Investing in REITs

A value-based approach

by

De Villiers Brits (BRTDEV004)

A minor dissertation presented to the Department of Construction Economics and Management, in partial fulfilment of the requirements for the degree MSc in Property Studies

Supervisor: Professor Francois Viruly

UCT Upper Campus

April 2019

Plagiarism declaration

I know the meaning of plagiarism and declare that all the work in this document, save for the properly acknowledged, is my own. This thesis/dissertation has been submitted to the Turnitin module (or equivalent similarity and originality checking software) and I confirm that my supervisor has seen my report and any concerns revealed by such have been resolved with my supervisor.

1. I know that plagiarism is a serious form of academic dishonesty

2. I have read the document about avoiding plagiarism, am familiar with its contents and have avoided all forms of plagiarism mentioned there

3. I have used the Harvard convention for citation and referencing. Each contribution to, and quotation in, this research from the work(s) of other people has been attributed, cited and referenced

4. I declare that this research is my own work

5. I have not and shall not allow others to plagiarise my work

Signature:

Signed by candidate

Date: April 2019

Abstract

The primary purpose of this study is to test whether a value-based investment strategy will outperform a growth-based investment strategy when applied to SAREIT investment. The secondary purpose is to assess whether the SAREIT investor can discriminate between strong and weak value-REITs through sound accounting-based fundamental analysis using the *F-Score Model*.

Building on existing research on value-based investment strategies and market efficiency, this study offers an SAREIT perspective to the existing body of knowledge on value investing theory through portfolio selection based on P/NAV, P/E, P/CF and DY ratio analysis. The holding period returns of the respective value-based portfolios are compared to their growth-based counterparts for an examination of relative performance.

The evidence from this research does not offer probabilistic support that a value-based approach to SAREIT selection and investment will outperform a growth-based approach, nor that it is possible to discriminate between financially strong and weak value-REITs through sound accounting-based fundamental analysis using the *F-Score Model*. Further research is required to develop the said strategies and models for application to the SAREIT sector.

Key words: SAREIT; value investing; fundamental analysis; ratio analysis; F-Score Model; market efficiency; value effect

Contents

List of figures

List of tables

List of abbreviations

ANOVA	-	Analysis of Variance
B/M	-	Book-to-market Ratio
CAPM	-	Capital Asset Pricing Model
CFO	-	Cash Flow from Operations
DY	-	Dividend Yield
EMH	-	Efficient Market Hypothesis
EPS	-	Earnings Per Share
FCF	-	Free Cash Flow
FPI	-	Financial Performance Indicators
HEPS	-	Headline Earnings Per Share
HPR	-	Holding Period Returns
JSE	-	Johannesburg Stock Exchange
LTV	-	Loan-to-value Ratio
NAV	-	Net Asset Value
OCF	-	Operating Cash Flow
P/E	-	Price-to-earnings Ratio
P/B	-	Price-to-book Ratio
P/CF	-	Price-to-cash-flow Ratio
P/NAV	-	Price-to-NAV Ratio
REIT	-	Real Estate Investment Trust
ROA	-	Return on Assets
SAREIT	-	South African Real Estate Investment Trust
TRI	-	Total Return Index

1. Introduction

This minor dissertation reports on research that critically examines the performance of value-based investment strategies when applied to the South African Real Estate Investment Trust (SAREIT) sector. The goal is to consolidate existing knowledge and to develop an understanding of value-based investment strategies in the context of SAREIT investment, through a comprehensive study of the existing literature on value-based investment and the analysis of quantitative financial data collected from the SAREIT sector. The success of this research is measured by the insight it provides into the performance of value-based approaches to SAREIT investment.

1.1. Background

1.1.1. The changing context for South African property investment and the rise of SAREITs

Property investment and portfolio management has been characterised by distinctive issues compared to other investment classes. Property's diversity, fixed location, large lot size, high transaction costs, low liquidity, and the use of market valuations rather than known prices for market information, coupled with limited data availability and a consequent lack of perfect market information, presents a unique challenge to investment analysts. Consequently, property investment and portfolio management has been treated differently to other investment classes and seen as a separate academic field to mainstream finance and investment (Hoesli and MacGregor, 2014).

However, property investment and portfolio management has changed substantially in recent decades. The development of alternative property investment vehicles and the rise of the Real Estate Investment Trust (REIT) asset class have developed partly in response to the unique issues posed by direct property investment (Hoesli and MacGregor, 2014). This integration of property with the capital market has allowed the investor to develop property portfolio structures which are set relative to a benchmark, providing for property to be analysed more explicitly in the context of the capital markets. While property's unique characteristics motivated the separate treatment of property investment to other investment classes in the past, the increasing integration of the property market with the capital market means that property's unique characteristics can now rather inform the application of analytical

approaches traditionally used with other main investment classes. Indeed, it is the premise of this research that the unique characteristics of property, and the SAREIT sector, may be the basis for *improved* applicability of certain analytical tools. Consider, for example, the SAREIT legislative environment – the fact that SAREITs have more limited discretion in decisions related to capital structuring, investment, earnings retention and dividend declarations, may lead to improved reliability of performance forecasts by analysts.

Since the investor is required to decide between different investment classes, and since most institutional investors have backgrounds in finance rather than property (Hoesli and MacGregor, 2014), the development of analytical tools for SAREIT analysis which are comparable to those traditionally used for other investment classes is warranted.

While it is true that property investment analysis requires specialist knowledge in areas such as urban land economics, property law, property valuation and real estate finance, successful investment in the listed SAREIT sector requires that such specialist knowledge be integrated with an understanding of how the SAREIT sector functions within the capital market environment.

1.1.2. Value investing

Value investing is an investment concept introduced early in the 20th century as a means for a more rational approach to investment decision-making (Graham and Dodd, 1934; Graham, 1949). The fundamental principle of the value-based approach is to identify and invest in companies or assets that are undervalued by fundamental analysis. Unlike growth investment strategies – which are typically momentum-focused, with investment selection based on low valuation ratios – value-based strategies call for investing in financially strong companies or assets with high valuation ratios, such as high book-to-market (B/M), low price-to-earnings (P/E), low price-to-cash-flow (P/CF), high dividend yields (DY) or other measures of value (Kwag and Whi, 2006).

The value-based approach places greater emphasis on an investment's quantitative financial data for investment analysis – rather than qualitative or behavioural factors. The focus is largely on the analysis of fundamental data involving rigorous quantitative approaches such as statistical- or mathematical analysis (Noma, 2010). 20th Century authors such as Benjamin Graham (1949) and Joel Greenblatt (2006) have attempted to eliminate cognitive bias through

the development of quantitative approaches. Qualitative and macro-economic factors are largely ignored since they are less significant in determining a company's intrinsic value and any attempts to predict the movements and impact of such factors are futile (Fama and French, 1992; Abarbanell and Bushee, 1997; Abarbanell and Bushee, 1998; Piotroski, 2000; Van Rensburg, 2001). If qualitative factors are introduced, many different conclusions may be reached regarding intrinsic value based on the perceptions of the analyst.

A common criticism to value-based investment strategies is that an emphasis on low – or recently depressed – stock prices may expose the investor to companies with financial health issues (Fama and French, 1992; Chen and Zhang, 1998). Piotroski (2000) and Noma (2010) demonstrated through the development and testing of the *F-Score Model* that quantitative accounting-based fundamental analysis could be used to discriminate between financially strong and weak value stocks. The model focuses on the selection of financially strong stocks that are trading at meaningful discounts to intrinsic value by fundamental analysis and discriminates between stocks with strong and weak financial performance indicators (FPI's) related to profitability, capital structure and operating efficiency. Significantly, the studies demonstrated that an assessment of a firm's FPI's concerning profitability, leverage, liquidity and operating efficiency could be used to increase portfolio returns by 7,5%, pointing to a lack of market efficiency among value stocks.

1.1.3. The case for SAREITs

SAREITs offer a unique opportunity to examine the performance of value-based investment strategies through accounting-based fundamental analysis. The legislative framework by which SAREITs are governed facilitates and imposes the formation of real estate portfolios of mostly long-term, tangible, fixed assets (i.e. real estate), with low gearing levels, and which provide for the regular and consistent payment of dividends. Also, since the primary business of SAREITs involve the acquisition and holding of income-generating properties, much of the focus and attention is on the ability and effectiveness of the real estate portfolio to generate earnings for its shareholders.

While there is the risk that companies which are trading at discounts to intrinsic values may be financially distressed (Fama and French, 1992; Chen and Zhang, 1998; Piotroski, 2000), the financial risks of high gearing levels and low tangible net asset values (NAV) are mitigated by

the SAREIT legislative framework (JSE, 2017). It is therefore expected that the SAREIT sector is well suited to value-based approaches for investment portfolio selection through quantitative fundamental analysis using the four valuation ratios; price-to-net-asset-value (P/NAV), price-to-earnings (P/E), price-to-cash-flow (P/CF) and Dividend Yield (DY). This research considers these value-based approaches to SAREIT investment, with a strong applied (but theoretically rigorous) emphasis.

1.2. Problem statement

The research problem is twofold:

1. Firstly, while academic research on property investment and portfolio management has grown substantially in recent years, such research has been more limited to the role of property in multi-asset portfolios, modelling and forecasting rents and development, indirect property investment vehicles and international property investment, with very little consideration given to the nature of the listed property sector in the context of the overall capital market (Corgel *et al.*, 1995; Hoesli and MacGregor, 2014).

   Moreover, while an extensive body of research in the general texts on finance and investment demonstrates the performance of value-based investment models when applied to a broad portfolio of firms that are undervalued by fundamental analysis (Graham and Dodd, 1934; Graham, 1949; Fama and French, 1992; Lakonishok *et al.*, 1994; Piotroski, 2000; Greenwald, 2001; Rousseau and Van Rensburg, 2003; Kwag and Whi, 2006; Gutaj, 2007; Del Fante, 2009), such research do not discriminate between sectors. Research on the application of value-based strategies to REITs is limited to two dated studies (Willard and Youguo, 1991; Goebel and Ma, 1993).

2. Secondly, a value-based investment approach may place a strong focus on SAREITs that may be in financial distress (Piotroski, 2000). It is not clear whether it is possible for the SAREIT investor to discriminate between financially strong and weak value-REITs through sound, accounting based fundamental analysis.

As a result, the following statement summarises the problem to be investigated in this minor dissertation:

The performance of the traditional value-based investment strategies in the context of SAREIT investment is not fully understood and this prevents the practical application of value-investing to SAREIT investment.

1.3. Research questions

The following research questions are considered in order to address the research problem:

1. *Does a value-based SAREIT investment strategy outperform a growth-based strategy and, if so, under what circumstances?*

2. *Are any of the four valuation indicators more successful than others in value-based portfolio selection, and which valuation ratio is the strongest?*

3. *Is it possible to discriminate between financially strong and weak value-REITs through sound accounting-based fundamental analysis?*

1.4. Research proposition and hypotheses

1.4.1. The proposition

The research proposition is as follows:

A value-based approach to SAREIT selection and investment will outperform a growth-based approach over the long term, and it is possible to discriminate between financially strong and weak value-REITs through sound accounting-based fundamental analysis.

1.4.2. The hypotheses

The proposition cannot be directly tested, because it is stated in the theoretical plane and the constructs are multidimensional (Bhattacherjee, 2012). Therefore, the proposition will be indirectly tested – through the hypotheses that follow – by examining the equivalent relationship between the measurable variables of the constructs *value-based investment* and *growth-based investment*.

The hypotheses and the associated measurable variables, which are applied as proxy measures to test the proposition (Bhattacherjee, 2012), are as follows:

1. *SAREITs that are trading at lower P/NAV ratios will outperform those trading at higher P/NAV ratios over one-, two-, three- and four-year holding periods*

2. *SAREITs that are trading at lower P/E ratios will outperform those trading at higher P/E ratios over one-, two-, three- and four-year holding periods*

3. *SAREITs that are trading at lower P/CF ratios will outperform those trading at higher P/CF ratios over one-, two-, three- and four-year holding periods*

4. *SAREITs that are delivering higher dividend yields will outperform those that are delivering lower dividend yields over one-, two-, three- and four-year holding periods*

5. *Return differentials between value and growth REITs will increase as the holding period increases*

6. *High F-Score value-REITs will outperform low F-Score value REITs over one-, two-, three- and four-year holding periods*

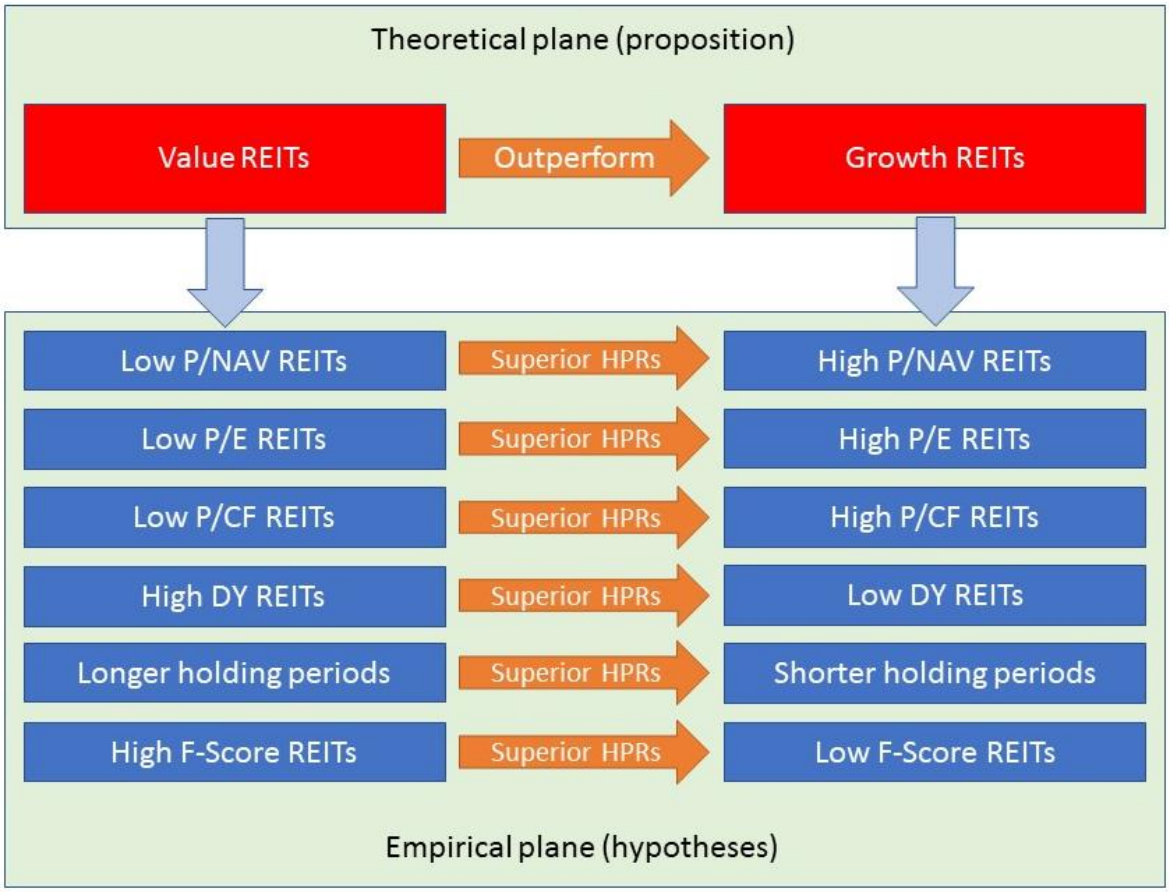


Figure 1 – The theoretical and empirical planes of the research, adapted from Bhattacherjee (2012)

1.5. Research aims and objectives

The aim of this research is to consolidate existing knowledge and to develop an understanding of value-based investment strategies in the context of SAREIT investment, through a comprehensive study of the existing literature on value-based investment and the analysis of quantitative financial data collected from the SAREIT sector:

1. The primary objective is to compare the performance of value-based SAREIT selection and investment strategies with the performance of growth-based SAREIT selection and investment strategies.

2. A secondary objective is to test the applicability of the Piotroski (2000) *F-Score Model* to the SAREIT sector in its ability to separate the winners from the losers through sound accounting-based fundamental analysis of historical financial data.

If successful, the research will contribute to an improved understanding of the traditional value-based investment strategies in the context of SAREIT investment and the functioning of the SAREIT sector within the capital market environment.

1.6. Research method

The research follows a quantitative and deductive approach to test existing value investing theories in the context of SAREIT investment. The goal is not just to test the existing theory but also to enhance it (Bhattacherjee, 2012).

The value investing concept is tested by analysing the one-, two-, three- and four-year holding period returns (HPRs) of SAREITs relative to their P/NAV, P/E, P/CF, and DY ratios. The research also explores the use of Piotroski's *F-Score Model* (Piotroski, 2000) to draw distinction between financially strong- and weak SAREITs, by applying the model to the SAREIT's historical financial performance data and analysing subsequent HPRs.

The financial performance data is collected from the *ShareData* platform (Profiledata, 2018), and the stated hypotheses are tested through rigorous statistical analysis using parametric techniques.

1.7. Limitations

The research analyses historical performance data collected for the years 2013 through 2018, in line with the establishment date of the SAREIT sector, and the last available full-year performance data. The research and results are therefore limited to the period 2013 – 2018.

The calculation of intrinsic value through discounted cash flow analysis is problematic in that future cash flows and discount rates can only be estimated or assumed. This research does not follow a speculative approach to calculating intrinsic value, but rather investigates the performance of a value-based strategy using historic figures which are known. It is not the purpose of this study to explore forecasting- or speculation techniques, nor to examine the qualitative or behavioural issues related to portfolio selection.

Given the vast differences between property markets in different countries, country-specific factors can significantly affect the value indicators (Foye and Mramor, 2016). There is a South African emphasis to this research and all research outcomes are in the specific context of the SAREIT sector. While it may be a recommendation for future research, it is not the intention of this research to draw any cross-border differentiation.

1.8. Structure of the research report

The following chapter covers the investment background which is essential for an understanding of value-based investment in the SAREIT context, through a review of existing literature on value-based investing, the characteristics of the SAREIT asset class, and the analyses adopted by others to develop a value-based investment strategy. Chapter 3 outlines the analyses necessary for a value-based approach and presents the research design and methodology adopted for this research, while chapter 4 outlines and discusses the results from the quantitative analyses. Chapter 5 concludes with a discussion on the performance of a value-based investment strategy when applied to the SAREIT sector and offers recommendations for further research.

Tables and figures are used throughout this paper to briefly summarise or illustrate the approaches taken or outcomes observed. The full and comprehensive data related to these tables and figures can be found in the Appendix.

2. Literature review

2.1. Introduction

Substantial academic empirical research has been published on value and growth investing. This chapter provides a critical review of the literature, considers the various academic theories which attempt to explain the superior performance of value strategies over growth strategies, and provides a new perspective by building a theoretical framework for value investing in the SAREIT context.

Since the existing literature offers overwhelming evidence in support of the proposition that value investing generates superior returns over growth investing, the focus is turned to the more conflicting schools of thought which attempt to explain the *value effect*, including risk factors, behavioural considerations and the agency costs of professional investment management. Central to the use of value investing as a pricing model is the view that there exist market inefficiencies, resulting in mispricing, which can be exploited. This chapter reviews the arguments for and against the Efficient Market Hypothesis (EMH) and mispricing and considers how existing capital market research can be used to assist with the valuation of stocks in the SAREIT sector.

This chapter sets an important theoretical framework for the research design and methodology, the findings and the discussion thereof in subsequent chapters.

2.2. The performance of value investing

The evidence in support of value-based strategies, found in the substantial academic literature on this topic, is overwhelming. In a review of existing literature, Chan and Lakonishok (2004) proposed that the recent rise of lively academic debate on the performance of value versus growth investing can largely be traced back to the seminal paper published by Fama and French (1992), which was later extended and refined by Lakonishok *et al.* (1994).

The study by Fama and French (1992) involved the formation of 10 portfolios with stocks selected from the New York Stock Exchange. The value portfolios were those comprising the top deciles of stocks ranked by high B/M or low P/E ratios respectively. Figure 2, which summarises the findings of the study, clearly demonstrates the outperformance of value-based strategies over growth-based strategies. The highest ranked value portfolio by B/M ratio

outperformed the lowest ranked growth portfolio by 1.53% per month, while the return difference between the extreme P/E ratio portfolios was slightly less at 0.68% per month.

Figure 2 – The returns of value vs growth investment strategies (Fama and French, 1992)

Perhaps most significantly, the Fama and French (1992) study found no strong correlation between a stock's average returns and the systematic risk of the stock in comparison to the unsystematic risk of the entire market (i.e. the stock's *beta coefficient*). Rather, the research identified a strong relationship between a stock's average return and its B/M ratio and demonstrated that portfolios of high B/M ratio companies outperform portfolios of low B/M ratio companies. This research, which built on similar earlier studies (Basu, 1977; Stattman, 1980; Rosenberg *et al.*, 1985; Chan *et al.*, 1991), largely discredited the ability of the capital asset pricing model (CAPM) to explain the cross-section of average stock returns, and shifted the focus of subsequent research to the occurrence of the *book-to-market effect* and the *size effect* in average stock returns (Fama and French, 1992: 440; Chan and Lakonishok, 2004).

Lakonishok *et al.* (1994) extended and refined the work of Fama and French (1992) by considering the performance of value-based strategies from the perspective of the long-term investor. Delivering similar results, the extreme value portfolio by B/M ratio outperformed the extreme growth portfolio by an average of 10.5% per annum over the five years following

portfolio formation, while the return difference between the extreme P/E ratio portfolios was an average of 5.4% per annum.

Figure 3 summarises the findings of the study.

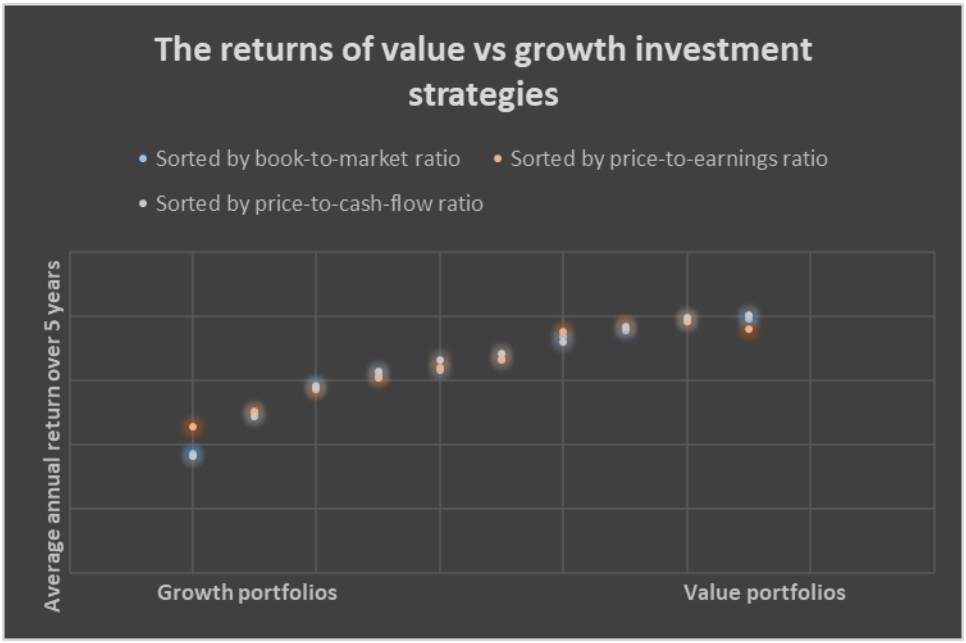


Figure 3 – The returns of value vs growth investment strategies (Lakonishok *et al.*, 1994)

The study by Lakonishok *et al.* (1994) considered the *size effect* of returns described by Fama and French (1992). Since the value portfolios continued to outperform the growth portfolios after controlling for differences in size of the market capitalisations of the various stocks, the study concluded that *size effect* is not a variable of the *value effect* of returns – in short, the success of value-based strategies is not influenced by company size.

Chan *et al.* (1991) and Lakonishok *et al.* (1994) also considered the P/CF ratio as a third indicator of value. Consistent with the B/M and P/E results, both studies revealed that the value-portfolios outperform the growth portfolios (see figures 3 and 4).

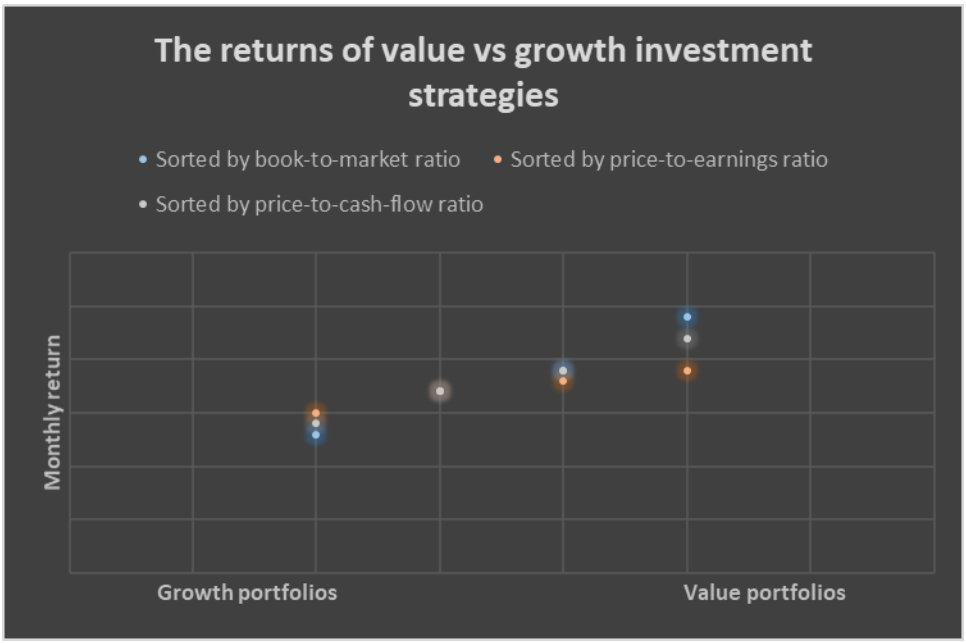


Figure 4 – The returns of value vs growth investment strategies (Chan *et al.*, 1991)

Since the studies by Chan *et al.* (1991), Fama and French (1992) and Lakonishok *et al.* (1994) were all based on data collected from the same U.S. markets (NYSE, Amex and Nasdaq) and during the same period within the economic cycle, a concern was raised about the possibility of data snooping through the repeated analysis of the same data (Chan and Lakonishok, 2004). If data snooping did indeed occur with these studies, the developed value theory my not hold for other markets or during other periods within the economic cycle.

Fama and French (1998) subsequently addressed the data snooping concerns by applying the 1992 study to a broad sample from 13 developed markets for international evidence of value versus growth. The study involved the formation of value- and growth portfolios by the four value indicators of B/M, P/E, P/CF and DY. The results are consistent with those from the U.S. markets in almost every country and across all value indicators. Figure 5 provides a summary of the results. As for emerging markets, studies by Kargin (2002) and Del Fante (2009) both confirmed that value strategies in underdeveloped countries deliver results consistent with those in developed countries, as have many other country-specific studies (Page and Palmer, 1991; Van Rensburg, 2001; Rousseau and Van Rensburg, 2003; Gutaj, 2007; Sareewiwatthana, 2013; 2014).

Figure 5 – The international evidence for value vs growth investment strategies (Fama and French, 1998)

During periods of economic contraction, the demand for services and goods suffers. This may affect the value-based approach which relies on valuation ratios that do not forecast future earnings. This is of relevance to this study in that the demand for real estate may suffer, affecting future rental streams which are not reflected in current valuation ratios. Furthermore, an issue with buying stocks in a contracting market is that stocks that appear undervalued may continue to drop for some time. If returns from value-based portfolios are sensitive to the economic cycle this would significantly affect investors' approach to the use of value-based strategies. Lakonishok *et al.* (1994) and Kwag and Whi (2006) both considered this issue by examining the performance of value-based investment strategies in the context of the economic cycle. Both studies compared the performance of value-based portfolios with growth-based portfolios during periods of economic expansion and contraction respectively. The study by Kwag and Whi (2006) compared the portfolios using three risk-adjusted performance measures, namely the Sharpe-, Treynor- and Information Ratios, and found that value-based strategies consistently outperform growth-based strategies regardless of the stage of the economic cycle. Similarly, the study by Lakonishok *et al.* (1994) compared the worst 25 months of U.S. stock market performance within one economic cycle, with the remaining 88 months of negative market returns, the 122 months with positive market returns excluding the best 25, and the 25 months with the best market performance (i.e. a total of 260

months in the cycle). The value portfolios outperformed the growth portfolios during all stages of the economic cycle. Most significantly, both studies demonstrated that value-based strategies are in fact more valuable during periods of economic contraction.

While much of the focus of the research is on the relationship between the *value effect* and the *size effect* (Chan and Lakonishok, 2004), a few studies have considered the relationship between the *value effect* and other variables, including holding periods (Rousseau and Van Rensburg, 2003), price momentum (Asness, 1997) and the incorporation of intangible assets for value analysis (Chan *et al.*, 2001). A simulation study by Rousseau and Van Rensburg (2003) showed that the performance of value-based investment strategies improve as the investment holding period lengthens and that *"value investors appear to be rewarded for time"* (Rousseau and Van Rensburg, 2003: 318). The study also found that the distributions of returns are increasingly skewed to the right as the investment horizon increases, suggesting that most of the *value effect* is attributable to a minority of shares in a value portfolio. Likewise, Piotroski (2000) and Noma (2010) examined the performance of an accounting-based fundamental analysis strategy focused on the selection of high B/M ratio firms, and found a right-skewness to the distribution of the higher mean realised returns. The paper documents that *"less than 44% of all high (B/M) firms earn positive market-adjusted returns in the two years following portfolio formation"* (Piotroski, 2000: 2) and suggests that the performance of value-based portfolios can be improved by discriminating between the outperforming minority and weak majority. It was further demonstrated that discrimination between the eventual *"winners and losers"* are indeed possible through simple accounting-based fundamental analysis.

The fact that the same overall findings emerge in various markets, including developed as well as emerging markets, and across a range of varying market- and practical conditions, reinforces confidence that data mining is not driving the research. The literature review revealed overwhelming evidence that value strategies outperform growth strategies quite consistently and across all states of the world.

2.3. Explaining the performance of value strategies

Despite criticism by some (Ball and Kothari, 1989; MacKinlay, 1995) the evidence in support of value-based strategies have generally withstood the tests (Lakonishok *et al.*, 1994; Chan and Lakonishok, 2004), and as a result academics now largely agree that value investment strategies tend to outperform growth investment strategies. However, discussions about the

underlying reasons for the superior performance are more controversial and there exists much less consensus (Lakonishok *et al.*, 1994; Chan and Lakonishok, 2004).

Two primary schools of thought are adopted by researchers to explain the performance of value-based investment strategies. The first argues that value-based strategies are fundamentally riskier than growth-based strategies since value-based strategies place an emphasis on stocks that are potentially in some form of financial distress, and therefore investors must be compensated for taking on greater risk (Fama and French, 1992; Asness, 1997; Chen and Zhang, 1998). The second argues that markets are inefficient and that stock prices do not fully reflect all financial information in a timely manner and, therefore, such market inefficiencies can be exploited by identifying undervalued stocks through sound accounting-based fundamental analysis (Lakonishok *et al.*, 1994; Piotroski, 2000; Rousseau and Van Rensburg, 2003). While a third explanation suggested that the *value effect* is the result of data-selection bias (Kothari *et al.*, 1995; MacKinlay, 1995), this argument was swiftly discredited (Chan *et al.*, 1995).

EMH theory suggests that stock will always fully reflect all available information, will always trade at fair market value, and that the purchase of undervalued stocks is therefore impossible (Basu, 1977; Plaistowe and Knight, 1986). Proponents of EMH argue that greater returns can only be achieved by taking on greater risk, and therefore the outperformance of value-based strategies to growth-based strategies is the result of the greater risk inherent in value-based strategies (Fama and French, 1992; Asness, 1997; Chen and Zhang, 1998). To put it differently, investors in value stocks are compensated for taking on greater fundamental risk through higher average returns. The implication of this argument is that no degree of technical or fundamental analysis will identify stocks that are undervalued, since EMH suggests that prices reflect all available information, and therefore no stock is fundamentally undervalued; rather, all risk premiums are priced into every stock.

Fama and French (1996) argued in favour of EMH to explain the *book-to-market effect* and suggested that high B/M portfolios expose the investor to companies that may be in financial distress, and therefore carry a greater degree of risk compared to growth portfolios. While this argument may hold for value stocks based on P/E, P/CF and DY ratios, it is questionable in explaining the *book-to-market effect*, particularly in the context of the *tangible-asset-intensive* SAREIT sector. Based on this argument, companies with limited book value such as 'tech stocks'

pose less risk to those with strong balance sheets comprising tangible assets, and which consequently have high B/M ratios. The value-growth study by Lakonishok *et al.* (1994) and the later study by Fama and French (1998) recorded risk measures in addition to the returns figures of the value and growth portfolios, including standard deviations, volatilities and betas. These studies found no notable differences in these risk measures, discrediting the notion that the superior returns of value strategies necessarily reflect higher risk.

The second argument is that value-based strategies are not necessarily riskier than growth-based strategies, but that value investing outperforms the market by exploiting the irrational behaviour of market participants (Basu, 1977; De Bondt and Thaler, 1987; Lakonishok *et al.*, 1994; Asness, 1997; Porta *et al.*, 1997; Piotroski, 2000; Rousseau and Van Rensburg, 2003). This view is based on the premise that markets are inefficient (and the 'market players' irrational) and can therefore be exploited by rational investors. Such inefficiencies or irrationalities may include the extrapolation of past earnings growth too far into the future, market overreaction to news and announcements or basing investment decisions on mere company reputation irrespective of the company's financial data. Insofar as value investing takes a contrarian approach to such inefficiencies and irrationalities through sound accounting-based fundamental analysis, value investing exploits the cognitive biases underlying investor behaviour and the agency costs of professional investment management by investing disproportionately in underpriced stocks and disinvesting from overpriced stocks (De Bondt and Thaler, 1987; Lakonishok *et al.*, 1994; Porta *et al.*, 1997; Chan and Lakonishok, 2004). Thus, value-investing outperforms the market.

Notwithstanding the recent rise of the automated investment platform, investment decisions are still largely made by individuals and the possibility of cognitive biases in investment behaviour is prominent. A study by Chan *et al.* (2003) showed limited persistence in long-term growth or contraction of stock performance and discovered that analysts typically overestimate the predictability of future performance from past performance. Furthermore, since analysts, fund executives and investment managers have a self-interest in recommending and backing successful stocks in order to generate trading commissions and new business, these individuals tend to gravitate toward the seemingly successful growth-oriented stocks (Bhushan, 1989; Lakonishok *et al.*, 1992; Chan and Lakonishok, 2004; Jegadeesh *et al.*, 2004). On this basis, and since value stocks tend to have recent histories of financial distress relative

to growth stocks (Lakonishok *et al.*, 1994), investors are more likely to favour growth stocks and avoid value stocks despite the evidence supporting value-based investment strategies. As a result, value stocks may become underpriced and growth stocks overpriced relative to their accounting-based fundamental data and such market mispricing may persist over extended periods of time (Lakonishok *et al.*, 1994; Porta *et al.*, 1997; Shleifer and Vishny, 1997; Chan and Lakonishok, 2004).

Insofar that the B/M ratio is a measure of the market's perception of a stock's future growth opportunities (Porta *et al.*, 1997; Chan and Lakonishok, 2004), a stock's growth figures should be inversely proportionate to its historical B/M ratios. The study by Chan *et al.* (2003) tested this premise and found no evidence of an inverse relationship between growth figures and historical B/M ratios. In another approach, research by Piotroski (2000) demonstrated that much of the superior performance to value-based analysis can be largely attributed small-cap stocks with limited share turnover and analyst following. Markets appear to under- or overreact to the financial information and announcements of these firms and *"do not fully incorporate historical financial information into prices in a timely manner"* (De Bondt and Thaler, 1987; Porta *et al.*, 1997; Piotroski, 2000: 1). This is similar to the findings of Fama and French (1992) and Lakonishok *et al.* (1994) in their studies of the *size effect* of stock returns. While the value strategies continued to outperform the growth strategies, the return differentials were less substantial in the portfolios of the largest stocks by market capitalisation. One explanation could be that small companies are less widely followed and analysed, and patterns of mispricing may therefore be more pronounced. To the extent that undervalued stocks do not enjoy as much analyst coverage as growth stocks and tend to be ignored for analysis given the lack of investor interest, EMH does not hold for value stocks given the absence of perfect information. It therefore stands to reason that an investor can consistently generate superior risk-adjusted returns through sound accounting-based fundamental analysis, particularly since the historical financial data of undervalued companies is likely to be the most reliable source of information. Conversely, it can of course be argued that the outperformance of small-cap stocks with limited turnover and investor coverage can be attributed to the higher risk associated with lack of accessibility to information or reduced liquidity resulting in higher transaction costs.

While the evidence does support the argument that that the superior returns of value investing can be attributed to market inefficiency and investor irrationality, it does not conclusively dismiss the premise that the superior returns of value strategies reflect their higher fundamental risk. Since the risk associated with capital market investment can manifest itself in numerous ways (Basu, 1977), the risk-based explanation cannot be definitively discredited. Whichever the school of thought, however, accounting-based fundamental analysis is warranted for value investing, either to analyse data which is not reflected in a stock price or to mitigate the risk inherent in value-investing by separating financially strong and weak companies.

2.4. The SAREIT perspective

The establishment of the REIT asset class in the 1960s, afforded researchers, real estate investors and market analysts a unique opportunity to investigate issues concerning real estate finance and economics. Direct property investment is typically associated with unique issues, including heterogeneity, fixed location, large lot size, high transaction costs, low liquidity, and the use of market valuations rather than known prices for market information – all of which result in limited data availability and a consequent lack of perfect market information. REITs, however, provide improved access to daily financial data on par with most other publicly traded stocks, allowing researchers to test risk/return characteristics, relative performance and behavioural issues more concisely (Worzala and Sirmans, 2003). Furthermore, the unique legislative frameworks by which REITs are governed may facilitate or even improve the applicability of models such as value investing, through improved certainty of capital structures, earnings forecasts or dividend policies.

In a review of existing literature, Corgel *et al.* (1995) found that the academic literature on REITs are largely divided into the three issues of 1) investment decisions, 2) financing decisions and 3) the characteristics of returns and risk. This literature review considers these issues in the context of the South African market and value-investment theory. While the effects of REIT acquisitions, dispositions and corporate governance and restructurings on shareholder value is an interesting field of REIT research (Corgel *et al.*, 1995), it is not relevant to the research aims of this dissertation and is therefore not discussed in this paper.

2.4.1. A brief history and overview of SAREITs

SAREITs provide investors with diversified exposure to the South African real estate asset class while maintaining the liquidity benefits of conventional capital market investments.

The SAREIT sector was established in May 2013 with the merger of the Association of Property Unit Trusts and the Property Loan Stock Association, and through the enactment of section 25BB of the Income Tax Act. The Act provides tax exemptions for qualified SAREITs that comply with registration requirements. To be qualified, the SAREIT must –

1. own property of more than R300 million in value;
2. maintain gearing levels below 60%;
3. derive at least 75% of earnings from rental revenue; and
4. distribute at least 75% of annual taxable earnings to shareholders.

The tax benefits to qualifying SAREITs and their shareholders include the deduction of qualifying distributions by SAREITs from their income, and exemption from any dividends tax being levied against distributions to South African shareholders. Qualifying SAREITs are also largely exempt from capital gains tax, although there are certain exceptions to this benefit (SAREIT.co.za, 2018).

SAREITs comprise conventional corporate structures like most publicly traded companies and are administered on behalf of shareholders by boards of directors, while the daily executive tasks are performed either by SAREIT staff (internally managed) or by external property specialists (externally managed). Unlike some of its international counterparts which classify REITs according to type of security instrument (NAREIT, 2018), the South African REIT Association (SAREIT.co.za, 2018) classifies SAREITs by the property sector within which they invest, including commercial, retail, industrial, residential, hospitality or diversified.

The establishment of the SAREIT sector places the South African listed property sector on par with international standards for listing and publicly funding property assets, resulting in exponential increases in total market capitalisation and trading volumes since 2013. There are currently 40 JSE-listed SAREITs, offering sector- and worldwide diversification into the property asset class.

The SAREIT Association publishes the SAREIT Best Practice Recommendations, which facilitates transparency and consistency in financial reporting standards, providing for easier analysis and comparison between SAREIT indicators (SAREIT.co.za, 2018).

2.4.2. Investment issues

A good starting point for testing the performance of value investing strategies in the REIT market is to appropriately characterise REITs as financial assets. The question that emerges is whether REITs are real estate investments, or whether they are more likened to traditional investment in the capital market. Given the investment rules prescribed by the REIT legislative framework, which require that REITs invest predominantly in income generating properties, it may be expected that REIT returns should track the performance of the real estate market within which they operate. However, since REITs are publicly traded, the traditional issues related to real estate investment (e.g. heterogeneity, fixed location, lot size, transaction costs, liquidity, limited data, and the use of market valuations rather than known prices for market information) are largely removed from the perspective of the REIT investor and therefore REITs may be expected to behave more like traditional stocks.

Some of the earliest studies found to consider the issue of the financial nature of REITs (albeit indirectly) was published by researchers for Goldman Sachs (Ross and Zisler, 1987a; Ross and Zisler, 1987b; Ross and Zisler, 1991). The underlying theme of this early research reflects a general scepticism that the cross-section of REIT returns reflects the real estate market within which they operate, given the volatility of such returns which are more likened to the stock markets. Conversely, research by Ennis and Burik (1991) argue that the observed volatility of REIT returns is consistent with the expected volatility of returns from direct real estate investment, and that therefore REIT return performance measures are a suitable proxy for the performance of the real estate market.

The idea of the hybrid nature of REITs was first considered and tested by Mengden and Hartzell (1986) and later refined by Corgel and Rogers (1990). The argument of both studies was that REIT returns exhibit characteristics of both the real estate market and the stock market – REIT dividends and valuations are closely associated with the fundamental performance of the income generating properties, while REIT prices exhibit similar characteristics to the stock market in that price changes are influenced by fundamental stock valuations, risk perceptions

of investors, market inefficiencies and behavioural issues. In a later literature review by Corgel *et al.* (1995), it was found that numerous papers on the composition of REIT returns have since been published (Geltner, 1990; Giliberto, 1990; Gyourko and Keim, 1992; Liu and Mei, 1992; Geltner, 1993; Giliberto, 1993) in an attempt to understand the relationships between REITs, direct real estate and the stock market.

The studies by Giliberto (1990; 1993) found a correlation in the return regressions of REITs and direct real estate and concluded that REIT returns contain factors that represent direct real estate market fundamentals. While differing arguments are tabled for the causality of returns between REITs and direct real estate (Scott, 1990; Han, 1991; Gyourko and Keim, 1992; Liu and Mei, 1992; Ghosh *et al.*, 1996), all confirm the *"common factor"* finding of Giliberto (Corgel *et al.*, 1995: 18). Furthermore, and most significantly, a study by Liu and Mei (1992) found that REIT returns can be more reliably predicted in comparison to other stocks given the underlying nature of a REIT's income generating assets, while research by Scott (1990) found that REIT prices do not reliably track indicators of fundamental value.

These findings are of significant relevance to the research proposition: In line with the arguments presented earlier in this literature review (Basu, 1977; De Bondt and Thaler, 1987; Lakonishok *et al.*, 1994; Asness, 1997; Porta *et al.*, 1997; Piotroski, 2000; Rousseau and Van Rensburg, 2003) these findings support the view that value investing in SAREITs, through sound accounting-based fundamental analysis, can outperform the market by exploiting market inefficiencies and the irrationalities of the market participants.

2.4.3. Financing issues

Earnings and dividend policy

The ability of any company to generate and distribute steady profits is subject to many variables, including company strategy, management, and business- and economic fundamentals (Worzala and Sirmans, 2003). As discussed earlier, there are limitations to the reliability of earnings forecasts in that existing data do not guarantee future earnings, nor do they consider potential earnings growth. Similarly, dividends are not guaranteed, and the declaration of dividends is generally dependent on both the profitability of the company as well as the policy of its directors.

However, SAREITs have less discretion with respect to earnings and distributions to shareholders compared to other listed companies, as legislation requires that SAREITs generate at least 75% of earnings from income-generating real estate, and that they distribute at least 75% of their taxable earnings to shareholders (JSE, 2017). As such, financial ratios derived from historic data in the case of REITs offer greater reliability as an indication of future performance compared to other stocks which are not governed by REIT legislation. This is expected to facilitate value-based portfolio selection based on P/NAV, P/E, P/CF and DY. Furthermore, SAREIT legislation and best practice recommendations prescribe accounting and financial reporting requirements, preventing the adoption of creative accounting methods which may inflate earnings-per-share (EPS) values and ratios (JSE, 2017; SAREIT.com, 2018).

On the other hand, the earnings and dividend policies enforced by SAREIT legislation may also be highly restrictive and present SAREITs with unique financing issues. Notably, since SAREITs are more limited in their ability to retain earnings to fund future growth opportunities, they must plan their ability to finance future real estate acquisitions with great care, through appropriate capital structuring and budgeting.

Although no conclusive evidence could be found in previous research which directly addresses these contradictory issues arising from REIT regulation, this paper revisits this issue in the concluding chapter of this report.

Capital structure and budgeting

The JSE REIT Listings Requirements (JSE, 2017) dictate that SAREITs may not have liabilities of more than 60% of the company's total consolidated assets, and most SAREITs have loan-to-value (LTV) ratios well below this figure. SAREITs therefore comply with Graham's (1949) prerequisite of low debt levels for the application of the value investment model.

They key issue that arises, however, is that SAREITs must compete in the debt markets with conventional, non-tax-exempt, firms which have a greater appetite for interest-bearing debt given the tax benefits (Corgel *et al.*, 1995). It is on this basis that Howe and Shilling (1990) tested market reactions to REIT announcements of new borrowings versus equity offerings. Interestingly, existing evidence does not point to negative market reactions to new borrowings and shows mixed reactions to equity offerings (Howe and Shilling, 1990; Jaffe, 1991).

However, empirical research on the effect of capital structures and budgeting is thin (and, in the case of SAREITs, nonexistent) and there is much to be gained from further analysis of SAREIT data in this field.

2.4.4. Previous applications of trading anomalies to REITs

Previous research on the application of trading anomalies to the REIT sector may give an indication of the applicability of value-strategies.

Net asset value, book-to-market ratio and accounting fundamentals

Similar to the work of Chan *et al.* (1991), Fama and French (1992), Lakonishok *et al.* (1994) and Fama and French (1998), a study by Goebel and Ma (1993) found strong correlations between REIT returns and their B/M, P/E, P/CF and DY ratios.

The Goebel and Ma (1993) study also found that REITs generally trade at discounts to NAV. Any assessment of NAV to determine intrinsic value is only useful for companies with mostly tangible assets (Graham and Dodd, 1934; Graham, 1949). Intangible assets are typically more open to interpretation and speculation, difficult to quantify, and the value of these assets are often dependent on the ongoing existence of the company itself. Conversely, the value of tangible fixed assets, such as the real estate investments of REITs, are underpinned with greater reliability. Since SAREITs are 'tangible asset intensive', they are well suited to NAV analysis in the value-based investment strategy to identify stocks that are trading at discounts to NAV.

Size effect

Similar to the *size effect* studies in value investing literature (Page and Palmer, 1991; Fama and French, 1992; Lakonishok *et al.*, 1994; Piotroski, 2000), the study by Willard and Youguo (1991) examined REIT returns relative to their market values, and found that smaller REITs deliver superior returns without increased risk.

The existence of the *book-to-market effect* and the *size effect* in REITs further reinforces the notion that REITs are well suited to value investing strategies through sound, accounting-based fundamental analysis (see "Explaining the performance of value strategies"), such as the *F-Score Model* recommended by Piotroski (2000).

2.5. The value indicators

Most of the research on the performance of value-based investment strategies adopt the B/M, P/E and P/CF ratios as the three primary indicators of value stocks versus growth stocks. Essentially, stocks that are trading at high B/M, low P/E or low P/CF ratios, compared to their peers, are considered 'value stocks' (Chan *et al.*, 1991; Fama and French, 1992; Lakonishok *et al.*, 1994).

Following the findings by Fama and French (1992), which revealed the strong relationship between a stock's average return and its B/M ratio, much of the focus of subsequent research was shifted to the B/M ratio as an indicator of value (Chan and Lakonishok, 2004). However, there are shortcomings to the B/M ratio as a standalone value indicator, and the possibility that stocks which are classified as value stocks by their B/M ratio may be less attractive by other valuation ratios, such as P/E, P/CF and DY, cannot be ruled out. This issue suggests that other indicators – or a combination of indicators – may serve as a stronger basis for value-investment strategies.

While a stock with a high B/M ratio may or may not be in some form of financial distress, a stock with strong recent returns relative to its market value is unlikely to be in financial distress (Asness, 1997). To this end, the P/E ratio may be a more reliable value indicator. As depicted in figures 2 and 3, the work by Fama and French (1992) and Lakonishok *et al.* (1994) both revealed that return differentials between the extreme value and growth portfolios based on P/E ratios are lower than those based on B/M ratios. One explanation for this result may be *"the noisy nature of earnings"*, where stocks may have high P/E ratios not only due to its status as a growth stock but also due to recently or temporarily depressed earnings (Chan and Lakonishok, 2004: 72), which may result in errors in stock selection during value- or growth-based portfolio formation.

A third valuation indicator that has been tested to a lesser extent in previous research is the P/CF ratio, which measures a company's market value relative to its operating cash flow. A key benefit of the P/CF ratio over the P/E ratio is that cash flow figures cannot be manipulated as easily as earnings figures (which are affected by non-cash items such as depreciation). It is therefore useful for the valuation of stocks with negative P/E ratios due to large non-cash charges. As shown in figures 3 and 4, portfolios formed on the basis of P/CF ratio can generate

larger return spreads than those based on B/M and P/E ratios (Chan *et al.*, 1991; Lakonishok *et al.*, 1994).

Lastly, research on the use of the dividend yield as a valuation indicator is limited and the results less consistent (Asness, 1997; Fama and French, 1998; Kwag and Whi, 2006; Sareewiwatthana, 2011; 2013). While DY appears to be a weaker predictive variable in existing research, the effect of the distribution requirements of SAREITs on the reliability of DY as a valuation indicator is unknown.

While the literature shows that many value strategies can deliver superior returns to growth strategies, it does appear that the value indicators are not necessarily correlated. A value strategy that adopts a combination (or all) of the value indicators may therefore be warranted for enhanced portfolio performance. This paper follows up on this suggestion in the concluding chapter of this report.

2.6. Summary and conclusions

The large body of empirical research reviewed in this chapter consistently find that value investing offers superior returns to growth investing. While the *size effect* is a proven variable of the differential in stock returns, the *value effect* is present in both small-cap and large-cap stocks. Furthermore, value investing theory holds for developed and emerging markets worldwide, and in all stages of economic expansion and contraction.

The underlying reasons for the outperformance of value strategies over growth strategies remain an open debate. However, much of the evidence from the reviewed research support the argument that value stocks are not necessarily riskier than growth stocks, and that expectational errors and market overreaction are at least part of the reason for the superior returns on value stocks. The school of thought that relies on market inefficiency and the extrapolative biases in investor behaviour to explain the *value effect* appears to be the most convincing.

SAREITs offer a unique opportunity to examine the performance of value-based investment strategies through accounting-based fundamental analysis, given the suitability of SAREITs to meet the criteria for value-based analysis. The legislative framework by which SAREITs are governed facilitates and imposes the formation of real estate portfolios of mostly long-term, tangible, fixed assets (i.e. real estate), with low gearing levels, and which provide for the regular

and consistent payment of dividends. While companies that are trading at discounts to intrinsic values tend to be financially distressed, the financial risks of high gearing levels and low tangible net asset values are mitigated by the SAREIT legislative framework. It is therefore expected that the SAREIT sector is well suited to value-based approaches for investment portfolio selection through sound accounting-based fundamental analysis.

The research papers considered in this literature review all share the common objective of advancing knowledge about the financial economics of the capital markets and of REITs respectively. This dissertation is a contribution to this common objective in both research fields.

3. Research design and methodology

3.1. Introduction

The aim of this research is to consolidate existing knowledge and to develop an understanding of value-based investment strategies in the context of SAREIT investment. The objectives are to compare the performance of value-based SAREIT portfolios with the performance of growth-based SAREIT portfolios, to compare the performance of each of the four valuation indicators for value-based SAREIT selection, namely P/NAV, P/E, P/CF and DY, and to test the applicability of the Piotroski (2000) *F-Score Model* to the SAREIT sector in its ability to separate the winners from the losers through sound accounting-based fundamental analysis of historical financial data.

Most of the academic research reviewed in this report is focused on global capital markets and is largely based on data up to the end of the 20th century. This research report provides an update to the existing evidence in the SAREIT context to 2018. The study considers the premise that the use of multiple valuation ratios may improve results (Chan and Lakonishok, 2004) and furthermore that it is possible to discriminate between strong and weak value stocks (Piotroski, 2000; Noma, 2010).

This chapter presents the research design, the research sample and the data collection procedures, and the research methods adopted to analyse the data and to address the research questions.

3.2. Research design

The stated research questions are:

1. *Does a value-based SAREIT investment strategy outperform a growth-based strategy and, if so, under what circumstances?*

2. *Are any of the four valuation indicators more successful than others in value-based portfolio selection, and which valuation ratio is the strongest?*

3. *Is it possible to discriminate between financially strong and weak value-REITs through sound accounting-based fundamental analysis?*

Since the research questions call for substantial accounting-based fundamental analysis of a large dataset, there is a strong quantitative quality to the research which seeks to objectively predict and generalise the findings. The research takes a *positivist* approach, by testing hypotheses associated with existing value investing theory in the context of SAREIT investment.

Approaching the research problem with a pure *positivist* worldview, however, presents potential problems of *"observer bias"* and *"structural limitations"* (Bhattacherjee, 2012: 11). Indeed, the literature review revealed evidence that much of the *value effect* could be attributed to the behaviour of the capital market participants, and therefore an understanding of the behaviour of the participants, although beyond the scope of this research, is warranted. There is therefore a greater *post-positivist* tone to this study, which provide for the empirical testing of the quantitative data while acknowledging the view that human knowledge is always challengeable and can never be proven but only disproven (Bhattacherjee, 2012). The empirical evidence presented in chapter 4 forms the basis for the attempt to disprove the null- or alternative hypotheses.

Though the research design does retain the positivistic emphases on objectivity and the use of scientific methods, there is value in drawing clear distinctions between quantitative and qualitive research, since it may provide the basis for subsequent *pragmatic* approaches in working back and forth between the distinctive approaches to the same research problem (Morgan, 2007).

	Qualitative Approach	Quantitative Approach	Pragmatic Approach
Connection of theory and data	Induction	Deduction	Abduction
Relationship to research process	Subjectivity	Objectivity	Intersubjectivity
Inference from data	Context	Generality	Transferability

Table 1 – Key issues in social science research methodology (Morgan, 2007)

This study exhibits the characteristics of both *descriptive* and *exploratory* research types as defined by Bhattacherjee (2012). The research is *descriptive* to the extent that the observations are based on the scientific method, and is replicable and precise, thereby reinforcing reliability.

There is, however, an *exploratory* tone to the discussions on the findings since the research serves to scope the extent of the *value effect* in the SAREIT sector, to generate some initial ideas about value investing in the SAREIT context, and to lay the foundation for more extensive studies on the application of value investing strategies to REIT investment. This study does not seek explanations to any observed *value effect* (or lack thereof) in the SAREIT sector – such *explanatory* research is a recommendation for future research on the topic.

3.3. Data

Financial performance data was collected from the Sharedata database (Profiledata, 2018), which contains the complete stock information, including live- and year-end financial data of all stocks listed on the Johannesburg Stock Exchange (JSE). The database covers stock information dating back up to 10 years, so all SAREIT data since the inception of the sector in 2013 is available and the sample period covered in this study is from the end of May 2013 to the end of October 2018.

A total of 40 active SAREITs listed on the JSE was identified, of which 3 received REIT status in early 2018, and 4 are secondary (preference share) listings of existing SAREITs. Since the 3 recently listed SAREITs have not yet published any full-year results and given that the 4 preference shares lack the liquidity and return characteristics of their 'ordinary' counterparts, these 7 listings were excluded from the dataset.

Next, the annual financial performance data of the remaining 33 SAREITs was collected for 2013 – 2018, dictated by the first available year-end results and the last available full year performance data. This provided a total of 117 observations comprising one-, two-, three- and four-year holding period performance data relative to the valuation ratios. The number of valid cases for each of the observations vary according to the validity of the respective valuation ratios and the availability of HPR data based on the age of the SAREIT concerned. In line with the methods adopted in previous studies on value investing (Fama and French, 1992; Lakonishok *et al.*, 1994; Piotroski, 2000; Chan and Lakonishok, 2004), negative P/E and P/CF ratios were excluded since negative ratios cannot be interpreted in terms of expected growth rates, and therefore in order to avoid the occurrence of 'false positives' during portfolio formation. Also, since some of the SAREITs are less than four years old, multi-year HPRs were not available in all cases. Table 2 provides a breakdown of the total number of valid cases, while complete tables of all observations can be found in the appendix.

HPR	P/NAV	P/E	P/CF	DY	F-SCORE
1 year	117	116	80	117	93
2 year	84	83	59	84	65
3 year	52	51	38	52	40
4 year	24	23	20	24	19

Table 2 – Number of valid cases in the sample, by HPR and valuation ratio

In assessing performance, any current year portfolio allocations and HPR assessments were based on the prior year's latest full-year published financial results and ratios. While some authors suggest that financial data should be collected and analysed in line with the dates when such data becomes available to the public (Basu, 1983; Piotroski, 2000), others suggest that the record date should be the stock's financial year-end date (Fama and French, 1992). The research by Fama and French (1992) found that there is little impact on the return tests between the use of different base dates for the valuation ratios. This study adopted the use of financial year-ends as base dates for the sake of simple consistency and to avoid analyst error in computing valuation ratios at various dates within a REIT's financial year.

3.4. Calculation of the variables

3.4.1. Holding period returns

The annual returns are measured as one-, two-, three- and four-year buy-and-hold returns earned from the first financial year following the publication of the REIT's first full-year financial results. The HPR is defined as the total return of the REIT measured as distributions plus change in value. The HPR for each case is calculated using the closing price at the REIT's financial year-end taken as the start of the holding period, the total dividend distributions per share for the holding period, and the closing price at the financial year-end of the respective holding period:

$$HPR = \frac{End\ of\ period\ price - Beginning\ of\ period\ price + Dividends}{Beginning\ of\ period\ price}$$

This measure allows for comparing the HPRs of SAREITs held for different periods and at different periods in time.

3.4.2. Price-to-net-asset-value

The P/NAV ratios are calculated as the ratio of the share price relative to the NAV at the REIT's respective year-end taken as the start of the subsequent holding period:

$$P/NAV = \frac{End\ of\ period\ price}{End\ of\ period\ total\ assets\ per\ share - End\ of\ period\ total\ liabilities\ per\ share}$$

3.4.3. Price-to-earnings

The P/E ratios are calculated as the ratio of the share price relative to the headline earnings per share (HEPS) at the REIT's respective year-end taken as the start of the subsequent holding period:

$$P/E = \frac{End\ of\ period\ price}{End\ of\ period\ headline\ earnings\ per\ share}$$

The use of HEPS in the ratio allows for stringent earnings measurement that isolates core operational profitability while excluding profits or losses resulting from exceptional items such as the sale of assets or revaluations. Since negative P/E ratios cannot be used as either value or growth indicators, negative P/E ratios are excluded from the research sample. Only 1.44% of all cases in the population delivered negative P/E ratios, so the internal validity of this variable has remained intact.

3.4.4. Price-to-cash-flow

The P/CF ratios are calculated as the ratio of the share price relative to the operational cash flow (OCF) per share at the REIT's respective year-end taken as the start of the subsequent holding period:

$$P/CF = \frac{End\ of\ period\ price}{End\ of\ period\ OCF\ per\ share}$$

As discussed in the literature review, a key benefit of the P/CF ratio over the P/E ratio is that cash flow figures cannot be manipulated as easily as earnings figures. However, it is only useful for valuing REITs with positive cash flows and where earnings figures are negative due to a lack of profitability during the growth years. An initial observation is that the use of the P/CF ratio in the SAREIT context is problematic given the substantial cash outflows associated with real estate investment – only 71% of all cases in the population delivered positive P/CF ratios, which could bring the statistical analysis of the value-REITs by P/CF ratio into question. This paper revisits this issue in chapter 5.

3.4.5. Dividend yield

The DY's are calculated as the ratio of the REIT's dividend during the year of assessment relative to the share price at the year-end taken as the start of the subsequent holding period:

$$DY = \frac{Dividend\ for\ the\ period}{End\ of\ period\ price}$$

3.4.6. F-Score

This section briefly summarises the *F-Score Model* adopted from Piotroski (2000) and applied in this research to the SAREIT sector.

The nine financial performance indicators used to assess a REIT's financial strength is grouped into three main areas, namely:

1. profitability;
2. capital structure; and
3. operating efficiency.

Each of the nine performance indicators is measured on a *binary scale*, given that they can only have one of two possible values – good and bad, indicated by a value of 1 or 0 respectively.

The F-Score is the total of all binary items for a given observation – a value from 0 to 9 – and is used as an overall measure of a REIT's financial strength for the period concerned.

Profitability

The profitability indicators provide insight into a firm's ability to generate cash from its operations which, in turn, affects its ability to raise funding and to distribute earnings to shareholders. While SAREITs are bound to minimum distribution requirements, such distributions are dependent on the firm's profitability. Four indicators are used to analyse earnings trends and identify improvements in a value-stock's cash-generating ability, namely return-on-assets (ROA), cash flow from operations (CFO), change in ROA, and Accrual.

ROA and CFO

Both ROA and CFO figures are scaled to the beginning-of-year total assets as follows:

$$ROA = \frac{End\ of\ year\ net\ income\ before\ extaordinary\ items}{Beginning\ of\ year\ total\ assets}$$

$$CFO = \frac{Cash\ flow\ from\ operations}{Beginning\ of\ year\ total\ assets}$$

ROA and CFO indicate whether the REIT is generating positive returns from its asset base. Positive ROA and CFO figures attracts a score of 1, whereas negative figures attracts a score of 0. The most important parameter here is that both indicators are scaled by beginning-of-year total assets to account for the fact that an increase in assets is expected to increase income and cash. This is particularly true in the case of REIT's, where the fixed assets are the primary income generators.

Change in ROA

ROA trends are considered by comparing current indicators with those of previous periods as follows:

$$\Delta ROA = \frac{Current\ period\ ROA}{Previous\ period\ ROA}$$

Positive or growing trends attracts a score of 1 whereas negative or declining trends attracts a score of 0.

Accrual

This study views the accrual of current assets on the back of poor cash flow figures in a bad light. This is an important consideration for value-based stock selection, since a value stock which may be in financial distress could be incentivised to manage earnings figures through positive accruals (Piotroski, 2000). Not all entries in the income statement are cash movements and therefore the total comprehensive income reported does not reflect the REIT's ability to meet its cash flow requirements, particularly its ability to pay dividends to its shareholders. As such, accrual provides the added functionality of assessing the sustainability of a REIT's current dividends when forming value-portfolios based on dividend yield.

Accrual analysis is presented as:

$$ACCRUAL = CFO - ROA$$

where a positive figure attracts a score of 1 and a negative figure attracts a score of 0.

Capital structure

Three indicators are used to analyse changes in capital structures and to assess the REIT's ability to meet its debt obligations. The three indicators measure changes in leverage and liquidity and considers whether the company raised funding through the issue of common shares during the period of assessment.

Given the legislative framework, SAREITs have less discretion with respect to retaining earnings or raising capital through long-term debt (JSE, 2017). This significantly affect's growth strategy, and SAREITs must consequently plan their ability to finance future capital requirements, particularly for new property acquisitions, with great care. Since SAREITs are constrained by the legislative framework, any increases in long-term debt levels, decreases in liquidity, or the issue of new share capital, is considered to increase financial risk (Piotroski, 2000).

Change in leverage

While an increase in long-term debt levels may increase returns (provided that return on capital exceeds cost of finance), this also reduces the REIT's financial flexibility given the 60% LTV cap placed on SAREITs by the legislative framework (JSE, 2017).

Change in leverage is presented as:

$$\Delta LEVER = \frac{\Delta\ Long\ term\ debt\ current\ period}{Average\ total\ assets\ current\ period} - \frac{\Delta\ Long\ term\ debt\ previous\ period}{Average\ total\ assets\ previous\ period}$$

where a negative figure (declining trend) attracts a score of 1 and positive figure (growing trend) attracts a score of 0.

Change in liquidity

Any improvement in liquidity is a positive indicator. Change in liquidity is considered by assessing changes in a firm's current ratio, and is presented as:

$$\Delta LIQUID = \frac{Current\ assets\ current\ period}{Current\ liabilities\ current\ period} - \frac{Current\ assets\ previous\ period}{Current\ liabilities\ previous\ period}$$

where a positive figure (growing trend) attracts a score of 1 and a negative figure (declining trend) attracts a score of 0.

While a shortcoming to this assessment may be that a firm attracting a positive score may still be in financial distress given the lack of liquidity of its current assets, it is argued that this is unlikely to be the case for SAREIT's since the current assets are more likely to be items such as rent- or interest-receivables i.e. income already secured rather than unsellable inventory. While it is acknowledged that there may still be liquidity issues related to such items it is argued that the liquidity risk is lower compared to a trading company that need to maintain minimum inventory levels.

Issue of new share capital

The willingness of a firm to issue new share capital, particularly in the case of a value-stock with a seemingly undervalued share price, indicates a company's inability to raise funds and

maintain liquidity requirements through operations. Also, previous research demonstrates that firms that issue new share capital typically underperform firms who do not or firms that repurchase shares (Loughran and Ritter, 1997; Ikenberry *et al.*, 1998). The variable EQ_OFFER attracts a score of 1 where no share capital was issued during the period of assessment, or 0 if capital was raised through a share offering.

Operating efficiency

The final two indicators are used to measure changes in a REIT's operating efficiencies.

Change in gross profit margin

Change in gross profit margin is presented as:

$$\Delta MARGIN = Gross\ margin\ current\ period - Gross\ margin\ previous\ period$$

where a positive figure attracts a score of 1 and negative figure attracts a score of 0.

In the case of SAREITs, improvements in gross profit margins signify reduced vacancies, lower asset management costs, or higher rental levels, all of which are positive indicators to the financial risk of REIT investment.

Change in turnover ratio

Changes in turnover ratios provide an indication to the efficiency of income generating assets. Such changes could be the result of changes in operating efficiencies or higher income levels due to improved market conditions. Also, since SAREITs invest substantial amounts of capital in income-generating real estate, an assessment of changes in turnover ratio provides an indication as to the success of the directorship's investment strategies.

Change in turnover ratio is presented as:

$$\Delta TURN = \frac{Total\ sales\ current\ period}{Beginning\ of\ year\ total\ assets\ current\ period} - \frac{Total\ sales\ previous\ period}{Beginning\ of\ year\ total\ assets\ previous\ period}$$

where a positive figure attracts a score of 1 and negative figure attracts a score of 0.

Composite score

The composite score – the F-Score – is the sum of the nine financial performance indicators and presented as:

$$F\_SCORE = ROA + CFO + \Delta ROA + ACCRUAL + \Delta LEVER + \Delta LIQUID + EQ\_OFFER + \Delta MARGIN + \Delta TURN$$

The F-Score ranges from 0 to 9, where 9 denotes a company with the strongest financial position and 0 the weakest.

The question of whether a given indicator is positive or negative is open to debate. Previous research has shown, for example, that increases in long-term debt levels can be either positive or negative indicators of future stock performance (Myers and Majluf, 1984; Miller and Rock, 1985; Harris and Raviv, 1990). However, this study recognises that SAREITs are financially constrained by the legislative framework by which they are governed to the extent that they can control cash flows and access funding. Furthermore, since the focus of this study is on a value-based SAREIT investment strategy, an emphasis is placed on SAREITs that are trading at discounts to intrinsic value which in turn may expose the portfolio to REITs that are potentially in financial distress. To this end, the negative implications of increased gearing levels and reductions in cash flows are more realistic, and this study's application of the F-Score is therefore consistent with Piotroski's (2000) view of positive vs. negative.

3.5. Data Analysis

Since the research is designed to test numerous hypotheses, this dissertation adopts inferential statistics to reach conclusions about the relationships between the variables. It is not possible to truly accept the stated hypotheses, it is only possible to reject the corresponding null hypotheses through empirical evidence and thereby to demonstrate probabilistic support for the stated hypotheses (Bhattacherjee, 2012; Cohen, 2013; Pallant, 2013).

Since the research hypotheses are concerned with the strengths of the relationships between value indicators and HPR's, this study adopts the statistical techniques of the general linear model to observe linear patterns of relationships in observed data (Bhattacherjee, 2012; Pallant, 2013). The two-variable linear method (correlation) is used to detect and describe

relationships among the variables, while analysis of variance (ANOVA) is used to compare the value and growth portfolios, as outlined below.

3.5.1. Statistical techniques used to explore the relationships between the variables

Pearson Product-moment Correlation (r) and Spearman Rank Order Correlation (rho) was used to explore the strength and direction of each of the relationships between the value indicators and the respective HPRs. The correlation coefficients range from –1 to +1, indicating both the strength and the direction of the correlation between the two variables concerned (for example, P/NAV ratio and 1-year HPR). Positive correlation indicates direct proportionality while negative correlation indicates inverse proportionality, and 1 indicates perfect correlation while 0 indicates no correlation.

3.5.2. Statistical techniques used to compare the value vs growth portfolios

At every full financial year-end after REIT formation, the REITs were sorted by their ranks in terms of their P/NAV, P/E, P/CF, DY ratios and their F-Scores (i.e. the value indicators) respectively, and each placed in 1 of 5 equally weighted quintile portfolios. The top two quintiles represent the value portfolios and the bottom two quintiles the growth portfolios. The third quintile is a neutral portfolio. For the F-Score analysis, portfolios were formed according to the achieved F-Score of the observation.

The buy-and-hold returns were then calculated in Rand currency terms for the portfolios for the one-, two-, three- and four-year holding periods following portfolio formation, and were compared to each other for an examination of relative performance. The emphasis is on long-term buy-and-hold returns (of up to 4 years) of the various value strategies, since the research is interested in the performance of value investing strategies over horizons suitable for long-term investors. While previous studies have adopted monthly buy-and-hold returns (Fama and French, 1992), this study measures returns on an annual basis since this produces returns that are more realistic to those that investors can actually capture (Lakonishok *et al.*, 1994).

The procedure conforms to the methodologies used in the most significant research on value investing (Fama and French, 1992; Lakonishok *et al.*, 1994; Piotroski, 2000; Chan and Lakonishok, 2004).

Parametric techniques were then used to assess the differences between the value and growth portfolios, and the relative performance of the *F-Score* groups. First, ANOVA was used to compare the variance in HPRs between the value and growth portfolios for each of the valuation ratios. With ANOVA, the *F ratio* is calculated to represent the variability in HPRs between the value and growth portfolios – a significant *F ratio* indicates greater variability in HPRs between the portfolios than within each portfolio, and vice versa. A significant *F ratio* therefore enables the rejection of either the null or the alternative hypotheses. Next, if ANOVA revealed significant variance in HPRs between the value and growth portfolios, post-hoc tests were conducted to determine which of the five portfolios for each of the valuation ratios differ and how. The added advantage of the post-hoc tests is that it protects against the likelihood of incorrectly rejecting the null hypotheses (Type I error) by setting more stringent criteria for statistical significance (Pallant, 2013).

3.5.3. Statistical significance

The statistical significance of the adopted techniques is an important consideration when attempting to reject a null or alternative hypothesis (Tabachnick *et al.*, 2007; Bhattacherjee, 2012; Pallant, 2013).

In line with the guidelines offered in numerous texts on inferential statistics (Tabachnick *et al.*, 2007; Hopkins, 2008; Bhattacherjee, 2012; Cohen, 2013; Pallant, 2013), the statistical results are only considered significant where it is shown that the probability of it being rejected due to chance is 5% or less. This 5% probability, referred to as the *p-value* or *significance level*, is the maximum risk that the study is willing to accept of being incorrect in rejecting either the null or alternative hypotheses (commonly referred to as Type 1 and Type 2 error respectively). If the significance level of the statistical results exceeds 5%, the evidence is not accepted as sufficiently substantial to reject either of the hypotheses.

3.6. Research validity

Several common issues affecting the validity of the parametric techniques adopted in this study is considered (Tabachnick *et al.*, 2007; Bhattacherjee, 2012; Pallant, 2013):

3.6.1. Internal and external validity

The data collection process takes the form of a longitudinal field survey, and involves repeated observations of the same variables (P/NAV, P/E, P/CF, DY and F-Score) over a period of time (Lynn and Lynn, 2009). This facilitates a reasonable balance between internal and external validity.

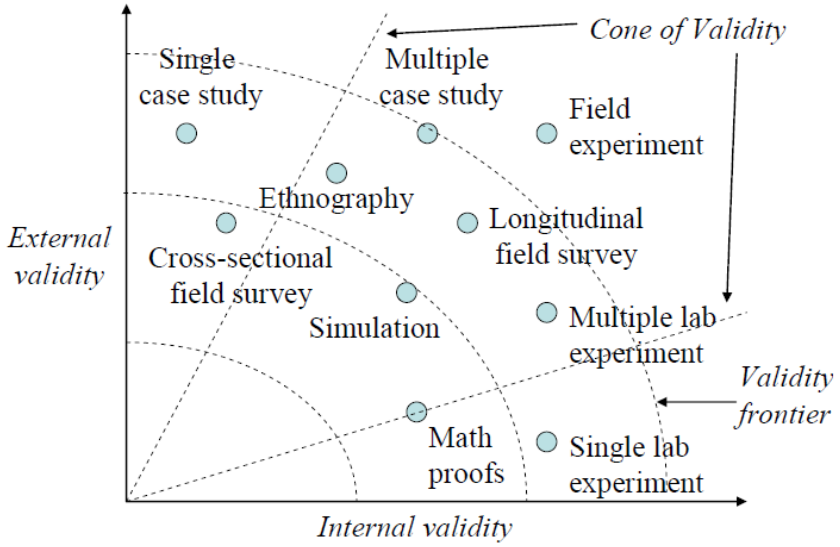


Figure 6 – Internal and external validity (Bhattacherjee, 2012)

For the research to conclusively confirm or refute the causality of the stated hypotheses, there must be a strong covariation of cause and effect, temporal precedence between the variables must be confirmed, and there must be no plausible alternative explanation (Bhattacherjee, 2012). While the internal validity of a quantitative analysis is typically weak compared to qualitative methods, the internal validity of this study is improved by restricting each of the stated hypotheses to a single and concise independent variable, i.e. a single valuation ratio is tested in each instance. Furthermore, the research is focused on the SAREIT sector only, thereby ensuring that the results are not clouded by any extraneous variables related to sector-specific characteristics such as differing accounting practices or asset profiles.

For the research to be meaningful, the observed results must be capable of being generalised from the sample to the population (Bhattacherjee, 2012). The external validity of this study is strong. To use an investable universe that corresponds to one available to the majority of SAREIT investors, the research sample includes the entire population of JSE-listed SAREITs,

apart from the listed preference shares. Preference shares typically have less liquidity and exhibit unique returns profiles by comparison, and they tend to be substantially owned by a parent REIT or a primary institutional investor.

3.6.2. Construct validity

Construct validity must assure that the variables used in the stated hypotheses are acceptable proxies for the constructs of the proposition (Bhattacherjee, 2012).

Consistent with existing literature on value-investing theory, 'Value REITs' are defined as SAREITs that are trading at 1) high net asset values compared to their market values (using P/NAV as the value indicator), 2) low prices relative to their earnings (using P/E as the value indicator), 3) high cash flow yields (using P/CF as the value indicator), and 4) high dividend yields (using D/Y as the value indicator). Conversely, 'Growth REITs' are defined as SAREITs that are trading at 1) high market values compared to their net asset values, 2) high prices relative to their earnings, low cash flow yields, and 4) low dividend yields. In short, SAREITs which appear to offer good value for the given selling price are 'Value REITs'. The value indicators (i.e. the variables) used in this study to test the occurrence of the *value effect* in the SAREIT sector is consistent with the generally accepted definitions for value and growth stocks.

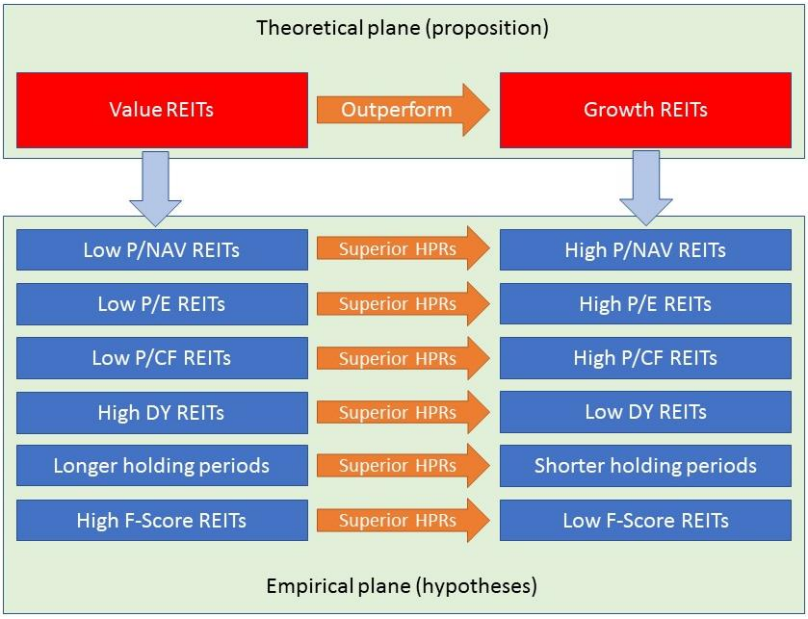


Figure 7 – The theoretical and empirical planes of the research

3.6.3. Statistical validity

Statistical validity of the quantitative research is ensured through the rigorous statistical analysis discussed in this chapter, and by using variables and a research sample consistent with the assumptions of the respective statistical test.

The parametric techniques adopted in this study assume that the subject populations are normally distributed and of equal variances. However, parametric techniques are tolerant of violations of these assumptions for larger sample sizes, and provided that the size of the groups are similar (Tabachnick *et al.*, 2007; Pallant, 2013). Since the sample size is large, and for the ANOVA tests adopts the use of 5 equally weighted value-growth portfolios formed of the entire SAREIT population, normality of sample distribution is ensured.

The test for equality of variances was performed as part of the statistical analyses described in the next chapter. For the results of the parametric tests to be statistically significant, the value and growth portfolios must have the same variance. If the assumption of homogeneity of variance is violated, the significance level of the *F ratio* may be underestimated resulting in the false rejection of the null hypotheses (Type 1 error). This study adopted Levene's test for homogeneity of variance, where a significance value of less than 0.05 indicates a violation of the assumption of homogeneity of variance (Pallant, 2013).

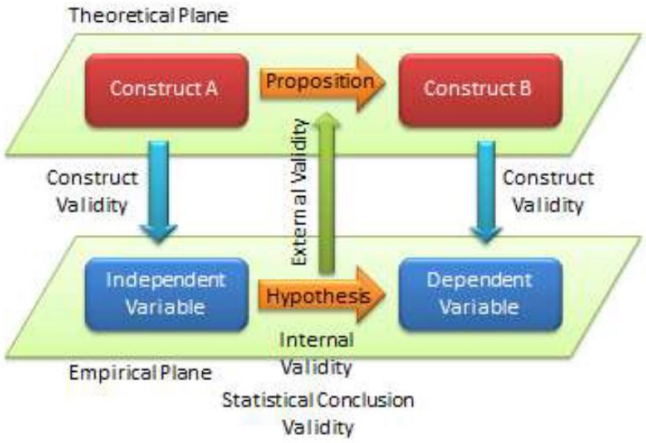


Figure 8 – Different types of validity in scientific research (Bhattacherjee, 2012)

3.7. Limitations

The research analyses historical performance data collected for the years 2013 through 2018, in line with the establishment date of the SAREIT sector, and the last available full-year

performance data. The research and results are therefore limited to the period 2013 – 2018, and to a maximum buy-and-hold timespan of four years.

Given the vast differences between property markets in different countries, country-specific factors can significantly affect the value indicators (Foye and Mramor, 2016). There is a South African emphasis to this research and all research outcomes are in the specific context of the SAREIT sector. While it may be a recommendation for future research, it is not the intention of this research to draw any cross-border differentiation.

The SAREIT sector comprises a very small segment of the listed market measured by number of registered firms. Therefore, the size of the research sample is much smaller than the samples used in prior research on value-investing. It is not the purpose of this research to carry out complete and exhaustive analyses through comprehensive simulation studies or bootstrapping, since it is unlikely that such in-depth analysis will yield any meaningful results given the relatively small sample size.

Although other value-investing strategies exist, this research focuses on P/NAV, P/E, P/CF and DY ratio strategies given their suitability and ease of use in the SAREIT context. Furthermore, the financial performance indicators used in this research is based on the *F-Score Model* developed by Piotroski (2000). While other statistical techniques to fundamental analysis exist, the *F-Score Model* was selected given its ease of implementation and understanding in assessing a broad set of performance measures for distinguishing between firms with strong and weak fundamental signals. While it is not the intention to imply that the *F-Score Model* is the optimal model for fundamental analysis, other statistical models were found to be more complex and costlier in terms of implementation.

This research does not follow a speculative approach to calculating intrinsic value, but rather investigates the performance of a value-based strategy using historic figures which are known. It is not the purpose of this study to explore forecasting- or speculation techniques, nor to examine the qualitative or behavioural issues related to portfolio selection.

Given the limitations outlined above, the research should be viewed in an academic context and investors are advised to adopt the approaches demonstrated in this research with caution.

4. Findings and discussion

4.1. Introduction

This chapter presents the results obtained from the statistical analyses of the collected data, all as described in Chapter 3. The complete and unmodified data can be found in Appendix.

Both primary and secondary research findings are tabled, although an emphasis is placed on the primary research findings given the relevance in addressing the research questions and testing the stated hypotheses.

4.2. Primary findings

4.2.1. Exploring the relationships between the variables

The relationships between the value indicators (as measured by the P/NAV, P/E, P/CF and DY ratios) and financial performance indicators (as measured by the F-Score) and the subsequent HPRs (as measured by the 1-, 2-, 3- and 4-year HPRs) was investigated using Pearson Product-moment Correlation (r) and Spearman Rank Order Correlation (rho) respectively. Preliminary analyses were performed to ensure no violation of the assumptions of normality, linearity and homoscedasticity. The results are presented in table 3.

The direction of the correlations fluctuates between the holding periods for all value indicators except the P/CF ratio, an indication of limited consistency in correlations across the holding periods. Furthermore, according to Cohen's (2013) guidelines for assessing correlation strength, the correlation between the respective value indicators and the subsequent HPRs is weak (i.e. $r < 0.29$) in all but one instance, where the positive correlation between the P/E ratio and the 4-year HPR is only moderate at 0.308 (i.e. $0.30 < r < 0.49$). Also, there is no trend showing an increase or decrease in the strength of the correlations as the holding period increases. Lastly, the analysis failed to deliver any statistically significant results at the $p < .05$ level apart from the correlation between the P/E ratio and 1-year HPR, where low P/E ratios explain only 4.12% (r^2) of the variance in 1-year HPRs.

Correlations					
		1-year HPR	2-year HPR	3-year HPR	4-year HPR
P/NAV	Pearson Correlation	-.026	-.052	.030	-.064
	Sig. (2-tailed)	.780	.641	.835	.767
	N	117	84	52	24
P/E	Pearson Correlation	-.203	-.188	-.234	.308
	Sig. (2-tailed)	.029	.089	.099	.152
	N	116	83	51	23
P/CF	Pearson Correlation	.212	.222	.101	.159
	Sig. (2-tailed)	.059	.092	.547	.504
	N	80	59	38	20
DY	Pearson Correlation	.166	.057	-.057	-.158
	Sig. (2-tailed)	.074	.605	.689	.461
	N	117	84	52	24
F-Score	Spearman Correlation	.074	.219	.023	-.226
	Sig. (2-tailed)	.480	.080	.886	.353
	N	93	65	40	19

Table 3 – Correlations between value indicators and HPRs

The intention was to follow up the correlation results with multiple regression analysis to explore the predictive ability of the value indicators on the respective HPRs, and thereby to find the optimal combination of value indicators for value portfolio formation based on the relative contribution of each variable. However, since the correlation analysis revealed no evidence of any strong correlations between the value indicators and the HPRs, the multiple regression analysis would be of little to no value.

4.2.2. Comparing the value and growth portfolios

One-way between groups analyses of variance (ANOVA) was conducted to explore the impact of the value vs growth portfolios on 1-, 2-, 3- and 4-year HPRs respectively. The sample was ranked by each of the valuation ratios and divided into five portfolios ranging from a value portfolio on the one end (characterised by low P/NAV, low P/E, low P/CF and high DY respectively) and a growth portfolio on the other (characterised by high P/NAV, high P/E, high P/CF and low DY respectively). Similarly, the sample was divided into portfolios according to

the achieved F-Scores. Hence, a total of five different analyses of variance was conducted, with each analysis comprising 5 portfolios.

Test of homogeneity of variances

Tables 4 to 8 show the homogeneity of the variances for the 1-, 2-, 3- and 4-year HPRs for the various portfolios. If the significance (Sig.) value for the given HPR exceeds 0.05, the assumption of homogeneity of variance is not violated and the statistical significance of the ANOVA test therefore is reinforced (Pallant, 2013).

This is the case for all but the DY portfolios formed to measure the 2- and 3-year HPR's – the Sig. value of the 2- and 3-year HPR is well below 0.05, while the Sig. value of the 1-year HPR is only marginally higher than the minimum at 0.07. It appears from this initial assessment that the ANOVA test for the DY portfolios would be less reliable for shorter holding periods. However, ANOVA is reasonably robust to violations of the assumption of homogeneity of variance, provided that the size of the groups are similar (Pallant, 2013), which is the case for the DY portfolios.

Test of Homogeneity of Variances – P/NAV Portfolios

		Levene Statistic	df1	df2	Sig.
1-year HPR	Based on Mean	.758	4	112	.555
	Based on trimmed mean	.821	4	112	.514
2-year HPR	Based on Mean	.928	4	79	.452
	Based on trimmed mean	.780	4	79	.541
3-year HPR	Based on Mean	1.199	4	47	.324
	Based on trimmed mean	1.151	4	47	.344
4-year HPR	Based on Mean	1.231	4	19	.331
	Based on trimmed mean	1.215	4	19	.337

Table 4 – Test of homogeneity of variances of the P/NAV portfolios

Test of Homogeneity of Variances – P/E Portfolios

		Levene Statistic	df1	df2	Sig.
1-year HPR	Based on Mean	.930	4	111	.450
	Based on trimmed mean	.884	4	111	.476
2-year HPR	Based on Mean	1.154	4	78	.338
	Based on trimmed mean	1.130	4	78	.348
3-year HPR	Based on Mean	2.308	4	46	.072
	Based on trimmed mean	2.184	4	46	.086
4-year HPR	Based on Mean	1.870	4	18	.160
	Based on trimmed mean	1.788	4	18	.175

Table 5 – Test of homogeneity of variances of the P/E portfolios

Test of Homogeneity of Variances – P/CF Portfolios

		Levene Statistic	df1	df2	Sig.
1-year HPR	Based on Mean	1.620	4	75	.178
	Based on trimmed mean	1.586	4	75	.187
2-year HPR	Based on Mean	1.065	4	54	.383
	Based on trimmed mean	1.069	4	54	.381
3-year HPR	Based on Mean	1.647	4	33	.186
	Based on trimmed mean	1.607	4	33	.196
4-year HPR	Based on Mean	2.004	4	15	.146
	Based on trimmed mean	1.947	4	15	.155

Table 6 – Test of homogeneity of variances of the P/CF portfolios

Test of Homogeneity of Variances – DY Portfolios

		Levene Statistic	df1	df2	Sig.
1-year HPR	Based on Mean	2.267	4	112	.066
	Based on trimmed mean	2.230	4	112	.070
2-year HPR	Based on Mean	2.825	4	79	.030
	Based on trimmed mean	2.638	4	79	.040
3-year HPR	Based on Mean	4.407	4	47	.004
	Based on trimmed mean	4.273	4	47	.005
4-year HPR	Based on Mean	.646	4	19	.637
	Based on trimmed mean	.530	4	19	.715

Table 7 – Test of homogeneity of variances of the DY portfolios

Test of Homogeneity of Variances – F-Score Portfolios

		Levene Statistic	df1	df2	Sig.
1-year HPR	Based on Mean	1.580	5	85	.174
	Based on trimmed mean	1.585	5	85	.173
2-year HPR	Based on Mean	.349	5	58	.881
	Based on trimmed mean	.198	5	58	.962
3-year HPR	Based on Mean	.760	4	34	.559
	Based on trimmed mean	.628	4	34	.646
4-year HPR	Based on Mean	3.207	3	13	.059
	Based on trimmed mean	3.202	3	13	.059

Table 8 – Test of homogeneity of variances of the F-Score portfolios

Analysis of variance

Tables 9 to 13 provide the results of the ANOVA. Statistical significance at the $p < 0.05$ level was found only in the following isolated cases:

- 4-year HPR for the five P/NAV portfolios : F (4, 19) = 4.024, p = .016
- 1-year HPR for the five P/E portfolios : F (4, 11) = 4.825, p = .001
- 2-year HPR for the nine F-Score portfolios : F (6, 58) = 2.707, p = .022

Despite reaching statistical significance, the post-hoc tests to find the differences in mean HPRs between the portfolios in the above scenarios provided little conclusive evidence of the occurrence of the *value effect* in the portfolios. For the 4-year HPRs of the P/NAV portfolios, only portfolios 1 and 2 (the value portfolios) and portfolio 3 (the neutral portfolio) are statistically significantly different from one another the $p < 0.05$ level. There are no statistically significant differences in HPRs between the value portfolios and the growth portfolios (portfolios 4 and 5). For the 2-year HPRs of the F-Score portfolios no post-hoc tests could be conducted since two of the portfolios had fewer than 2 cases.

Only the difference in mean HPRs for the 1-year P/E portfolios are statistically significant. The effect size, calculated using *eta squared*, was 0.15 which is considered to be a large effect size (Cohen, 2013). Post-hoc comparisons using the Tukey HSD test indicated that the mean HPR

for the extreme value portfolio (portfolio 1) was significantly higher than the mean HPR for the extreme growth portfolio (portfolio 5). Given the isolated nature of this finding, however, the occurrence of the *value effect* in the SAREIT sector remains questionable.

ANOVA – P/NAV Portfolios

	Sum of Squares	df	Mean Square	F	Sig.
1-year HPR					
Between Groups	1580.135	4	395.034	.950	.438
Within Groups	46571.117	112	415.814		
Total	48151.253	116			
2-year HPR					
Between Groups	5018.604	4	1254.651	1.740	.149
Within Groups	56964.674	79	721.072		
Total	61983.278	83			
3-year HPR					
Between Groups	8218.991	4	2054.748	2.315	.071
Within Groups	41713.477	47	887.521		
Total	49932.468	51			
4-year HPR					
Between Groups	8886.759	4	2221.690	4.024	.016
Within Groups	10489.295	19	552.068		
Total	19376.054	23			

Table 9 – ANOVA for the P/NAV portfolios

ANOVA – P/E Portfolios

	Sum of Squares	df	Mean Square	F	Sig.
1-year HPR					
Between Groups	7104.408	4	1776.102	4.852	.001
Within Groups	40631.597	111	366.050		
Total	47736.005	115			
2-year HPR					
Between Groups	6108.647	4	1527.162	2.153	.082
Within Groups	55322.553	78	709.263		
Total	61431.199	82			
3-year HPR					
Between Groups	7869.515	4	1967.379	2.198	.084
Within Groups	41175.223	46	895.114		
Total	49044.738	50			
4-year HPR					
Between Groups	3763.618	4	940.904	1.540	.233
Within Groups	10997.162	18	610.953		
Total	14760.780	22			

Table 10 – ANOVA for the P/E portfolios

ANOVA – P/CF Portfolios

	Sum of Squares	df	Mean Square	F	Sig.
1-year HPR					
Between Groups	1814.580	4	453.645	1.081	.372
Within Groups	31479.364	75	419.725		
Total	33293.943	79			
2-year HPR					
Between Groups	1992.253	4	498.063	.776	.546
Within Groups	34654.923	54	641.758		
Total	36647.176	58			
3-year HPR					
Between Groups	3702.293	4	925.573	1.053	.395
Within Groups	28994.833	33	878.631		
Total	32697.127	37			
4-year HPR					
Between Groups	1584.180	4	396.045	.354	.837
Within Groups	16796.762	15	1119.784		
Total	18380.943	19			

Table 11 – ANOVA for the P/CF portfolios

ANOVA – DY Portfolios

	Sum of Squares	df	Mean Square	F	Sig.
1-year HPR					
Between Groups	1348.789	4	337.197	.807	.523
Within Groups	46802.464	112	417.879		
Total	48151.253	116			
2-year HPR					
Between Groups	2799.244	4	699.811	.934	.449
Within Groups	59184.034	79	749.165		
Total	61983.278	83			
3-year HPR					
Between Groups	1044.286	4	261.071	.251	.908
Within Groups	48888.182	47	1040.174		
Total	49932.468	51			
4-year HPR					
Between Groups	704.129	4	176.032	.179	.946
Within Groups	18671.925	19	982.733		
Total	19376.054	23			

Table 12 – ANOVA for the DY portfolios

ANOVA – F-Score Portfolios

		Sum of Squares	Df	Mean Square	F	Sig.
1-year HPR	Between Groups	2698.782	7	385.540	.963	.463
	Within Groups	34019.070	85	400.224		
	Total	36717.852	92			
2-year HPR	Between Groups	10040.784	6	1673.464	2.707	.022
	Within Groups	35862.071	58	618.312		
	Total	45902.855	64			
3-year HPR	Between Groups	3422.472	5	684.494	.694	.632
	Within Groups	33545.999	34	986.647		
	Total	36968.471	39			
4-year HPR	Between Groups	3255.308	5	651.062	.594	.705
	Within Groups	14251.219	13	1096.248		
	Total	17506.527	18			

Table 13 – ANOVA for the F-Score portfolios

4.3. Secondary findings

4.3.1. Annual performance of the value and growth portfolios by year

In conducting the primary analyses, it was found that 2018/19 was a particularly poor year for the SAREIT sector. Specifically, the SAREIT sector was the worst performing sector on the JSE in 2018, posting an overall loss of approximately -25% (Naidoo, 2019). Upon assessing the 1-year HPRs on a yearly basis, the effect of the overall 2018/19 performance on the extreme value portfolios is clear, as shown in figures 9 – 12 below.

The extreme value portfolios by all valuation ratios, posted substantial losses or substantially underperformed the growth portfolios, or both. This is in contrast the prior 3 years, where the extreme value portfolios appear to have performed generally well against the growth portfolios. Since the 1-year HPRs for 2018/19 comprise more than 28% of all 1-year HPR observations, the 2018/19 results may have had a significant negative effect on the primary analyses.

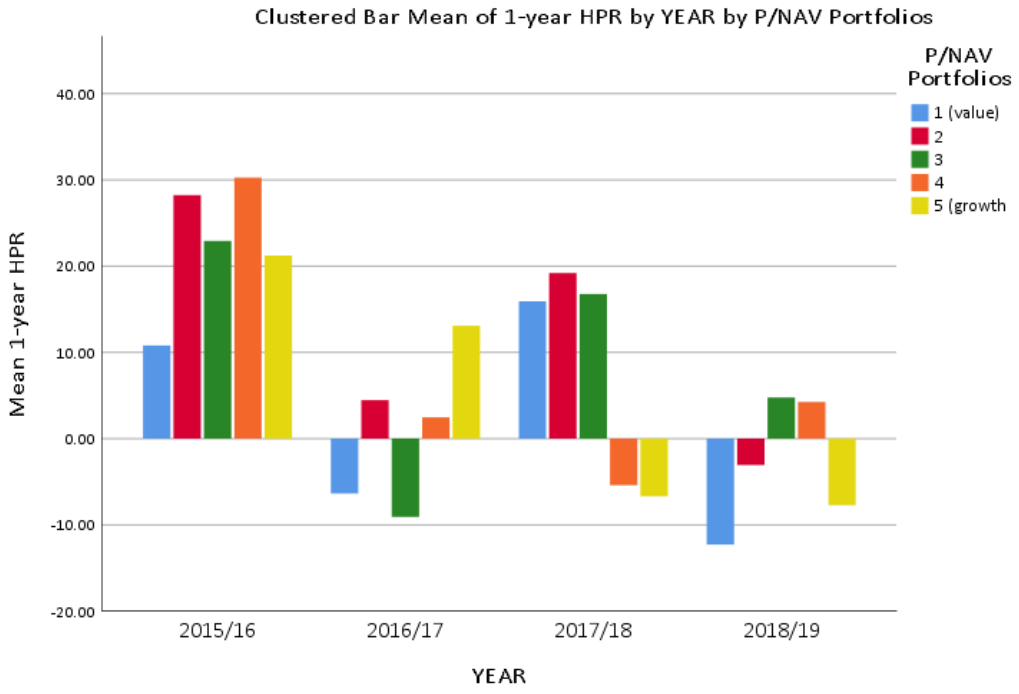


Figure 9 – 1-year HPRs of P/NAV portfolios

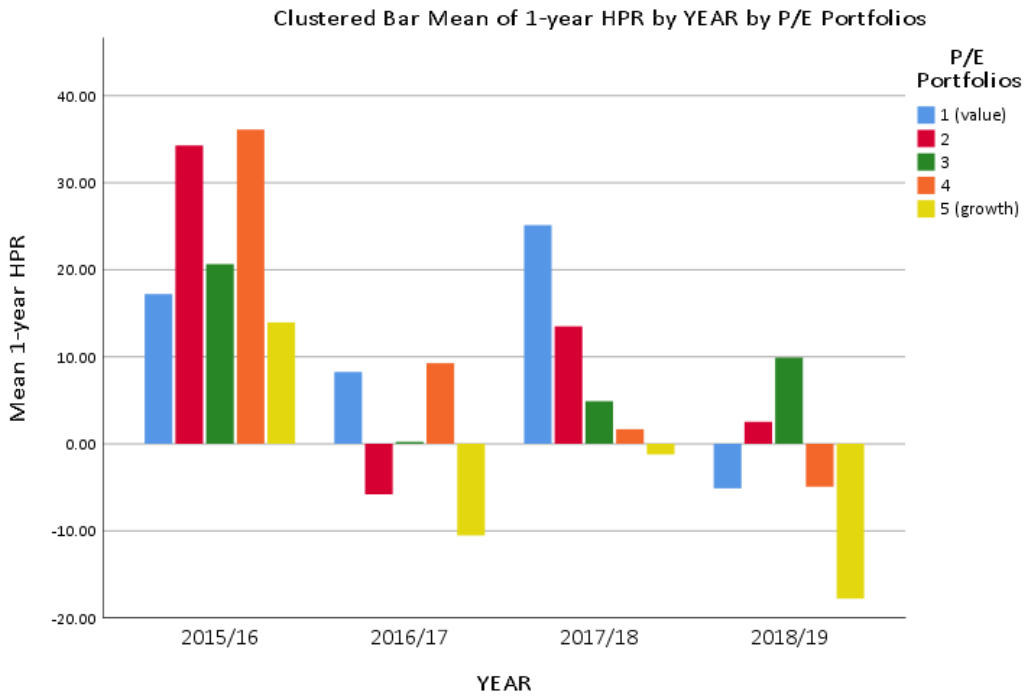


Figure 10 – 1-year HPRs of P/E portfolios

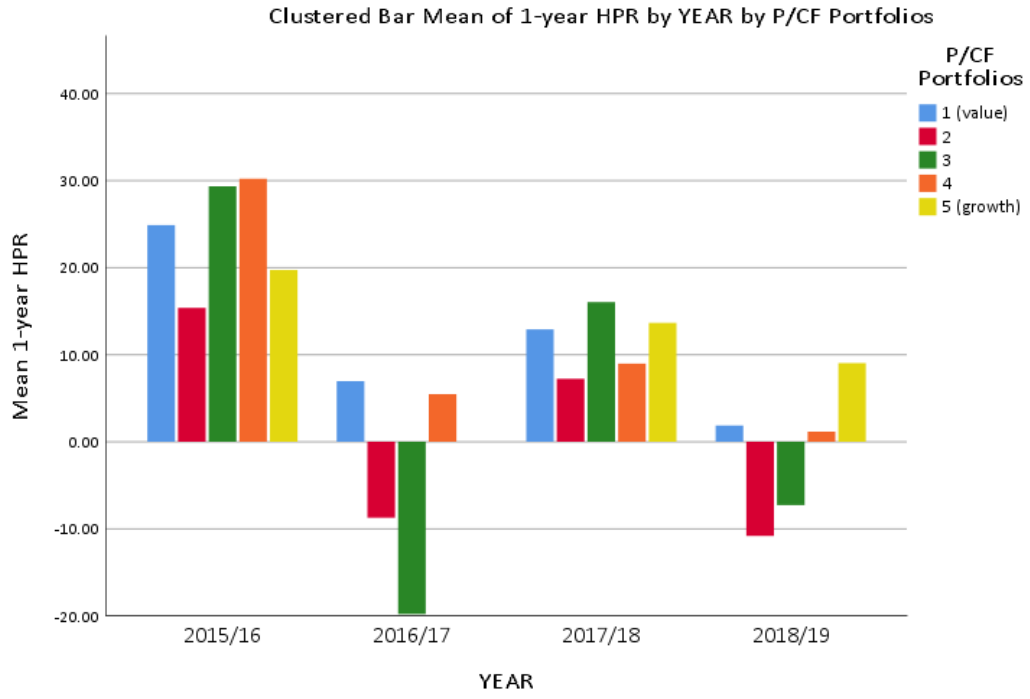


Figure 11 – 1-year HPRs of P/CF portfolios

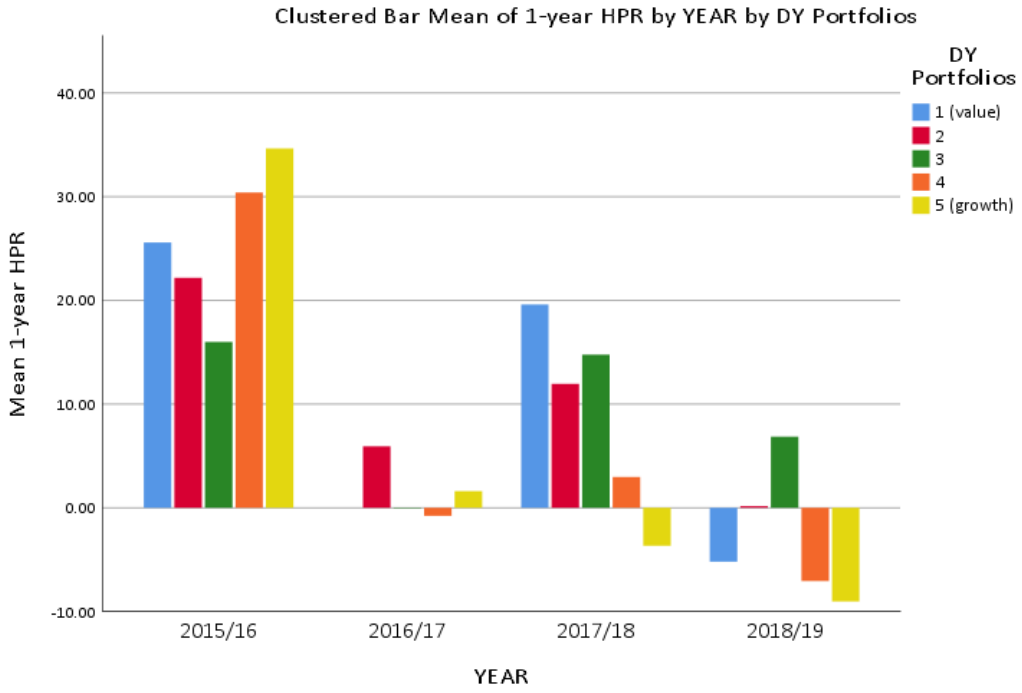


Figure 12 – 1-year HPRs of DY portfolios

In consideration of this finding, the correlation tests were repeated excluding the 2018/19 performance data. In the repeated correlation analyses, the directions of the correlations continue to fluctuate between the holding periods for P/NAV and DY. The consistency in correlation for the P/E, and P/CF ratios does however improve, with a consistent indication of positive or negative correlation across all holding periods. The strength in correlation remains weak, however, for all but the P/E ratio. Also, the correlations of the P/CF ratio are positive (i.e. higher ratios explain increased returns) which gives an indication of a *growth effect* rather than a *value effect*. Lastly, only the P/E correlations show signs of any statistical significance at the $p < .05$ level, where low P/E ratios explain 7.45% (r^2) of the variance in 1-year HPRs and 13.40% (r^2) of the variance in 3-year HPRs. The results of the repeated correlation analyses are shown in table 14.

While the repeated analyses delivered signs of the existence of a *value effect* in P/E ratios, there is no theoretical basis for the removal of the 2018/19 results from the dataset, for the testing of the stated hypotheses. The purpose of this repeated test is therefore not to serve as an alternative test for the stated hypotheses of this research, but rather to identify the potential existence of macro-economic influence on value strategies when applied to the SAREIT sector, for further investigation in future research.

Correlations

		1-year HPR	2-year HPR	3-year HPR
P/NAV	Pearson Correlation	-.162	.095	.073
	Sig. (2-tailed)	.142	.502	.663
	N	84	52	38
P/E	Pearson Correlation	-.273*	-.195	-.366*
	Sig. (2-tailed)	.013	.171	.026
	N	83	51	37
P/CF	Pearson Correlation	.174	.057	.181
	Sig. (2-tailed)	.188	.735	.329
	N	59	38	31
DY	Pearson Correlation	.200	-.076	-.022
	Sig. (2-tailed)	.067	.593	.895
	N	84	52	38

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Table 14 – Correlations between value indicators and HPRs (excluding 2018/19 results)

4.3.2. F-Score distribution

Figure 13 shows the number of occurrences for each F-Score from 0 to 9 for the total sample of 93 observations. None of the REITs achieved a perfect F-Score in any of the years, and only one achieved an F-Score of 1 and 8 respectively. Most of the observations are clustered around the average scores of 3 to 5, with a total mean score of 4.33 (4.01 trimmed mean). If the *F-Score Model* is valid for the SAREIT sector, then it appears that SAREITs are generally financially weak. This is unlikely to be the case given the SAREITs' strong, fixed-asset-intensive balance sheets with gearing levels below 60%.

The observation that achieved the weakest F-Score of 1 (Emira Property Fund in 2017/18) delivered solid results the following year, posting a sector-beating 1-year HPR of 14.05% in 2018/19. Conversely, the observation that achieved an impressive F-Score of 8 (Gemgrow Properties in 2016/17) disappointed with 1- and 2-year holding period losses of -10.01% and -10.86% in 2017/18 and 2018/19 respectively. While the sample size is small, given the limited number of observations due to the young age of the SAREIT sector, this initial finding delivers

a stunning blow to the validity of the *F-Score Model* as applied to the SAREIT sector. The ability of the *F-Score Model* to separate the winners from the losers in the SAREIT sector is doubtful.

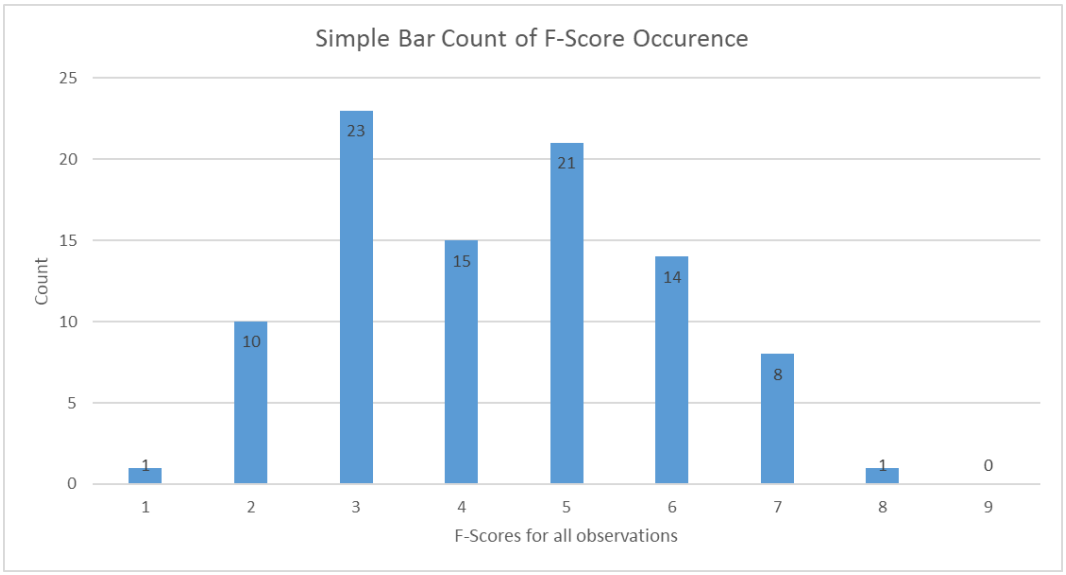


Figure 13 – Breakdown of F-Score occurrence in the sample

Figures 14 to 17 provide the boxplots showing the distributions of the 1-, 2-, 3- and 4-yr HPRs for the achieved F-Score groups. Each of the rectangles represent 50 per cent of the cases, while the whiskers provide the spreads of the smallest and largest HPRs. The additional circles and asterisks represent the occurrence of outliers and extreme HPRs in each of the groups, and the line inside each of the rectangles represents the median HPRs. While several results can be observed from the boxplots in figure 14 to 17, these are left to the reader's interest and/or further analysis.

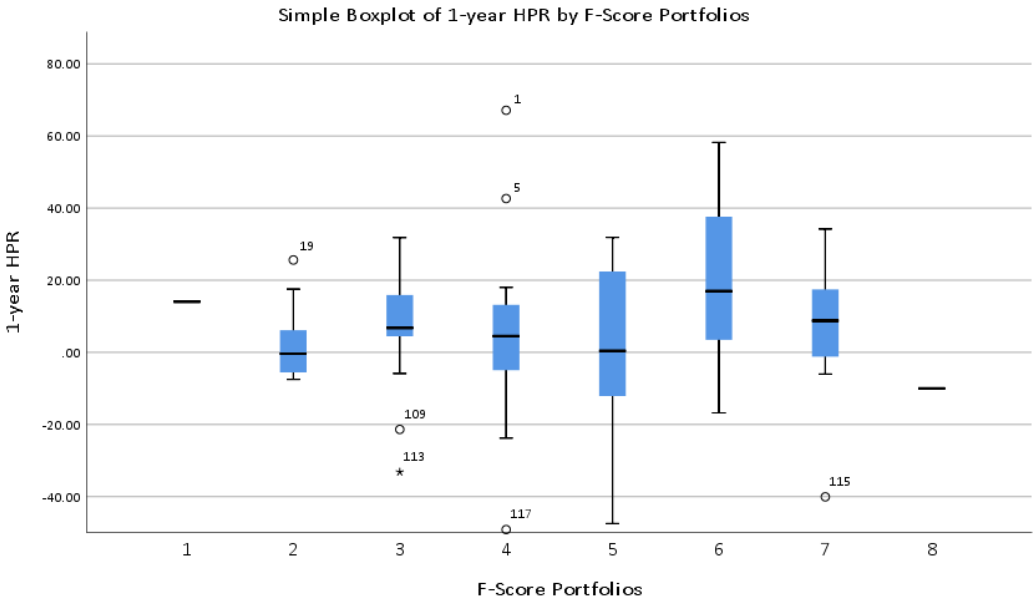


Figure 14 – Range of 1-year HPRs relative to F-Score

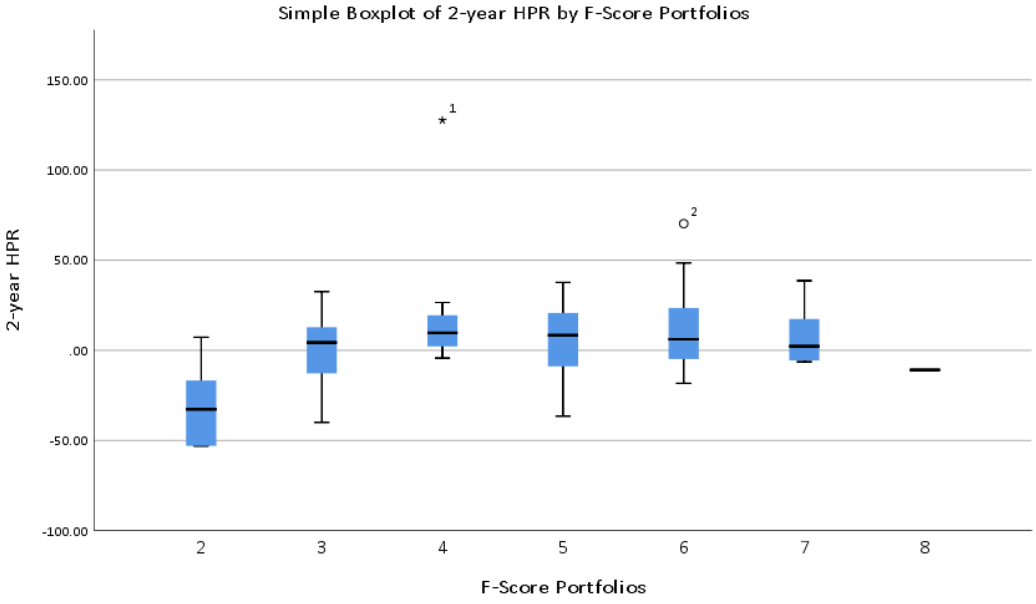


Figure 15 – Range of 2-year HPRs relative to F-Score

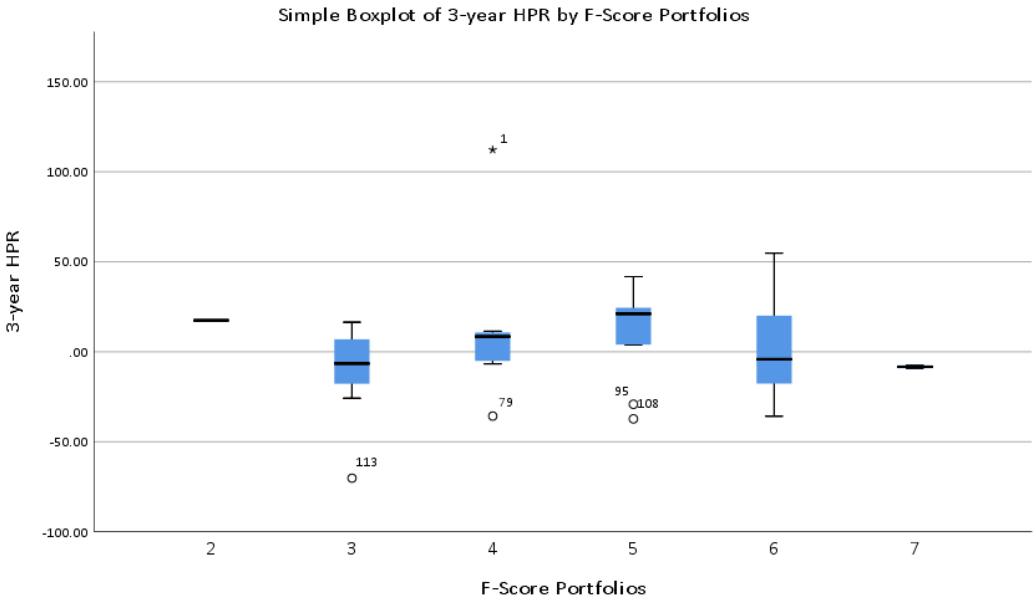


Figure 16 – Range of 3-year HPRs relative to F-Score

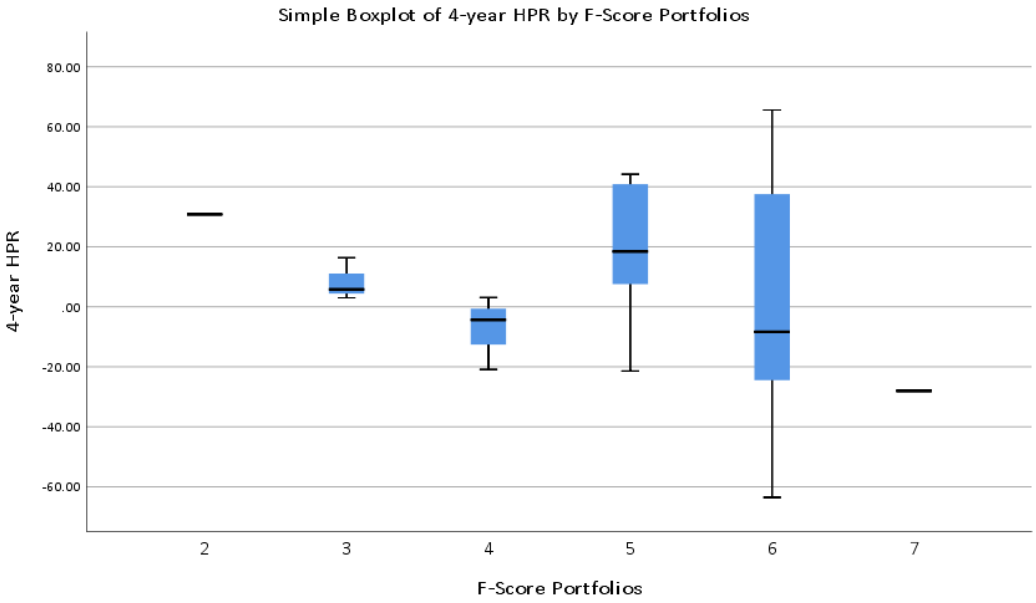


Figure 17 – Range of 4-year HPRs relative to F-Score

Figure 18 shows a breakdown of the occurrence of each of the 9 financial performance indicators. The blue rectangle indicates the maximum number of positive scores achievable given the sample size (i.e. maximum if all observation in the sample achieved a positive score), while the orange bars show the actual number of positive scores achieved.

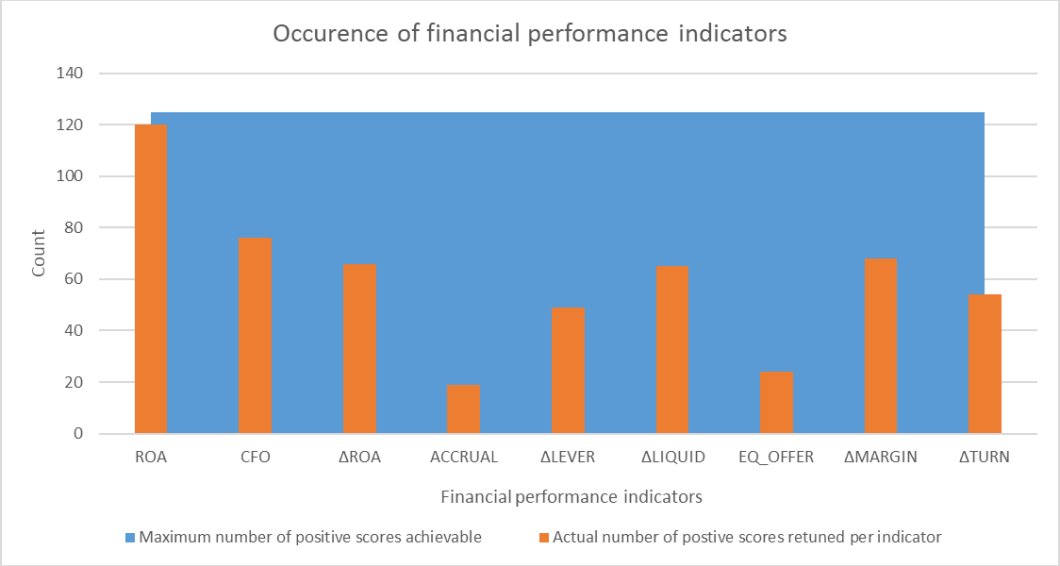


Figure 18 – Breakdown of FPI occurrence in the sample

The accrual of income on the back of poor cash flow figures is viewed in a bad light, since a stock which may be in financial distress could be incentivised to manage earnings figures through positive accruals (Piotroski, 2000). The four profitability indicators, namely ROA, CFO, ΔROA and ACCRUAL show signs of such income statement manipulation and poor cash flow management among SAREITs. While SAREITs reported positive returns on assets in 96% of all observations, this contrasts with the positive cash flow figures reported in only 61% of all observations. Furthermore, only 53% of all observations reported a growing trend in ROA, while returns exceeded cash flows in all 15% of observations (reflected under ACCRUAL). One possible explanation for the apparently weak profitability data in the SAREIT sector may be that the capital appreciation on the properties exceed rental returns, resulting in generally higher ROA's compared to CFO's. In contrast to the assumptions of the *F-Score Model*, this may not necessary be a negative indication of SAREIT performance.

The three performance indicators for capital structure (ΔLEVER, ΔLIQUID and EQ_OFFER) yielded varying results, although the majority of SAREITs are seen to have raised capital throughout the period, either through long- and short-term borrowing or through the issue of new share capital. Only 39%, 52% and 19% of the observations showed improvements in LTV ratios, current ratios, or shares in issue respectively. The *F-Score Model* considers increases in leverage to be a negative indicator, and assumes that the willingness of a stock to issue new share capital may indicate the company's inability to raise funds and maintain liquidity

requirements through operations (Piotroski, 2000). Also, companies that issue new share capital generally underperform companies that do not or those that repurchase shares (Loughran and Ritter, 1997; Ikenberry *et al.*, 1998). In the SAREIT sector, however, maximum gearing levels are strictly regulated, and increases gearing within the required parameters may therefore be a positive indicator, in contrast to the assumptions of the *F-Score Model*.

The observations discussed in this section suggest that the characteristics of the SAREIT sector renders the *F-Score Model* unsuitable for differentiating between the winners and the losers. Further research is warranted to modify the *F-Score Model* for application in the SAREIT context.

5. Conclusion and Suggestions for Further Research

5.1. Introduction

This chapter discusses the findings of the research that critically examined the performance of value-based investment strategies when applied to the SAREIT sector. The research problem that was investigated in this research was summarised as follows:

> *The performance of the traditional value-based investment strategies in the context of SAREIT investment is not fully understood and this prevents the practical application of value-investing to SAREIT investment.*

The goal was therefore to consolidate existing knowledge and to develop an understanding of value-based investment strategies in the context of SAREIT investment, through a comprehensive study of the existing literature on value-based investment and the rigorous analysis of quantitative financial data collected from the SAREIT sector. While the findings of the research were unexpected and contradictory to the existing body of knowledge on value investing, the success of this research is measured by the insight it provides into the performance of value-based approaches to SAREIT investment. While the findings are not conducive to increased practical application of value-investing to SAREIT investment, it does improve the understanding of value-based strategies in the SAREIT context and establishes the basis for further research as outlined in the sections that follow.

First, the primary findings are discussed in the context of the stated research questions and are presented specifically as the empirical evidence for the rejection of either the stated hypotheses or the corresponding null hypotheses. Then, the discussion on the secondary findings attempts to identify contingent factors influencing the performance of value investing in the SAREIT sector and elaborates on the identified shortcomings of this research and the additional research questions identified for future research.

5.2. Discussion of primary findings

The objectives of this research was 1) to compare the performance of a value-based SAREIT selection and investment strategies with the performance of growth-based SAREIT selection

and investment strategies, and 2) to test the applicability of the Piotroski (2000) *F-Score Model* to the SAREIT sector in its ability to separate the winners from the losers through sound accounting-based fundamental analysis of historical financial data. These objectives were addressed by 1) examining the strengths of the relationships between value indicators and subsequent HPR's through rigorous statistical analysis, and 2) by comparing the performance of extreme value and growth portfolios which included simulated portfolio selection by P/NAV, P/CF, P/E, DY and F-Score. This approach facilitated the application of theoretically rigorous tests, while maintaining a strong applied emphasis.

The stated research questions were indirectly answered by testing the following hypotheses:

1. *SAREITs that are trading at lower P/NAV ratios will outperform those trading at higher P/NAV ratios over one-, two-, three- and four-year holding periods*

2. *SAREITs that are trading at lower P/E ratios will outperform those trading at higher P/E ratios over one-, two-, three- and four-year holding periods*

3. *SAREITs that are trading at lower P/CF ratios will outperform those trading at higher P/CF ratios over one-, two-, three- and four-year holding periods*

4. *SAREITs that are delivering higher dividend yields will outperform those that are delivering lower dividend yields over one-, two-, three- and four-year holding periods*

5. *Return differentials between value and growth REITs will increase as the holding period increases*

6. *High F-Score value-REITs will outperform low F-Score value REITs over one-, two-, three- and four-year holding periods*

The direction of the Pearson Product-moment Correlations (r) between the P/NAV, P/CF and DY ratios and the subsequent HPRs were negative (i.e. lower ratio explains higher HPRs) in

several cases, which does signify the existence of a *value effect*. However, the strength of the negative correlations was weak at $r < 0.29$ in all cases, and the direction of the correlations was inconsistent. The Spearman Rank Order Correlation (rho) delivered similar inconclusive results for the correlation between the F-Scores and HPRs. The statistical tests also failed to deliver any statistically significant results at the $p < 0.05$ level.

For the P/E ratio, the correlation test delivered a statistically significant result for the 1-year HPR (i.e. lower P/E ratios explain higher one-year HPR's), confirming the existence of the *value effect* for SAREITs selected by P/E ratio and held for one year. However, the strength of the 1-year HPR correlation was weak at $r < 0.29$, the correlations of the 2-, 3- and 4- year HPRs failed to deliver statistically significant results, and the direction of the 4-year HPR was positive (i.e. higher P/E ratios explain higher 4-year HPRs), signifying the existence of a *growth effect* rather than a *value effect* in the long term.

The ANOVA tests delivered similar results of limited significance and weak variance between value and growth portfolios. No statistically significant differences in HPRs between the value portfolios and the growth portfolios were found, apart from difference in mean HPRs for the 1-year HPR P/E portfolios. In this instance, the mean HPR of the extreme value portfolio (portfolio 1) was significantly higher than the mean HPR for the extreme growth portfolio (portfolio 5).

Given the isolated nature of the results for 1-year HPR P/E portfolios, the evidence provides little probabilistic support for the stated hypotheses. Furthermore, given the shortage of statistically significant results at the $p < 0.05$ level, the evidence was not accepted as sufficiently substantial to reject the null hypotheses. The research questions are therefore answered as follows:

1. *Does a value-based SAREIT investment strategy outperform a growth-based strategy and, if so, under what circumstances?*

    - Only a value-based investment strategy that adopts portfolio selection by P/E ratio will outperform an equivalent growth-based strategy, provided that the holding period is for one year only.

2. *Are any of the four valuation indicators more successful than others in value-based portfolio selection, and which valuation ratio is the strongest?*

   - Only the P/E ratio delivered conclusive positive results for value-based portfolio selection, and then only for 1-year holding periods.

3. *Is it possible to discriminate between financially strong and weak value-REITs through sound accounting-based fundamental analysis?*

   - While the possibility to discriminate between financially strong and weak value-REITs through sound accounting-based fundamental analysis cannot be ruled out, the evidence suggests that the *F-Score Model* is an inappropriate model for discriminating between strong and weak SAREITs.

In concluding the discussion of the primary findings, the proposition offered in Chapter 1 of this report is revisited as follows:

> *The evidence from this research does not offer probabilistic support that a value-based approach to SAREIT selection and investment will outperform a growth-based approach, nor that it is possible to discriminate between financially strong and weak value-REITs through sound accounting-based fundamental analysis using the F-Score Model.*

5.3. Discussion of secondary findings and suggestions for further research

5.3.1. Annual performance of the value and growth portfolios by year

In assessing the performance of the value portfolios by year, it was found that the sector-wide poor results for 2018/19 significantly affected the overall performance of the value portfolios for the overall period 2013 – 2018. Since the 1-year HPRs for 2018/19 comprised more than

28% of all 1-year HPR observations, it is possible that the results of this research may be skewed.

Alternatively, the poor performance of the value portfolios in 2018/19 may be an indication of the existence of macro-economic influence on value strategies when applied to the SAREIT sector. The existing literature shows that REIT dividends and valuations are more closely associated with the fundamental performance of the income generating properties in which they are invested (Corgel et al., 1995). This distinguishing characteristic may undermine the performance of value strategies during periods of economic contraction, since the demand for real estate may suffer, affecting future rental streams which are not reflected in current valuation ratios.

The size of the research sample was much smaller than the samples used in prior research on value-investing, given the focus of the study. It is therefore recommended that the study be repeated once a longer time frame is available in order to address the possible skewness of these results, and to examine the performance of value investing in the SAREIT context throughout a full economic cycle of expansion and contraction.

5.3.2. F-Score distribution

While Piotroski demonstrated the positive relationship between a firm's F-Score and future firm performance, this study could not confirm the compatibility of the *F-Score Model* with the SAREIT sector – in several cases, REITs that achieved low F-Scores delivered sector-beating returns in the following years, and vice versa.

Further research is therefore required to adapt the *F-Score Model* to suit the unique characteristics of the SAREIT sector. For example, while the *F-Score Model* views the accrual of income on the back of lower cash flow figures in a bad light, this may be the unavoidable result of substantial changes in fair values of properties. Since changes in fair values of income generating properties are underpinned by rentals and capitalisation rates, such accruals may not necessarily be a negative indication of performance in the SAREIT context. Similarly, the *F-Score Model* considers increases in leverage to be a negative indicator, however given the LTV limits set by SAREIT legislation which mitigates liquidity risk, increases in leverage by SAREITs within the prescribed limits may be well received by shareholders. The study Howe and Shilling

(1990), for example, which tested market reactions to REIT announcements of new borrowings found no negative market reactions to new borrowings.

In adapting the *F-Score Model* to suit the SAREIT sector, future research could include an examination the qualitative or behavioural issues related to portfolio selection, such as market reactions to changes in profitability, financial leverage and liquidity, rather than to rely solely on the quantitative theoretical effect of such changes on a REIT's balance sheet.

5.3.3. Market (in)efficiencies

Lastly, an alternative viewpoint may be that the nature of the SAREIT sector facilitates more efficient market conditions compared to other sectors. Since REIT returns can be more reliably predicted in comparison to other stocks given the underlying nature of a REIT's income generating assets (Liu and Mei, 1992), and to the extent that the legislative framework by which SAREITs are governed facilitates improved certainty of capital structures, earnings forecasts or dividend policies, it may be argued that SAREITs are more efficiently priced and that prices fully reflect all financial information in a timely manner. As a result, no degree of technical or fundamental analysis will identify REITs that are undervalued.

In order to address this argument, further research is required to record risk measures in addition to the returns figures of the value- and growth-REITs, including standard deviations, volatilities and betas. If EMH does hold for the SAREIT sector, then such research should find notable differences in these risk measures between value- and growth-REIT returns.

6. References

Abarbanell, J. and Lehavy, R. (2003a) Biased forecasts or biased earnings? The role of reported earnings in explaining apparent bias and over/underreaction in analysts' earnings forecasts. *Journal of accounting and economics*, **36**(1-3), 105-146.

Abarbanell, J. and Lehavy, R. (2003b) Can stock recommendations predict earnings management and analysts' earnings forecast errors? *Journal of accounting research*, **41**(1), 1-31.

Abarbanell, J.S. and Bushee, B.J. (1997) Fundamental analysis, future earnings, and stock prices. *Journal of accounting research*, **35**(1), 1-24.

Abarbanell, J.S. and Bushee, B.J. (1998) Abnormal returns to a fundamental analysis strategy. *Accounting Review*, 19-45.

Asness, C.S. (1997) The interaction of value and momentum strategies. *Financial Analysts Journal*, **53**(2), 29-36.

Ball, R. and Kothari, S. (1989) Nonstationary expected returns: Implications for tests of market efficiency and serial correlation in returns. *Journal of financial economics*, **25**(1), 51-74.

Basu, S. (1977) Investment performance of common stocks in relation to their price-earnings ratios: A test of the efficient market hypothesis. *The journal of Finance*, **32**(3), 663-682.

Basu, S. (1983) The relationship between earnings' yield, market value and return for NYSE common stocks: Further evidence. *Journal of financial economics*, **12**(1), 129-156.

Bhattacherjee, A. (2012) Social science research: Principles, methods, and practices.

Bhushan, R. (1989) Firm characteristics and analyst following. *Journal of accounting and economics*, **11**(2-3), 255-274.

Chan, L.K. and Lakonishok, J. (2004) Value and growth investing: Review and update. *Financial Analysts Journal*, **60**(1), 71-86.

Chan, L.K., Hamao, Y. and Lakonishok, J. (1991) Fundamentals and stock returns in Japan. *The journal of Finance*, **46**(5), 1739-1764.

Chan, L.K., Jegadeesh, N. and Lakonishok, J. (1995) Evaluating the performance of value versus glamour stocks The impact of selection bias. *Journal of financial economics*, **38**(3), 269-296.

Chan, L.K., Lakonishok, J. and Sougiannis, T. (2001) The stock market valuation of research and development expenditures. *The journal of Finance*, **56**(6), 2431-2456.

Chan, L.K., Karceski, J. and Lakonishok, J. (2003) The level and persistence of growth rates. *The journal of Finance*, **58**(2), 643-684.

Chen, N.f. and Zhang, F. (1998) Risk and return of value stocks. *The Journal of Business*, **71**(4), 501-535.

Cohen, J. (2013) *Statistical power analysis for the behavioral sciences*. Routledge.

Corgel, J., McIntosh, W. and Ott, S. (1995) Real estate investment trusts: a review of the financial economics literature. *Journal of Real Estate Literature*, **3**(1), 13-43.

Corgel, J.B. and Rogers, R.C. (1990) *Market trading characteristics of REITs: Tests of the stock market and hybrid securities hypotheses*. Division of Research, College of Business Administration, University of ….

De Bondt, W.F. and Thaler, R.H. (1987) Further evidence on investor overreaction and stock market seasonality. *The journal of Finance*, **42**(3), 557-581.

Del Fante, C. (2009) *Value investing in emerging markets*. School of Management Studies

University of Cape Town.

Ennis, R.M. and Burik, P. (1991) Pension fund real estate investment under a simple equilibrium pricing model. *Financial Analysts Journal*, **47**(3), 20-30.
Fama, E.F. and French, K.R. (1992) The cross-section of expected stock returns. *The journal of Finance*, **47**(2), 427-465.
Fama, E.F. and French, K.R. (1996) Multifactor explanations of asset pricing anomalies. *The journal of Finance*, **51**(1), 55-84.
Fama, E.F. and French, K.R. (1998) Value versus growth: The international evidence. *The journal of Finance*, **53**(6), 1975-1999.
Foye, J. and Mramor, D. (2016) A New Perspective on the International Evidence Concerning the Book-Price Effect. *Emerging Markets Finance and Trade*, **52**(10), 2348-2363.
Geltner, D. (1990) Return Risk and Cash Flow Risk with Long-Term Riskless Leases in Commercial Real Estate. *Real Estate Economics*, **18**(4), 377-402.
Geltner, D. (1993) Estimating market values from appraised values without assuming an efficient market. *Journal of Real Estate Research*, **8**(3), 325-345.
Ghosh, C., Miles, M. and Sirmans, C. (1996) Are REITS stocks? *Real Estate Finance*, **13**, 46-53.
Giliberto, M. (1990) Equity real estate investment trusts and real estate returns. *Journal of Real Estate Research*, **5**(2), 259-263.
Giliberto, S.M. (1993) Measuring real estate returns: the hedged REIT index. *Journal of Portfolio Management*, **19**(3), 94.
Goebel, P.R. and Ma, C.K. (1993) *Stock Returns and Business Performance in REITs*. Working paper, Texas Tech University.
Graham, B. (1949) *The Intelligent Investor*. New York: Collins.
Graham, B. and Dodd, D. (1934) *Security Analysis*. New York: McGraw Hill Book Co.
Greenblatt, J. (2006) *The little book that beats the market*. John Wiley & Sons.
Greenwald, B.C.N. (2001) *Value investing : from Graham to Buffet and beyond*. New York: Wiley.
Gutaj, R. (2007) *Value investing as an investment strategy in South Africa (1992-2007)*. School of Management Studies, University of Cape Town.
Gyourko, J. and Keim, D.B. (1992) What does the stock market tell us about real estate returns? *Real Estate Economics*, **20**(3), 457-485.
Han, Q. (1991) *The Return-Generating Process for Real Estate Investment Trusts*. Massachusetts Institute of Technology, Center for Real Estate Development.
Harris, M. and Raviv, A. (1990) Capital structure and the informational role of debt. *The journal of Finance*, **45**(2), 321-349.
Hoesli, M. and MacGregor, B.D. (2014) *Property investment: principles and practice of portfolio management*. Routledge.
Hopkins, W.G. (2008) Quantitative research design.
Howe, J.S. and Shilling, J.D. (1990) REIT advisor performance. *Real Estate Economics*, **18**(4), 479-500.
Ikenberry, D., Lakonishok, J. and Vermaelen, T. (1998) *Open market stock repurchases: The Canadian experience*. INSEAD.
Jaffe, J.F. (1991) Taxes and the capital structure of partnerships, REIT's, and related entities. *The journal of Finance*, **46**(1), 401-407.
Jegadeesh, N., Kim, J., Krische, S.D. and Lee, C.M. (2004) Analyzing the analysts: When do recommendations add value? *The journal of Finance*, **59**(3), 1083-1124.
JSE (2017) JSE Listings Requirements. In: *REITs*, Johannesburg: LexisNexis, 218-225.

Kargin, V. (2002) Value investing in emerging markets: risks and benefits. *Emerging markets review*, **3**(3), 233-244.
Kothari, S.P., Shanken, J. and Sloan, R.G. (1995) Another look at the cross-section of expected stock returns. *The journal of Finance*, **50**(1), 185-224.
Kwag, S. and Whi, S. (2006) Value investing and the business cycle. *Journal of financial planning*, **19**(1), 64.
Lakonishok, J., Shleifer, A. and Vishny, R.W. (1992) The impact of institutional trading on stock prices. *Journal of financial economics*, **32**(1), 23-43.
Lakonishok, J., Shleifer, A. and Vishny, R.W. (1994) Contrarian investment, extrapolation, and risk. *The journal of Finance*, **49**(5), 1541-1578.
Liu, C.H. and Mei, J. (1992) The predictability of returns on equity REITs and their co-movement with other assets. *The Journal of Real Estate Finance and Economics*, **5**(4), 401-418.
Loughran, T. and Ritter, J.R. (1997) The operating performance of firms conducting seasoned equity offerings. *The journal of Finance*, **52**(5), 1823-1850.
Lynn, P. and Lynn, P. (2009) *Methodology of longitudinal surveys*. Wiley Online Library.
MacKinlay, A.C. (1995) Multifactor models do not explain deviations from the CAPM. *Journal of financial economics*, **38**(1), 3-28.
Mengden, A.E. and Hartzell, D. (1986) *Real estate investment trusts: are they stocks or real estate?* Salomon Bros.
Miller, M.H. and Rock, K. (1985) Dividend policy under asymmetric information. *The journal of Finance*, **40**(4), 1031-1051.
Morgan, D.L. (2007) Paradigms lost and pragmatism regained: Methodological implications of combining qualitative and quantitative methods. *Journal of mixed methods research*, **1**(1), 48-76.
Myers, S.C. and Majluf, N.S. (1984) Corporate financing and investment decisions when firms have information that investors do not have. *Journal of financial economics*, **13**(2), 187-221.
Naidoo, S. (2019) REITs on the recovery path.
Noma, M. (2010) Value investing and financial statement analysis. *Hitotsubashi journal of commerce and management*, 29-46.
Page, M.J. and Palmer, F. (1991) The relationship between excess returns, firm size and earnings on the Johannesburg Stock Exchange. *South African Journal of Business Management*, **22**(3), 63-73.
Pallant, J. (2013) *SPSS survival manual*. McGraw-Hill Education (UK).
Piotroski, J.D. (2000) Value Investing: The Use of Historical Financial Statement Information to Separate Winners from Losers. *Journal of accounting research*, **38**, 1.
Plaistowe, T. and Knight, R.F. (1986) Premium to book value may be a contrary indicator. *Investment Analysts Journal*, **15**(28), 35-39.
Porta, R.L., Lakonishok, J., Shleifer, A. and Vishny, R. (1997) Good news for value stocks: Further evidence on market efficiency. *The journal of Finance*, **52**(2), 859-874.
Profiledata (2018) *Sharedata Online* [Online]. Available: http://www.sharedata.co.za/ [Accessed 06 October 2018, 2018].
Rosenberg, B., Reid, K. and Lanstein, R. (1985) Persuasive evidence of market inefficiency. *The Journal of Portfolio Management*, **11**(3), 9-16.
Ross, S. and Zisler, R. (1987a) Managing Real Estate Portfolios, Part 3: A Close Look at Equity Real Estate Risk. *Real Estate Research*.

Ross, S.A. and Zisler, R.C. (1987b) Managing real estate portfolios part 2: Risk and return in real estate. *New York: Goldman Sachs*.
Ross, S.A. and Zisler, R.C. (1991) Risk and return in real estate. *The Journal of Real Estate Finance and Economics*, **4**(2), 175-190.
Rousseau, R. and Van Rensburg, P. (2003) Time and the payoff to value investing. *Journal of asset management*, **4**(5), 318-325.
Sareewiwatthana, P. (2011) Value investing in Thailand: the test of basic screening rules. *International Review of Business Research Papers*, **7**(4), 1-13.
Sareewiwatthana, P. (2013) Common Financial Ratios and Value Investing in Thailand. *Journal of Finance and Investment Analysis*, **2**(3), 69-85.
Sareewiwatthana, P. (2014) PE growth and risk: Evidences from value investing in Thailand. *Technology and Investment*, **5**(02), 116.
SAREIT.co.za (2018) *The South African REIT Association* [Online]. Available: http://www.sareit.com/101_WhoShouldInvest.php [Accessed 29 August, 2019].
Scott, L.O. (1990) Do prices reflect market fundamentals in real estate markets? *The Journal of Real Estate Finance and Economics*, **3**(1), 5-23.
Shleifer, A. and Vishny, R.W. (1997) The limits of arbitrage. *The journal of Finance*, **52**(1), 35-55.
Stattman, D. (1980) Book values and stock returns. *The Chicago MBA: A journal of selected papers*, **4**(1), 25-45.
Tabachnick, B.G., Fidell, L.S. and Ullman, J.B. (2007) *Using multivariate statistics*. Vol. 5, Pearson Boston, MA.
Van Rensburg, P. (2001) A decomposition of style-based risk on the JSE. *Investment Analysts Journal*, **30**(54), 45-60.
Willard, M. and Youguo, L. (1991) An examination of the small-firm effect within the REIT industry. *Journal of Real Estate Research*, **6**(1), 9-17.
Worzala, E. and Sirmans, C. (2003) Investing in international real estate stocks: a review of the literature. *Urban Studies*, **40**(5-6), 1115-1149.

7. Appendix

7.1. Annexure 1 – Valuation and performance data obtained from Sharedata

	2014						
ID no	P/NAV	P/E	P/CF	DY	CLOSING PRICE	DIVIDEND	F-SCORE
1	0,83	9,69	27,16	2,81%	R 4,90	R 0,14	
2	1,14	9,21	31,83	8,49%	R 7,85	R 0,67	5
3							
4	0,89	3,85		9,20%	R 7,90	R 0,73	
5	1,27	11,24	209,94	8,45%	R 10,35	R 0,88	3
6	0,97	9,79	187,97	8,38%	R 14,70	R 1,23	5
7							
8	0,87	10,15	48,77	9,87%	R 1,39	R 0,14	6
9	1,16	7,31	297,75	7,40%	R 15,90	R 1,18	3
10	1,17	12,54	48,22	7,89%	R 11,00	R 0,87	4
11	1,12	16,03	-1637,75	6,52%	R 24,73	R 1,61	3
12							
13	0,43	5,58	41,93	28,60%	R 17,30	R 4,95	6
14	1,05	15,86	89,77	5,91%	R 79,92	R 4,72	6
15							
16	0,97	-76,99	78,41	4,07%	R 60,44	R 2,46	6
17	1,23	9,51	25,06	2,82%	R 11,76	R 0,33	
18	1,04	10,20	652,70	7,47%	R 14,49	R 1,08	2
19							
20	0,88	21,93	18,97	5,68%	R 15,00	R 0,85	5
21	0,86	12,35	60,38	8,34%	R 21,06	R 1,76	6
22	1,42	8,62	24,56	6,11%	R 46,40	R 2,84	
23	0,91	11,11	135,35	9,08%	R 10,95	R 0,99	6
24	0,98	12,67	175,09	7,80%	R 9,56	R 0,75	5
25	1,13	11,05	-288,98	5,46%	R 60,05	R 3,28	4
26	1,25	20,34	-60,05	7,47%	R 4,78	R 0,36	4
27							
28							
29							
30							
31	0,97	10,43	59,06	8,86%	R 9,65	R 0,85	7
32	0,90	9,14	10,20	8,77%	R 8,51	R 0,75	
33	1,12	10,22	8,79	8,39%	R 16,73	R 1,40	5
3							
7							
10							
13							
15							
29							
36							

	2015							
ID no	P/NAV	P/E	P/CF	DY	CLOSING PRICE	DIVIDEND	F-SCORE	2014 TO 15
34	1,01	12,76	24,82	7,30%	R 6,74	R 0,49		47,59%
35	1,10	16,47	-121,06	7,83%	R 9,60	R 0,75	4	31,87%
36	0,94	25,24	26,46	2,17%	R 15,75	R 0,34		
37	0,80	6,45	24,49	9,45%	R 8,90	R 0,84	6	23,30%
38	1,26	13,44	84,01	7,84%	R 11,72	R 0,92	6	22,11%
39	0,97	9,35	-268,67	7,91%	R 16,98	R 1,34	6	24,64%
40	1,12	16,69	33,67	4,82%	R 12,70	R 0,61		
41	0,98	11,30	253,52	8,39%	R 1,80	R 0,15	5	40,37%
42	0,99	6,21	-223,99	7,94%	R 15,50	R 1,23	4	5,23%
43	1,32	13,68	-24,83	5,59%	R 12,10	R 0,68	3	16,15%
44	1,12	17,71	-52,26	6,55%	R 26,46	R 1,73	3	14,01%
45								
46	0,34	4,93	-27,83	37,11%	R 13,98	R 5,19	3	10,80%
47	1,36	22,25	301,07	4,49%	R 121,00	R 5,43	7	58,20%
48	1,10	10,01	61,62	2,64%	R 11,00	R 0,29		
49	0,80	29,88	26,44	3,99%	R 73,92	R 2,95	3	27,19%
50	1,18	14,73	111,21	3,49%	R 10,99	R 0,38		-3,28%
51	1,12	11,96	72,14	7,00%	R 17,01	R 1,19	4	25,61%
52								
53	0,91	15,87	17,12	5,75%	R 17,50	R 1,01	5	23,38%
54	0,88	11,93	108,84	7,80%	R 24,25	R 1,89	4	24,13%
55	1,33	20,17	22,42	5,74%	R 55,30	R 3,17	5	26,02%
56	0,71	13,09	-33,77	9,86%	R 11,20	R 1,10	3	12,37%
57	1,11	13,85	17,85	6,97%	R 11,48	R 0,80	6	28,45%
58	1,40	6,73	-2030,53	4,05%	R 96,45	R 3,90	6	67,12%
59	1,06	11,37	-105,02	8,60%	R 4,60	R 0,40	3	4,51%
60	0,97	15,74	-261,54	8,00%	R 8,50	R 0,68		
61								
62								
63								
64	0,91	11,81	167,24	9,67%	R 9,80	R 0,95	5	11,38%
65	0,98	11,99	28,49	8,77%	R 9,90	R 0,87		26,53%
66	1,12	10,30	11,86	7,10%	R 19,25	R 1,37	6	23,24%

	2016								
ID no	P/NAV	P/E	P/CF	DY	CLOSING PRICE	DIVIDEND	F-SCORE	2015 TO 16	2014 TO 16
67	0,83	10,68	21,03	8,93%	R 6,01	R 0,54	6	-2,87%	33,61%
68	0,97	12,58	-267,80	9,54%	R 8,65	R 0,83	3	-1,30%	20,71%
69	0,79	25,06	12,08	6,54%	R 9,00	R 0,59		-39,12%	
70	0,61	11,08	117,12	13,97%	R 6,50	R 0,91	4	-16,77%	-6,23%
71	1,09	11,00	-114,34	8,45%	R 11,42	R 0,96	5	5,67%	19,66%
72	0,78	8,22	-345,41	10,79%	R 13,54	R 1,46	3	-11,65%	2,05%
73	0,93	8,15	524,89	8,04%	R 12,02	R 0,97		2,25%	
74	0,77	8,60	51,84	10,75%	R 1,55	R 0,17	6	-4,63%	23,50%
75	1,01	8,71	-26,06	8,18%	R 15,79	R 1,29	5	10,20%	7,43%
76	1,24	11,00	14,07	5,24%	R 11,80	R 0,62	8	2,63%	12,89%
77	1,04	18,27	103,55	7,16%	R 25,68	R 1,84	4	4,00%	11,27%
78	0,78	19,43	25,29	2,30%	R 96,07	R 2,21			
79	0,25	3,22	9,61	47,99%	R 11,13	R 5,34	7	17,82%	-4,79%
80	1,37	22,62	-149,97	4,77%	R 129,89	R 6,20	5	12,47%	70,28%
81	0,90	10,02	168,49	10,01%	R 9,25	R 0,93		-7,49%	
82	0,76	23,97	28,63	5,15%	R 46,98	R 2,42	2	-33,17%	-18,27%
83	1,15	15,19	68,89	7,17%	R 13,81	R 0,99	2	34,67%	25,85%
84	0,90	8,65	-624,45	8,72%	R 14,30	R 1,25	3	-8,60%	7,29%
85	1,09	218,75	78,95	0,46%	R 10,50	R 0,05			
86	0,93	15,83	17,37	5,93%	R 19,50	R 1,16	5	18,04%	37,71%
87	0,79	10,46	-544,59	8,76%	R 22,99	R 2,02	3	3,11%	18,73%
88	1,11	19,71	19,65	7,29%	R 41,90	R 3,06	5	-18,70%	-3,11%
89	0,74	9,98	121,17	11,10%	R 10,76	R 1,19	3	6,74%	9,17%
90	1,04	14,31	18,15	7,80%	R 11,02	R 0,86	4	3,48%	24,27%
91	1,70	15,16	-176,25	3,71%	R 131,80	R 4,89	2	41,72%	127,62%
92	1,13	13,67	-148,28	7,65%	R 5,62	R 0,43	2	31,53%	26,57%
93	0,85	15,53	-17,54	9,04%	R 7,30	R 0,66	3	-6,35%	
94	1,18	209,97	270,18	1,03%	R 24,00	R 0,25			
95									
96	0,94	31,24	18,45	2,97%	R 10,35	R 0,31			
97	0,80	6,03	-235,99	12,96%	R 8,00	R 1,04	3	-7,79%	-6,35%
98	0,82	11,63	10,20	11,39%	R 8,08	R 0,92	7	-9,09%	5,76%
99	0,92	10,12	8,59	8,61%	R 17,00	R 1,46	7	-4,09%	10,36%

	2017									
ID no	P/NAV	P/E	P/CF	DY	CLOSING PRICE	DIVIDEND	F-SCORE	2016 TO 17	2015 TO 17	2014 TO 17
100	0,90	15,28	36,82	8,55%	R 6,73	R 0,58	2	21,56%	8,39%	49,10%
101	0,73	10,01	-125,15	10,53%	R 8,31	R 0,88	5	6,19%	-4,32%	17,01%
102	0,90	14,59	14,72	6,38%	R 10,00	R 0,64	7	18,20%	-32,46%	
103	0,84	7,97	-798,08	11,72%	R 8,30	R 0,97	5	42,65%	4,18%	17,37%
104	0,98	10,66	131,79	10,18%	R 9,95	R 1,01	4	-4,00%	-6,46%	5,92%
105	0,80	13,71	-135,48	10,33%	R 13,86	R 1,43	1	12,94%	-9,94%	4,03%
106	1,14	9,74	-104,40	6,86%	R 16,10	R 1,10	3	43,13%	35,46%	
107	0,89	10,14	188,86	9,40%	R 1,95	R 0,18	4	37,63%	18,52%	53,47%
108	1,02	10,35	-10,76	7,90%	R 17,16	R 1,36	3	17,27%	19,46%	16,45%
109	0,99	12,05	17,53	10,61%	R 9,60	R 1,02	5	-10,01%	-12,24%	-3,47%
110	0,97	13,63	-116,13	8,00%	R 24,48	R 1,96	2	2,95%	-0,08%	6,91%
111	0,72	22,90	31,33	4,73%	R 90,68	R 4,29		-1,14%		
112	0,70	7,31	28,67	7,46%	R 13,90	R 1,04	7	34,21%	6,85%	-13,66%
113	1,17	18,12	90,67	5,95%	R 116,75	R 6,95	3	-4,76%	2,23%	54,78%
114	0,93	9,83	-631,58	10,18%	R 9,60	R 0,98	2	14,35%	-3,84%	
115	0,67	17,86	24,23	5,78%	R 41,95	R 2,42	5	-5,55%	-39,97%	-26,58%
116	1,09	10,62	140,83	7,51%	R 12,96	R 0,97	4	0,89%	26,78%	18,48%
117	0,93	12,70	40,46	8,11%	R 15,74	R 1,28	3	19,00%	0,04%	17,44%
118	0,84	14,83	45,68	7,09%	R 8,35	R 0,59		-14,84%		
119	0,99	19,01	20,30	4,95%	R 20,25	R 1,00	3	8,99%	21,45%	41,69%
120	0,78	13,28	-651,58	8,93%	R 22,74	R 2,03	2	7,75%	2,15%	17,62%
121	0,96	14,83	14,46	6,94%	R 32,85	R 2,28	3	-16,16%	-36,47%	-24,29%
122	0,59	14,63	-29,28	11,78%	R 10,90	R 1,28	4	13,23%	8,78%	11,26%
123	1,04	12,75	14,15	8,63%	R 10,66	R 0,92	7	5,08%	0,87%	21,13%
124	1,36	20,68	-34,30	4,66%	R 121,74	R 5,67	4	-3,33%	32,10%	112,18%
125	0,94	11,24	-206,44	9,34%	R 4,81	R 0,45	3	-6,42%	14,33%	10,03%
126	0,80	16,44	-18,05	9,43%	R 7,00	R 0,66	2	4,93%	-9,88%	
127	0,91	20,83	17,10	4,11%	R 19,25	R 0,79		-16,50%		
128	0,95	3,31	72,67	2,45%	R 9,60	R 0,24				
129	1,03	12,86	170,28	7,19%	R 12,25	R 0,88		26,86%		
130	1,02	6,89	21,39	13,01%	R 7,90	R 1,03	5	11,60%	-8,90%	-7,48%
131	0,79	7,99	11,48	10,14%	R 7,60	R 0,77	5	3,60%	-15,45%	-1,64%
132	1,03	12,74	12,23	8,14%	R 19,25	R 1,57	5	22,46%	8,14%	24,43%

	2018					
ID no	CLOSING PRICE	DIVIDEND	2017 TO 18	2016 TO 18	2015 TO 18	2014 TO 18
100	R 5,65	R 0,58	-7,50%	3,59%	-7,63%	27,05%
101	R 5,43	R 0,74	-25,74%	-28,66%	-35,72%	-21,39%
102	R 5,54	R 0,45	-40,06%	-33,40%	-61,94%	
103	R 6,00	R 0,97	-16,00%	7,27%	-21,66%	-11,74%
104	R 9,60	R 1,06	7,12%	-6,67%	-9,06%	2,98%
105	R 14,34	R 1,47	14,05%	16,75%	-6,90%	7,54%
106	R 19,99	R 1,24	31,85%	76,61%	67,15%	
107	R 2,10	R 0,20	18,03%	48,48%	27,86%	65,58%
108	R 15,40	R 1,42	-1,99%	6,51%	8,50%	5,77%
109	R 9,45	R 1,07	9,57%	-10,86%	-13,07%	-4,37%
110	R 26,69	R 2,09	17,55%	12,06%	8,75%	16,36%
111	R 60,82	R 4,88	-27,54%	-31,61%		
112	R 11,75	R 1,31	-6,01%	17,38%	-6,55%	-24,48%
113	R 102,34	R 7,57	-5,86%	-15,39%	-9,17%	37,52%
114	R 8,60	R 0,98	-0,23%	3,54%	-12,93%	
115	R 21,14	R 0,90	-47,47%	-53,09%	-70,19%	-63,54%
116	R 10,50	R 1,00	-11,28%	-16,74%	4,62%	-2,23%
117	R 17,57	R 1,39	20,43%	32,56%	11,44%	30,82%
118	R 6,91	R 0,13	-15,73%	-32,98%		
119	R 20,60	R 1,03	6,80%	10,91%	23,59%	44,18%
120	R 20,58	R 2,03	-0,55%	-1,64%	-6,75%	7,38%
121	R 32,35	R 2,34	5,60%	-17,21%	-37,27%	-25,24%
122	R 7,38	R 0,93	-23,78%	-22,79%	-25,82%	-24,13%
123	R 10,35	R 0,97	6,20%	2,73%	-1,39%	18,42%
124	R 56,25	R 5,65	-49,15%	-53,03%	-35,82%	3,09%
125	R 3,36	R 0,42	-21,37%	-32,70%	-17,78%	-20,87%
126	R 6,75	R 0,68	6,14%	1,78%	-12,59%	
127	R 21,26	R 1,19	16,63%	-6,45%		
128	R 9,60	R 0,79	8,18%			
129	R 14,00	R 0,98	22,27%	44,72%		
130	R 6,05	R 0,89	-12,11%	-13,21%	-29,15%	-28,05%
131	R 6,82	R 0,81	0,39%	-5,57%	-22,93%	-10,35%
132	R 21,88	R 1,69	22,43%	38,64%	22,43%	40,87%

7.2. Annexure 2 – FPI tables

	2014									
	PROFITABILITY				CAPITAL STRUCTURE			OPERATING EFFICIENCY		*F-Score*
	ROA	CFO	ΔROA	ACCRUAL	ΔLEVER	ΔLIQUID	EQ_OFFER	ΔMARGIN	ΔTURN	
APF	First year of trading									***n/a***
AWA	1	1	0	1	0	1	0	0	1	***5***
CRP	Not yet established as a REIT									***n/a***
DLT	Second year of trading									***n/a***
DIA / DIB	1	1	0	0	0	0	0	0	1	***3***
EMI	1	1	0	0	0	0	1	1	1	***5***
EQU	Not yet established as a REIT									***n/a***
FVT	1	1	1	0	1	1	0	1	0	***6***
FFA / FFB	0	1	0	1	1	0	0	0	0	***3***
GPA / GPB	1	1	0	0	1	0	1	0	0	***4***
GRT	1	0	1	0	1	0	0	0	0	***3***
HMN	Not yet established as a REIT									***n/a***
HPB	0	1	1	1	0	1	1	0	1	***6***
HYP	1	1	1	1	1	0	0	0	1	***6***
ILU	Not yet established as a REIT									***n/a***
ITU	1	1	1	0	1	1	0	1	0	***6***
IAP	First year of trading									***n/a***
IPF	1	1	0	0	0	0	0	0	0	***2***
L2D	Not yet established as a REIT									***n/a***
OAS	1	1	1	0	0	1	0	1	0	***5***
OCT	1	1	1	0	1	1	0	1	0	***6***
RPL	Second year of trading									***n/a***
REB / REA	1	1	1	0	0	1	0	1	1	***6***
RDF	1	1	1	0	1	0	0	0	1	***5***
RES	1	0	1	0	1	0	0	0	1	***4***
SAC	1	0	1	0	0	1	0	0	1	***4***
SAR	First year of trading									***n/a***
SCD	Not yet established as a REIT									***n/a***
SEA	Not yet established as a REIT									***n/a***
SSS	Not yet established as a REIT									***n/a***
TEX	1	1	1	0	1	1	0	1	1	***7***
TWR	First year of trading									***n/a***
VKE	1	1	1	1	0	0	0	1	0	***5***

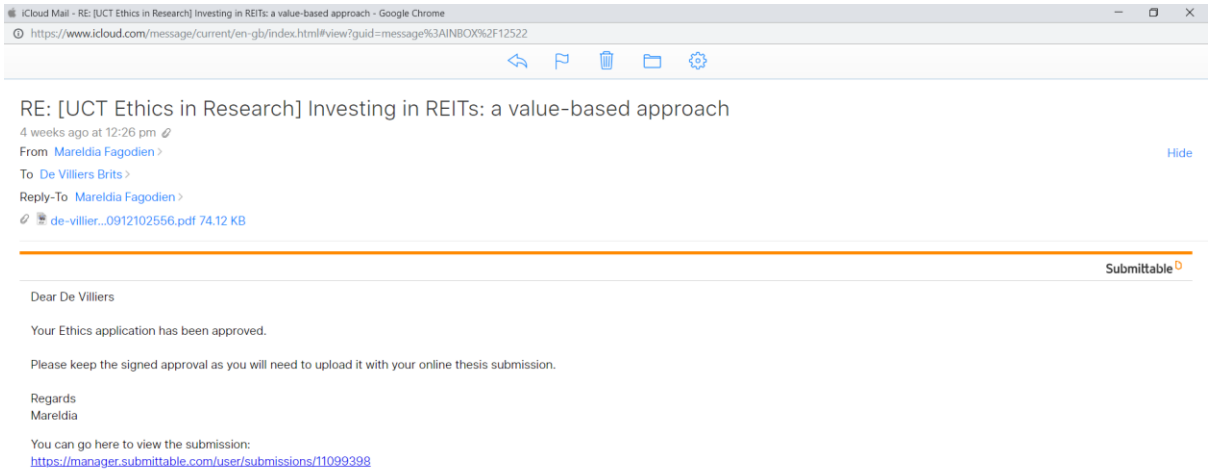
	2015									
	PROFITABILITY				CAPITAL STRUCTURE			OPERATING EFFICIENCY		F-Score
	ROA	CFO	ΔROA	ACCRUAL	ΔLEVER	ΔLIQUID	EQ_OFFER	ΔMARGIN	ΔTURN	
APF	Second year of trading									*n/a*
AWA	1	0	1	0	1	1	0	0	0	*4*
CRP	First year of trading									*n/a*
DLT	1	1	1	1	0	1	0	1	0	*6*
DIA / DIB	1	1	1	0	1	1	0	0	1	*6*
EMI	1	0	1	0	1	1	0	1	1	*6*
EQU	First year of trading									*n/a*
FVT	1	1	1	0	1	0	0	1	0	*5*
FFA / FFB	1	0	1	0	1	1	0	0	0	*4*
GPA / GPB	0	0	0	1	0	1	1	0	0	*3*
GRT	1	0	0	0	0	1	0	1	0	*3*
HMN	Not yet established as a REIT									*n/a*
HPB	0	0	1	0	1	0	0	1	0	*3*
HYP	1	1	1	0	1	1	1	1	0	*7*
ILU	First year of trading									*n/a*
ITU	1	1	0	0	1	0	0	0	0	*3*
IAP	Second year of trading									*n/a*
IPF	1	1	1	0	0	0	0	0	1	*4*
L2D	Not yet established as a REIT									*n/a*
OAS	1	1	1	0	0	1	0	0	1	*5*
OCT	1	1	1	0	0	0	0	0	1	*4*
RPL	1	1	1	0	1	1	0	0	0	*5*
REB / REA	1	0	0	0	1	1	0	0	0	*3*
RDF	1	1	1	0	0	1	0	1	1	*6*
RES	1	0	1	0	1	1	0	1	1	*6*
SAC	1	0	0	0	0	1	0	0	1	*3*
SAR	Second year of trading									*n/a*
SCD	Not yet established as a REIT									*n/a*
SEA	Not yet established as a REIT									*n/a*
SSS	Not yet established as a REIT									*n/a*
TEX	1	1	1	0	0	1	0	0	1	*5*
TWR	Second year of trading									*n/a*
VKE	1	1	1	1	1	1	0	0	0	*6*

	2016									
	PROFITABILITY				CAPITAL STRUCTURE			OPERATING EFFICIENCY		F-Score
	ROA	CFO	ΔROA	ACCRUAL	ΔLEVER	ΔLIQUID	EQ_OFFER	ΔMARGIN	ΔTURN	
APF	1	1	1	0	1	0	0	1	1	***6***
AWA	1	0	1	0	1	0	0	0	0	***3***
CRP	Second year of trading									***n/a***
DLT	1	1	1	0	0	0	0	1	0	***4***
DIA / DIB	1	0	1	0	0	1	0	1	1	***5***
EMI	1	0	0	0	0	1	1	0	0	***3***
EQU	Second year of trading									***n/a***
FVT	1	1	1	0	0	1	0	1	1	***6***
FFA / FFB	1	0	1	0	0	1	0	1	1	***5***
GPA / GPB	1	1	1	0	1	1	1	1	1	***8***
GRT	1	1	0	0	0	1	0	0	1	***4***
HMN	First year of trading									***n/a***
HPB	1	1	1	0	1	0	1	1	1	***7***
HYP	1	0	1	0	0	0	1	1	1	***5***
ILU	Second year of trading									***n/a***
ITU	1	1	0	0	0	0	0	0	0	***2***
IAP	1	1	0	0	0	0	0	0	0	***2***
IPF	1	0	0	0	0	0	0	1	1	***3***
L2D	First year of trading									***n/a***
OAS	1	1	1	0	0	1	0	1	0	***5***
OCT	1	0	0	0	0	1	0	1	0	***3***
RPL	1	1	1	0	0	0	0	1	1	***5***
REB / REA	1	1	0	0	0	1	0	0	0	***3***
RDF	1	1	0	1	0	0	0	1	0	***4***
RES	1	0	1	0	0	0	0	0	0	***2***
SAC	1	0	0	0	0	0	0	1	0	***2***
SAR	1	0	0	0	0	1	0	0	1	***3***
SCD	First year of trading									***n/a***
SEA	Not yet established as a REIT									***n/a***
SSS	First year of trading									***n/a***
TEX	1	0	0	0	1	0	0	1	0	***3***
TWR	1	1	1	0	1	1	0	1	1	***7***
VKE	1	1	1	1	0	1	0	1	1	***7***

	2017									
	PROFITABILITY				CAPITAL STRUCTURE			OPERATING EFFICIENCY		F-Score
	ROA	CFO	ΔROA	ACCRUAL	ΔLEVER	ΔLIQUID	EQ_OFFER	ΔMARGIN	ΔTURN	
APF	1	1	0	0	0	0	0	0	0	***2***
AWA	1	0	1	0	1	0	0	1	1	***5***
CRP	1	1	1	1	0	1	0	1	1	***7***
DLT	1	0	1	0	1	1	0	0	1	***5***
DIA / DIB	1	1	0	0	1	0	0	1	0	***4***
EMI	1	0	0	0	0	0	0	0	0	***1***
EQU	1	0	0	0	0	1	0	1	0	***3***
FVT	1	1	0	0	1	0	0	1	0	***4***
FFA / FFB	1	0	0	0	0	1	0	1	0	***3***
GPA / GPB	1	1	0	0	1	0	1	1	0	***5***
GRT	1	0	0	0	0	1	0	0	0	***2***
HMN	Second year of trading									***n/a***
HPB	1	1	1	0	1	1	0	1	1	***7***
HYP	1	1	0	0	1	0	0	0	0	***3***
ILU	1	0	0	0	0	0	0	1	0	***2***
ITU	1	1	1	0	0	1	0	0	1	***5***
IAP	1	1	1	0	0	1	0	0	0	***4***
IPF	1	1	0	0	0	1	0	0	0	***3***
L2D	Second year of trading									***n/a***
OAS	1	1	0	0	0	1	0	0	0	***3***
OCT	1	0	0	0	1	0	0	0	0	***2***
RPL	1	1	0	0	0	1	0	0	0	***3***
REB / REA	1	0	0	0	1	0	0	1	1	***4***
RDF	1	1	1	1	0	1	0	1	1	***7***
RES	1	0	0	0	0	1	1	0	1	***4***
SAC	1	0	0	0	0	1	0	1	0	***3***
SAR	1	0	0	0	0	0	1	0	0	***2***
SCD	Second year of trading									***n/a***
SEA	First year of trading									***n/a***
SSS	Second year of trading									***n/a***
TEX	1	1	0	0	1	0	1	1	0	***5***
TWR	1	1	1	0	0	1	0	1	0	***5***
VKE	1	1	0	1	1	0	0	1	0	***5***

	2018									
	PROFITABILITY				CAPITAL STRUCTURE			OPERATING EFFICIENCY		F-Score
	ROA	CFO	ΔROA	ACCRUAL	ΔLEVER	ΔLIQUID	EQ_OFFER	ΔMARGIN	ΔTURN	
APF	1	1	0	0	0	0	1	1	0	**4**
AWA	1	1	0	0	0	1	0	0	0	**3**
CRP	1	1	0	1	0	0	0	0	0	**3**
DLT	1	1	0	0	1	0	0	1	0	**4**
DIA / DIB	1	0	1	0	0	0	0	1	1	**4**
EMI	1	0	1	0	0	1	1	1	0	**5**
EQU	1	0	0	0	1	1	0	1	0	**4**
FVT	1	0	1	0	0	0	0	1	1	**4**
FFA / FFB	1	0	0	0	0	0	0	1	0	**2**
GPA / GPB	1	1	0	0	0	1	1	0	0	**4**
GRT	1	0	0	0	0	1	0	1	0	**3**
HMN	1	1	1	1	0	0	1	0	0	**5**
HPB	1	1	1	0	1	1	0	1	1	**7**
HYP	1	1	0	0	1	1	0	1	0	**5**
ILU	1	1	1	0	0	0	0	0	1	**4**
ITU	0	1	0	1	0	0	0	0	0	**2**
IAP	1	0	0	0	0	1	0	0	0	**2**
IPF	1	0	0	0	0	0	0	0	0	**1**
L2D	1	0	1	0	0	0	1	0	1	**4**
OAS	1	1	1	0	0	1	0	1	1	**6**
OCT	1	1	0	0	0	0	1	1	0	**4**
RPL	1	1	1	0	1	0	0	0	1	**5**
REB / REA	1	1	1	0	0	1	0	1	1	**6**
RDF	1	1	1	1	1	1	0	1	0	**7**
RES	1	0	1	0	0	0	0	1	1	**4**
SAC	1	0	0	0	0	0	1	1	0	**3**
SAR	1	0	0	0	1	1	1	1	1	**6**
SCD	1	1	1	1	1	0	1	1	1	**8**
SEA	Second year of trading									***n/a***
SSS	1	0	1	0	0	1	0	1	1	**5**
TEX	1	0	0	0	1	0	1	0	1	**4**
TWR	1	1	0	0	1	0	1	0	0	**4**
VKE	1	1	1	1	0	0	0	1	1	**6**

7.3. Annexure 3 – Assessment of Ethics in Research Projects



iCloud Mail - RE: [UCT Ethics in Research] Investing in REITs: a value-based approach - Google Chrome

https://www.icloud.com/message/current/en-gb/index.html#view?guid=message%3AINBOX%2F12522

RE: [UCT Ethics in Research] Investing in REITs: a value-based approach

4 weeks ago at 12:26 pm

From Mareldia Fagodien

To De Villiers Brits

Reply-To Mareldia Fagodien

de-villier...0912102556.pdf 74.12 KB

Hide

Submittable

Dear De Villiers

Your Ethics application has been approved.

Please keep the signed approval as you will need to upload it with your online thesis submission.

Regards
Mareldia

You can go here to view the submission:
https://manager.submittable.com/user/submissions/11099398

Application for Approval of Ethics in Research (EIR) Projects
Faculty of Engineering and the Built Environment, University of Cape Town

APPLICATION FORM

Please Note:
Any person planning to undertake research in the Faculty of Engineering and the Built Environment (EBE) at the University of Cape Town is required to complete this form before collecting or analysing data. The objective of submitting this application *prior* to embarking on research is to ensure that the highest ethical standards in research, conducted under the auspices of the EBE Faculty, are met. Please ensure that you have read, and understood the **EBE Ethics in Research Handbook** (available from the UCT EBE, Research Ethics website) prior to completing this application form: http://www.ebe.uct.ac.za/ebe/research/ethics1

APPLICANT'S DETAILS		
Name of principal researcher, student or external applicant		De Villiers Brits
Department		Construction Economics and Management
Preferred email address of applicant:		dvbrits@icloud.com
If Student	Your Degree: e.g., MSc, PhD, etc.	MSc Property Studies
	Credit Value of Research: e.g., 60/120/180/360 etc.	60
	Name of Supervisor (if supervised):	Francois Viruly
If this is a research contract, indicate the source of funding/sponsorship		Not applicable
Project Title		Investing in REITs: a value-based approach

I hereby undertake to carry out my research in such a way that:
- there is no apparent legal objection to the nature or the method of research; and
- the research will not compromise staff or students or the other responsibilities of the University;
- the stated objective will be achieved, and the findings will have a high degree of validity;
- limitations and alternative interpretations will be considered;
- the findings could be subject to peer review and publicly available; and
- I will comply with the conventions of copyright and avoid any practice that would constitute plagiarism.

SIGNED BY	Full name	Signature	Date
Principal Researcher/ Student/External applicant	De Villiers Brits	Signature removed	31 Aug 2018

APPLICATION APPROVED BY	Full name	Signature	Date
Supervisor (where applicable)	Francois Viruly	Signature removed	31 Aug 2018
HOD (or delegated nominee) Final authority for all applicants who have answered NO to all questions in Section1; and for all Undergraduate research (including Honours).	Click here to enter text.	Signature removed	Click here to enter a date.
Chair : Faculty EIR Committee For applicants other than undergraduate students who have answered YES to any of the above questions.	NIEN-TSU TUAN	Signature Removed	12 Sep. 2018

Page 1 of 1