed, and at times contradictory, results. In many instances it is possible to find reasonable explanations for a variable to have both a negative and positive relationship with NAV discount, and for the magnitude and/or direction of the relationship to

change over time and depending on market conditions. The inability of rational factors to successfully explain the NAV spread and why the levels vary greatly over time has led researchers to examine other "non-rational" or irrational approaches. These consider non-fundamental or non-company specific factors such as the behaviour of irrational investors, market sentiment and herd mentality in explaining the deviation of NAV from share prices (Morri *et al.*, 2005; Mueller and Pfnuer, 2013).

Early research carried out by Malkiel (1977) found that rational explanations such as unrealised capital appreciation, distribution policy and portfolio policies, only explained a small part of why closed-end fund shares usually sold at a discount from the actual values of the portfolio of shares held and that the discounts varied over time. It was concluded that this indicated that market psychology had an important impact on the degree and structure of the discounts.

De Long *et al.* (1990) put forward a model, termed the Noise Trader Model (NTM), of an asset market which comprises two types of investors: rational, sophisticated investors and irrational investors or 'noise traders'. Rational investors' activities are based on current information on market fundamentals and impartial estimates of future earnings. Irrational investors or noise traders' activities are based on market sentiment, advice from third parties, simple trading rules and spontaneous decisions. Such investors incorrectly believe that they have special information about the future prices of assets. Their irrational behaviour introduces an additional risk in the asset price leading to volatility of the price and a large divergence between market prices and fundamental value. The unpredictable beliefs and behaviour of such investors discourages rational investors from aggressively betting against them and engaging in arbitrage. This leads to a situation where prices can deviate substantially from fundamental values even in instances where there is no fundamental risk. They note that discounts are higher when investors are bearish (pessimistic) about future performance and lower when investors are bullish (optimistic), that is, when investors become pessimistic about closed-end funds (such as REITs), the value of the fund's shares is pushed below its true, underlying value. Similarly, if investors are overly optimistic, the share price may be above the NAV. Noise traders can also earn above expected returns by taking on a disproportionate amount of risk that they themselves create. The model makes three critical assumptions: firstly, rational investors are risk averse and have limited investment horizons; secondly, noise trader sentiment is stochastic/random and unpredictable; and finally, noise trader risk, causing excess volatility and the deviation of prices from fundamental values, is systematic and correlated across assets. The result is a permanent divergence of price from fundamental value (De Long *et al.*, 1990; Clayton and MacKinnon, 2000; Morri *et al.*, 2005; Morri and Benedetto, 2009).

Lee *et al.* (1991) investigated closed-end funds and the work of De Long *et al.* (1990) pertaining to the Noise Trader Model. They postulate that closed-end fund shares are held largely by individual investors (noise traders) and are therefore subject to an additional noise trader risk caused by the unpredictability of investor sentiment. This risk is over and above the risk inherent in the fund's underlying assets, which are predominantly held by institutional investors (rational investors). This results in the shares of closed-end funds being more risky than the underlying assets and can cause changes in the demand for closed-end fund shares which is reflected in changes in discounts and the under-pricing of funds relative to

fundamental values, that is, resulting in a discount to NAV, which essentially is a sentiment indicator (Lee *et al.*, 1991; Clayton and MacKinnon, 2000; Morri and Benedetto, 2009).

Gentry *et al.* (2004), however argue that the institutional ownership in REITs is significantly higher, at about 50% and hence, the role that individual investor sentiments plays in determining REIT pricing is far smaller. They found that the deviations from NAV were not solely due to investor sentiment, unless institutions also exhibit the same kinds of investor sentiment as individual investors.

Barkham and Ward (1999) tested the influence of a number of rational variables, such as size, leverage and insider ownership, on the NAV discount using two models, one including a variable to control for the influence of market sentiment on each company's discount and one without. They found that approximately 50% of the variability in the discount to NAV explained by their model was due to the market sentiment variable and concluded that sector wide positive or negative sentiment has an important influence on individual company NAV discount. They also found that in equilibrium, market wide sentiment creates a tendency for shares of property companies to trade at a discount.

Clayton and MacKinnon (2000) examined changes in REIT NAV spreads in relation to fluctuations in the average REIT sector premium to NAV and found that trading transaction costs increased when share prices were getting closer to NAVs, even when controlling for changes in volume and volatility. This result suggests the presence of a higher proportion of uninformed traders in the market when REIT share prices are diverging from NAV, which is consistent with noise theory.

Efficient market theories, however hypothesise that the discrepancies in prices that emerge as a result of the activities of noise traders are removed by the arbitrage of rational investors which results in prices moving to levels justified by current information. The irrational market participants have therefore, little impact on price (Morri *et al.*, 2005; Morri and Benedetto, 2009).

Mueller and Pfnuer (2013) examined the NTM's implications concerning Western European Union based REITs by investigating whether the difference between the share price of a REIT and its NAV may be explained by irrational noise traders. They found that NAV spread showed a significant correlation with the sentiment indicators they examined thus confirming that REIT markets meet the implications of the NTM and that noise trader sentiment impacts on NAV spread. They further found that by considering noise trader sentiment, investors and analysts can benefit from a better understanding of market development, enhance market models and forecasts, adjust their strategies, improve arbitrage and optimise shareholder value via better timing of value-creating decisions like initial public offerings (IPOs) and seasoned equity offerings (SEOs) (e.g. REITs predominantly conduct IPOs and SEOs during premium periods, therefore capitalising on irrational investors' exaggerated willingness to pay).

2.3.2.1. Market Sentiment

Clayton and MacKinnon (2002) examined REIT share price premium to NAV by looking at growth opportunities in the public market (listed/REIT market), differences in risk factors

investors face in both the private (direct real estate) and public markets such as liquidity, and investor sentiment. They found sentiment played a significant role in REIT prices.

Morri and Baccarin (2016) carried out research on French, Dutch and British REITs, investigating the effect of sentiment on NAV discount by analysing a number of fundamental variables (leverage, size, liquidity, operational risk, performance and investment activity) against a traditional version of NAV discount, an unlevered NAV discount and a sentiment adjusted version of NAV discount. They tested market sentiment, measured as the weighted average of the NAV discounts for six-month average market capitalisations, against the traditional and unlevered NAV discounts. They found that in all countries market sentiment had a significant and positive relationship with NAV discount in the first two models, alone accounting for 10% -15% of the explanatory power of the models. The sentiment adjusted version confirmed that sentiment had an impact of the valuation of the REITs analysed.

Boshoff and Cloete (2012) examined the share prices of Property Loan Stock (PLS) companies compared to the JSE Index and the All Share Index and found a high correlation suggesting that fluctuations in the PLS share prices were influenced by general JSE sentiment and hence influenced by market sentiment and irrational investors behaviour. Morri and Benedetto (2009) found a positive relationship between market sentiment and NAV discount. Ke (2015) found that the market average discount to NAV had a significant impact on a company's discount, implying that individual property companies' discounts are influenced by sector-wide sentiment.

2.4. Conclusion

The literature reviewed identified rational and irrational factors that impact on REITs trading at a discount or premium to their NAV. The rational factors identified were diversification, dividend yield, financial leverage, performance and size. The irrational factors included noise traders/irrational investors who influence market conditions and market sentiment. There are, however, many inconsistencies and contradictory findings amongst authors as to the direction and statistical significance of the relationship between the factors identified and the NAV Discount. The relationships also change depending on the country examined and sample time period reviewed.

3. Methodology

3.1. Introduction

This chapter sets out the research paradigm and methodology adopted for this research, namely the positivism paradigm and quantitative approach using numerical secondary data, and the justification for using these is given. The research methods used for data collection and analysis are described. The research sample and dependent and independent variables that are included in the research are specified. The chapter ends with an evaluation of the ethical considerations and the limitations imposed on the research.

3.2. Research Paradigms

Research refers to a process of enquiry and investigation which is methodical, systematic and results in an increase in knowledge. There are two paradigms or schools of thought relating to research, namely logical positivism and phenomenological or interpretive science. Positivism makes use of quantitative and experimental approaches to exam hypothetical-deductive generalisations. It holds the basic belief that the world is external and objective and relies on theories that can be directly tested. It requires the observer or researcher to be independent from the subject being observed or researched and requires a hypothesis to be formulated which will be verified. Positivism should be restricted to what can be observed and measured and aims to find causal explanations and fundamental laws and break down complex issues into simpler components in order to enable analysis. Interpretive science makes use of qualitative and real-life approaches to inductively and holistically understand the human experience in context specific situations. It holds the basic belief that the world is socially constructed, subjective and requires that the observer or researcher is part of what is being observed and develops ideas through induction from data. Interpretive science attempts to understand and explain a situation as opposed to looking for an external cause (Amaratunga *et al.*, 2002; Bhattacherjee, 2012).

This research adopts the logical positivism approach as it sets out a hypothesis to verify, namely that there are multiple factors that impact South African REITs trading at a discount or premium to their NAV. The researcher is independent from the subject being researched and the aim of the research is to find causal explanations for South African REITs trading at a discount or premium to their NAV.

3.3. Research Methodology

Research methodology refers to how research is carried out, that is, the overall approach and procedures undertaken to conduct the study. Research can be either qualitative or quantitative (Rajasekar *et al.*, 2013):

Qualitative research is non-numerical, descriptive, uses words and applies reasoning. It is exploratory and aims to obtain the meaning and feeling of a situation. It focuses on words and observations to convey reality and endeavours to describe people in natural circumstances. Qualitative research examines the how and why of decision making (Amaratunga *et al.*, 2002; Rajasekar *et al.*, 2013).

Quantitative research is numerical, non-descriptive, uses numbers and applies statistics or mathematics. It is conclusive and follows an iterative process whereby evidence is evaluated. Quantitative research examines the what, where and when of decision making. The quantitative research process aims to develop a testable hypothesis and theory which is generalisable across settings (Amaratunga *et al.*, 2002; Rajasekar *et al.*, 2013).

Both approaches are widely accepted and used in carrying out research. The main differences lie in how the data is collected and analysed. The chosen approach should be appropriate for the nature of the research being undertaken. Table 3-1 summarises the key differences between the qualitative and quantitative research approaches.

Table 3-1 Differing characteristics of qualitative and quantitative research methods (Sogunro, 2001: 3)

Factor	Qualitative	Quantitative
Data Collected	Soft Data	Hard Data
Data Collection Techniques	Active interaction with sample population (Observation by active participation)	Passive interaction through questionnaire and/or experimental design
Sample Population	Small population	Large population
Research Variables	Large number	Small number
Data Collection	On-going observation and interview	Before and after training or experiment
Relationship	Intense and long term with Subjects	Distant and short term
Research Context	Uncontrolled	Controlled
Data Analysis	Content/interpretive analyses through themes, patterns, and narrative synthesis, using coding and descriptive statistics, including ranking, frequency, percentages, etc.	Statistical analyses (e.g. descriptive, inferential statistics) using specific procedures such as the Statistical Package for the Social Sciences (SPSS)
Research Findings	Inductive through creativity and critical reflection	Deductive through inferences from data

Research Instruments / Tools	Researcher as an instrument, interview guide, tape recorder, transcriber, computer, type writer, etc.	Questionnaires, computer, calculator, etc.
Interpretation of Information / Results	Subjective nature of enquiry	Objective, Interpretivism, Positivism
Research Tradition	Ethnography, hermeneutics, phenomenography, case studies, etc.	Descriptive, correlational, experimental, causal-comparative, etc.

The choice of research methodology adopted in this research is based on the problem statement, aim and research question set out in Chapter One. The research question to be addressed is stated as: What factors impact on South African REITs trading at a discount or premium to their NAV? Based on the explanations by Sogunro (2001) , Amaratunga *et al.* (2002) and Rajasekar *et al.* (2013) this research adopts the positivism research paradigm and the research methodology employed is quantitative making use of secondary numerical data.

Quantitative methodology is used because the data utilised is quantifiable, numerical and requires statistical analysis in order to accept or reject the research hypothesis, namely that there are multiple factors that impact on South African REITs trading at a discount or premium to their NAV. The choice of using a quantitative approach is based on the methodology used by previous research carried out on subject matter similar to this research. For example Barkham and Ward (1999) examined the hypothesis that NAV discounts are the result of a number of firm specific factors and the hypothesis that NAV discounts result from the interaction of noise traders and rational investors. They used an ordinary least squares (OLS) regression to test the relationship between the variables and NAV discount. Clayton and MacKinnon (2000) ran a cross-sectional regression to determine which variables impact on the NAV premiums of a sample of REITs. Clayton and MacKinnon (2002) developed and estimated a model in which variations in the average sector NAV premium are a function of a number of factors by carrying out a correlation and regression analysis. Brounen and Laak (2005) investigated why a set of European property shares traded at a discount to NAV by examining the correlation between a number of variables and NAV discount and thereafter running a regression analysis. Morri *et al.* (2005) examined a number of variables which could potentially impact on the NAV discount by conducting a correlation and regression analysis. Morri and Benedetto (2009) investigated the determinants of NAV discount by carrying out an OLS regression. Lee *et al.* (2013) ran panel regressions to test whether a number of variables effected the NAV premiums of REITs listed on the Singapore Stock Exchange. Mueller and Pfnuer (2013) investigated whether the NAV spread of REITs can be explained by irrational noise trader sentiment by running a panel regression. Morri and Baccarin (2016) examined the hypothesis that NAV discounts are the result of a number of factors by carrying out a generalised least squares regression analysis.

3.4. Research Method

Research method refers to the various procedures used in the study, that is, the techniques used to collect data and find a solution to a problem (Rajasekar *et al.*, 2013).

This research has made use of a number of methods including a literature review of studies undertaken focusing on identifying factors which have impacted on the NAV spread of REITs – the factors were identified in Chapter Two. Sample data on the South African REITs listed on the JSE for the period 1 July 2012 to 30 June 2017 were identified and collected and encompassed publicly available data on the factors which were included in the research. A statistical analysis of the impact of the factors on the NAV spread of the relevant South African REITs was undertaken. The results of the statistical analysis and the interpretation thereof are set out in Chapter Four. Conclusions and recommendations are presented in Chapter Five.

3.5. Data

The sample used in this research comprised 12 REITs listed on the JSE from 1 July 2012 to 30 June 2017. In determining the sample size and sample period it was decided that only REITs listed on the JSE for the entire sample period be included in the sample. It was also decided that the sample period would start once markets had sufficiently recovered from the effects of the global financial crisis in 2008 / 2009. This research commenced in late 2017 and 30 June 2017 was chosen as the end date of the sample period as it coincided with the financial year end of a number of REITs and allowed sufficient time for annual and interim results to be published and included in the research. If a larger sample was to be used then a shorter sample period would have needed to be chosen, similarly if a longer sample period had been chosen then the sample size would have needed to be smaller. It was therefore decided that the sample period would commence on 1 July 2012 to allow for a five year sample period. As at 30 June 2017 there were 28 REITs listed on the JSE, however, only 12 REITs were listed for the duration of the five year sample period from 1 July 2012 to 30 June 2017 (SAREIT, 2017c) thus the sample sise was limited to 12 REITs. At the beginning of the sample period property companies listed on the JSE were either Property Unit Trusts (PUT) or Property Loan Stocks (PLS). As of 1 April 2013 REIT Tax Legislation was introduced in South Africa, bringing property investment companies and their structures in line with international principles (Ungerer, 2013). All of the REITs included in the sample were previously either a PLS or a PUT and converted to REIT status in 2013. The date from which each company was deemed a REIT is listed in Table 3-2.

The data for each REIT is available every six months, as published in the interim and annual financial results of the individual REITs. Table 3-2 lists the 12 REITs included in the sample, their code used on the JSE as well as their financial interim and year-end dates.

Table 3-2 Sample of REITs included in the research

REIT	Date converted to REIT	JSE Code	Interim Date	Year-end Date
Dipula A	1 September 2013	DIA	28 February	31 August
Dipula B	1 September 2013	DIB	28 February	31 August
Fortress A	1 July 2013	FFA	31 December	30 June
Fortress B	1 July 2013	FFB	31 December	30 June
Growthpoint	1 July 2013	GRT	31 December	30 June
Hyprop	1 July 2013	HYP	31 December	30 June
Investec Prop	1 April 2013	IPF	30 September	31 March
Octodec	1 September 2013	OCT	28 February	31 August
Rebosis	1 September 2013	REB	28 February	31 August
Redefine	1 September 2013	RDF	28 February	31 August
Resilient	1 July 2013	RES	31 December	30 June
Vukile	1 April 2013	VKE	30 September	31 March

Two of the REITs included in the sample, namely Dipula and Fortress, have A and B linked units. This provides the opportunity for investors to have investments in Dipula and Fortress with different risk and reward structures. For example,the distribution of the A units in Fortress escalate annually at the lower of CPI and 5% with the remaining distributable income accruing to the B unit holders. The A units have preferential entitlements to income distributions and to capital participation on winding up maing them less risky however limited in their distribution potential (Fortress, 2012). The company specific financial data, such as Diversification by Property Type, Leverage, Return on Equity and Size will be the same for both the A and B linked units however the market data such as share price and number of units in issue and hence the NAV Discount or Premium and Dividend Yield will differ between the A and B linked units.

The data used in this research was collected from the following publically available sources:

- Share Price information was accessed from the ShareData and ShareNet websites. The day's closing share price was used. If the interim or year-end date fell on a non-work day then the closest working day's share price was used;
- Financial data from the interim and year-end financial statements available on the various REITs websites; and
- Consumer Confidence Index data from the Bureau of Economic Research (BER) website.

3.6. Method

A statistical analysis was undertaken comparing NAV discount (the dependant variable) to nine factors which may impact on the NAV discount (independent variables).

Two dependent variables were identified: a Traditional version of NAV discount and an Unlevered version of NAV disount. The Unlevered version of NAV discount, as introduced by

Morri *et al.* (2005), corrects for the effect of leverage on the NAV discount by adjusting for the debt of the REITs. This is elaborated on under section 3.6.1.

The relationship between the dependent variables and the independent variables was analyzed by carrying out a multiple regression analysis, more specifically a linear mixed effects (LME) model. A LME Model was chosen because there was more than one observation for every unit of analysis (i.e. each REIT included in the sample was a unit of analysis and hence there were 12 units of analysis). We expected the units to vary independently, but we expected the observations to correlate within a unit. This is contrary to a conventional linear model where it is assumed that the errors are uncorrelated. The analysis was carried out using the statistical computer package R version 3.5.0 and the models were fitted using the lmer function in the lme4 package in R (R Core Team, 2018).

Multiple regression analysis is used to predict the value of one variable (the dependent variable) on the basis of other variables (the independent variables) (Keller and Warrack, 2000). The independent variables were regressed, using a linear mixed effects model, against the Traditional version of NAV discount and then against the Unlevered version of NAV discount (dependent variables) (Morri *et al.*, 2005). A conventional linear model aims to establish a linear relationship between the dependent variable and the independent variables (predictors or fixed effects) and these models are assumed to be linear in the parameters, that is, the response and predictors are related through a linear function. The dependent variable is predicted by or is a function of the independent variables and fixed effects and epsilon (denoted as 'ε'). Linear mixed effects models are an extension of conventional linear models to allow both fixed effects and random effects, allowing for the inclusion of random deviations (effects) other than those associated with the overall error term (UCLA Institute for Digital Research and Education, 2018a). Put another way, a linear mixed effects model is a regression model that takes into consideration the variation that is explained by the independent variables (the fixed effects) as well as the variation that is not explained by the independent variables (the random effects and epsilon). The model is called a mixed model because it includes a mix of fixed and random effects (Keller and Warrack, 2000; Winter, 2013; UCLA Institute for Digital Research and Education, 2018a).

In the regression analysis carried out in this research two random effects are included, namely REIT and YEAR. REIT accounts for the variability that the REITs have on the dependent variables and YEAR accounts for the variability that time has on the dependent variables.

The adequacy of the model was evaluated using diagnostic methods, more specifically, inspecting the residual plots. Residuals are the differences between the predicted and the obtained dependent variable scores. Residuals against fitted values should resemble a cloud of points, should be contained in a horizontal band and should not show any patterns or curves, that is, they should be normally distributed and have a straight-line relationship with predicted scores (Pallant, 2013). Four plots were evaluated. Firstly, the scatterplot was evaluated for constant variance of the residuals. The purpose of a scatterplot is to explore the relationship between continuous variables and to give an indication of whether variables are related in a linear fashion (Pallant, 2013). Secondly, the histogram was evaluated to test for normality of the residuals. A histogram plots the distribution scores of a variable on a graph, the distribution of which are expected to be normal, that is, where the scores create a symmetrical, bell-shaped curve with the greatest frequency of scores in the middle and smaller

frequencies of scores towards the extremes (Pallant, 2013). Thirdly, the normal probability plot (labelled Normal Q-Q plot) was evaluated. A normal probability plot plots the observed value for each score against the expected value. A reasonably straight line is expected and indicates a normal distribution (Pallant, 2013). Lastly, the spaghetti plot was evaluated. A spaghetti plot is a diagnostic tool used to depict the distribution scores of a number of variables / units (in this research the REITs). A separate line for each unit is plotted and the space between the lines represents between unit variability, the change in each line (slope) represents within variability (UCLA Institute for Digital Research and Education, 2018b).

3.7. Dependent Variables

3.7.1. Traditional NAV Discount (NAV Disc)

NAV Discount, as adapted from Barkham and Ward (1999), Brounen and Laak (2005), Morri *et al.* (2005) and Morri and Baccarin (2016), can be written as:

$$NAV\ Disc_t = 100\ x\ (NAV_t - MC_t) / NAV_t \quad (1)$$

Where:

NAV = Net Asset Value

MC = Market Capitalisation

t = Point in time (calculated bi-anually)

The NAV per share is reported in the financial statements of the REITs. To make it comparable to the MC, the NAV per share was multiplied by the number of share issued.

MC is the total value of shares (calculated as the share price multiplied by the number of issued shares) as at the financial interim and year end dates for each REIT (Morri *et al.*, 2005).

Given that the NAV is reported semi-annually in the interim and year-end reports of REITs the semi-annual frequency was used in the NAV discount analysis.

3.7.2. Unlevered NAV Discount

According to Barkham and Ward (1999) leverage is positively correlated with NAV discount and this correlation can be implicit in how NAV discount is calculated resulting in an accounting bias, in other words debt can impact on NAV discount simply because of the way in which the NAV discount is calculated. They cite an example of a company with no debt, $100 worth of book assets and shares valued at $80 having a discount of 20% (calculated as follows: NAV Discount = (Book Assets – Value of Shares) / Book Assets, that is, ($100 - $80) / $100 = 20%). If the company issues debt to the value of $40 to repurchase $40 of equity, then the book value of net assets decreases to $60 but the market value of the shares, all things being equal, will be $40 and the discount increases to 33% (($60 - $40) / $60 = 33%) (Barkham and Ward, 1999; Morri and Baccarin, 2016).

Morri *et al.* (2005) provide another simplistic example to further illustrate the effect of debt. Consider a company with no debt, a market asset value of £100 and therefore a NAV of £100 and assuming a market capitalisation of £80, the Traditional NAV discount would be 20% (calculated as follows: NAV Discount = (Market Asset Value – Market Capitalisation) / Masket Asset Value, that is, (£100 - £80) / £100 = 20%). Now consider the same company issuing debt of £12 in order to buy back equity at market value. The market asset value does not change however, there is a new financial structure made up of equity which has been reduced by £12 and is now £68 from £80 and debt of £12. The NAV becomes £88 (Market Asset Value less Debt) and the Traditional NAV discount increases to 22.7% ((£88 - £68) / £88 = 22.7%). No change has occurred in the Market Asset Value, however, through an accounting effect there is a change in the NAV discount. This is illustrated in Table 3-3 (Morri *et al.*, 2005).

Table 3-3 Illustration of Discount to NAV with and without debt (Morri et al., 2005: 18)

	A	B
Market Asset Value	100	100
Debt Value	0	12
NAV	100	88
Market Capitalisation	80	68
Discount to NAV	**20%**	**22.7%**

In order to negate the accounting effect of debt from the NAV discount formula, the value of the debt is added back to the NAV and MC in the Traditional formula, that is, the new Unlevered NAV discount formula takes into account the gross asset value, that is, total asset and total liability values as opposed to the net asset value, which removes the total liability value. This new Unlevered NAV discount formula eliminates the accounting effect of the REITs financial structure on NAV discount and therefore allows for a better approach to assessing the effects of factors other than debt impacting on NAV discount as well as allowing for a better understanding of the effect of the debt structure on the level of NAV discount (Morri *et al.*, 2005; Morri and Benedetto, 2009). A criticism of this approach is that it is a very simplistic way of looking at the effect of debt on the financial structure of a REIT by assuming that the NAV and MC will decrease by the exact same amount (Morri and Benedetto, 2009).

Unlevered NAV Discount, as adapted from Morri *et al.* (2005) and Morri and Baccarin (2016), can be written as:

$$Unlevered\ NAV\ Disc_t = 100\ x\ [(NAV_t + Debt_t) - (MC_t + Debt_t)] / (NAV_t + Debt_t) \quad (2)$$

Rewriting,

$$Unlevered\ NAV\ Disc_t = 100\ x\ (NAV_t - MC_t) / (NAV_t + Debt_t) \quad (3)$$

Where:

Debt = Value of liabilities

If NAV $Disc_t$ in equation (1) and Unlevered NAV $Disc_t$ in equation (3) are less than 0 then the REIT is trading at a premium, conversely, if NAV $Disc_t$ and Unlevered NAV $Disc_t$ are larger than 0 then the REIT is trading at a discount. NAV $Disc_t$ and Unlevered NAV $Disc_t$ can change over time in response to changes in the property market, such as when investor sentiment is optimistic investors may be willing to pay a premium (Ke, 2015).

3.8. Independent Variables

3.8.1. Rational Variables

3.8.1.1. Diversification by Property Type (HTYPE)

The Herfindahl Index is a widely used measure of market concentration/diversification. In the context of this research it adds the sum of the squares of the proportion of property types for each REIT to obtain a value which ranges from close to zero, indicating widespread diversification to 1, indicating complete focus in one property type. For example, if a REIT invests equally in retail and office properties then the Herfindahl Index will be 0.5, that is, (0.5^2 + 0.5^2) (Brounen and Laak, 2005).

In this research the property types were examined based on the revenue generated by each type and the following formula was used, as adapted from Brounen and Laak (2005) and Ke (2015):

$$HTYPE_{i,t} = \sum_{i=1}^{n} S_{i,t}^2 \quad (4)$$

Where:

HTYPE = Herfindahl Index

n = number of Property Type's

i = Property Type

t = Point in time (calculated bi-anually)

S = proportion of portfolio invested in property type *i* by revenue at time *t*

The revenue per property type was obtained from the segmental analysis section of the interim and annual financial results of the REITs and included the following property types: retail, office, industrial, residential, hotel, motor trade, hospital and sovereign.

3.8.1.2. Dividend Yield Ratio

Morri *et al.* (2005) define the dividend yield ratio as dividend per share divided by the share price, namely:

$$DY = Dividend / Share\ Price \quad (5)$$

REITs generally declare a dividend every six months; an interim dividend half way through the financial year and a final dividend at the end of the financial year. Occassionally they declare a special dividend. This was added to either the interim or final dividend depending on which half of the year the special dividend was declared in.

3.8.1.3. Leverage

There are a number of ways leverage (gearing) has been calculated in past research, for example Barkham and Ward (1999) calculate gearing as debt as a percentage of total balance sheet value, Brounen and Laak (2005) use long term debt to total balance sheet value, Morri *et al.* (2005) use the formula NAVGEAR = Total Borrowings (being long term and short term debt) / NAV and Morri and Baccarin (2016) express leverage as gross debt to average total assets.

For the purpose of this research the following formula was used, adapted from (Morri and Baccarin, 2016):

$$LEV = Interest\text{-}bearing\ Liabilities / Total\ Assets \quad (6)$$

The interest-bearing liabilities comprise current and non-current interest-bearing liabilities as specified in the Statement of Financial Position (balance sheet) in the REITs' financial statements. The total assets are also specified in the Statement of Financial Position.

3.8.1.4. Performance using the Return on Equity Ratio

This ratio measures profitability by looking at the profit a company produces with the funds shareholders have invested, and is represented by the following formula (Tezel and McManus, 2003):

$$ROE = Net\ Income / Shareholder\ Equity \quad (7)$$

The net income used in this research was the total comprehensive income as specified in the Statement of Comprehensive Income in the REITs' financial statements. The shareholder equity used was the total equity attributable to equity holders or owners as specified in the Statement of Financial Position in the REITs' financial statements.

The net income specified in the interim financial statements covers a period of six months whereas the net income specified in the annual financial statements covers a period of 12 months. In order to make the two comparable the net income in the interim results was initially doubled to effectively calculate a figure covering 12 months however when this figure was compared to the year end income there were large discrepancies. It was therefore decided to

halve the net income specified at the year end and add it to the interim net income to reflect a period of 12 months. The resultant annualised net income was more comparable to the year end income and therefore this methodology was adopted.

3.8.1.5. Size

A review of the literature revealed two predominant measures of Size, namely the natural logarithm of total balance sheet value (also stated as total assets) as used by Barkham and Ward (1999), Brounen and Laak (2005), Morri and Benedetto (2009), Ke (2015) and Morri and Baccarin (2016) and market capitalisation as used by Clayton and MacKinnon (2000) and Lee *et al.* (2013). It was decided to use the former measure as it was the more prevalent method used is previous research and it was decided that one measure of Size was sufficient for this research. The following formula was therefore used in this research:

$$SIZE = ln\ (x) \tag{8}$$

Where:

ln = natural logarithm

x = total balance sheet value, that is, total asset value

The total balance sheet value was derived from the total assets line item in the Statement of Financial Position in the REITs' financial statements.

3.8.2. Market Sentiment Variables

It is expected that during periods when investors are bearish/negative about the market in general all the REITs will experience an increase in the NAV discount/decrease in NAV premium, and conversely, when investors are bullish/positive about the market then all the REITs will experience a decrease in the NAV discount/increase in the NAV premium (Barkham and Ward, 1999).

Market sentiment was investigated in several ways in this research:

3.8.2.1. Property Indicators of Sentiment

3.8.2.1.1. Sector Average Discount

The half-yearly average discount for all the REITs included in the research over the sample period was calculated and regressed against the NAV discount of the individual REITs, as investigated by Barkham and Ward (1999), Mueller and Pfnuer (2013) and Morri and Baccarin (2016).

The Sector Average Discount was calculated in two ways, firstly using the Traditional NAV model and secondly using the Unlevered NAV model, as adapted from Mueller and Pfnuer (2013).

3.8.2.1.1.1. Traditional Sector Average Discount:

$$SAD_t = \frac{\sum_{i=1}^{n} NAV_{it} - \sum_{i=1}^{n} MC_{it}}{\sum_{i=1}^{n} NAV_{it}} x\ 100 \quad (9)$$

Where:

SAD = Sector Average Discount

t = Time (calculated bi-annually)

i = REITs 1 to n in the sample at time t

NAV_i = Net Asset Value of REIT i

MC_i = Market Capitalisation of REIT i

3.8.2.1.1.2. Unlevered Sector Average Discount:

$$Unlevered\ SAD_t = \frac{\sum_{i=1}^{n} NAV_{it} - \sum_{i=1}^{n} MC_{it}}{\sum_{i=1}^{n} NAV_{it} + \sum_{i=1}^{n} Debt_{it}} x\ 100 \quad (10)$$

Where:

Debt = Value of liabilities

The long-term average NAV discount and Unlevered NAV discount is calculated as the arithmetic mean of SAD and Unlevered SAD, respectively.

3.8.2.1.2. SA Listed Property Index – SAPI

This index is made up of the top 20 liquid companies (by market capitalisation) with a primary listing on the JSE in the Real Estate Investment & Services Sector (8630) and Real Estate Investment Trusts Sector (8670) (Johannesburg Stock Exchange (JSE), 2017b). Although the SAPI comprises REITs and non-REITs and can therefore not be used as an exact proxy of all listed REITs, it does provide a proxy for how investors perceive the listed property market in general. The index share price at the date corresponding to the REIT interim and year end reporting dates was used in the analysis.

3.8.2.2. Non-Property Indicators of Sentiment

3.8.2.2.1. All Share Index – ALSI

This index represents 99% of the full market capital of all ordinary securities listed on the main board of the JSE, subject to minimum free float and liquidity criteria (Johannesburg Stock Exchange (JSE), 2017c). It provides a proxy for how investors perceive the listed market in general. The index share price at the date corresponding to the REIT interim and year end reporting dates was used in the analysis.

3.8.2.2.2. FNB / BER Consumer Confidence Index – CCI

This index is based on a consumer survey which poses three questions to adults living in predominantly urban areas in South Africa about the expected performance of the economy, the expected financial position of households and the appropriateness to buy durable goods. Consumer surveys provide assessments of consumer attitudes and expectations and are used to gauge economic trends and prospects and can thus be a proxy for market sentiment (Bureau for Economic Research, 2018).

3.9. Ethical Considerations

There were no ethical considerations in carrying out this research. The data used in the research was numerical secondary data which was obtained from publicly available sources such as the financial statements of REITs listed on their websites, websites listing share price information and the BER website.

3.10. Limitations

The research had a number of limitations. The first limitation was the sample size. As at 30 June 2017 there were 28 REITs listed on the JSE, however, only 12 REITs were listed for the five year sample period from 1 July 2012 to 30 June 2017 (SAREIT, 2017c).

A final limitation was that only certain information is reported in the REITs financial statements and some only annually as opposed to every six months. Therefore, the research was limited to those variables reported in the financial statements of the REITs and to those variables reported bi-annually.

3.11. Summary

This chapter defined and discussed the research paradigm and methodology employed in the research, namely the positivism paradigm and quantitative approach. The data set was specified which included 12 REITs listed on the JSE for the sample period from 1 July 2012 to 30 June 2017. The research method, a statistical regression analysis using a linear mixed effects model, was described. Two dependent variables were identified, being the Traditional NAV Discount and the Unlevered NAV Discount. Nine independent variables were identified and comprised of five rational factors and four market sentiment indicators. Finally, the ethical considerations and limitations of the research were discussed.

In the next chapter the data collected is analysed and interpreted.

4. Findings and Data Analysis

4.1. Introduction

This chapter shows and interprets the results of the statistical tests carried out to identify which factors impact on the NAV discount of the REITs included in the sample. The descriptive statistics are listed and elaborated on. Thereafter the regression analysis that was carried out and the results thereof is discussed. The analysis is divided into two parts; part one comprises the regression analysis carried out with Traditional NAV Discount as the dependent variable and part two with Unlevered NAV Discount as the dependent variable. The results based on the two different dependent variables are subsequently compared.

4.2. Descriptive Statistics

Table 4-1 summarises the statistical characteristics of the data set used. The data consists of bi-annual data for 12 REITs for the five year sample period from 1 July 2012 to 30 June 2017.

Table 4-1 Descriptive statistics

Variable	Minimum	Median	Mean	Maximum	Missing Data
Traditional NAV Disc	-485.37%	-11.12%	-17.88%	33.49%	2
Unlevered NAV Disc	-47.36%	-5.35%	-7.49%	14.92%	2
Dividend Yield	1.54%	3.80%	3.61%	5.82%	0
H Type	0.26	0.44	0.52	1.00	0
Leverage	9.61%	30.04%	30.39%	49.94%	1
ROE	-101.44%	14.57%	13.73%	43.33%	1
Size	21.61	23.49	23.50	25.57	1
SAD - Traditional	-33.35%	-12.48%	-16.31%	-7.55%	0
SAD - Unlevered	-16.20%	-7.37%	-9.14%	-4.63%	0
SAPI	R3.91	R5.75	R5.62	R6.61	0
ALSI	R353.10	R503.10	R478.60	R534.50	0
CCI	-15.00	-5.00	-5.53	4.00	0

A negative value for the Traditional and Unlevered NAV Discounts indicates that the REIT is trading at a premium to NAV and a positive value indicates that the REIT is trading at a discount to NAV. Over the sample period, the Traditional NAV Discount displayed a very wide range of values, ranging from a premium of 485.37% to a discount of 33.49% with the mean

value trading at a 17.88% premium to NAV. The Unlevered NAV Discount range was less extreme, ranging from a premium of 47.36% to a discount of 14.92% with a mean value of 7.49%. This suggests that the effect of debt, which is included in the Traditional NAV Discount formula, does indeed create an accounting bias, as suggested by Barkham and Ward (1999) and Morri and Benedetto (2009), and exaggerates the premium or discount at which a REIT trades.

The Sector Average Discount for the Traditional NAV (SAD Traditional) ranged from a premium of 33.35% to a premium of 7.55% with a mean value trading at a 16.31% premium. The Sector Average Discount for the Unlevered NAV (SAD Unlevered) ranged from a premium of 16.20% to a premium of 4.63% with a mean value trading at a 9.14% premium, again suggesting that debt creates an accounting bias. The SAD Traditional also showed a larger premium than the SAD Unlevered, suggesting that including debt in the NAV Discount formula exaggerates or over states the premium, or conversely, by removing the debt from the NAV Discount formula the premium is understated. This is illustrated in Figure 4-1 which shows the Unlevered SAD value range is less extreme than the Traditional SAD value range.

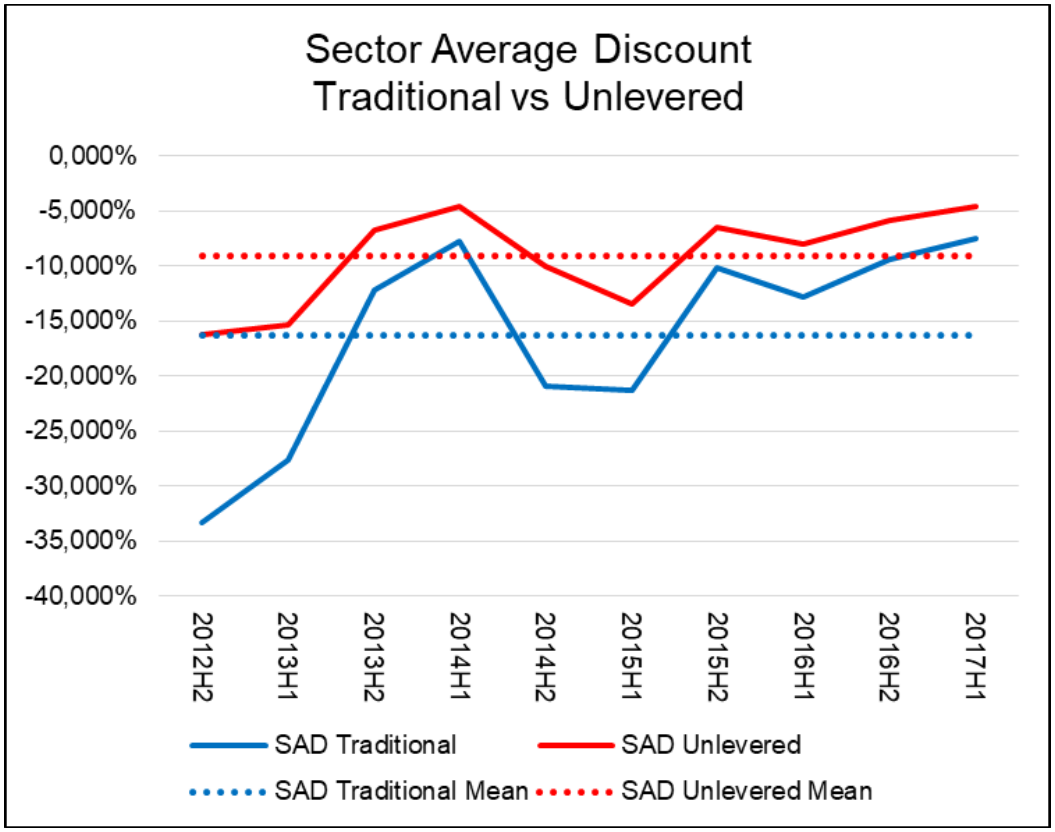

Figure 4-1 Comparison of Sector Average Discount for NAV: Traditional vs Unlevered

Over the sample period of 1 July 2012 to 30 June 2017 the REITs included in the sample traded at a premium to their NAV, however, the premium has steadily been decreasing, as is illustrated in Figure 4-2 showing the SAD for the Traditional NAV Discount and Figure 4-3 showing the SAD for the Unlevered NAV Discount. This suggests that historically the market was bullish and overvalued listed property. However, as NAV Discount values approach their share price, that is, equilibrium, it suggests the market is correcting itself and may be becoming more bearish.

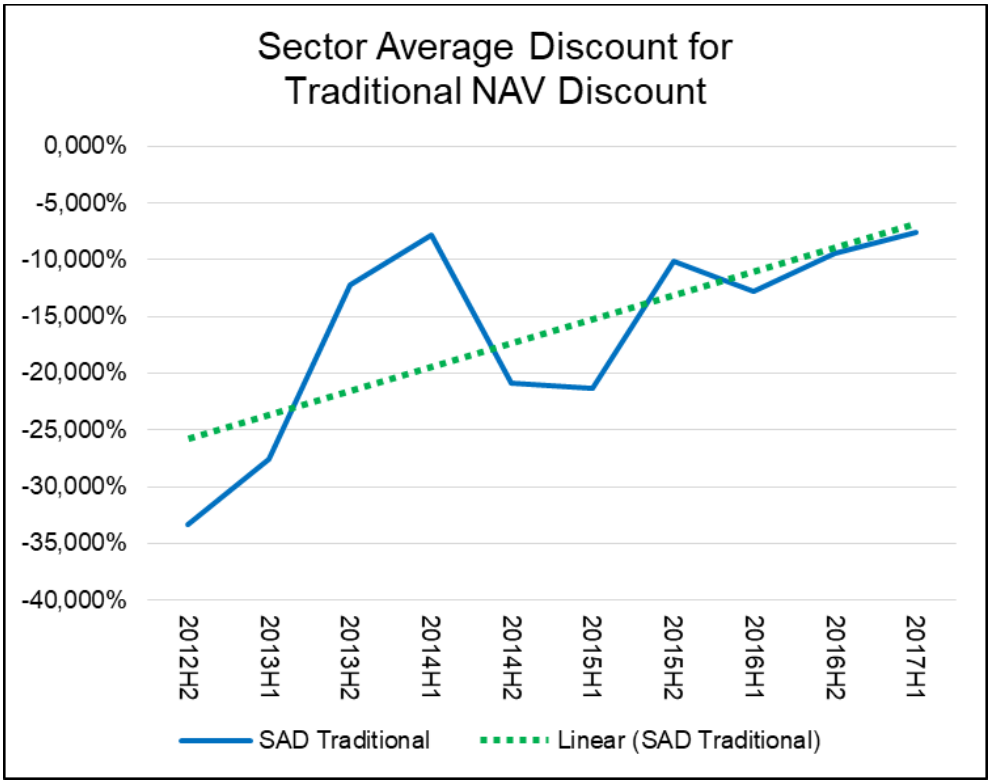

Figure 4-2 Sector Average Discount for Traditional NAV Discount

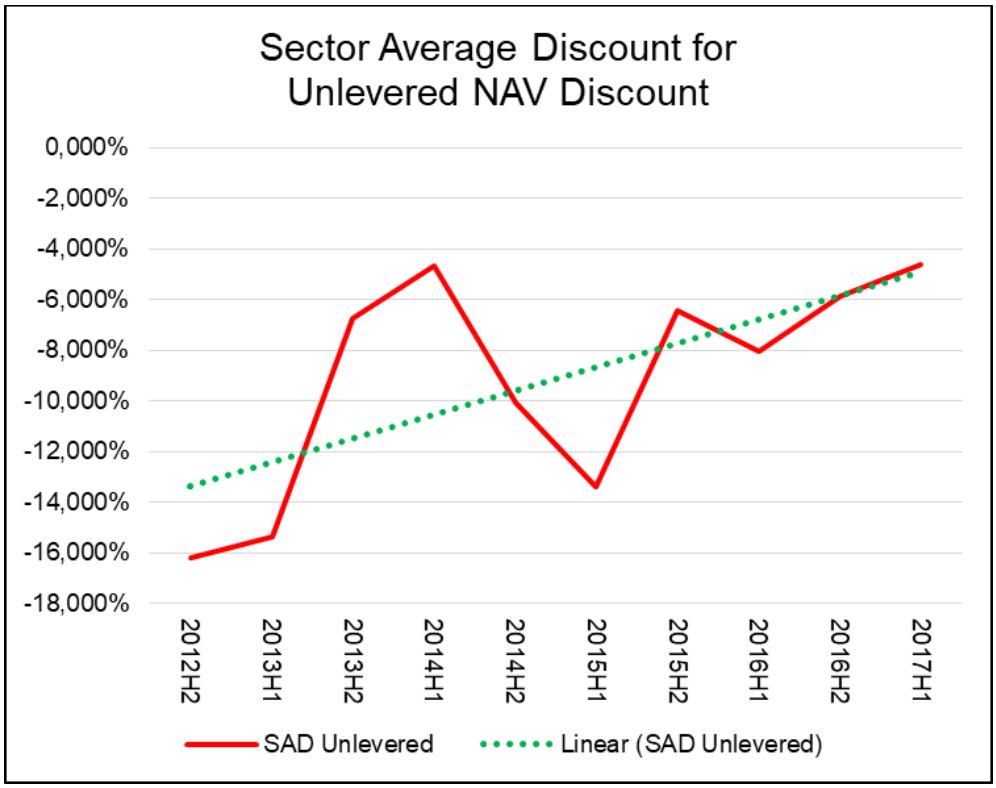

Figure 4-3 Sector Average Discount for Unlevered NAV Discount

The Dividend Yield Ratio (DY) ranged from 1.54% to 5.82% with a mean value of 3.61%. Fortress B (FFB) had the lowest DY, which ranged between 1.54% and 2.69% during the sample period. Rebosis (REB) had the highest DY, which ranged from 3.51% to 5.82% over the sample period.

The Diversification by Property Type (HTYPE) ranged from 0.26, suggesting a high level of diversification, to 1, which is no diversification and a focus on one property type. In the sample of REITs Growthpoint (GRT) was the most diversified with investments in the office, retail and industrial sectors and Redefine (RDF) the most focused, specialising in the retail sector.

Leverage (LEV) ranged from 9.61% to 49.94% with a mean value of 30.86%. Investec Property Fund (IPF) had the lowest leverage percentage of 9.61% in 2013 H1 but this steadily increased over the sample period to 33.48% in 2017 H1. Rebosis (REB) had the highest leverage percentage of 49.94% in 2017 H1 and had a leverage range of 24.86% and 49.94% throughout the sample period.

Return on Equity ranged from -101.44% to 43.33% with a mean value of 13.73%. GRT had the lowest ROE of -101.44% in 2013 H1. Fortress A (FFA) and Fortress B (FFB) had the highest ROE of 43.33% in 2012 H2, however, this steadily decreased over the sample period until 2015 H2 when it reached -27.30% after which it increased to 9.60% by the end of the sample period.

Size ranged from 21.61 to 25.57 with a mean of 23.50. Size was calculated using the natural log of the Total Asset value of the REITs. In rand values, the REIT with the smallest Total Asset value was IPF in 2012 H2 at R2.422 billion and the largest was GRT in 2017 H1 at R126.715 billion.

Traditional Sector Average Discount ranged from a premium of 7.55% to a premium of 33.35% with a mean premium of 16.32%, indicating that over the sample period the REIT market in general traded at a premium. The highest premium was in 2012 H2 and the lowest was in 2017 H1 suggesting that over the sample period the SAD was decreasing.

Unlevered Sector Average Discount ranged from a premium of 4.63% to a premium of 16.20% with a mean premium of 9.14%, again indicating that over the sample period the REIT market in general traded at a premium. The highest premium was in 2012 H2 and the lowest was in 2017 H1 suggesting that over the sample period the SAD was decreasing.

4.3. Regression Analysis

The regression analysis was divided into two parts: part one comprised a linear mixed effects (LME) regression model using the Traditional NAV Discount as the dependent variable and part two comprised a LME regression model using the Unlevered NAV Discount as the dependent variable. The analysis is accordingly reported in two parts.

4.3.1. Traditional NAV Discount LME Model

The following linear mixed effects regression models were carried out using Traditional NAV Discount as the dependent variable:

MODEL 1

LME 1 (Traditional NAV Discount ~ DY + HTYPE + LEV + ROE + SIZE + Traditional SAD + SAPI + ALSI + CCI + (1 | REIT) + (1 | Year : Half)

In other words, Model 1 attempts to predict Traditional NAV Discount as a function of dividend yield ratio, diversification by property type, leverage, return on equity, size, the traditional sector average discount, SA listed property index, all share index, consumer confidence index and the random effects of the REITs included in the sample and time. The regression results for Model 1 are shown in Table 4-2.

Table 4-2 Regression Results for Model 1

Variable	Coefficient	Std. Error	t-value	*p*-value
(Intercept)	-3.600709	1.443881	-2.494	0.0225
DY	34.288681	7.413669	4.625	0.00006*
HTYPE	0.377969	0.232113	1.628	0.1206
LEV	-0.594197	0.724079	-0.821	0.4179
ROE	-0.392335	0.251505	-1.560	0.1219
SIZE	0.118347	0.054348	2.178	0.0474*
Traditional SAD	1.177202	0.880252	1.337	0.2541
SAPI	0.208240	0.101214	2.057	0.0560**
ALSI	-0.003089	0.001801	-1.715	0.1175
CCI	0.010303	0.010104	1.020	0.3113

*Notes: * p<0.05 **p<0.06*

Statistical Tests and Estimated Parameters based on the Model

The column "Coefficient" in Table 4-2 shows the estimated regression coefficients which represent the mean change in the dependent variable for one unit of change in the independent variable while holding the other independent variables in the model constant. This is useful in isolating the role of one variable from all of the others in the model (Stone *et al.*, 2016). For example, the coefficient for DY was 34.288681 indicating a positive relationship between DY and Traditional NAV Discount, that is, as DY increases, the NAV Discount increases and that for every unit increase in DY, the Traditional NAV Discount increased by 34.29%. The Value for ROE was -0.392335 indicating a negative relationship between ROE

and Traditional NAV Discount and that for every unit increase in ROE, the Traditional NAV Discount decreased by 0.39%.

The column “Std. Error” is the standard error of the coefficient which represents the average distance that the observed values lie from the regression line. The smaller the value, the closer the observations lie to the fitted line and the better the model (Stone *et al.*, 2014). All of the independent variables except for DY have Std. Errors of below 1% indicating a good fit with the model. DY, however, has a Std. Error of 7.413669 indicating that the average distance of the data points from the fitted line is approximately 7.41% and that the model may not be the most effective analytical and forecasting tool (Keller and Warrack, 2000). The standard error is used to derive the t test statistic for each coefficient by dividing the coefficient by the standard error. For example, considering DY, coefficient/standard error = 34.288681/7.413669 = 4.625 (Princeton University Library, 2007).

The column “t-value” is a statistical test (t test statistic) which compares the sample means to the null hypothesis and incorporates both the sample size and the variability in the data. In this research it is used to test the hypothesis about each coefficient. The null hypothesis is that there is no significant relationship between Traditional NAV Discount and the independent variables. A t-value of 0 indicates that the sample results exactly equal the null hypothesis. As the difference between the sample data and the null hypothesis increases, the absolute value of the t-value increases (Stone *et al.*, 2016).

The column “*p*-value” is of most interest. *P*-values are used in hypothesis tests to determine the significance of the corresponding t-value results and assist in interpreting the results of the t test statistic. They test whether there is evidence to support or reject a null hypothesis. *P*-values range from 0 to 1 and any value equal to or less than 0.05 indicates strong evidence against the null hypothesis and the null hypothesis is then rejected. Values close to 0.05 are considered to be marginal (Ramsey, 2018).

Results

The analysis using Model 1 found two statistically significant variables, namely, DY (*p*-value = 0.00006) and SIZE (*p*-value = 0.0474). One variable was found to have a marginally significant relationship, namely, SAPI (*p*-value = 0.0560). This indicates that Dividend Yield, and Size have statistically significant relationships with the Traditional NAV Discount and the SA Property Index has a marginally significant relationship with Traditional NAV Discount.

DY was found to have a significant positive relationship with Traditional NAV Discount, that is, the higher the dividends paid by REITs, the larger the NAV Discount. This implies that investors favour REITs or assign higher value to REITs that retain a higher proportion of their income rather than paying a larger proportion out as dividends. An explanation for this may be that by retaining a higher proportion of their income REITs may invest it in their existing stock or in new stock and thus increase the capital value of the REIT essentially giving up short term financial gain for longer term capital growth. Morri and Benedetto (2009) suggest that investors may prefer to keep their funds invested in the REITs rather than needing to reinvest the dividends earned in an increasing property market. Morri *et al.* (2005) found a significant positive relationship between DY and NAV discount, however, they suggest that a

high dividend yield may be the result of the factors that drive NAV discount as opposed to an explanatory *per se*.

SIZE was found to have a significant positive relationship with Traditional NAV Discount, that is, as the size of the REIT increased, the NAV discount increased. This suggests that the larger the REIT and therefore, the more complex and difficult to manage and the less flexible and liquid the REIT, the higher the NAV Discount (Morri and Benedetto, 2009). Contrary to the finding in this research, most of the literature reviewed found a negative relationship between size and NAV discount, for example, Capozza and Lee (1995), Clayton and MacKinnon (2000), Brounen and Laak (2005), Lee *et al.* (2013) and Ke (2015), citing the benefits of economies of scale, operational efficiencies, smaller liquidity premiums, higher transparency and increased popularity as explanations for the negative relationship. One study by Barkham and Ward (1999) found that company size had a positive relationship to NAV discount, however, not at a statistically significant level, a finding which needs to be viewed with caution when compared to other findings which are statistically significant.

SAPI was found to have a marginally significant positive relationship with Traditional NAV Discount, that is, the higher the SA Property Index the higher the NAV Discount. SAPI was used as a proxy for market sentiment. The significant positive relationship suggests that the individual REITs NAV Discount is affected by the behaviour of the REITs market in general. Intuitively this is expected to be a negative relationship, that is, an increase in the SAPI share price indicates that investors see value in the listed property market and are investing in it; this increase in demand drives the share price up. As the share price increases the NAV discount is expected to decrease or the NAV premium is expected to increase. Consider the formula for NAV Discount, as adapted from Barkham and Ward (1999), Brounen and Laak (2005), Morri *et al.* (2005) and Morri and Baccarin (2016):

$$NAV\ Disc_t = 100\ x\ (NAV_t - MC_t) / NAV_t \quad (1)$$

Where:

NAV = Net Asset Value

MC = Market Capitalisation

t = Point in time (calculated bi-anually)

NAV Discount is therefore a function of the NAV and MC of a REIT. A decrease in NAV Discount is caused by a decrease in the NAV, an increase in the MC or both. NAV is calculated by determining the appraised value of the underlying assets, referred to as the net present value (NPV) and subtracting any liabilities (Morri and Baccarin, 2016). MC is the total value of shares calculated as the share price multiplied by the number of issued shares (Morri *et al.*, 2005). Therefore, all things being equal, if the share price increases then MC increases and the NAV Discount decreases suggesting there is a negative relationship between NAV Discount and Share Price. However, the opposite relationship was found in this research

although at only a marginally significant level which does warrant further research is required to understand why a positive relationship was found.

Model Diagnostic

In order to evaluate the adequacy of Model 1 the following model diagnostics were carried out:

Residual Scatterplot

The purpose of a scatterplots is to explore the relationship between continuous variables and to give an indication of whether variables are related in a linear fashion (Pallant, 2013), in this instance the Traditional NAV Discount residuals for each individual REIT were plotted against the fitted value. Residuals are the differences between the predicted and the obtained dependent variable scores. Residuals against fitted values should resemble a cloud of points, should be contained in a horizontal band and should not show any patterns or curves, that is, they should be normally distributed and have a straight-line relationship with predicted scores (Pallant, 2013). The values of the standardised residuals are expected to be between -3 and 3; any scores beyond these are considered outliers. Figure 4-4 shows the scatterplot for Model 1. Most of the scores lie around 0 except for the large residual for FFB (Fortress B Income Fund) 2012 H2 at the bottom left hand corner of the graph (circled in red), lying below a standardised residual of -8. The residual was considered an outlier.

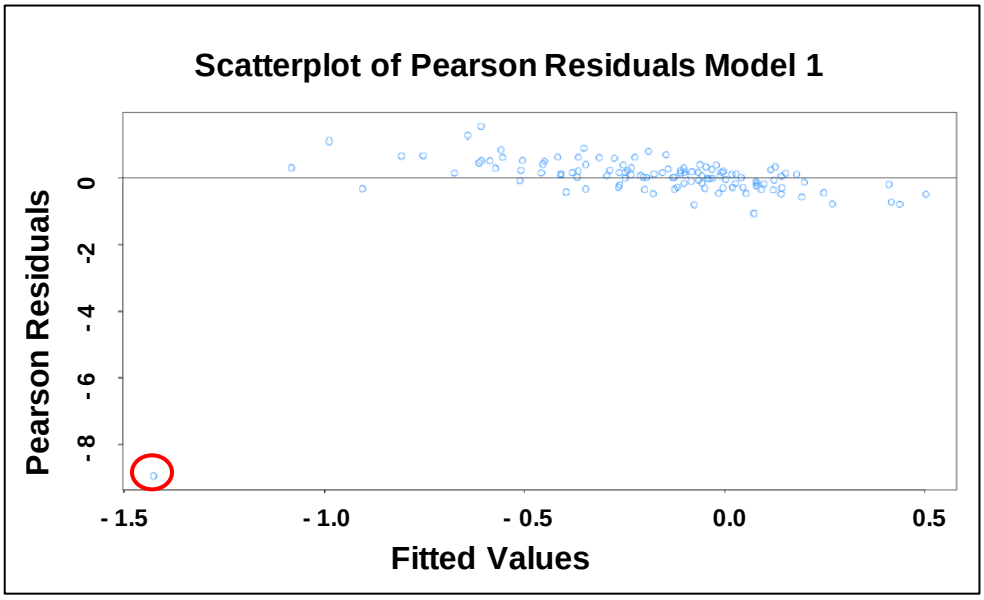

Figure 4-4 Model 1 Scatterplot of Residuals

Histogram of Residuals

A histogram plots the distribution scores of a variable on a graph, the distribution of which are expected to be normal, that is, where the scores create a symmetrical, bell-shaped curve with the greatest frequency of scores in the middle and smaller frequencies of scores towards the

extremes (Pallant, 2013). The residual values of the Traditional NAV Discount Model were plotted on a histogram. Figure 4-5 shows the histogram of the residuals for the Traditional NAV Discount of the REITs for Model 1. The histogram did not display a normal distribution, but was negatively skewed. All of the residual scores but one lay between -2 and 2. One value, the FFB 2012 H2 score, lay below a residual value of -8.

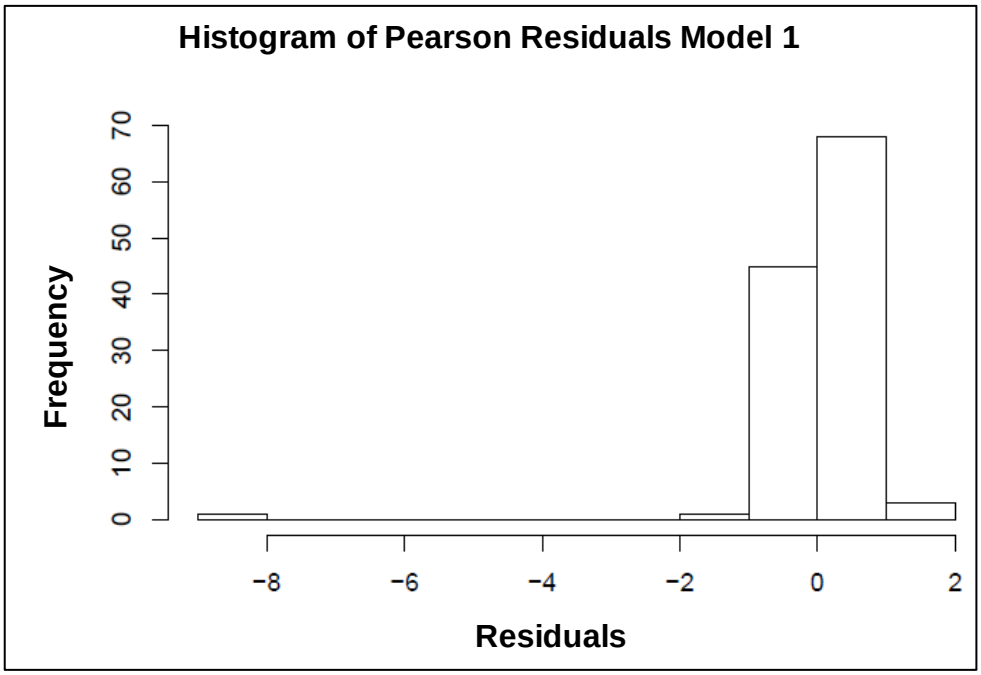

Figure 4-5 Model 1 Histogram of Residuals

Normal Q-Q Plot

Normal Q-Q Plots plot the observed value for each score against the expected value, in this instance the observed residuals for the Traditional NAV Discount values of the REITs against the theoretical/expected values. A reasonably straight line is expected and indicates a normal distribution (Pallant, 2013). Figure 4-6 shows the Normal Q-Q Plot, where as before, one large residual, the FFB 2012 H2 residual, can be observed in the bottom left corner of the chart lying below a sample quantile of -8. It was considered an outlier.

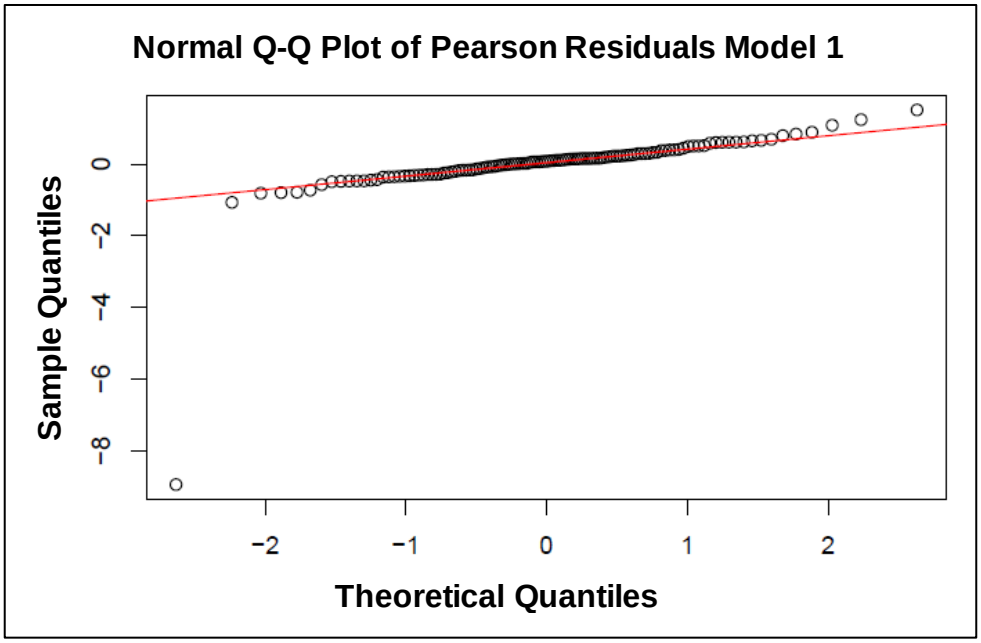

Figure 4-6 Model 1 Normal Q-Q Plot

Spaghetti Plot

A spaghetti plot is a diagnostic tool used to depict the distribution scores of a number of variables / units (in this research the REITs). A separate line for each unit is plotted and the space between the lines represents between unit variability, the change in each line (slope) represents within variability (UCLA Institute for Digital Research and Education, 2018b). In this instance the Traditional NAV Discount values of the individual REITs included in the analysis, as line plots overlapping each other. From the spaghetti plot it was evident that there was one outlier which deviated significantly from the centre line. The outlier was attributed to FFB 2012 H2. Figure 4-7 shows the spaghetti plot.

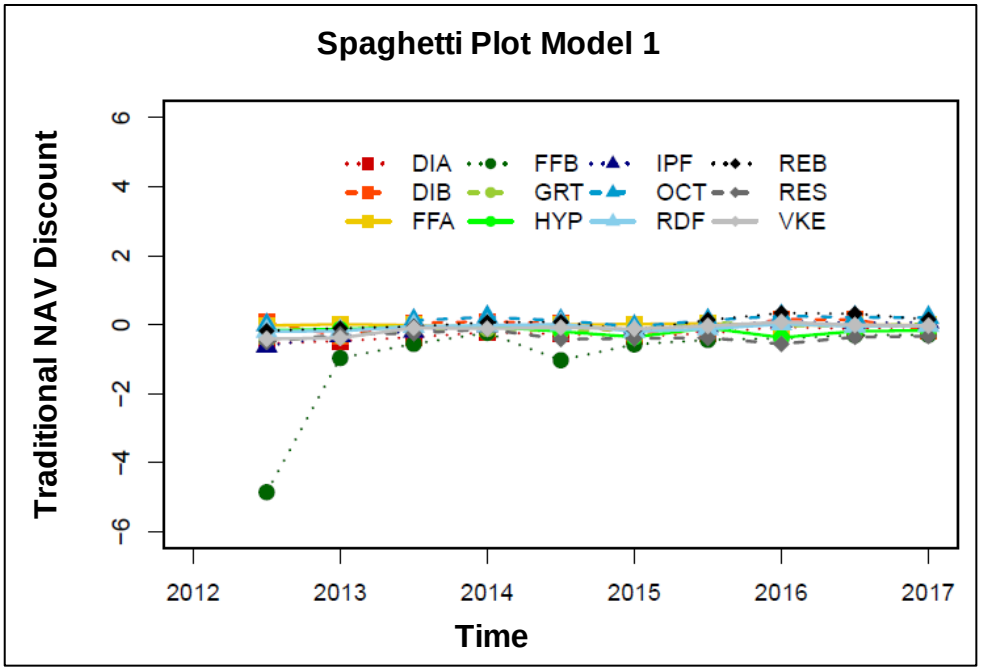

Figure 4-7 Model 1 Spaghetti Plot

The results of the model diagnostics identified one outlying Traditional NAV Discount value which could be affecting the LME model, namely the FFB 2012 H2 value. In 2012 H2 FFB had a NAV of R1.23 per share however, was trading at a share price of R7.20 resulting in a NAV premium of 485% which is far above the Sector Average Discount of -33.35% (a NAV premium of 33.35%) calculated for the sample for 2012 H2. In order to check the effect of this point on the regression line (i.e. the coefficients) this observation was removed from the data set and the regression was run again using Model 2.

MODEL 2

The one outlying FFB observation from 2012 H2 was removed and as with Model 1, the model was run using the following formula:

LME 2 (Traditional NAV Discount ~ DY + HTYPE + LEV + ROE + SIZE + Traditional SAD + SAPI + ALSI + CCI + (1 | REIT) + (1 | Year : Half)

The regression results for Model 2 are shown in Table 4-3.

Table 4-3 Regression Results for Model 2

Variable	Coefficient	Std. Error	t-value	*p*-value
(Intercept)	-2.3610	0.5361	-4.404	0.00007
DY	20.3400	2.2260	9.136	< 0.01*
HTYPE	-0.00437	0.0894	-0.049	0.96114
LEV	-0.15670	0.2215	-0.708	0.48065
ROE	0.05172	0.06194	0.835	0.40573
SIZE	0.07106	0.02410	2.960	0.00550*
Traditional SAD	0.43330	0.16440	2.635	0.00976*
SAPI	-0.01433	0.02279	-0.629	0.53101
ALSI	0.00002	0.00036	0.064	0.94944
CCI	0.00049	0.00230	0.212	0.83292

*Notes: * p<0.05*

Statistical Tests

The Std. Error for DY decreased from 7.36816 in Model 1 to 2.226 in Model 2 suggesting Model 2 is a more effective analytical and forecasting tool than Model 1 with regards to predicting the relationship between DY and Traditional NAV Discount.

Results

The analysis using Model 2 found three statistically significant variables, DY (*p*-value < 0.001), SIZE (*p*-value = 0.00550) and Traditional SAD (*p*-value = 0.00976). DY and SIZE were statistically significant in Model 1.

Traditional SAD was found to have a significant positive relationship with Traditional NAV Discount, that is, the higher the Sector Average Discount based on the Traditional NAV Discounts of the REITs in the sample the higher the NAV Discount of the individual REITs. Traditional SAD was used as a proxy for market sentiment. The significant positive relationship suggests that the individual REITs NAV Discount is affected by the behaviour of the REITs market in general. This is in line with findings by Morri and Baccarin (2016) who found that in French, Dutch and British REITs market sentiment had a significant positive relationship with NAV discount.

SAPI which was marginally significant in Model 1 was no longer statistically significant in Model 2. This suggests that the outlying FFB value, which was removed from the analysis in Model 2, was having an influencing effect on the variable SAPI and may partly explain why the positive relationship between SAPI and Traditional NAV Discount could not be intuitively explained.

Model Diagnostics

Residual Scatterplot

The one outlier, namely, the Traditional NAV Discount value for FFB at 2012 H2 was removed from the analyses and the Traditional NAV Discount residuals for each individual REIT were plotted against the fitted values. Figure 4-8 shows the scatterplot for Model 2. All of the scores lie between -3 and 3, do not resemble a particular pattern and are contained in a horizontal band, indicating a good regression model.

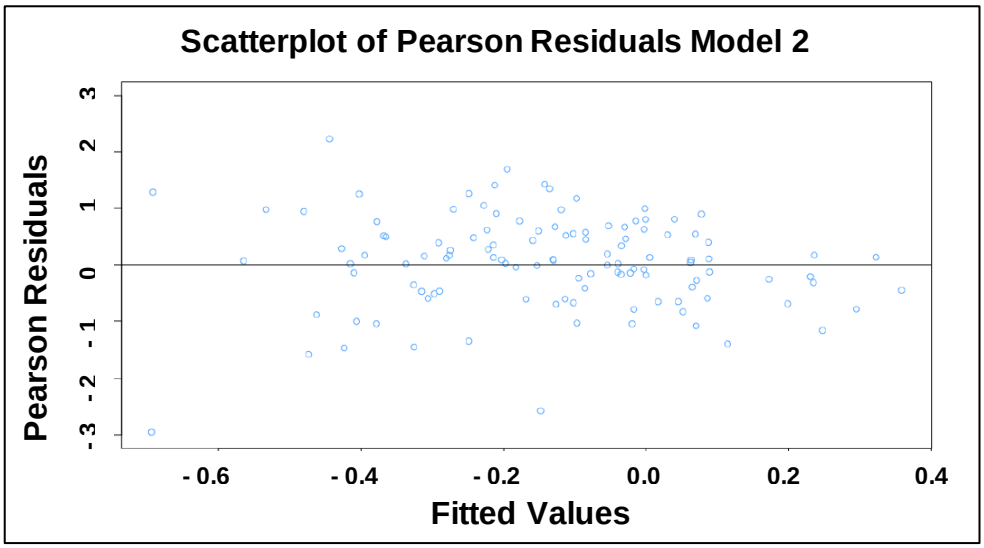

Figure 4-8 Model 2 Scatterplot of Residuals

Residual Histogram

The FFB 2012 H2 outlying score was removed from the data set and the residual values of the Traditional NAV Discount were plotted on a histogram. Figure 4-9 shows the residual histogram for Model 2. We still observe some points that are removed from the rest in terms of the magnitude of their residuals (an FFB and VKE observation), it doesn't deviate too seriously from normality, indicating a good fit with the regression model.

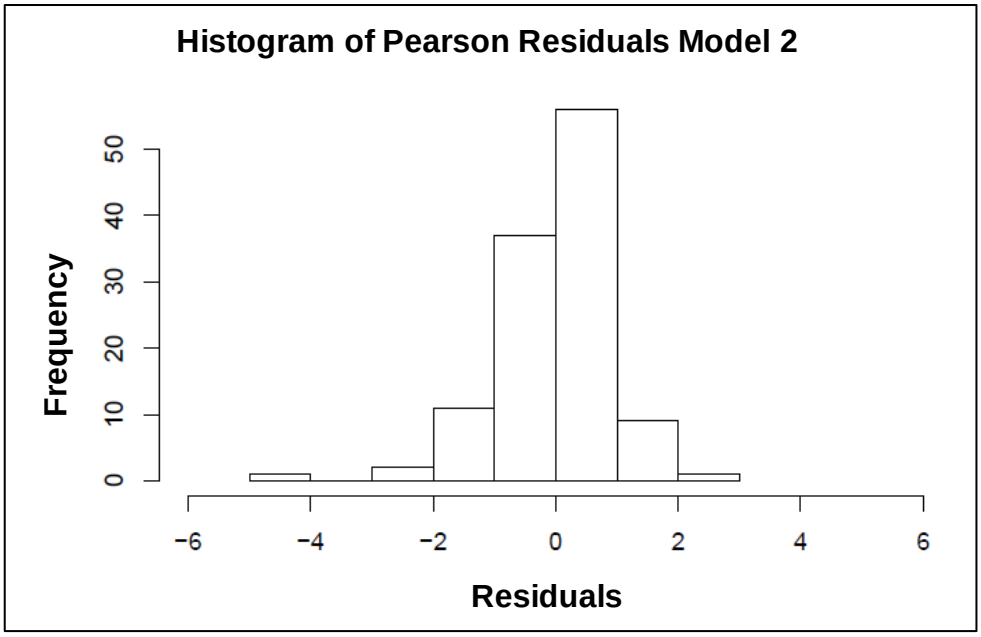

Figure 4-9 Model 2 Histogram of Residuals

Normal Q-Q Plot

The observed residuals for the Traditional NAV Discount values of the REITs were plotted against the theoretical/expected values. Figure 4-10 shows the Normal Q-Q Plot for Model 2. In Model 1 the outlying FFB value lay at a sample quartile of approximately -9 whereas in Model 2 all the values lie within a sample quartile of -4.5. Although there are three observations in the bottom left hand of the graph indicating some deviation from normality, they were not deemed too extreme. Model 2 was considered a better fit for the regression analysis compared to Model 1.

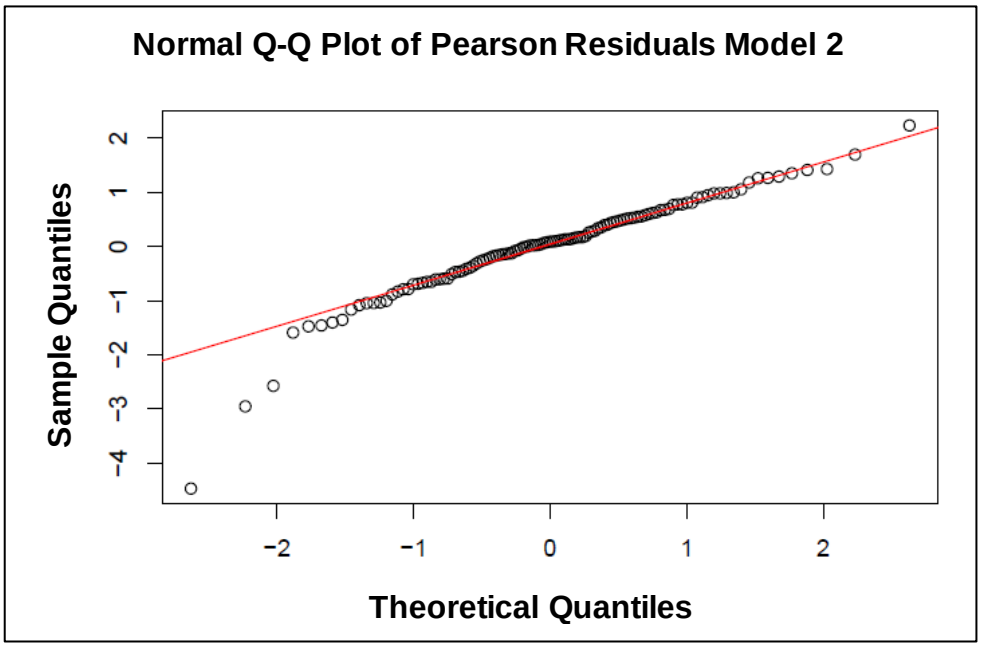

Figure 4-10 Model 2 Normal Q-Q Plot

Spaghetti Plot

The distribution scores of the Traditional NAV Discount values of the individual REITs excluding the FFB 2012 H2 observation were plotted as a spaghetti plot. The spaghetti plot for Model 2, with Traditional NAV Discount values ranging between 0.5 and -1.0, showed a better distribution with no significant outliers compared to Model 1, which had values ranging between 0.5 and -6.0. Figure 4-11 shows the spaghetti plot for Model 2.

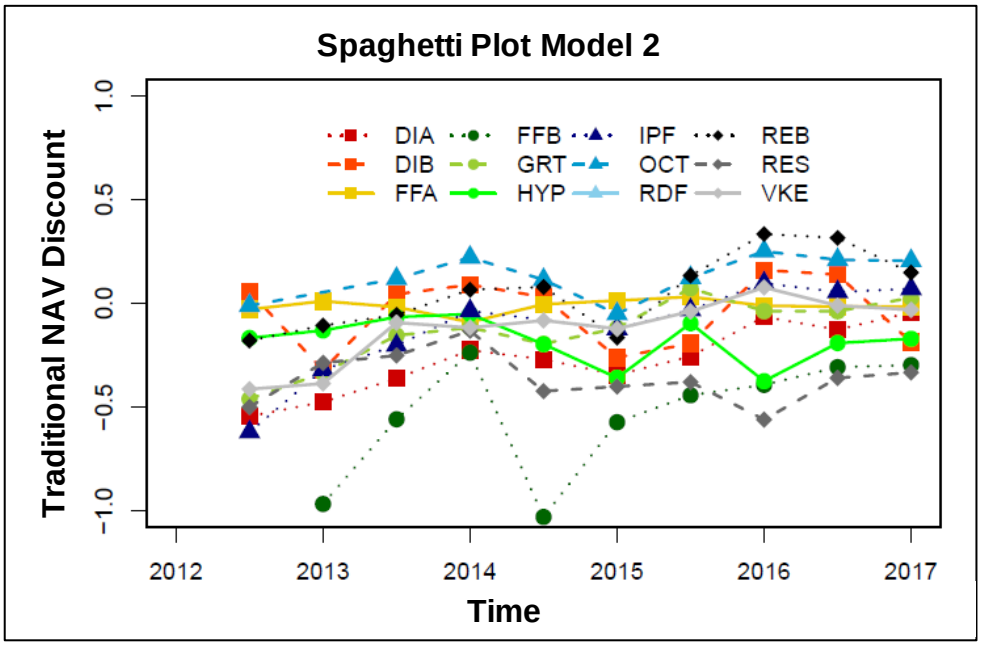

Figure 4-11 Model 2 Spaghetti Plot

4.3.2. Unlevered NAV Discount LME Model

The following linear mixed effects model regressions were carried out using Unlevered NAV Discount as the dependent variable:

MODEL 3

LME 3 (Unlevered NAV Discount ~ DY + HTYPE + LEV + ROE + SIZE + Unlevered SAD + SAPI + ALSI + CCI + (1 | REIT) + (1 | Year : Half)

The regression results for Model 3 are shown in Table 4-4.

Table 4-4 Regression Results for Model 3

Variable	Coefficient	Std. Error	t-value	*p*-value
(Intercept)	-0.75640	0.2643	-2.862	0.00711
DY	9.43300	1.1930	7.907	< 0.001*
HTYPE	-0.03196	0.0445	-0.719	0.47524
LEV	0.18680	0.1174	1.591	0.11472
ROE	0.11060	0.0333	3.318	0.00127*
SIZE	0.01498	0.0115	1.298	0.20490
Unlevered SAD	0.44590	0.1900	2.347	0.04523*
SAPI	-0.00838	0.0133	-0.632	0.53185
ALSI	0.00007	0.0002	0.322	0.75161
CCI	0.00206	0.0013	1.602	0.11385

*Notes: * p<0.05*

Results

The analysis using Model 3 found three statistically significant variables, namely, DY (*p*-value < 0.001), ROE (*p*-value = 0.00127) and Unlevered SAD (*p*-value = 0.04523). This indicates that Dividend Yield, Return on Equity and Sector Average Discount Unlevered have statistically significant relationships with the Unlevered NAV Discount.

As with the models using the Traditional NAV Discount, DY was found to have a significant positive relationship with Unlevered NAV Discount, that is, the higher the dividends paid by REITs, the larger the Unlevered NAV Discount.

ROE was found to have a significant positive relationship with Unlevered NAV Discount, that is, the higher the Return on Equity the higher the NAV Discount. ROE was used as a proxy for the REITs profitability and performance. The significant positive relationship is

counterintuitive as one would expect there to be a negative relationship, that is, one would expect investors to value a REIT whose profitability and performance is higher and therefore pay more for the REIT resulting in a decrease of the NAV Discount or a premium. Research carried out overseas by Barkham and Ward (1999), Morri *et al.* (2005), Lee *et al.* (2013), Ke (2015) and Morri and Baccarin (2016) found a significant negative relationship between performance and NAV Discount, however, the Traditional NAV Discount formula was used. The only study to use the Unlevered NAV Discount formula was Morri and Baccarin (2016) who found that once adjusting for leverage, profitability became insignificant, however, still showing a negative relationship. Further research is required to understand why there is a positive relationship in the South African market.

Unlevered SAD was found to have a significant positive relationship with Unlevered NAV Discount, that is, the higher the Sector Average Discount based on the Unlevered NAV Discounts of the REITs in the sample the higher the NAV Discount of the individual REITs. Unlevered SAD was used as a proxy for market sentiment. The significant positive relationship suggests that the individual REITs NAV Discount is affected by the behaviour of the REITs market in general. Previous research has found that market sentiment, for which Sector Average Discount was a proxy, has a significant influence on the discount to NAV. Barkham and Ward (1999) found that approximately 50% of the variability in the discount to NAV explained by their model was due to the market sentiment variable and concluded that sector wide positive or negative sentiment has an important influence on individual company NAV discount. They also found that in equilibrium, market wide sentiment creates a tendency for shares of property companies to trade at a discount. Clayton and MacKinnon (2002) examined REIT share price premium to NAV by looking at growth opportunities in the public market (listed/REIT market), differences in risk factors investors face in both the private (direct real estate) and public markets such as liquidity, and investor sentiment. They found sentiment played a significant role in REIT prices. Morri and Benedetto (2009) found a positive relationship between market sentiment and NAV discount. Boshoff and Cloete (2012) examined the share prices of Property Loan Stock (PLS) companies compared to the JSE Index and the All Share Index and found a high correlation suggesting that fluctuations in the PLS share prices were influenced by general JSE sentiment and hence influenced by market sentiment and irrational investors behavior. Ke (2015) found that the market average discount to NAV had a significant impact on a company's discount, implying that individual property companies' discounts are influenced by sector-wide sentiment. Morri and Baccarin (2016) investigated market sentiment, measured as the weighted average of the NAV discounts for six-month average market capitalisations, against the traditional and unlevered NAV discounts. They found that market sentiment had a significant and positive relationship with NAV discount in both models.

Model Diagnostic

In order to evaluate the adequacy of Model 3 the following model diagnostics were carried out:

Residual Scatterplot

The Unlevered NAV Discount residuals for each individual REIT were plotted against the fitted value. The values of the residuals are expected to be between -3 and 3; any scores beyond these are considered outliers. Figure 4-12 shows the scatterplot for Model 3. There was one value, IPF (Investec Property Fund) 2012 H2, at approximately -4 which was considered to be an outlier.

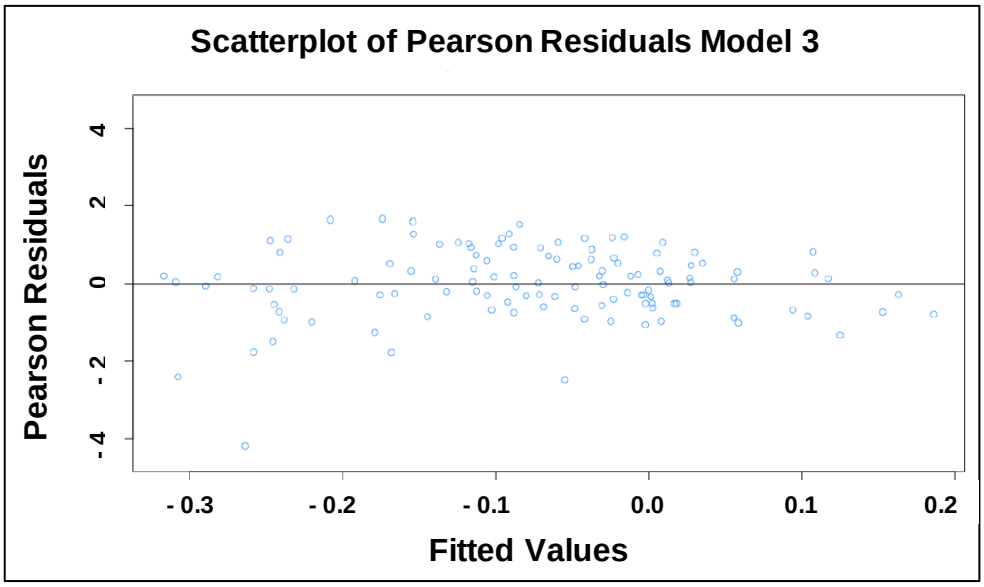

Figure 4-12 Model 3 Scatterplot of Residuals

Histogram of Residuals

The residual values of the Unlevered NAV Discount were plotted on a histogram. The values are expected to be normally distributed. Figure 4-13 shows that the histogram of the residuals for Model 3 did not display a normal distribution but was negatively skewed. All of the scores but one lay between -3 and 2. One value, IPF 2012 H2, lay between -4 and -5, making it an outlier.

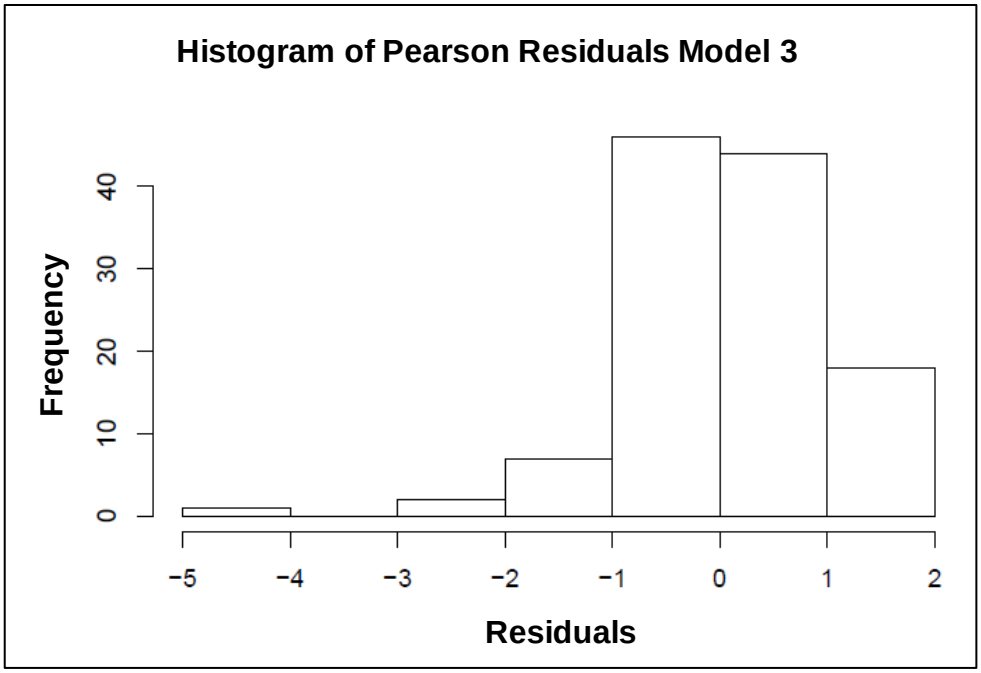

Figure 4-13 Model 3 Histogram of Residuals

Normal Q-Q Plot

The observed residuals for the Unlevered NAV Discount values of the REITs were plotted against the theoretical/expected values. Figure 4-14 shows the Normal Q-Q Plot, where as before, an outlier, IPF 2012 H2, can be observed in the bottom left corner.

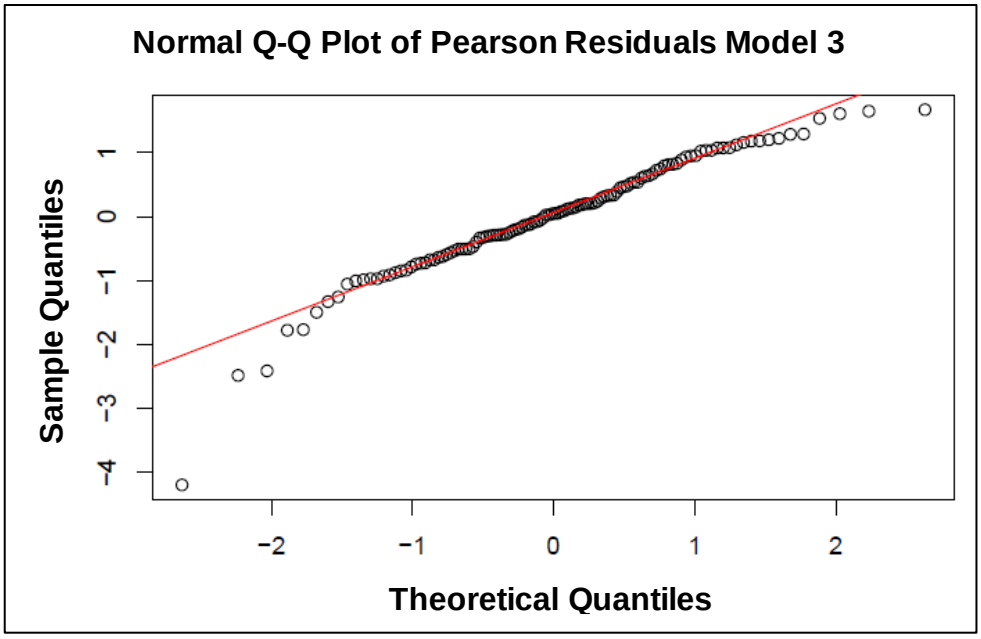

Figure 4-14 Model 3 Normal Q-Q Plot

Spaghetti Plot

The distribution scores of the Unlevered NAV Discount values of the individual REITs were plotted as a spaghetti plot. The spaghetti plot showed all but one value lying between 0.5 and -0.5. IPF 2012 H2 lay below -0.5 and was therefore considered an outlier. Figure 4-15 shows the spaghetti plot for Model 3.

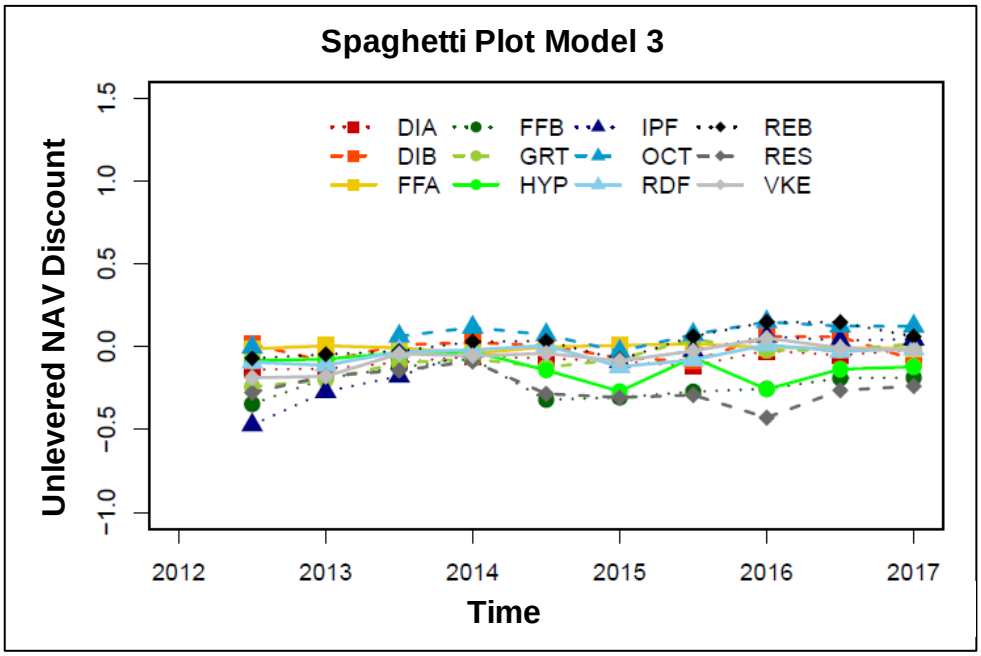

Figure 4-15 Model 3 Spaghetti Plot

The results of the model diagnostics identified one outlying Unlevered NAV Discount value which was affecting the LME model, namely the IPF 2012 H2 value. In 2012 H2 IPF had a NAV of R10.86 per share however, was trading at a share price of R17.60 resulting in a NAV premium of 62.0% which is above the Unlevered Sector Average Discount of -16.2% (a NAV premium of 16.2%) calculated for the sample for 2012 H2. This observation was removed from the data set and the regression was run again using Model 4.

MODEL 4

LME 4 (Unlevered NAV Discount ~ DY + HTYPE + LEV + ROE + SIZE + Unlevered SAD + SAPI + ALSI + CCI + (1 | REIT) + (1 | Year : Half)

The regression results for Model 4 are shown in Table 4-5.

Table 4-5 Regression Results for Model 4

Variable	Coefficient	Std. Error	t-value	*p*-value
(Intercept)	-0.45790	0.24980	-1.833	0.07422
DY	8.75200	1.06800	8.191	< 0.001*
HTYPE	-0.02230	0.04148	-0.538	0.59279
LEV	0.19160	0.10530	1.820	0.07157
ROE	0.09546	0.02962	3.223	0.00172*
SIZE	0.00374	0.01109	0.337	0.73830
Unlevered SAD	0.49510	0.14650	3.380	0.00103*
SAPI	0.00074	0.01116	0.066	0.94713
ALSI	-0.00005	0.00017	-0.297	0.76733
CCI	0.00227	0.00109	2.075	0.04058*

*Notes: * p<0.05*

Results

The analysis using Model 4 found four statistically significant variables, namely, DY (*p*-value < 0.001), ROE (*p*-value = 0.00172), Unlevered SAD (*p*-value = 0.00103) and CCI (*p*-value = 0.04058). As in Model 3, DY, ROE and Unlevered SAD showed significant positive relationships. CCI (Consumer Confidence Index) was not significant in Model 3, but after removing the outlying value, became significant in Model 4.

DY was found to have a significant positive relationship with Unlevered NAV Discount, that is, the higher the dividends paid by REITs, the larger the NAV Discount. This implies that investors favour REITs or assign higher value to REITs that retain a higher proportion of their income rather than paying a larger proportion out as dividends. An explanation for this may be that by retaining a higher proportion of their income REITs may invest it in their existing stock or in new stock and thus increase the capital value of the REIT essentially giving up short term financial gain for longer term capital growth. Morri and Benedetto (2009) suggest that investors may prefer to keep their funds invested in the REITs rather than needing to reinvest the dividends earned in an increasing property market. Morri *et al.* (2005) found a significant positive relationship between DY and NAV discount, however, they suggest that a high dividend yield may be the result of the factors that drive NAV discount as opposed to an explanatory *per se*.

ROE was found to have a significant positive relationship with Unlevered NAV Discount, that is, the higher the Return on Equity the higher the NAV Discount. ROE was used as a proxy for the REITs profitability and performance. The significant positive relationship is counterintuitive as one would expect there to be a negative relationship, that is, one would expect investors to value a REIT whose profitability and performance is higher and therefore pay more for the REIT resulting in a decrease of the NAV Discount or a premium. Research carried out overseas by Barkham and Ward (1999), Morri *et al.* (2005), Lee *et al.* (2013), Ke

(2015) and Morri and Baccarin (2016) found a significant negative relationship between performance and NAV Discount, however, the Traditional NAV Discount formula was used. The only study to use the Unlevered NAV Discount formula was Morri and Baccarin (2016) who found that once adjusting for leverage, profitability became insignificant, however, still showing a negative relationship. Further research is required to understand why there is a positive relationship in the South African market.

Unlevered SAD was found to have a significant positive relationship with Unlevered NAV Discount, that is, the higher the Sector Average Discount based on the Unlevered NAV Discounts of the REITs in the sample the higher the NAV Discount of the individual REITs. Unlevered SAD was used as a proxy for market sentiment. The significant positive relationship suggests that the individual REITs NAV Discount is affected by the behaviour of the REITs market in general. Previous research has found that market sentiment, for which Sector Average Discount was a proxy, has a significant influence on the discount to NAV. Barkham and Ward (1999) found that approximately 50% of the variability in the discount to NAV explained by their model was due to the market sentiment variable and concluded that sector wide positive or negative sentiment has an important influence on individual company NAV discount. They also found that in equilibrium, market wide sentiment creates a tendency for shares of property companies to trade at a discount. Clayton and MacKinnon (2002) examined REIT share price premium to NAV by looking at growth opportunities in the public market (listed/REIT market), differences in risk factors investors face in both the private (direct real estate) and public markets such as liquidity, and investor sentiment. They found sentiment played a significant role in REIT prices. Morri and Benedetto (2009) found a positive relationship between market sentiment and NAV discount. Boshoff and Cloete (2012) examined the share prices of Property Loan Stock (PLS) companies compared to the JSE Index and the All Share Index and found a high correlation suggesting that fluctuations in the PLS share prices were influenced by general JSE sentiment and hence influenced by market sentiment and irrational investors behavior. Ke (2015) found that the market average discount to NAV had a significant impact on a company's discount, implying that individual property companies' discounts are influenced by sector-wide sentiment. Morri and Baccarin (2016) investigated market sentiment, measured as the weighted average of the NAV discounts for six-month average market capitalisations, against the traditional and unlevered NAV discounts. They found that market sentiment had a significant and positive relationship with NAV discount in both models.

CCI was found to have a significant positive relationship, with Unlevered NAV Discount, that is, the higher the Consumer Confidence Index, the larger the NAV Discount. CCI was used as a proxy for market sentiment. Intuitively, a higher CCI indicates that consumers are bullish about the market and it is expected that this would translate into more investment driving share prices up and therefore decreasing the NAV discount resulting in a negative relationship between CCI and NAV Discount. However, the opposite relationship was found. In order to try and explain the significant positive relationship an understanding of the elements that make up Unlevered NAV Discount is required.

The formula for Unlevered NAV discount, as adapted from Morri *et al.* (2005) and Morri and Baccarin (2016), can be written as:

$$Unlevered\ NAV\ Disc_t = 100\ x\ (NAV_t - MC_t) / (NAV_t + Debt_t) \quad (3)$$

Where:

NAV = Net Asset Value

MC = Market Capitalisation

Debt = Value of liabilities

Unlevered NAV Discount is therefore, a function of the NAV, MC and Debt of a REIT. An increase in NAV Discount is caused by an increase in the NAV, a decrease in the MC, an decrease in Debt or a combination of the three. NAV is calculated by determining the appraised value of the underlying assets, referred to as the net present value (NPV) and subtracting any liabilities (Morri and Baccarin, 2016). MC is the total value of shares calculated as the share price multiplied by the number of issued shares (Morri *et al.*, 2005). Debt is the value of liabilities (Morri and Baccarin, 2016).

Therefore, all things being equal, if the appraised value of the underlying assets of a REIT increases then the NAV Discount will increase. Similarly if the appraised value increases by more than an increase in the MC caused by an increase in the share price or number of shares issued then the NAV Discount will increase. The positive relationship between CCI and NAV Discount found in this research can therefore suggest that as consumer confidence increases in the market the underlying value of the REITs assets increases by more than the MC or share price and hence the NAV Discount increases. Further research is required to understand this relationship.

Model Diagnostic

In order to test the strength of Model 4 the following model diagnostics were carried out:

Residual Scatterplot

The Unlevered NAV Discount residuals for each individual REIT were plotted against the fitted value. The values of the residuals were between -3 and 3, as is expected. Figure 4-16 shows the scatterplot for Model 4.

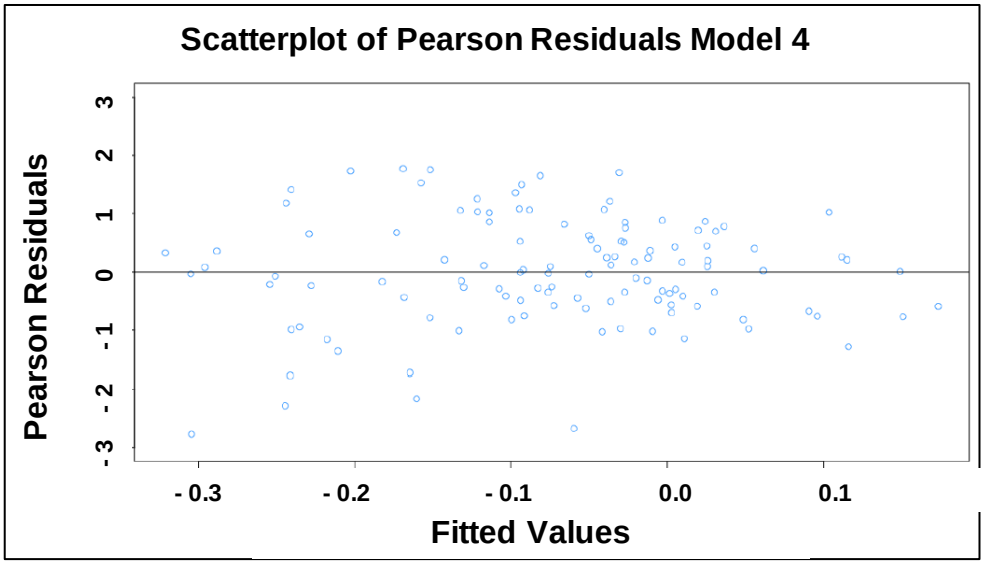

Figure 4-16 Model 4 Scatterplot of Residuals

Histogram of Residuals

The residual values of the Unlevered NAV Discount were plotted on a histogram. As is expected, the values were normally distributed. Figure 4-17 shows the histogram of the residuals for Model 4.

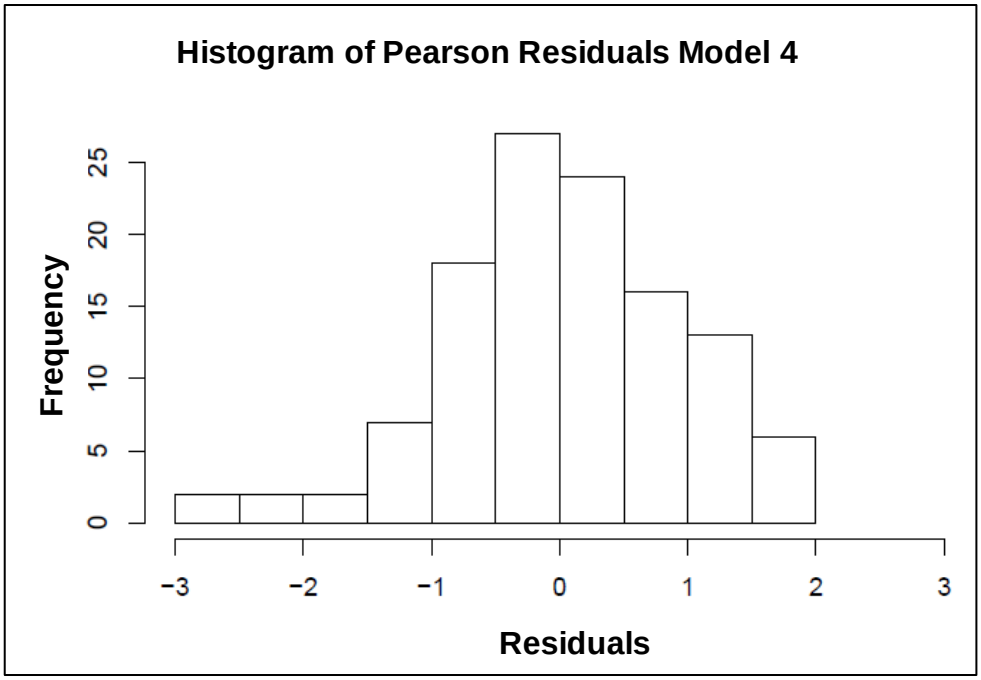

Figure 4-17 Model 4 Histogram of Residuals

Normal Q-Q Plot

The observed residuals for the Unlevered NAV Discount values of the REITs were plotted against the theoretical/expected values. Figure 4-18 shows the Normal Q-Q Plot with the values behaving as expected.

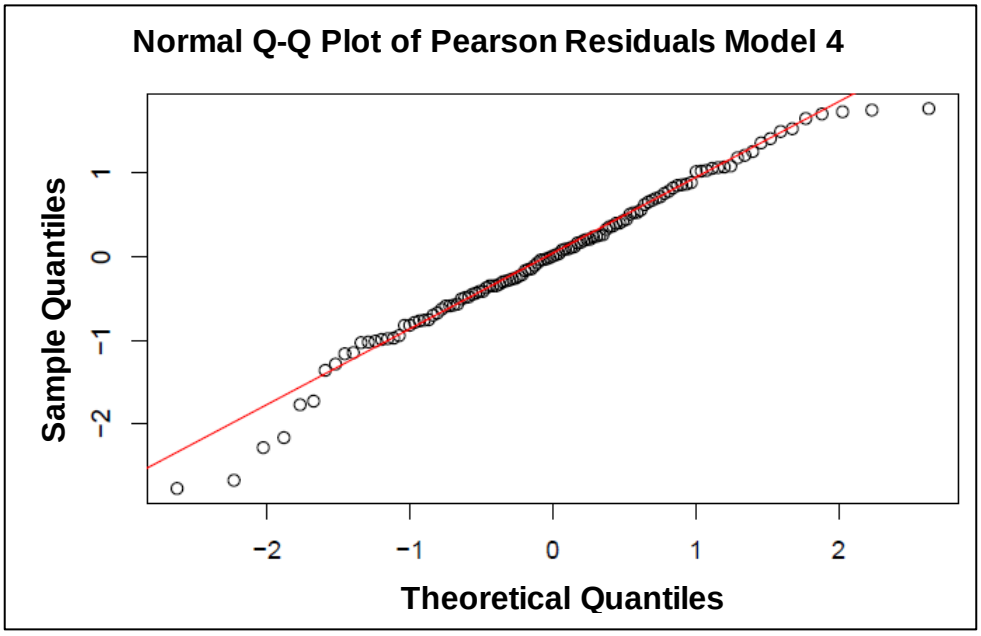

Figure 4-18 Model 4 Normal Q-Q Plot

Spaghetti Plot

The distribution scores of the Unlevered NAV Discount values of the individual REITs excluding the IPF 2012 H2 observation were plotted as a spaghetti plot. The spaghetti plot showed a better distribution with no significant outliers. Figure 4-19 shows the spaghetti plot for Model 4.

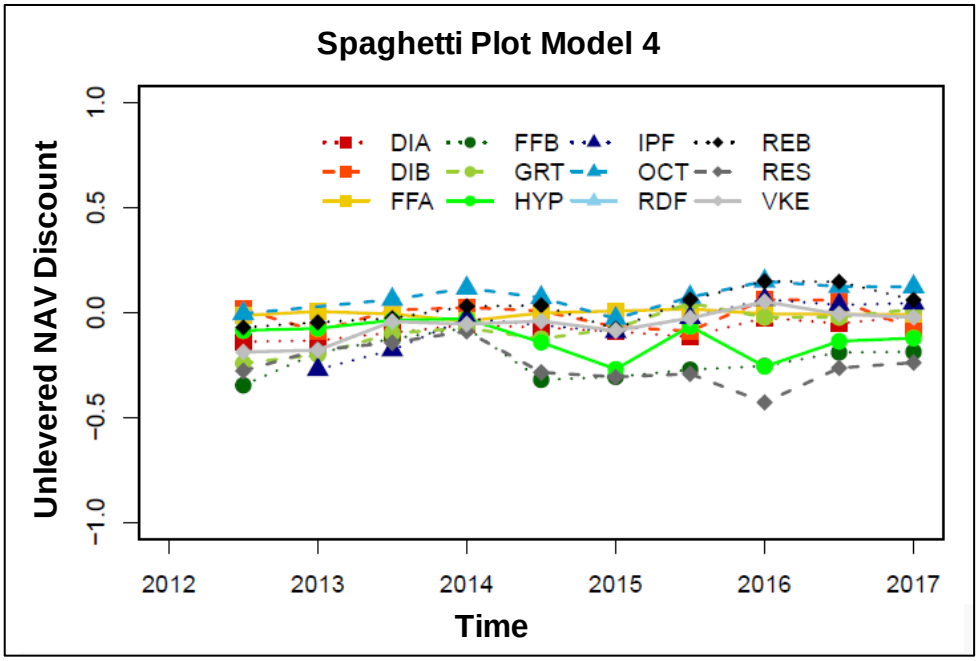

Figure 4-19 Model 4 Spaghetti Plot

4.4. Comparing the results for the Traditional NAV Discount versus the Unlevered NAV Discount

The difference between the Traditional NAV Discount and the Unlevered NAV Discount is that in the latter, the effect of debt on the NAV Discount is eliminated. Barkham and Ward (1999), Morri *et al.* (2005), Morri and Benedetto (2009) and Morri and Baccarin (2016) argue that leverage (debt) has an effect on NAV discount by the way in which NAV discount is calculated, that is, debt has an accounting effect on the discount formula. In order to eliminate this effect, debt is added back into the Unlevered NAV Discount formula. A criticism of this argument is that it is a very simplistic way of looking at the effect of debt on the financial structure of a REIT (Morri and Benedetto, 2009). It is also a theoretical construct as all the REITs included in the sample had some level of debt.

This research carried out a regression analysis using both formulas against the same set of independent variables in order to establish whether eliminating debt from the NAV Discount formula resulted in any significant changes to the results. Table 4-6 shows the t-value and *p*-value results of all 4 regression models carried out in the analysis. Models 1 and 2 were run using the Traditional NAV Discount formula and based on the model diagnostics carried out, Model 2 showed a better fit with the regression model. Models 3 and 4 were run using the Unlevered NAV Discount formula and based on the model diagnostics carried out, Model 4 showed a better fit with the regression model.

Table 4-6 Regression analysis results for Models 1 to 4

	Traditional NAV Discount				Unlevered NAV Discount			
	Model 1		Model 2 (~~FFB~~ outlier removed)		Model 3		Model 4 (IPF outlier removed)	
Variable	t-value	*p*-value	t-value	*p*-value	t-value	*p*-value	t-value	p-value
DY	4.625	**0.00006***	9.136	**< 0.001***	7.907	**< 0.001***	8.191	**< 0.001***
HTYPE	1.628	0.1206	-0.049	0.96114	-0.719	0.47524	-0.538	0.59279
LEV	-0.821	0.4179	-0.708	0.48065	1.591	0.11472	1.820	0.07157
ROE	-1.560	0.1219	0.835	0.40573	3.318	**0.00127***	3.223	**0.00172***
SIZE	2.178	**0.0474***	2.960	**0.00550***	1.298	0.20490	0.337	0.73830
SAD	1.337	0.2541	2.635	**0.00976***	2.347	**0.04523***	3.380	**0.00103***
SAPI	2.057	**0.0560****	-0.629	0.53101	-0.632	0.53185	0.066	0.94713
ALSI	-1.715	0.1175	0.064	0.94944	0.322	0.75161	-0.297	0.76733
CCI	1.020	0.3113	0.212	0.83292	1.602	0.11385	2.075	**0.04058***

*Notes: * p<0.05, **p<0.06*

In all four models DY showed a significant positive relationship to NAV Discount indicating that whether or not the NAV Discount formula incorporated debt, the higher the dividends paid by REITs, the larger the NAV Discount. This implies that investors favour REITs or assign higher value to REITs that retain a larger proportion of their income rather than paying a larger proportion as dividends.

In Models 2, 3 and 4 SAD showed a significant positive relationship to NAV Discount. SAD is calculated as the average discount for all the REITs included in the sample and it is expected that there should be a significant positive relationship between SAD and NAV Discount regardless of whether debt is adjusted for in the NAV Discount formula.

ROE was not statistically significant in the Traditional NAV Discount analysis (Models 1 and 2), however became significant in the Unlevered NAV Discount analysis (Models 3 and 4). Conversely, SIZE was statistically significant in the Traditional NAV Discount analysis (Models 1 and 2), however became statistically insignificant in the Unlevered NAV Discount analysis (Models 3 and 4). This suggests that debt has an effect on the impact that ROE and SIZE have on the NAV Discount. Further research is required to understand what that impact is.

LEV showed the opposite relationship for the two NAV Discount formulae. There is a negative relationship with the Traditional NAV Discount formula (Models 1 and 2) but a positive relationship with the Unlevered NAV Discount formula (Models 3 and 4), however, both at insignificant levels in all four models. The change in relationship between the two formulae suggests that there is an accounting bias created by the effect of debt on the computation of the Traditional NAV Discount formula (Morri and Benedetto, 2009).

Similarly, HTYPE showed the opposite relationship for the two NAV Discount formulae. There is a positive relationship with the Traditional NAV Discount formula (Models 1 and 2) but a

negative relationship with the Unlevered NAV Discount formula (Models 3 and 4), however, both at insignificant levels in all four models.

4.5. Summary

The regression analysis was carried out using four models: Model 1 using the Traditional NAV Discount with all the observations from the data set; Model 2 using the Traditional NAV Discount however, excluding one outlier, the FFB 2012 H2 observation; Model 3 using the Unlevered NAV Discount with all the observations from the data set; and Model 4 using the Unlevered NAV Discount however, excluding one outlier, the IFP 2012 H2 observation. Only one variables was found to be statistically significant in all four models, namely DY. SAD (calculated using either the Traditional NAV Discount for all the REITs included in the sample for Models 1 and 2 or the Unlevered NAV Discount for Models 3 and 4) was found to be statistically significant in Models 2, 3 and 4. ROE was significant in Models 3 and 4, SIZE was significant in Models 1 and 2 and CCI was significant in Model 4. SAPI was marginally significant in Model 1. Based on the model diagnostics carried out, Model 2 and 4 showed the better fitted regression models and were the preferred models. The statistically significant variables in Model 2 were DY, SIZE and SAD. The statistically significant variables in Model 4 were DY, ROE, SAD and CCI. This suggests that there are multiple factors that affect the NAV Discount however, depend on which NAV Discount formula is being used in the regression analysis.

Table 4-7 Summary of statistically significant results for Models 1 to 4

Model	Statistically Significant Results	Nature of Relationship
Model 1 – Traditional NAV Discount with all the observations	Dividend Yield	Positive
	Size	Positive
	SA Property Index – marginally significant only	Positive
Model 2 - Traditional NAV Discount, excluding FFB 2012 H2 observation	Dividend Yield	Positive
	Size	Positive
	Sector Average Discount	Positive
Model 3 – Unlevered NAV Discount with all the observations	Dividend Yield	Positive
	Sector Average Discount	Positive
	Return on Equity	Positive
Model 4 – Unlevered NAV Discount excluding IFP 2012 H2 observation	Dividend Yield	Positive Positive
	Sector Average Discount	Positive
	Return on Equity	Positive
	Consumer Confidence Index	Positive

5. Conclusions and Implications

5.1. Introduction

This research has examined the factors that impact on South African REITs trading at a discount or premium to their NAV with a focus on rational and irrational/market sentiment factors that affect NAV discount.

The research problem proposed in Chapter One was:

> *There is limited information on what factors impact on South African REITs trading at a discount or premium to their NAV.*

In order to examine the problem the following research question was constructed:

> *What factors impact on South African REITs trading at a discount or premium to their NAV?*

The hypothesis tested in this research was:

> *H0: There are not multiple factors that impact on South African REITs trading at a discount or premium to their NAV.*
>
> *H1: There are multiple factors that impact on South African REITs trading at a discount or premium to their NAV.*

The research method consisted of examining available literature relevant to the research question and a quantitative data analysis and interpretation of publicly available information obtained for 12 South African REITs listed on the JSE for the sample period 1 July 2012 to 30 June 2017.

In this chapter, the research aim and objectives are discussed and the findings of the research question are put forward with the hypothesis partially accepted. Thereafter, the limitations of the research and the implications of the research on theory are discussed. The chapter concludes with recommendations for possible future research.

5.2. Achievement of Research Aim and Objectives

The aim of the research, as set out in Chapter One was:

> *To identify what factors impact on South African REITs trading at a discount or premium to their NAV.*

In order to achieve this, the following objectives were identified:

a. *To identify key rational and irrational factors that may impact on the NAV spread based on research conducted locally and internationally;*
b. *To establish which South African REITs were listed on the JSE over the five year sample period (1 July 2012 to 30 June 2017); and*

c. *To test for any statistically significant relationships between the factors identified and the NAV spread of South African REITs included in the sample.*

Objective (a) was achieved through a literature review of studies undertaken internationally and in South Africa with a particular focus on identifying factors which have impacted on the NAV spread of REITs. It was found that there is very limited literature available pertaining to South African REITs and their NAV spread. Six rational factors and four irrational factors or indicators of market sentiment were identified.

Objective (b) was fulfilled by analysing data available on the SAREIT website and it was found that 12 South African REITs were listed on the JSE for the sample period 1 July 2012 to 30 June 2017.

Objective (c) was achieved by compiling publicly available data on the rational and market sentiment factors pertaining to the 12 REITs. A review of the literature identified two approaches to examining NAV spread, namely using a Traditional NAV Discount formula and an Unlevered NAV Discount formula, which eliminates the effect of debt on the NAV Discount. A regression analysis was carried out using a linear mixed effects model where both the Traditional NAV Discount and the Unlevered NAV Discount were regressed against the rational and market sentiment factors identified in order to establish any statistically significant relationships.

The objectives of this research were therefore achieved.

5.3. Findings of the Research Question

The research question was as follows:

What factors impact on South African REITs trading at a discount or premium to their NAV?

Two formulas for NAV Discount, namely the Traditional NAV Discount formula and the Unlevered NAV Discount formula which accounts for debt, were used in the regression analysis employing a linear mixed effects model. The regression analysis was run using the Traditional NAV Discount as the dependent variable and the nine independent variables (Model 1), however, based on the model diagnostics carried out, an outlying observation was found. This was removed from the data set and the model was run again (Model 2) which resulted in a better fitted regression model. Thereafter, the regression analysis was run using the Unlevered NAV Discount as the dependent variable (Model 3). As with Model 1, based on the model diagnostics carried out, an outlying observation was found. This was removed from the data set and the model was run again (Model 4) which resulted in a better fitted regression model. The results of the four sets of regression models are summarised in Table 5-1.

Table 5-1 Regression analysis results for Models 1 to 4

	Traditional NAV Discount				Unlevered NAV Discount			
	Model 1		Model 2 (~~FFB~~ outlier removed)		Model 3		Model 4 (IPF outlier removed)	
Variable	t-value	*p*-value	t-value	*p*-value	t-value	*p*-value	t-value	p-value
DY	4.625	**0.00006***	9.136	**< 0.001***	7.907	**< 0.001***	8.191	**< 0.001***
HTYPE	1.628	0.1206	-0.049	0.96114	-0.719	0.47524	-0.538	0.59279
LEV	-0.821	0.4179	-0.708	0.48065	1.591	0.11472	1.820	0.07157
ROE	-1.560	0.1219	0.835	0.40573	3.318	**0.00127***	3.223	**0.00172***
SIZE	2.178	**0.0474***	2.960	**0.00550***	1.298	0.20490	0.337	0.73830
SAD	1.337	0.2541	2.635	**0.00976***	2.347	**0.04523***	3.380	**0.00103***
SAPI	2.057	**0.0560****	-0.629	0.53101	-0.632	0.53185	0.066	0.94713
ALSI	-1.715	0.1175	0.064	0.94944	0.322	0.75161	-0.297	0.76733
CCI	1.020	0.3113	0.212	0.83292	1.602	0.11385	2.075	**0.04058***

*Notes: * p<0.05, **p<0.06*

The findings show that only one variable was statistically significant in all four models, namely, the Dividend Yield ratio (DY) which showed a positive relationship to NAV Discount. DY is calculated as dividend per share divided by the share price. The positive relationship implies that the higher the dividends paid by REITs, the larger the NAV Discount regardless of whether debt is accounted for. This suggests that investors favour REITs or assign higher value to REITs that retain a higher proportion of their income rather than paying a higher proportion out as dividends. An explanation for this may be that by retaining the income REITs may invest it in their existing stock or in new stock and thus increase the capital value of the REIT essentially giving up short term financial gain for longer term capital growth. This finding is supported by research carried out by Morri *et al.* (2005) who found a significant positive relationship between DY and NAV discount. Morri and Benedetto (2009) suggest that investors may prefer to keep their funds invested in the REITs rather than needing to reinvest the dividends earned in an increasing property market.

Sector Average Discount (SAD) was found to be statistically significant positive relationship to NAV Discount in Models 2, 3 and 4. In Models 3 and 4, using the Unlevered NAV Discount Formula, there was no substantial change in the p-value with and without the outlier and therefore there is reasonable confidence of the statistical significance of SAD even with the outlier included in the model. SAD is calculated as the half-yearly average discount for all the REITs included in the study over the sample period. The finding that SAD was not statistically significant in Model 1, but was significant in the rest of the models indicates that the outlying observation was affecting the data. SAD was used as a proxy for market sentiment and hence, the significant positive relationship found in Models 2, 3 and 4 suggest that the individual REITs NAV Discount is affected by the behaviour of the REITs market in general. This is in line with findings by Morri and Baccarin (2016) who found that in French, Dutch and British REITs market sentiment had a significant positive relationship with NAV discount.

SIZE, measured as the natural logarithm of the Total Asset Value of the REITs, was found to have a statistically significant positive relationship in Models 1 and 2 using the Traditional NAV Discount formula but not with Models 3 and 4 using the Unlevered NAV Discount formula where debt is added to the equation. In Models 1 and 2 there was no substantial change in the p-value with and without the outlier and therefore there is reasonable confidence of the statistical significance of SIZE when using the Traditional NAV Discount formula even with the outlier included in the model. The positive relationship implies that as the size of the REITs increased, the NAV discount increased. An explanation for this given by Morri and Benedetto (2009) is that the larger the REIT the more complex and difficult it is to manage and the less flexible and liquid it is and hence the higher the risk perceived by investors which translates into a higher NAV Discount. Most of the literature reviewed found a negative relationship between size and NAV discount which is contrary to the findings of this research, for example, Capozza and Lee (1995), Clayton and MacKinnon (2000), Brounen and Laak (2005), Lee *et al.* (2013) and Ke (2015), who cite the benefits of economies of scale, operational efficiencies, smaller liquidity premiums, higher transparency and increased popularity as explanations for the negative relationship. One study by Barkham and Ward (1999) found that company size had a positive relationship to NAV discount, however, not at a statistically significant level; a finding which needs to be viewed with caution when compared to other findings which are statistically significant.

Return on Equity (ROE), which was a proxy for REIT performance and profitability and was calculated as net income divided by shareholder equity, showed a statistically significant positive relationship in Models 3 and 4 using the Unlevered NAV Discount formula. There was no substantial change in the p-value with and without the outlier and therefore there is reasonable confidence of the statistical significance of ROE when using the Unlevered NAV Discount formula even with the outlier included in the model. The positive relationship implies that the higher the ROE, the higher the NAV Discount, however, this is counterintuitive as one would expect there to be a negative relationship, that is, one would expect investors to value a REIT whose profitability and performance is higher and therefore pay more for the REIT resulting in a decrease of the NAV Discount or a premium. Research carried out internationally by Barkham and Ward (1999), Morri *et al.* (2005), Lee *et al.* (2013), Ke (2015) and Morri and Baccarin (2016) found a significant negative relationship between performance and NAV Discount, however, the Traditional NAV Discount formula was used. The only study to use the Unlevered NAV Discount formula was Morri and Baccarin (2016) who found that once adjusting for leverage, profitability became insignificant, however, still showing a negative relationship. Further research is required to understand why there is a positive relationship in the South African market.

CCI, the Consumer Confidence Index and a proxy for market sentiment, showed a statistically significant positive relationship only in Model 4, using the Unlevered NAV Discount formula and excluding the outlying observation. The positive relationship implies that the higher the CCI, the larger the NAV Discount. Intuitively, a higher CCI indicates that consumers are bullish about the market and it is expected that this would translate into more investment driving share prices up and therefore decreasing the NAV discount resulting in a negative relationship between CCI and NAV Discount. However, the opposite relationship was found. In order to try and explain the significant positive relationship, an understanding of the elements that make up Unlevered NAV Discount is required.

The formula for Unlevered NAV discount, as adapted from Morri *et al.* (2005) and Morri and Baccarin (2016), can be written as:

$$Unlevered\ NAV\ Disc_t = 100\ x\ (NAV_t - MC_t) / (NAV_t + Debt_t) \quad (3)$$

Where:

NAV = Net Asset Value

MC = Market Capitalisation

Debt = Value of liabilities

Unlevered NAV Discount is therefore, a function of the NAV, MC and Debt of a REIT. An increase in NAV Discount is caused by an increase in the NAV, a decrease in the MC, an decrease in Debt or a combination of the three. NAV is calculated by determining the appraised value of the underlying assets, referred to as the net present value (NPV) and subtracting any liabilities (Morri and Baccarin, 2016). MC is the total value of shares calculated as the share price multiplied by the number of issued shares (Morri *et al.*, 2005). Debt is the value of liabilities (Morri and Baccarin, 2016).

Therefore, all things being equal, if the appraised value of the underlying assets of a REIT increases then the NAV Discount will increase. Similarly if the appraised value increases by more than an increase in the market capitalisation caused by an increase in the share price or number of shares issued then the NAV Discount will increase. The positive relationship between CCI and NAV Discount found in this research can therefore suggest that as consumer confidence increases in the market the underlying value of the REITs assets increases by more than the market cap or share price and hence the NAV Discount increases. Further research is required to understand this relationship.

SAPI, the SA Property Index share price, used as a proxy for market sentiment, showed a marginally statistically significant positive relationship only in Model 1 using the Traditional NAV Discount formula and including the outlying observation. The positive relationship implies that higher the SA Property Index share price the higher the NAV Discount and that the individual REITs NAV Discount is affected by the behaviour of the REITs market in general. Intuitively this is expected to be a negative relationship, that is, an increase in the SAPI share price indicates that investors see value in the listed property market and are investing in it; this increase in demand drives the share price up. As the share price increases the NAV discount is expected to decrease or the NAV premium is expected to increase. Consider the formula for NAV Discount, as adapted from Barkham and Ward (1999), Brounen and Laak (2005), Morri *et al.* (2005) and Morri and Baccarin (2016):

$$NAV\ Disc_t = 100\ x\ (NAV_t - MC_t) / NAV_t \quad (1)$$

Where:

NAV = Net Asset Value

MC = Market Capitalisation

t = Point in time (calculated bi-anually)

NAV Discount is therefore, a function of the NAV and MC of a REIT. A decrease in NAV Discount is caused by a decrease in the NAV, an increase in the MC or both. NAV is calculated

by determining the appraised value of the underlying assets, referred to as the net present value (NPV) and subtracting any liabilities (Morri and Baccarin, 2016). MC is the total value of shares calculated as the share price multiplied by the number of issued shares (Morri *et al.*, 2005). Therefore, all things being equal, if the share price increases then MC increases and the NAV Discount decreases suggesting there is a negative relationship between NAV Discount and Share Price. However, the opposite relationship was found in this research. Further research is required to understand why a positive relationship was found.

Based on the model diagnostics carried out, Model 2 and 4 showed the better fitted regression models and were the preferred models. The statistically significant variables in Model 2 were DY, SIZE and SAD. The statistically significant variables in Model 4 were DY, ROE, SAD and CCI. The findings suggest that there are a number of factors that impact on the NAV Discount, however, besides DY and SAD, the factors depend on what NAV discount formula was used. This suggests that the impact of debt on the NAV Discount does indeed have an accounting effect as suggested by Barkham and Ward (1999), Morri *et al.* (2005), Morri and Benedetto (2009) and Morri and Baccarin (2016).

5.4. The Research Hypothesis

The hypothesis tested in this research was:

H0: There are not multiple factors that impact on South African REITs trading at a discount or premium to their NAV.

H1: There are multiple factors that impact on South African REITs trading at a discount or premium to their NAV.

The results of this research found only one factor, DY, to have a statistically significant impact on REITs trading at a discount or premium to their NAV in all four models employed in the regression analysis. SAD was found to be statistically significant in Models 2, 3 and 4. SIZE was found to be statistically significant in Models 1 and 2. ROE was found to be statistically significant in Models 3 and 4. CCI was found to be statistically significant in Model 4. SAPI was found to be marginally statistically significant in Model 1.

This suggests that both rational factors (DY, ROE and SIZE) and irrational factors (SAD, CCI and SAPI) impact on South African REITs trading at a discount or premium to their NAV, however, the factors are dependent on whether debt is accounted for or not in the NAV Discount Formula. The results also suggest that the factors are partly influenced by the outlying observations, as was the case for SAD, CCI and SAPI.

The research hypothesis has therefore been partially accepted.

5.5. Limitations

The research had a number of limitations. The first limitation was the sample size. As at 30 June 2017 there were 28 REITs listed on the JSE, however, only 12 REITs were listed for the five year sample period from 1 July 2012 to 30 June 2017 (SAREIT, 2017c).

Only certain information is reported in the REITs financial statements and some only annually as opposed to every six months. Therefore, the research was limited to those variables reported in the financial statements of the REITs and to those variables reported bi-annually.

Two NAV Discount formulae were used in carrying out the regression analysis, namely the Traditional NAV Discount Formula and the Unlevered NAV Discount formula which removes debt from the equation. The different formulae resulted in different factors being statistically significant in impacting on South African REITs trading at a discount or premium to their NAV. The reason for these differences was not explored in the research.

5.6. Implications of this Research for Theory

This research has contributed to quantitative evidence on the factors that impact on South African REITs trading at a discount or premium to their NAV.

This research makes three significant contributions to the study of REITS. Firstly, it adds to the literature on South African REITs trading at a discount or premium to their NAV. Although there is extensive literature on international REITs, the literature on South African REITs is very limited. Secondly, it adds to the literature on using two formulae for the NAV Discount, that is, the Traditional NAV Discount formula and the Unlevered NAV Discount Formula, as was done by Morri *et al*. (2005), Morri and Benedetto (2009), Morri and Baccarin (2016).

Thirdly, it adds insights into which factors impact on REITs trading at a discount or premium to their NAV and shows some similarities between South African REITs and international REITs, for example, the positive relationship between DY and NAV Discount as found by Morri *et al*. (2005) in their analysis of UK listed property companies and the positive relationship between SAD and NAV Discount as found by Morri and Baccarin (2016) in French, Dutch and British REITs. It also identifies a number of findings which are contrary to research carried out on international REITs, for example, the positive relationship found between SIZE and NAV Discount is contrary to the negative relationship found by Capozza and Lee (1995) on REITs listed on the NYSE, Brounen and Laak (2005) on European property shares, Lee *et al*. (2013) on Singapore REITs and Ke (2015) in UK listed property companies. ROE, used as a proxy for REIT performance and profitability, was found to have a positive relationship with the Unlevered NAV Discount formula in this research, however, Morri and Baccarin (2016) found profitability to have a negative but insignificant relationship to the Unlevered NAV Discount. The other research reviewed used the Traditional NAV Discount formula and found a negative relationship with SIZE, for example, Barkham and Ward (1999) on listed UK property companies, Morri *et al*. (2005) in UK listed property companies, Lee *et al.* (2013) on Singapore

REITs, Ke (2015) in UK listed property companies and Morri and Baccarin (2016) in European REITs.

5.7. Implications for Further Research

The results of the research showed three relationships that were not intuitively explained. Return on Equity (ROE), which was a proxy for REIT performance and profitability, showed a statistically significant positive relationship in Models 3 and 4 using the Unlevered NAV Discount formula. The positive relationship implies that the higher the ROE, the higher the NAV Discount, however, this is counterintuitive as one would expect there to be a negative relationship, as found by Barkham and Ward (1999), Morri *et al.* (2005), Lee *et al.* (2013), Ke (2015) and Morri and Baccarin (2016). Further research is required to understand why there is a positive relationship in the South African market.

CCI, the Consumer Confidence Index and a proxy for market sentiment, showed a statistically significant positive relationship only in Model 4, using the Unlevered NAV Discount formula and excluding the outlying observation. The positive relationship implies that the higher the CCI, the larger the NAV Discount. Intuitively, a negative relationship is expected, where a higher CCI indicates an increase in market sentiment and should therefore result in a decrease in the NAV Discount. An explanation proposed for the positive relationship was that as consumer confidence increases in the market the underlying value of the REITs assets increases by more than the market capitalisation or share price and hence the NAV Discount increases. Further research is required to understand this relationship.

SAPI, the SA Property Index share price, used as a proxy for market sentiment, showed a statistically significant positive relationship only in Model 1 using the Traditional NAV Discount formula and including the outlying observation. The positive relationship implies that the higher the SA Property Index the higher the NAV Discount and that the individual REITs NAV Discount is affected by the behaviour of the REITs market in general. Intuitively this is expected to be a negative relationship, that is, an increase in the SAPI share price indicates that investors see value in the listed property market and are investing in it; this increase in demand drives the share price up. As the share price increases the NAV discount is expected to decrease or the NAV premium is expected to increase, however, the opposite relationship was found in this research. Further research is required to understand why a positive relationship was found.

A further area for future research is the effect that debt has on the NAV Discount. The results of this research showed that depending on which NAV Discount Formula (Traditional versus Unlevered) was used certain factors were/were not statistically significant. The results make it clear that debt does have an effect on the factors that impact on South African REITs trading at a discount or premium to their NAV. Further research is required to analyse and explain what that impact is.

The sample size used was limited by the time frame as there are only 12 REITs which were listed on the JSE over the sample period. Similarly the time frame was limited by the sample size because a longer sample period would have reduced the sample size. Future research

could use a larger sample size and longer sample period and consider all REITs active at some point during the sample period and not require them to have been listed on the JSE for the duration of the sample period as was done by Capozza and Lee (1995) whose sample size increased from 33 to 75 REITs during their sample period of 1985 to 1992. Research carried out internationally generally had a larger sample size and sample period, for example, Liow (1996) investigated 16 listed property companies over the period 1980 to 1994, Barkham and Ward (1999) used a sample size of 44 property companies over a 17 year sample period from 1977 to 1994, Morri *et al.* (2005) analysed 26 property companies however they had a shorter sample period of four years from 2000 to 2003. Liow and Li (2006) examined eight Asian-Pacific securitized real estate markets for an eight year period from 1995 to 2003 and Ke (2015) had a sample size of 41 property companies and used a sample period of eight years from 2005 to 2013.

An area not explored by this research was the specific differences in the SA REIT market to international markets, those being the length of leases and relatively high annual escalation rates often well above inflation. A comparison of standard practices in both SA and internationally may provide insight into why some contrasting results were found by this research compared to international research.

The sample used in this research included two REITs with A and B linked units and eight REITs with only one type of unit. A and B linked units provide the opportunity for investors to have investments in the same REIT but with different risk and reward structures. The company specific financial data, such as Diversification by Property Type, Leverage, Return on Equity and Size will be the same for both the A and B linked units however the market data such as share price and number of units in issue and hence the NAV Discount or Premium and Dividend Yield will differ between the A and B linked units. The effect on the results of including REITs with A and B linked units and REITs with only one unit could be a possible area for further research.

The share prices used in this research were at date of interim and financial year end and at those corresponding dates the share prices excluded the dividend paid. The share price used to calculate DY therefore excluded the dividend paid. A review of previous literature research could not find reference to whether the share prices used included or excluded the dividend paid. Future research could use two measures of DY, one including and one excluding the dividends paid to see whther different results are achieved.

Future research should also differentiate between distributions paid out as dividends, which is derived from the income generated by the properties owned by REITs, and interest earned by investments held by REITs which earn interest as a source of income, as there are tax implications for the REIT and/or the investor.

A final consideration for future research is that in addition to the variable Dividend Yield, Distribution Growth be included in the analysis as an additional variable to test. Investors do not only look at the Dividend Yield but also consider its track record over a period of time to see if it is stable or volatile, increasing or decreasing. The assumption is that a REIT which has a stable or increasing income and hence dividend distribution per share over the long term will be more attractive to investors and hence trade at a premium or smaller discount to NAV compared to more volatile and negative growth REITs (Wong, 2016). Another reason SA investors focus on dividend growth as opposed to DY which is the focus in more developed markets (such as Europe, USA) is because the SA market is different in terms of inflation and lease structure. SA has relatively high inflation which results in annual escalation clauses in leases hence the focus on dividend growth, while in other markets DY is more important due to lower inflation and possible rent reviews. This difference between developing and more developed markets could be explored in future research.

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