



**DETERMINANTS OF CAPITAL STRUCTURE IN THE SOUTH AFRICAN LISTED
PROPERTY SECTOR**

By

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*A thesis submitted in fulfillment of the requirements for the degree of Master of Commerce
in the field of Financial Management.*

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2020

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ACKNOWLEDGEMENTS

I would like to express my appreciation to my supervisor, Associate Professor Francois Toerien, for all of his help, supervision, and in particular patience, whilst completing this dissertation. The constructive advice, constant guidance provided by him during the completion of this thesis were invaluable.

I would like to thank the University of Cape Town, and more specifically the Department of Finance and Tax, for providing me with the facilities, resources and time that allowed me to complete my research.

Lastly, I am grateful to have received constant support from my partner, my family and my friends.

ABSTRACT

The purpose of this study is to investigate whether empirical evidence support traditional determinants and theories of capital structure in the listed South African property industry, a relatively new adopter of the globally recognised and regulated Real Estate Investment Trust (REIT) structure. There currently exists little academic literature focusing on this specific topic in the South African property sector. Furthermore, the recent change of the prevalent legal form of South African listed property companies, affords a unique opportunity to investigate the possible impact of regulatory changes on capital structure within this context.

A panel regression is applied to a sample of 39 firms over the period 2005 to 2019, which includes all property companies with South African exposure listed on the JSE, both during the pre-REIT and REIT regimes. This results in an unbalanced panel of 314 company years. The regime change to the REIT structure appears to have, on average, increased the use of leverage in South Africa's listed property sector. Debt usage, however, remains well below the allowed regulatory limit and lower than worldwide counterparts.

The regression results offer support for the trade-off theory, pecking order theory and market timing theory in the South African listed property context, and are generally in agreement with international findings. Thus, size is found to be positively correlated to debt levels, in line with trade-off theory prediction. Growth opportunities tend to increase leverage ratios, which is consistent with the pecking order theory. Evidence for market timing behavior is the positive correlation found between 12-month share price movements and leverage. Other firm specific determinants including share volatility and interest cover ratio also offered pecking order theory support. Inflation was also found to have a significant effect on leverage in the sector. In conclusion, it is found that the evidence supports elements of most capital structure theories in the South African listed property sector.

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LIST OF ACRONYMS

AFS:	Annual Financial Statements
CS:	Capital Structure
EPRA:	European Public Real Estate Association
FE:	Fixed Effects
GCC:	Gulf Cooperation Council
GMM:	Generalised method of moments
ICR:	Interest Cover Ratio
IPO:	Initial Public Offering
JSE:	Johannesburg Stock Exchange
LEV:	Leverage
MTT:	Market Timing Theory
NAREIT:	National Association of Real Estate Investment Trusts
OLS:	Ordinary least squares
PLS:	Property Loan Stock
POT:	Pecking Order Theory
PUT:	Property Unit Trust
RE:	Random Effects
REIT:	Real Estate Investment Trust
SA:	South Africa/South African
SAREIT:	South African Real Estate Investment Trust Association
TOT:	Trade-off Theory
UK:	United Kingdom
USA/US:	United States of America

CHAPTER 1: INTRODUCTION

1.1 Background and rationale

Capital structure is a long debated and researched topic in finance, with many different and sometimes opposing theories being developed to explain observed, and propose optimal, capital structures. More than fifty years have passed since Modigliani and Miller's¹ landmark paper on the impact of capital structure on firm value, and there is still no real consensus on the driving forces of capital structure. Myers (1984) refers to the "Capital Structure Puzzle". He later states that there is no universal theory for capital structure, and nor does he see any reason to expect one (Myers, 2001).

Capital structure theories attempt to explain the choice of financing within a firm, where the choices can be internal in the form of retained earnings, or external through a mix of either debt or equity. A firm needs to finance business activities and investment with one or a combination of these sources. How it does this and the driving factors behind this decision are central to the capital structure discussion – which is still ongoing. Traditional capital structure theories have been well cemented in the modern day finance curriculum, and supported (and disputed) by countless empirical studies on listed firms, which cover many countries, industries and time periods.

However, one important subsector of the listed equity market that has received less attention from academic researchers in this regard are listed property funds, or Real Estate Investment Trusts (REITs)² which, because of various unique characteristics, may behave quite differently to listed non-property firms when it comes to factors affecting their capital structure. REITs are considered regulated firms, as aspects of their operations, such as the amount of debt they can take on and their flexibility with regards to the retention of profits, are constrained by law. This REIT-specific regulation makes for interesting comparison to traditional firms, and how REIT's capital structure behaviour and drivers compare in a finance and investment setting.

¹ Modigliani and Miller (1958), widely considered the forefathers of corporate finance and capital structure theory, introduced the original publication "The cost of capital, corporate finance, and the theory of investment" in 1958. This is thought to have been a catalyst for much of the theoretical and empirical studies that followed.

² A REIT is described in more detail later but is essentially a category of listed property. Furthermore the terms real estate and property (which is typically the term used for real estate in South Africa) are used interchangeably throughout this study.

Graham and Leary (2011) conclude that a “one size fits all” approach to capital structure across multiple industries does not sufficiently explain firms’ capital structures. Furthermore, Mackay and Phillips (2005) find that most variation in capital structure is firm specific, rather than industry specific. Feng et al (2007) specifically note that much of the capital structure literature excludes REITs due to their unique regulatory operating environment, and Howe and Schilling (1988) state that little empirical work exists on regulated firms and, in particular, non-tax paying entities (which include REITs).

Harrison et al (2010) suggest that, given the size of the global REIT market³, closer investigation into REIT capital structure decisions are warranted. Riddiough and Steiner (2015) go so far as to put forward a customised theory of REIT capital structure and Breuer et al (2018) further investigate what they refer to as a “REIT Debt Puzzle”. With this in mind and with the South African REIT market at least six years old and of significant size⁴, it is clearly worth investigating the capital structure relationships of SA REITs and their non-REIT precursors, and further to determine whether the changes in the South African regulatory environment for listed property affect the results.

This study investigates capital structure determinants in the South African listed property industry both before and after its conversion to REIT status, and whether the empirical evidence for this sector supports any of the traditional capital structure theories. As previously mentioned, whilst there is plenty of academic literature regarding the capital structures of firms, only a small proportion of these relate to REITs. An even lesser proportion relates REITs in developing markets such as South Africa, which is a rare case of a listed property industry converting from other formats to REIT status. This potentially makes South Africa a unique subject for study with regards to listed property and capital structure, a study which to the author’s knowledge has not been conducted before.⁵

³ Latest estimates from NAREIT place the total market capitalisation of only US REITs at \$1.3 trillion

⁴ South Africa officially introduced REIT regulations 1 April 2013. Latest figures from the South African REIT Association place the total market capitalisation of South African REITs at circa R 280 billion down from its historic peak in of circa R 400 billion in early 2017.

⁵ Le and Ooi (2012), Rovolis et al (2014) and Dogan et al (2019) include South Africa in their analysis of global listed property and REIT capital structure determinants, but their samples do not extend past 2013 ie, the post REIT era in South Africa.

1.2 Listed property and REITs as an asset class

Listed property is a portfolio of properties organised into one investable instrument so that investors are able to participate in the income and growth return of that specific property portfolio. Investors are able to access to the associated cash flows that would otherwise be inaccessible to them, as they are unable to buy these properties themselves in their individual capacities. The vast majority of worldwide listed property vehicles are classified as REITs. A REIT is a tax conduit company dedicated to the owning, managing and operating income-producing real estate (Mazurczak, 2011). This short definition highlights two important aspects of REITs, being i) they are focused on real estate and real estate related activities and ii) they have a flow-through tax status.

A REIT is a globally identifiable, liquid and tradable investment instrument with which an investor can gain exposure to the underlying asset class of real estate. By virtue of their tradability on a public stock exchange these funds, which were originally largely created as an investment vehicle for institutions that tended to avoid investing in real estate because of lack of transparency and liquidity, provide liquidity for an asset class generally considered illiquid (Feng et al, 2007).

Real estate, whether in REIT form or not, is essentially an alternative asset class which can be considered a hybrid security exhibiting elements of both bonds and equities (Maritz & Miller, 2004). The steady, predictable and sustainable cash flows emanating from the underlying portfolio of properties give it bond like features, whilst the supply and demand forces and capital growth potential of the underlying property give it equity like features (Bradford & Munro, 2010). The motivations for real estate investment or its addition to a general portfolio include (i) to establish a portfolio that reasonably represents an overall investment universe (Hudson-Wilson et al, 2003); (ii) to reduce overall portfolio risk through uncorrelated, inflation hedging, cash flows from real estate exposure which results in portfolio diversification benefits⁶; and iii) enhancement of portfolio returns⁷. REIT specific motivating factors include i) liquidity and tradability on

⁶ Taderera and Akinsomi (2020) find that South African industrial and retail property provide a good inflation hedge in the long term. Erasmus (2015) found evidence of inflation protection when analysing the South African listed property sector. Marzuki (2019) finds evidence of diversification benefits when including South African listed property into a mixed asset portfolio allocation. Carstens (2018) also found evidence of diversification benefits when adding South African REITs to a portfolio of US REITs.

⁷ Edelstein et al (2010) find support for enhanced returns when adding South African listed property to a mixed asset South African portfolio.

a recognised stock exchange; ii) transparency by virtue of having specific regulation; iii) regular dividends through mandatory net rental distributions; iv) and advantageous tax treatments⁸.

1.3 A brief history of REIT markets

The US were the first adopters of REIT structures in 1960, and are considered the leaders in REIT thinking, having tested and refined the structures long before other countries considered implementing REITs (Rampersad, 2010). Globally the US are also the dominant players with a market size of \$ 1,144 billion (ZAR 17,160 billion) and approximately 200 separately listed REITs trading in the market. This far exceeds any other global REIT market. The first European country to officially adopt the REIT structures was the Netherlands in 1969. Despite the age of their REIT sector they consist of only 5 REITs, with a market size of \$ 23 billion (ZAR 355 billion). Australia's REIT market has been functioning since 1971, consists of 50 REITs and is \$ 95 billion (ZAR 1,431 billion) in size. Many other major economic markets including, amongst others, the UK, Japan, France, Singapore and Canada, gradually started adopting official REIT status through the 1990's and early 2000's.

South Africa's official REIT status came online relatively late in 2013. Promisingly though, with a market size of circa \$ 22 billion (ZAR 340 billion) consisting of 31 REITs, it is the largest REIT market by value among developing countries,⁹ and is also larger than some of the developed markets. Appendix 1 shows selected global REIT markets, their relative sizes, number of REITs listed and year of commencement relative to South Africa. Appendix 2 shows a selection of developing REIT markets relative to South Africa.

1.4 REIT characteristics

Given that REITs represent a specific and rather unique asset class, it is important that there is uniformity and clarity around the treatment and governance of REITs. Each

⁸ The tax conduit nature of REIT allows all profits to be distributed free of tax to investors. Tax savings or advantages have not been argued in this study. See Atkinson, A. 2017, Listed property: An attractive option for your tax-free investment portfolio, viewed 21 September 2018.

⁹ These figures are according to the EPRA Global REIT Survey 2019. Interestingly of the BRICS countries Russia and China do not yet have official REIT structures. India's REIT structures are fledging with little to no officially recognised REITs. One imagines given the size of these markets that once their REIT structures have been recognised and properly taken off these REIT markets would outsize that of SA. Brazil's REIT environment is older, has more listed REITs, but is smaller in size to that of SA. Other noteworthy developing market REITs include Mexico, Malaysia, Thailand and Turkey. In Africa, Ghana, Nigeria and Kenya have official REIT regimes.

global REIT market has its own specific REIT legislation and structure outlining its respective requirements, but these are mostly conceptually similar¹⁰. In general, REIT legislation typically include income and asset tests, requiring that either a proportion of income must be derived from property, or a percentage of assets must actually constitute property. This requirement ensures REITs do not deviate from their property focus.

There are also typically minimum distribution ratios for dividends, which are associated with the tax flow-through nature of REITs. As a general rule, provided all taxable earnings (or at least the minimum prescribed amount) are distributed as dividends, a REIT will not pay normal company tax. In essence, a REIT acts as a conduit and tax is then payable by the recipient of those earnings, that being the net income from the portfolio of properties. In South Africa, the dividends received from REITs are included as part of a taxpayer's taxable income, and would attract tax at that person or entity's marginal tax rate¹¹. Similarly, a REIT is not subject to capital gains tax on any disposal of properties or property related assets. The conduit principle would again apply, where the ultimate owner of the REIT security is liable for the capital gains tax on disposal of the security.

Furthermore, dividends tax is not applied to any amounts distributed by a REIT. REITs are therefore required to pay out the minimum prescribed taxable earnings in order to maintain REIT status, and in order to be fully tax optimal REITs should pay out as close to 100% of taxable earnings as possible¹². This is generally the case in practice. The minimum distribution ratios prescribed by law vary from 75% to 100% amongst the larger REIT markets. The minimum distribution in South Africa is 75%.

REITs also have restrictions on the amount of debt or leverage they are able to use. Some jurisdictions have a conservative approach whilst others are much more lenient. Leverage limits among the leading REIT markets range from 45% in Singapore, to

¹⁰ Appendix 3 summarises REIT requirements of relevance to the study for selected REIT markets – namely the larger developed markets. The European Public REIT Association (EPRA) Annual Global REIT Survey 2019 provide good summaries of legislation, requirements and restrictions for the all global REIT markets.

¹¹ Here a person could be a natural person or juristic person. Income tax rate for SA companies is 28%. Tax structuring beyond the first and official owner of a SA REIT has not been considered.

¹² For clarity, REITs need to distribute according to their prescribed minimum – in South Africa 75% - to maintain their REIT status, and thus importantly their tax neutrality. A REIT distributing 100% of earnings would in theory have zero tax liability, and one distributing between 75% and 100% would have a – albeit negligible – tax liability. It would be a reasonably safe assumption that REITs would operate around the 100% mark, as investors regard the distributions received as a very important metric.

unlimited (implying greater than 100% leverage¹³) in Australia, Brazil, Canada, Japan, Spain and the US. South Africa's leverage restriction, at 60%, lies to the more conservative end of the scale¹⁴. Appendix 3 contains a comprehensive comparison of regulatory restrictions for the main REIT markets globally.

1.5 Listed property and REITs in South Africa

While the SA listed property sector has been operating for a couple of decades, the era of standardised and regulated South African Real Estate Investment Trusts (REITs) is still in its early years. Following years of debate and negotiation the SA REIT legislation was formalised and officially enacted in April 2013. One of the main rationales for the changes was to bring the SA listed property sector in line with well-established and international best practices regarding the treatment and classification of REITs, and in so doing, promote foreign investment¹⁵. Previously popular structures in the SA property sector – namely Property Loan Stocks (PLSs) and Property Unit Trusts (PUTs)¹⁶ – were complex, confusing and not recognised by the international investment community. In this regard SA property sector lacked the uniformity and transparency of the REIT branding that its international counterparts had, and in the case of some international markets had enjoyed for several years.

The introduction of this new legislation in SA was soon followed by the conversion – over time – of the existing SA listed property companies to REIT status. The introduced REIT structure has since 2013 gone on to replace the previously used PLS and PUTs structures, with new entrants into the SA property market post 2013 opting to use the REIT structure. Approximately 10 new REITs have listed on the JSE after 2013. Since 2006, which is about when the initial discussions around conversion to REITs commenced (Boshoff & Bredell, 2013), the JSE REIT sector market capitalisation has increased fourfold. Since the REIT legislation of 2013, this market capitalisation doubled¹⁷.

¹³ Whilst the legislation allows for unlimited leverage in certain REIT jurisdictions, other legislation, such as thin capitalisation rules and interest deductibility limits, may curb the amount of leverage used.

¹⁴ In South Africa, the leverage limit of 60% is based on a leverage ratio defined as total debt to gross assets. In other REIT jurisdictions that have a fixed leverage limit, the definition of leverage may differ slightly. This study will focus on interest bearing debt to total assets as the primary leverage measure.

¹⁵ Carstens (2018) found that foreign investors have had a significant impact of share liquidity of REITs post the introduction of REIT status in South Africa.

¹⁶ A summary and comparison of Property Loan Stocks, Property Unit Trusts and REITs is provided in Appendix 4.

¹⁷ This is with reference to its last peak in 2017. 2018 and 2019 were unfortunately rather ignominious years for the South African REIT market. Appendix 5 demonstrates the growth in the South African listed property market in both pre-REIT and post-REIT periods.

1.6 Preview, research objectives and approach

Over the sample period South Africa's use of leverage in listed property, and subsequently REITs, are in this study found to be on the lower end of the scale when compared to other developed market REITs. Of the countries with no leverage limits Japan, Canada and the US appear to be more liberal in the use of debt, with leverage ratios of between 42% and 52% (see Appendix 6). On average South African REITs seem to operate well below the regulatory leverage limit of 60%. Of the countries with leverage limits, South Africa appears to have the lowest leverage ratio, and adjusted for the regulatory limit is the most conservative. At first glance it would appear that South Africa errs on the side of conservatism with regards to usage of debt in capital structure.

The research questions for this study can be summarised as follows:

1. *Are there marked differences between pre- and post-REIT implementation leverage levels in South Africa?*
2. *Which determinants of capital structure are correlated with the leverage ratios of South African listed property companies, and is the evidence consistent with any capital structure theories?*
3. *Can the determinants and theories alone explain the leverage levels and funding decisions of listed property in South Africa, or are there other factors involved?*

In an attempt to shed more light on these research questions, South African listed property data from 39 firms listed on the JSE has been collected for the sample period 2005 - 2019, then used in a panel regression model. The variable of interest or dependent variable, leverage, is regressed against various control variables generally used in capital structure research and may hopefully provide further explanation in respect of the research objectives.

1.7 Novelty and contribution

The unique characteristics of REITs as outlined above, include (i) tax exempt status, (ii) mandatory dividend distribution, and (iii) limitations on leverage levels¹⁸. All these elements have noteworthy differences from traditional firms, and can therefore potentially have an effect on capital structure decisions. Various studies, mainly focused

¹⁸ It is noted that there are other distinguishing features. For example, Riddiough and Steiner (2015) highlight the diversified ownership rule in US REITs and its effect on capital structure. South Africa has no ownership rules pertaining to REITs so this feature is not elaborated on in this study.

of US REITs¹⁹ or well-established REIT markets in developed countries²⁰, have sought to explain which capital structure determinants have a significant impact on the financing mix within REITs, as well as which traditional capital structure theories (or non-traditional theories) are prevalent. This study seeks to explain same for the South African listed property market. The introduction of REITs and switch over from the previously used Property Loan Stock and Property Unit Trust structures in 2013 makes for an interesting investigation of how regulatory changes affect listed property debt levels, and whether drivers of capital structures changed between the two regimes.

The author's intention is to contribute to the existing literature of capital structure of REITs and provide further insight on funding decisions and leverage levels chosen by South African REITs in particular. The novelty of the research emanates from (i) the industry analysed, REITs, which are a unique asset class generally neglected in the literature, (ii) the country analysed, South Africa, which is a developing country with relatively young and under-researched REIT system; (iii) that includes both the period before and after a regulatory switch to a REIT-based industry structure. The findings may be of interest to investors, managers and professionals operating in the REIT and REIT lending space.

1.8 Thesis map

The remainder of the document is set out as follows. Chapter 2 reviews relevant literature on general capital structure and further discusses theories and determinants of capital structure, generally and with specific reference to REITs and listed property, in developed and developing markets. Chapter 3 describes the data and methodology used. The results and analysis are set out in the Chapter 4. Finally, Chapter 5 summarises the findings and concludes.

¹⁹ Alcock and Steiner (2017), Harrison et al (2010) and Sant (2018) look at capital structure determinants in US REITs.

²⁰ Chikolwa (2011) and Zarebski and Dimovski (2012) consider Australian REITs, Jakobsen and Olsson (2015) perform a study on European REITs, Bond and Scott (2006) consider UK listed property firms. Cashman et al (2016) focus on Asian real estate markets. Erol and Tirtiroglu (2011) review Turkish REITs. Rovolis et al (2014) consider REITs and listed property in developed and developing markets including South Africa, as do Dogan et al (2019)..

CHAPTER 2: LITERATURE REVIEW AND CAPITAL STRUCTURE THEORIES

Capital structure and the use of leverage within firms has been a well-documented topic in finance since the original pioneering paper of Modigliani and Miller in 1958. They introduced the Irrelevance Theorem which suggested that, under certain assumptions, a firm's overall value is unaffected by the combination of debt and equity it chooses. So the leverage within a firm - no matter the quantum or detail - is under the theory, irrelevant. Whilst the theory holds under perfect market assumptions it, ironically, ignores rather 'relevant' and real modern day considerations including taxes, bankruptcy costs, agency costs and transactions costs – to name a few. Notwithstanding its suggested lack of applicability, the Irrelevance Theorem was influential in igniting more discussion and research around capital structure, with many looking to either prove or disprove it. Incremental research since then has led to adapted versions of the Irrelevance Theory, and new theories altogether, of which the origin is in most cases Modigliani and Miller's opening theory.

2.1 Capital structure theories

Modigliani and Miller (1963) would later update their capital structure theory to cater for taxes. They introduced the concept of a tax shield benefit that is derived from the use of debt. That is, a firm is able to reduce their tax liability with the use of debt as the interest from debt is a tax deductible expense. They argued as the debt increases within the capital structure of a firm, the market value of the firm increased by the present value of the tax shield benefit from debt. By implication, a firm would be motivated to maximise debt within the capital structure in order to maximise the tax shield benefit, and thus increase the value of the firm. However, as pointed out by Solomon (1963), at extreme levels of debt the cost of capital must rise as capital markets will demand higher rates of return for extreme levels of debt. Baxter (1967) also suggested that higher levels of debt would lead to a probability of default of interest payments to creditors and thus bankruptcy – what he dubbed “risk of ruin”. Firms would seek a capital structure that maximises the tax shield benefit yet minimises bankruptcy costs. Stiglitz (1972) looked at the effects of bankruptcy on the value of a firm and concluded that interest rates on debt increase where there is a likelihood of bankruptcy and thus market value of a firm is dependent on the likelihood of bankruptcy. These were the early signals that there was an important relationship between taxes and bankruptcy.

2.1.1 Trade-off theory

Kraus and Litzenberger (1973) later suggested that capital structure is a trade-off between two of these perfect assumptions under the Modigliani and Miller (1963) theory – taxes and bankruptcy. Their study incorporated the tax shield benefit and bankruptcy into a state preference model. On the one end of the trade-off theory firms will derive a tax shield benefit from the use of debt within their capital structure. The tax shield benefit increases with the usage of debt. Firms with higher marginal tax rates will benefit more, and such firms may be inclined to increase their leverage (Miglo, 2010). Mackie-Mason (1990) found that firms with higher marginal tax rates were more likely to have higher debt ratios within their capital structures. Fama and French (1998) however find no evidence that the tax shield benefit from debt affects the market value of firms. Barclay et al (2013) find that taxable real estate firms use more debt than their non-taxable counterparts in a US sample spanning 1984 to 2010. This finding, although not large in magnitude, lends credence to a tax shield effect or lack thereof in non-taxable real estate firms.

Under the trade-off theory this debt tax shield benefit is counterbalanced by the risk of bankruptcy stemming from the usage of debt. The use of leverage requires regular payments to be made to creditors. Failure to or potential failure to pay creditors can result in financial distress in the form of actual bankruptcy or the threat of bankruptcy. Costs of bankruptcy can be direct or indirect. Baxter (1967) outlines direct costs to be administrative costs, legal expenses and penalties incurred whereas indirect costs relate to the reduction in market value and increased cost of capital, both debt and equity. The greater the usage of debt the greater the risk of financial distress and bankruptcy. By deduction, a less risky firm is able to leverage more than a relatively riskier comparative firm (Myers, 1984). That is, they are able to leverage more before the costs of financial distress start to negate the debt tax shield benefit.

Essentially the balance of debt and equity in a firm is determined by the balance between the debt tax shield benefit and the increased risk of bankruptcy. Under the theory firms will trade-off between the debt tax shield benefit and bankruptcy costs to find their optimal capital structure or put differently have a target capital structure. Graham and Harvey (2001) found that a fair proportion of CFO's surveyed adopted a target capital structure. What this also implies is that firms will target an optimal capital structure once

found and would return to it if there is a deviation, that is, leverage ratios are mean or 'target' reverting. Leary and Roberts (2005) find evidence of firms rebalancing leverage within an optimal range for firms observed between 1980 and 1999. Kayhan and Titman (2007) find support for mean reversion in debt ratios in a large sample of firms between 1960 and 2003.²¹ Versmissen and Zietz (2017) investigate US REITs between 1993 and 2013, and find support for active target debt behavior.

The above concept of optimal or target capital structure is considered within a static trade-off theory in a single period framework. A dynamic trade-off theory looks at optimal capital structure over multiple periods. The correct capital structure decision is dependent on what is anticipated and required in the next period – and even subsequent periods. Firms will tend to forecast and then implement investment activities such as acquisitions, disposals and capital expenditure and any associated financing activities. Importantly, the cost of capital in future periods can be different to the current period. Firms may wish to raise finance (or repay finance) as either debt or equity, depending on the cost of each. What this essentially means is that the optimal capital structure is different over time.²²

Under the trade-off theory firms with tangible assets are thought to be less susceptible to financial distress and are therefore expected to have more debt in their capital structure. Conversely, firms with either less tangible assets or significant intangible assets are expected to have less debt in their capital structure. The presumption here is that tangible assets are less risky than intangible assets. As Myers (1984) points out, specialised intangible assets or growth opportunities are more likely to lose value in times of financial distress when compared to tangible assets. Rajan and Zingales (1995) find that this relationship exists in the capital structures of companies in the G7 countries. REIT firms would be an example of firms with a very high percentage of tangible assets.

The trade-off theory also predicts that firms with fewer non-debt tax shield opportunities, such as depreciation, are more motivated to take on debt to take advantage of the debt tax shield (DeAngelo & Masulis, 1980). On the other hand, firms with

²¹ Both these studies exclude regulated firms like listed property and REITs.

²² The mean reversion or adjustment rate to target debt ratios have not been included in the statistical analysis or hypothesis testing in this study. See Fama and French (2002), Ertugral and Giambona (2011), and Versmissen and Zietz (2017) for more information on this.

significant non-debt tax shields may be less inclined to adjust their capital structure towards debt solely for gaining the debt tax shield advantage. Titman and Wessels (1988) do not find any significant support for non-debt tax shields having an effect on debt ratios when analysing US firms from 1974 to 1982. Interestingly, with REIT firms one would expect, given their high percentage of tangible assets, a significant non debt tax shield – ignoring the fact that REITs are tax exempt. However, the real estate held in a REIT is considered an investment and is not depreciated, but rather revalued annually.²³

Due to their tax status REITs have neither debt nor non-debt tax shield benefits, yet the other end of the trade-off balancing act – bankruptcy – is still very relevant. This situation is not isolated to REITs; there are other regulated firms with tax exemptions, who lack incentive to borrow given no apparent tax advantage (Myers, 1984). What is isolated to REITs in certain jurisdictions - South Africa for example - is the regulatory limit on leverage. The imposition of a leverage limit has some interesting implications. Firstly, it could be argued that where the imposed limit is lower than perceived maximum level where financial distress would become an issue, there could be an inherent loss of optimal leverage. Secondly, by having a fixed upper limit on leverage, firms operating at, or very close to, that limit would have little to no debt capacity available. At these limit levels firms would have no choice but to use non-debt funding resources. It should be noted that the lack of debt capacity issue would also apply where a firm was operating at, or close to, the financial distress limit as envisaged under the trade-off theory.

This makes the application of the trade-off theory trickier in the case of regulated and tax exempt firms such as REITs. The inherent lack of tax incentive leaves a one legged trade-off theory, suggesting lower debt levels in REITs relative to firms in other tax paying industries. Although a logical argument, there is empirical evidence showing contra signs. Harrison et al (2010), Feng et al (2007) and Barclay et al (2013) all report fairly high average leverage ratios in their real estate samples. Breuer et al (2018) compare a US REITs to non-REIT sample between 1999 and 2015, and find the median REIT leverage ratio to be far larger than that of the non-REIT sample.

²³ To the author's knowledge this is the case in South African REITs. Real estate may in certain circumstances have equipment such as security monitoring equipment, or other depreciable assets such as solar panels. These are generally not material in value and can be ignored for the purposes of this study.

2.1.2 Agency cost theory

Jensen and Meckling (1976) refer to the agency problems between different parties in a firm, and how these might affect the makeup of capital structure. One of these conflicts is between managers and shareholders. Harris and Raviv (1991) point out that to the extent managers do not own 100% of equity in a firm, they do not receive the entire gain from their management activities, which creates a lack of incentive. This leads to moral hazard behaviour, as managers may tend to pursue activities that maximise personal gain over maximising firm value. Jensen (1986) reveals the free cash flow problem, whereby over-investment issues can occur due to managers taking on too many projects (of high risk) with the sole view of self-gain, whilst such investment can be suboptimal for the firm and create unnecessary financial risk. Managerial incentives can, depending on structure, either mitigate or enhance these agency problems.

The other conflict involves shareholders and debtholders. Shareholders have limited liability in the event of failed projects, which again may lead to moral hazard behaviour from shareholders who will pursue riskier projects knowing their risk is limited. Shareholders will shift risk to debtholders by replacing quality projects for inferior projects, referred to as the asset substitution problem (Jensen, 1986). On the other hand, shareholders of poorly performing firms that are close to bankruptcy will have little incentive to invest in new value-increasing projects, as the majority of the returns of this project will flow to debtholders, whilst shareholders bear the full cost (Myers, 1977). This is considered a debt overhang issue, where the amount of existing leverage would also discourage debtholders from new investments just as much as shareholders. This agency issue instigated by too much leverage leads to underinvestment in new profitable projects.

However, as put forward by Jensen (1986), the use of debt can be useful in mitigating some of these agency issues. The frequent and mandatory interest payments on debt can limit the availability of free cash, so that managers are forced to manage prudently as opposed to recklessly spending resources on self-gain. This 'disciplining effect' is useful to shareholders. Stulz (1990), does however, point out that excessively high debt levels result in high interest payments that reduce free cash flow beyond reasonable levels, thus perpetuating underinvestment in profitable projects.

When considering agency issues in REITs one can immediately conclude that the free cash flow problem is significantly mitigated by the mandatory dividend distributions. Managers have little to no internal resources to play with, and are forced to use either debt, equity or a combination for new investments. In REIT regimes that impose leverage limits, the asset substitution effect would be curbed by virtue of the maximum debt allowed and similarly debt overhang issues would in theory be less, due to an inability to reach excessively high debt levels. REIT regimes with very high or unlimited leverage limits would still face these problems. Howton et al (2003) report that the agency cost hypothesis is not consistent with their findings when analyzing debt and equity issues of US REITs between 1993 and 2001. Brown and Riddiough (2003) argue an agency cost effect in US REITs due to the nature of secured and unsecured debt and their relative covenants. The increased scrutiny from outside debt holders as well as inherent covenant restrictions curb the amount of debt used.²⁴

2.1.3 Pecking order theory

Myers and Maljuf (1984) introduced the pecking order theory, which states that firms follow an order of preference with regards to capital structure. A firm will finance itself firstly using internal profits, then source debt, and lastly issue equity as a last resort (Myers, 1984). The theory revolves around the concept of asymmetric information (information disparities) between insiders and stakeholders²⁵. Equity is considered to have the highest information asymmetry cost, followed by debt, and then retained earnings as having no such cost. The Myers and Maljuf (1984) model posits that managers will not issue undervalued equity if acting in the interest of shareholders, which leads shareholders to assume that equity issued is thus overvalued. This, in turn, could lead to a downward adjustment of equity in the market. Managers wish to avoid issuing equity to prevent this costly situation. The pecking order follows the order of least information asymmetry costs. Thus, managers choose what is at the time the lowest cost financing option, or the path of least resistance (Barclay & Smith, 2005). Rajan and Zingales (1995) find support for pecking order predictions for firms in G7 countries.

Within a REIT scenario, it would appear the traditional pecking order cannot hold due to the mandatory payouts of profits. REIT firms only really have the option of debt and/or

²⁴ See also Riddiough and Steiner (2018)

²⁵ The terms information costs or adverse selection are also commonly used here.

equity financing. Furthermore, the debt element can potentially be capped to a limit depending on the REIT regime. Ott et al (2005) find that US REITs between 1981 and 1999 placed little reliance on retained earnings for financing of investments, but rather used equity and long term debt. Feng et al (2007) looked at US REITs that had IPO's between 1991 and 2003, and concluded that REITs prefer to issue debt whenever the cost of discounted equity exceeds the costs of financial distress.

2.1.4 Market timing theory

The market timing theory of capital structure claims that firms will attempt to align the issuance of debt or equity with the most optimal and favourable time in the prevailing market. This market timing can manifest itself in two versions. One version, as proposed by Myers and Majluf (1984), is that managers and investors are rational, and it is assumed that the issuance of equity is preceded by the release of positive firm information to the public, which is said to reduce information asymmetry between managers and shareholders. The reduction in information asymmetry will increase the share price. Firms can thus create their own market timing. This is referred to as the dynamic asymmetric information version of market timing.

The other version, as put forward by Baker and Wurgler (2002), is that market participants are irrational, which results in stock mispricings over time. Managers of firms will issue equity when they believe the cost of issue is abnormally low (shares are overpriced) and repurchase equity when the cost of issue is abnormally high (shares are underpriced). Managers believe they can time the market, and this drives their capital structure decisions. Managers will consider the debt and equity market conditions and issue what they consider the most favourable at the time – whether or not funding is required. The implications are that changes in prevailing market values will affect capital structure decisions.

In a survey of US firms, Graham and Harvey (2001) found that some managers do indeed attempt to time the market and interestingly also found they tried to issue debt at periods of low prevailing interest rates, a sort of debt based market timing. Brounen et al (2006) similarly find an association between stock price increases and new stock issuances in their European survey study. Boudry et al (2010) report strong evidence of market timing theory for a US REIT sample for the period 1997 to 2006. Ooi et al (2010) also conclude strong market timing behavior in US REITs between 1986 and 2003.

2.1.5 Financial flexibility

Financial flexibility has been found to be one of managers' top priorities in capital structure decision making. Both Graham and Harvey (2001) and Brounen et al (2006) find evidence of this in the survey of managers in the US and Europe respectively.²⁶ In the evolution of capital structure theories, financial flexibility is a fairly new and under-researched theory relative to the traditional theories, but has gained more coverage over recent years. A broad definition for financial flexibility is a firm's ability to easily access finance, either internal or external, at reasonably low cost and within acceptable time to (i) avoid any financial distress situations that may arise and (ii) capitalise on profitable investment opportunities. Thus, financial flexibility contains elements of risk management and investment growth management.

In the literature, financial flexibility has been measured using different proxies, usually leverage policy, spare debt capacity, excess cash holdings, share repurchases, and debt retirements. Ma et al (2015) considered spare debt capacity in American and Chinese firms and concluded that financial flexibility has a positive impact on performance. Arslan et al (2014) considered South East Asian firms pre- and post the 1998 Asian crisis. They suggest that leverage-based and cash-based flexibility measures are better predictors than traditional measures. Their analysis showed that firms with greater financial flexibility pre-crisis had greater ability to take on investment opportunities and performed better during the crisis. Harris (2015) shows in a large US sample that financial flexibility in the form of share repurchase activity is positively related to firms' debt levels.

Marchica et al (2014) document that conservative leverage policies focused on financial flexibility can enhance investment ability. Their tests suggest that financially flexible firms invest more and invest better. They argue that financial flexibility in the form of untapped borrowing reserves is a crucial component of capital structure theory. Wong (2017) considers the unused debt capacity of Malaysian and Singaporean REITs between 2003 and 2015. They conclude that debt conservatism behaviour is at play with lower than optimal debt ratios, as well as conservative use of debt buffers relative to the

²⁶ Bancel and Mittoo (2004) also found that managers in sixteen European countries valued financial flexibility when considering firm capital structure.

regulatory REIT limits applied in those countries. They contend these results cannot be explained by traditional capital structure theories like trade-off theory and pecking order theory.

2.2 Measures of leverage

The definition and measurement of leverage varies throughout the existing literature. There is no universally accepted unit of measurement, and the different measurements may provide mixed results when analysing capital structure decisions (Harris & Raviv, 1991). Book leverage is based on book values as stated in financial statements, whereas market leverage is based on the market value of equity, or market capitalisation. According to Adrian et al (2016) managers actively manage book leverage, while market leverage is driven mainly by market forces. Fama and French (2002) similarly believe that managers make capital structure decisions based on available book value data, because market value data can be highly volatile and depend on factors outside of the firm's control. The literature seems divided on which measure is more relevant, and which measure is better when reviewing different capital structure theories, with some studies using both measures in their assessments - sometimes with differing results.²⁷

Rajan and Zingales (1995) consider various different refinements of the leverage proxy, and suggest that the selection of leverage measure would depend on the objective of the research. They distinguish between total liability and total debt, where total liability consists of total debt, plus other liabilities and accruals, accounts payable and miscellaneous creditors. Total debt is a measure of actual debt issued or borrowings sourced – at a cost – where there is an obligation of repayment of both interest and capital. Total debt can be further broken down into short term debt and long term debt.²⁸ Earnings to interest expense ratio is also considered as a proxy of leverage.

In studies specific to REITs and listed property, total debt is generally used as either a book leverage measure, or a market leverage measure. Chikolwa (2011), Jakobsen and Olsson (2015), and Breuer et al (2018), focus on the book leverage measure. Alcock et al

²⁷ See Pandey (2001), Wang (2017) and Dogan et al (2019) for examples where differing proxies can produce either very similar, or very different, results.

²⁸ An important consideration is the role of debt maturity in capital structure (see Giambona et al (2008), Alcock et al (2010) and Alcock and Steiner (2017)).

(2010), Harrison et al (2010), Alcock and Steiner (2017), and Sant (2018) opt for market leverage measures in their studies.²⁹

2.3 Determinants of capital structure and empirical evidence

Capital structure determinants found in the literature are generally classified into three categories, namely:

- Firm specific characteristics
- Industry specific characteristics
- Country specific characteristics

What follows is a discussion of the more common determinants found in the literature, their relationship with capital structure theories, and supporting empirical evidence, in both general and REIT contexts.

2.3.1 Traditional firm specific determinants of capital structure

Firm specific characteristics consider the idiosyncratic differences among firms, either in the same or different industries. Morri and Beretta (2008) argue that asset tangibility, profitability, growth opportunities, firm size and operating risk are the more important capital structure determinants amongst REITs, while other potential determinants have little influence on capital structure determination. These factors are the most commonly documented in capital structure literature.³⁰

Asset Tangibility

Tangible assets are considered to be a better collateral offering than intangible. This idea centers largely on more ascertainable and reliable values for real estate, both generally, and in the event of bankruptcy and subsequent liquidation. The perception that tangible assets are relatively less risky than intangible assets tends to attract debt providers. By implication, a firm with a more tangible asset base would have a larger propensity for debt. Therefore, there is an expected positive relationship between asset tangibility and leverage under the trade-off theory.

²⁹ For studies in the listed real estate arena that consider both book and market leverage measures, see Cashman et al (2016), Dogan et al (2019), and Yousef (2019), who further break down the leverage measure into short and long term debt.

³⁰ Frank and Goyal (2009) also believe that tangibility, size, profitability and market-to-book ratio are the leading firm-specific determinants in addition to other important determinants of expected inflation and industry median leverage ratio.

This positive relationship is well reinforced by the literature across markets and firm type³¹. In the REIT and listed property space, Alcock and Steiner (2017) find significant positive effects in USA REITs between 1973 and 2011, Zarebski and Dimovski (2012) find the same relationship for Australian REITs, as do Suciati et al (2018) for Malaysian listed property firms.

An alternative viewpoint is that real estate as an asset class has information asymmetry implications. Consensus seems divided on whether real estate is transparent or opaque in nature, affecting the level of information available to stakeholders outside of the firm. The analogous and tangible nature of real estate should provide reasonable transparency to outsiders, and suggests that REITs exhibit less information asymmetry, promoting equity issuances over debt. However, Han (2006) argues that REIT assets are difficult to value due to their uniqueness, complexity and illiquidity. Specialised knowledge of the asset class and market is required. Feng et al (2007) also state that the asymmetric costs for REITs can be severe, because transparency of the underlying asset is less than perfect.

The pecking order interpretation differs, depending on which school of thought is followed. If real estate is considered informationally opaque and exhibits high information asymmetry costs for equity, debt will be favoured over equity. The higher the proportion of tangible real estate in a firm, the higher the information asymmetry, leading to higher debt levels. The result is an expected positive relationship, as is also predicted in the trade-off theory. A negative relationship is expected when real estate is assumed to exhibit low information asymmetry, and when the proportion of tangible assets in a firm is low. Bond and Scott (2006) find a significant negative relationship for UK listed property firms. Feng et al (2007) also observe this negative relationship for US REITs that had IPO's between 1991 and 2003, as do Erol and Tirtiroglu (2011) when reviewing Turkish REITs between 1998 and 2007.

Profitability

If we are to presume that higher profits are a sign of financially strong firms, then such firms are considered to be in a better position to take on (and repay) more debt than their

³¹ Deesomsak et al (2004) find supporting evidence in developed markets (Australia and Singapore) and developing markets (Malaysia and Thailand) in a 1993 to 2001 sample of non-financial firms. Song (2005) shows that the positive relationship exists in Swedish firms. See also Gwatidzo et al (2016) who find that this relationship holds for SA general firms and similarly Akinyomi and Olagunju (2013) for Nigerian general firms.

lesser performing counterparts.³² Under the trade-off theory, higher profits lead to higher leverage ratios, a positive relationship.

Conversely, under the pecking order theory, one expects a negative relationship, as firms with greater profits have greater retained earnings available to use at the start of the pecking order. The requirement for debt would be less, pointing towards a lower leverage ratio. On the other hand, it can be argued that since all profits in REITs are required to be distributed, the level of profitability or retained earnings in a REIT firm does not affect leverage. This notion view been highlighted by Feng et al (2007), Harrison et al (2010) and Versmissen and Zietz (2017).

There appears to be a slight bent towards pecking order theory in the general literature.³³ Regarding REITs and listed property, all points of view are supported and refuted. Liang et al (2014) find a significant positive relationship for Chinese listed property firms. Dogan et al (2019) find evidence of positive trade-off theory association for USA and Canadians REITs. Harrison et al (2010) and Sant (2018) find evidence supporting pecking order theory for US REITs, as do Erol and Tirtiroglu (2011) in their analysis of Turkish REITs. Nhung et al (2017) echo the negative relationship for Vietnamese listed real estate firms. Feng et al (2007), Breuer et al (2018), Bond and Scott (2006), as well Alcock and Steiner (2017) find scant support for either trade-off theory or pecking order theory apropos REITs, pointing towards an insignificant (neutral) relationship.

Growth opportunities

Under the trade-off theory high growth firms are expected to exhibit lower leverage. The two arguments for this negative relationship are: (i) high growth firms are generally riskier than stable firms, and this higher risk and associated higher probability of financial distress results in lower leverage; and (ii), the asset structure of high growth firms – generally more intangible relative to tangible assets – means that they have a lesser ability to provide collateral for debt, again translating into lower leverage levels.

³² An important consideration here is the proportion of a firm's profit that is considered cash flow profit, and that which is non-cash profit. The ability of a firm to regularly repay debt obligations relies on excess cash flow profit. In the case of REITs, cash flow profit stems from the net rental income collected from properties and non-cash profit (loss) would feature when real estate investments held are revalued upwards (downwards) to fair market value.

³³ Chipeta (2018) finds significant negative relationships for non-financial firms of sub-Saharan African countries, including South Africa. Céspedes (2008) find a negative significant relationship in Latin American countries. Both Chen (2004) and Huang and Song (2006) report the same negative relationship for Chinese general firms.

Under the pecking order theory the relationship ought to be positive, as high growth firms invest heavily in the growth phase, and therefore require substantial capital. They will exhaust the first call in the pecking order – retained earnings, if any – and seek debt to fill the void, implying higher levels of debt. Furthermore, high growth firms may exhibit more information asymmetries, forcing managers to issue more debt before potentially costly equity. Further, REITs have limited availability of retained earnings due to mandatory distributions, which puts more emphasis on the debt option in the pecking order hierarchy. Feng et al (2007) find that REITs with high growth opportunities – as measured by high market to book value ratios – tend to exhibit higher leverage. They attribute this to managers erring on the side of financial distress costs, versus the adverse selection cost of information asymmetry in equity issues.

A market timing theory interpretation of the growth determinant also exists. High market-to-book ratios signify high firm market value relative to book value. This can imply an overvaluation of equity scenario in which managers may take advantage by issuing equity. The effect is lower debt levels, a similar result to trade-off theory.

The empirical evidence yields mixed results, supporting both capital structure arguments. Harrison and Widjaja (2014) find significant negative coefficients both pre- and post the 2008 global financial crisis, using market-to-book ratios for US S&P 500 non-financial firms, which they attribute to market timing theory. Wang (2017) performs a similar analysis on Canadian firms, and finds a strong negative association when using market leverage as a proxy, but a strong positive association when using book leverage as a proxy. These results seem to provide support for both the trade-off and pecking order theories respectively.³⁴

Support for the trade-off theory's negative relationship with regards to REITs or listed property is found by Alcock et al (2010) and Alcock and Steiner (2017) in the US market, and Jakobsen and Olsson (2015) in the European market. Dogan et al 2019 report a strong negative relationship for most countries (including South Africa) in their sample from 2006 to 2013. The pecking order's expected positive relationship is backed up by Le and Ooi (2012), who find strong support that growth as a determinant of capital

³⁴ Rajan and Zingales (1995) demonstrate pecking order preference in most G7 countries. More support for pecking order theory in Indian general listed firms is found by Handoo and Sharma (2014). Neither Gwatidzo et al (2016), nor Smith (2016), could find strong support for either theory when analysing the South African general listed market.

structure follows the pecking order theory in both developed and developing property companies across thirteen different countries (one of which is South Africa) between 1994 and 2007. This was echoed by Rovolis et al (2014) on a similar sample set. Zarebski and Dimovski (2012) also reported positive relationship between growth opportunities and leverage for Australian REITs.

Size

The size of a firm is representative of its maturity and stability. A firm of substantial size can be considered well established and would have generally more financial means and strength than smaller comparable firm having moved out of the initial growth phase into mature phase. One would expect to witness decreasing probability of financial distress and firm size increases. It can be argued that larger firm is relatively less risky than a smaller firm, which would under the trade-off theory predict a positive relationship between firm size and leverage.

Empirical evidence supporting this relationship includes a study by Rajan and Zingales (1995) in many of the G7 countries³⁵. Rovolis et al (2014) also find significant positive relationships for 371 international real estate firms between 2005 and 2010. Their sample included South African real estate firms, which also exhibited this positive relationship. Harrison et al (2010) report positive relationships for US REITs. Yousef (2019) also finds significant positive relationships in both UK and GCC³⁶ real estate markets.

Conversely, an argument can be made for decreasing information asymmetry costs as firm size increases. Established firms with a good reputation and of a critical mass may find it more favourable to issue better priced equity than debt. This pecking order prediction can equate to lower debt levels in a firm's capital structure – a negative relationship between leverage and firm size. Dogan et al (2019) find a significant negative relationship between firm size and leverage in the USA and South Africa for both market leverage and book leverage measures using a 2002-2013 sample. Giambona et al (2008) also observe significant negative relationship for US REITs in the 1997-2003 time period.

³⁵ Wang (2017) looks at general Canadian firms and finds a significant positive relationship for firm size using both book and market leverage measures. Cespedes (2008) find the same relationship in Latin American countries. Gwatidzo et al (2016) make a similar finding for general South African listed firms.

³⁶ GCC stands for Gulf Cooperation Council and includes countries of the Gulf region – Bahrain, Kuwait, Oman, Qatar, Saudi Arabia and UAE.

Operating risk

Operating risk refers to variability in a firm's core earnings, where more variability represents more risk and therefore a riskier firm. Firms with inconsistent earnings flirt more closely with the risk of bankruptcy and financial distress. The trade-off theory suggests that firms with higher earnings volatility and hence exhibiting greater operating risk will have lower leverage levels. The negative association stems from less certainty in earnings available to repay debt levels, affecting its ultimate debt capacity. Empirical support for trade-off theory in REITs or listed property has been found by Zarebski and Dimovski (2012), Alcock and Steiner (2017) and Breuer et al (2019).

Pecking order theory suggests a contrary view. Greater volatility in earnings and cash flows aggravates the information asymmetry problem, meaning debt is favoured over potentially mispriced equity. Breuer et al (2018) concur, alluding to greater misvaluation when cash flows are volatile. Giambona et al (2008) find that there is a positive impact on US REIT leverage due to operating risk. Breuer et al (2018) find strong positive effects of operating risk on leverage in their US REIT sample, in line with pecking order behavior. Suciati et al (2018) also find a significant positive relationship in Malaysian listed property.³⁷

2.3.2 Other firm specific determinants of capital structure in the literature

Age

Firms of significant age are considered mature, well-established, and generally have a good reputation. Given their longevity, they would have survived economic and business cycles, market shocks or crises, and regular industry competition. These long track records support the notion that older firms are less risky than younger firms, and would exhibit a lower probability of bankruptcy. Under the trade-off theory, older firms are expected to have higher leverage ratios than younger firms. A contrasting view would be – as was the case when considering size of a firm – that information asymmetry costs are lower for older firms. Equity is thus favoured over debt, leading to lower debt levels.

³⁷ In a South African context, Chipeta (2016) observes a trade-off theory like negative association between operating risk and leverage in South African general firms, whilst Gwatidzo et al (2016) and Mouton and Smith (2016) find significant positive relationships in South African general firms - in favour of pecking order theory.

Gwatidzo and Ojah (2009) find a significant and positive trade-off theory relationship in general South African firms, in contrast to Gwatidzo et al's (2016) strong negative results, in favour of the pecking order theory. Handoo and Sharma (2014), on the other hand, find no significant relationship in listed general Indian firms. Similarly, Nejad and Wassiuzzaman (2016) find no significant relationship in Malaysian firms. Neither Harrison et al (2010), Hardin and Wu (2010), nor Sant (2018), find any conclusive evidence of age affecting leverage in US REITs.

Share Price Performance

As predicted under the Baker and Wurgler (2002) version of the market timing theory, firms will try to time their capital structure decisions based on the under- or overvaluation of a firm's equity. Thus, firm managers will attempt to time the market based on their perceived value of the firm's equity relative to its traded equity value, with share issues occurring at times of overvaluation and share repurchases occurring at times of undervaluation. It is therefore generally expected to see firms experiencing appreciating (depreciating) share prices to exhibit lower (higher) leverage ratios, all else equal. This translates to an expected negative relationship between share price performance and leverage.

Deesomsak et al (2004) find significant positive relationship in general firms in Malaysia, Thailand, Australia and Singapore - in favour of market timing theory. Harrison et al (2010) observe a significant negative relationship in US REITs. Versmissen and Zietz (2017) also find strong negative association in their US REIT sample covering the period 1993 to 2013, as do Breuer et al (2019), in a slightly later sample. These results support the notion of market timing activity in REITs. Zarebski and Dimovski (2012) and Jakobsen and Olsson (2015) both produce inconclusive results for Australian and European REITs, respectively.

Volatility and Risk

The extent to which a firm is considered risky is said to contribute to a firm's capital structure. This risk concept envisaged here is that of market risk or total firm risk experienced by the equity holders, and not the operating risk mentioned under a previous heading. The common proxies used for measuring a firm's market risk can be

the firm's beta,³⁸ or the standard deviation (volatility) of the firm's share price. Consistent with trade-off theory, an inherently risky firm would have a lower threshold for debt due to higher financial distress concerns, as well as the higher associated debt costs. The trade-off theory predicts a negative relationship between risk and leverage.³⁹ An alternative explanation is that it may be more difficult for managers to issue equity of firms displaying higher levels of volatility. The relative risk premium market participants may require can possibly deter prospective shareholders. Managers may have to issue shares at less than ideal prices or not all, leaving debt as the only feasible alternative, especially in the case of REITs. It would be feasible then that the pecking order theory would be present through a negative relationship.

Versmissen and Zietz (2017) find a significant positive relationship between leverage and the equity volatility of US REITs, as do Jakobsen and Olsson (2015) for European REITs, lending support for the pecking order theory. Sant (2018), however, finds a marginally significant negative relationship, thus supporting the trade-off theory. Morri and Artegianni (2015) finds an insignificant negative relationship in his pre- and post-financial crisis REIT sample. Howton et al (2003) do not find a relationship of significance.

Interest cover ratio

The interest cover ratio, typically measured as earnings over debt interest cost, serves as a generally accepted measure of the debt capacity of a firm. The trade-off theory predicts that firms with higher interest cover ratios should have a higher debt threshold, and thus exhibit higher leverage. Lower interest cover ratio firms are more likely to result in financial difficulties in servicing debt payments, translating into a greater probability of financial distress. Breaking the interest cover ratio into its components highlights that the numerator is a profitability proxy. It may be the case that a high interest cover ratio will lead to lower leverage, because of the influence of the pecking order theory. However, the denominator of the ratio is interest cost, which can at very high levels increase the probability of financial distress. The movements of the numerator and denominator can make this variable difficult to interpret. Rovolis and Feidakis (2014) point out that a high ratio may be a sign that a firm has an undesirable lack of debt, or is paying off debt too

³⁸ See Sant (2018) and Morri and Artegianni (2015). Note that the detail on whether beta is adjusted to levered or unlevered beta is not relevant to this study, as this proxy was not been used.

³⁹ See Chen et al (2014) for comprehensive analysis of stock return volatility and capital structure. Their findings, consistent with trade-off theory, show that firms with high volatility actively reduce leverage.

quickly, rather than investing excess profits into high yielding projects. This may be due to policy or simply a lack of profitable projects.

Harrison et al (2010) find a negative coefficient with no statistical significance in their US REIT sample, while Dogan et al (2019) find negative directionality of the interest cover ratio relative to both market and book leverage, in particular in South African and US real estate markets, which they indicate to be consistent with the pecking order theory. Handoo and Sharma (2014) also find a negative relationship between interest cover ratio and leverage in a sample of general Indian firms. Rovolis and Feidakis (2014) find a significant yet small positive coefficient in their analysis of worldwide REITs and listed property, including South Africa, between 2005 and 2010.

Lagged Leverage

Harrison et al (2010) include a lagged variable of the dependent variable, leverage, in their models. They find strongly significant positive coefficients indicating stability in firms' capital structure from period to period. The premise for inclusion is that a firm's capital structure is a function of the previous period's capital structure. The lagged dependent variable is often used to assess whether there is strong mean reversion within the sample.⁴⁰

2.3.3 Industry specific determinants of capital structure

Industry specific determinants refer to factors that are particular to an industry, and that impact capital structure. Frank and Goyal (2009) contend that the industry median leverage ratio is a relevant determinant of capital structure, as it serves as a benchmark for managers when deciding on their own firm's leverage. Versmissen and Zietz (2017) include property segment specific median leverage in their analysis of US REITs, and find a strong positive correlation to firm level leverage ratios. Intra-industry concentration, competition and regulation are also potentially influential in firm level capital structure decisions.

⁴⁰ Partial adjustment models and GMM models are usually used to analyse mean reversion, target debt ratios and adjustment rates to mean or target ratios. These models have not been considered in this study. See Bond and Scott (2006) and Versmissen and Zietz (2017).

Organisational Type

Different organisational types operate under different rules. The differing governing rules and regulations for alternative firm structures can possibly influence capital structure decision making. The relationship between different organisational structures and capital structure theories is not straightforward, and largely depend on the specifics of the structure.⁴¹ Harrison et al (2010) consider the US REIT market and the effects of state of incorporation, and whether a REIT belonged to the “old REIT” or “new REIT” era. It is found that there are slightly significant differences. Morri and Artegiani (2015) compare a European REIT sample to a non-REIT real estate sample, with results generally of the same directionality, but with differing magnitudes and significance of coefficients.

The above is relevant to this study, as South Africa’s listed real estate market underwent a significant change of organisational structure post 2013, with PLSs and PUTs converting to REIT structures. Recalling that REITs have a leverage limit of 60%, while that of PUTs was 30%, and PLSs unlimited, it can be deduced that PUTs will have lower leverage than REITs and PLSs, with PLSs potentially having higher leverage than REITs.

Property Type

It has already been noted that the tangibility of assets potentially influence the determination of capital structure. Titman and Wessels (1988) assert that firms with unique or specialised products have lower debt ratios on a relative basis. Ooi (1999) finds that asset structure is a significant determinant in corporate debt policies of UK property firms. REITs can vary by type of underlying property. Ertugrul and Giambona (2011) find that 65% of variation in REIT capital structure can be linked to property segment.

Traditional real estate categories include the retail, office, industrial and residential sectors. Other categories which are sometimes included in the preceding categories, or may be considered specialised categories, include hotels, data centers, self-storage etc. Definitions may vary or overlap across different REIT markets, but it is important to note that each category can have different revenue drivers and risk factors. A REIT may opt for a diversified strategy across real estate categories, or may choose to focus and specialise on a single category of real estate.

⁴¹ In the same way that REITs are different to traditional non-real estate firms, firms within the collective real estate bracket may have differing structures, potentially leading to innate differences in capital structure. See Harrison et al (2010), who make the argument for expected capital structure differences due to organisational differences specific to the US REIT market.

One may infer that a REIT with a diversified portfolio of property types is naturally hedged as a result of income streams across categories. Lenders may find that collateral spread across multiple categories is more appealing than a single strategy alternative. Brown and Riddiough (2003) state that debt capacity can vary markedly between property type, as more stable cashflows tend to support higher debt levels. Giambona et al (2008) find that firms focusing on what are considered most (least) liquid property types use more (less) leverage. Dogan et al (2019) observe lower average leverage ratios in specialised property types than other more common property types. A possible relationship between the underlying composition of a REIT's property portfolio and its capital structure exists. It would seem to most resemble elements of the trade-off theory, where the less risky types of property would provide enhanced debt capacity.

In other literature, Chikolwa's (2011) results show that retail property has a marginal and significant positive effect on total debt ratios in Australian REITs. Harrison et al (2010) observe that regional malls exhibit higher leverage, and storage facilities lower leverage, relative to a diversified base case. Bond and Scott (2006) found little evidence of any property type association with leverage levels.

2.3.4 Country specific determinants of capital structure

A further factor of interest is how a country's economic, social or geographic elements can influence the capital structures of firms within that country, often but not always, relative to another country. Various studies put the importance of country factors above that of firm specific factors - for example, Booth et al (2001) suggest that leverage tends to increase the greater the maturity of the capital markets in question. Other considerations are countries' legal systems, political risk, and economic conditions.

Rovolis et al (2014) studied the specific economic and urban effect of a country in their worldwide sample, and found significant negative influence for South African listed property relative to other countries in the sample. Cashman et al (2016) consider economic and political factors influencing capital structures of Asian listed real estate and conclude that firms with properties located in countries with higher degrees of political risk and instability employ less debt than counterparts in politically stable countries. Dogan et al (2019) perform an analysis considering all the differing REIT specific rules

across different REIT regimes, and find that REIT regimes with higher payout ratios have higher leverage. They also find statistical significance for GDP growth as a determinant of capital structure in the US and Canada. Rovolis and Feidakis (2014) found GDP growth had a negative correlation with leverage ratios in worldwide REITs. Le and Ooi (2012) consider the development of bond and equity markets of different countries, specifically within the real estate industry. They find that the greater the maturity of the debt market, the greater the debt ratios.

Market Interest Rates

The prevailing market interest rates of a country can play a role in firm decisions on capital structure. Market interest rates are proxies for a firm's cost of debt, with the explicit firm cost of debt generally being priced off market lending rates at a point in time, plus a spread that depends on its quality and credit rating.⁴² Economic theory suggests that the lower the cost of debt, the more incentive firms will have to borrow. Trade-off theory further adds that higher costs of debt lead to firms experiencing financial distress, with increase probability of default. Thus the expectation is that lower (higher) interest rates, or cost of debt, lead to higher (lower) debt levels; thus an inverse relationship. Closely linked to this is the notion that firms will want to time these interest rate cycles to their benefit. Harrison et al (2010) highlight that when the market interest rates are high, firms are reluctant to commit to long term debt funding. In survey studies by Graham and Harvey (2001) in the US and Brounen et al (2006) in Europe, managers acknowledged that prevailing interest rates were a factor when considering their firm's capital structure.

Under both the trade-off theory and market timing theory, a negative relationship is expected between market interest rates and leverage. Harrison et al (2010) report a strongly significant negative relationship between the 10 year treasury rate and leverage of US REITs, which they ascribe to market timing theory. Cashman et al (2016) present evidence of the US 10 year treasury rate having small negative effects on leverage in their model focused on the Asian real estate market. Morri and Artegiani (2015) also reports negative coefficients for both the pre- and post-global financial crisis periods in the European real estate market. Rovolis and Feidakis (2014) consider the government bond

⁴² Another noteworthy relationship not within the scope of this study is the impact of credit ratings on leverage, see Versmissen and Zietz (2017) and Harrison et al (2010).

yields as interest rate proxies in worldwide REIT markets between 2005 and 2010, including South Africa, and find significant negative coefficients lending support to the trade-off and market timing theories.⁴³

Inflation

Frank and Goyal (2009) postulate that expected inflation in the economic environment is a primary driver of capital structure decision making. Their reasoning, following trade-off theory logic, is that the value of the tax shield is higher when inflation is higher. Thus, firms will increase debt levels in periods of high inflation. Nejad and Wasiuzzaman (2016) find that this relationship holds for non-financial Malaysian firms.

The expectation for tax exempt REITs may not be as clear cut, as the tax shield advantage is not relevant. Le and Ooi (2012) find positive effects of inflation of debt levels in their cross country analysis, including South Africa. They argue that firms in higher inflation countries will use more debt in their capital structure to hedge against inflation risk. Breuer et al (2019) found negative but non-significant coefficients in their analysis of US REITs. Howton et al (2003) analyse equity and debt issues of US REITs between 1993 and 2001, and find that debt levels have an inverse relationship with inflation. Erol and Tirtiroglu (2011) find negative coefficients when analysing Turkish REITs, and argue that inflation is a hindrance when contracting for long term debt.

2.4 Concluding on the literature and hypotheses development

This study primarily aims to investigate the impact of capital structure determinants on leverage usage in the South African listed property market over the transition period to REITs. The literature review has taken into account extant literature and empirical evidence of both general and listed property and REIT capital structure studies. Table 1 summarises the determinants and associated theories, with supporting empirical evidence, from predominantly listed property and REIT based literature. The determinants outlined form the basis for the hypothesis testing on the South African sample in this study.

⁴³ They also analyse the cost of debt using the ratio of interest expense to debt. Whilst this metric is more a firm specific, the strongly negative result supports of either the trade-off theory, or the market timing theory. See Rovolis et al (2014) for similar result.

Table 1: Determinants and theories of capital structure

Determinant	Theoretical Relationship	Evidence in Literature
Tangibility	+ (Trade-off theory) - (Pecking order theory)	Rajan & Zingales (1995); Gwatidzo et al (2016); Chikolwa (2011); Harrison et al (2010); Alcock & Steiner (2017); Zarebski & Dimovski (2012) Bond & Scott (2006); Feng et al (2007); Erol and Tirtiroglu (2011)
Growth opportunities	- (Trade-off theory) - (Market timing theory) + (Pecking order theory)	Rajan & Zingales (1995); Deesomsak et al (2004); Chikolwa (2011); Alcock & Steiner (2017); Dogan et al (2019); Harrison et al (2010); Harrison & Widjaja (2014); Feng et al (2007); Rovolis et al (2014); Le & Ooi (2012); Zarebski & Dimovski (2012)
Profitability	+ (Trade-off theory) - (Pecking order theory)	Liang et al (2014); Dogan et al (2019) Rajan & Zingales (1995); Fama & French (2002); Gwatidzo & Ojah (2009); Nhung et al (2017); Harrison et al (2010); Sant (2018)
Firm size	+ (Trade-off theory) - (Pecking order theory)	Rajan & Zingales (1995); Deesomsak et al (2004); Gwatidzo et al (2016); Harrison et al (2010); Rovolis et al (2014); Yousef (2019) Howton et al (2003); Giambona et al (2008); Dogan et al (2019); Breuer et al (2019)
Operating risk	- (Trade-off theory) + (Pecking order theory)	Alcock & Steiner (2017); Zarebski & Dimovski (2012); Breuer et al (2019) Giambona et al (2008); Gwatidzo et al (2016); Breuer et al (2018); Suciati et al (2018)
Lagged Leverage	+/- (No clear connection to CS theories)	Harrison et al (2010); Bond & Scott (2006)
Firm age	+ (Trade-off theory) - (Pecking order theory)	Gwatidzo & Ojah (2009); Wong (2017) Gwatidzo et al (2016)
Share performance	- (Market timing theory)	Deesomsak et al (2004); Howton et al (2003); Harrison et al (2010); Versmissen & Zietz (2017); Breuer et al (2019)
Volatility	- (Trade-off theory) + (Pecking order theory)	Wang et al (2014); Morri & Artegiani (2015); Sant (2018) Versmissen & Zietz (2017); Jakobsen & Olsson (2015)
Interest cover ratio	+ (Trade-off theory)	Harrison et al (2010); Rovolis & Feidakis (2014); Handoo & Sharma (2014)
Corporate structure	+/- (No clear connection to CS theories)	Harrison et al (2010); Morri & Artegiani (2015);
Property type	+/- (No clear connection to CS theories)	Chikolwa (2011); Harrison et al (2010); Dogan et al (2019)
Market interest rate	- (Market timing theory) - (Trade off theory)	Harrison et al (2010); Morri & Artegiani (2015); Cashman et al (2016) Rovolis et al (2014); Rovolis & Feidakis (2014)
Inflation	+ (Trade-off theory)	Frank & Goyal (2009); Breuer et al (2019)

CHAPTER 3: DATA AND RESEARCH METHODOLOGY

This chapter focuses on the data collection process, the selection and defining of independent and dependent variables, and the defining of the various model equations that represent the tests and regressions utilised in this study for the purpose of answering the research questions.

3.1 Sample and data collection

The sample for this study comprised of South African listed property (PLSs, PUTs and REITs) that were listed on the JSE for the period 2005 to 2019.⁴⁴ The time period was selected to give a reasonable total sample size and sufficient observations both before and after the 2013 introduction of the South African REIT regime. Firms that were delisted, renamed, taken over or merged were, as far as possible, included in the sample in order to avoid survivorship bias. Firms for which specific variables were not available were excluded and only firms with at least two clear regressible firm years were included in the sample. The dependent and independent variables were collected from Bloomberg database and annual financial statements of the sample firms.

After allowing for loss of observations due to use of lagged variables the final sample consists of 39 individual listed property firms, and a total of 314 firm year observations. This sample consists of both firms classified as REITs in the REIT era (137 observations), and PUTs (53 observations) and PLSs (124 observations) in the pre REIT era.⁴⁵ The data is both cross sectional and a time series in nature, and thus constitutes a panel data set, being a combination of cross section of firms analyzed over a period of time. Not all firms are represented in every year between 2005 and 2019, thus resulting in an unbalanced panel. Appendix 7 contains the list of firms and respective firm years used in the sample.

3.2 The dependent variable

As discussed earlier, various proxies of leverage have been used in the literature. The version of leverage chosen for this study was total interest bearing debt to total assets, which is a book value ratio. The book value ratio is more relevant in the context of the research objectives. The imposed South African REIT debt limit is based on the book value

⁴⁴ It is noted that some firms may either be dual listed or listed on the JSE, but domiciled in another jurisdiction. The firms included in the sample are only those that are strictly considered South African REITs being those that fall under the South African REIT regime.

⁴⁵ Only one non REIT entity exists post 2013, Liberty Two Degrees (L2D) has not yet converted to a REIT and is still classified a PUT.

of total assets, and creditors are more concerned with leverage ratios based on the book value of assets held as collateral.⁴⁶ Market leverage measures are not altogether relevant for creditors holding collateral, and do not feature in the regulatory debt limits. Furthermore, since the market value of a firm is constantly changing and not within managers' influence, to gain an insight into actual and active capital structure decision making book leverage is more appropriate (Versmissen & Zietz, 2017). Total interest bearing debt (long and short term) is the more important leverage component, as it incurs a tangible cost of debt and has associated costs of financial distress. The dependent variable selection and definition is the most appropriate and relevant measure of leverage when analyzing the capital structure of the South African listed property firms in this sample, and its use is in line with studies by Chikolwa (2011), Versmissen and Zietz (2017) and Breuer et al (2018).

Of importance in this particular leverage definition is that the total interest bearing debt used was only that owed to external third party funders. Any internal or intercompany financing arrangements were excluded. Furthermore, with regards to the PLS specific observations, the linked debenture financing instruments⁴⁷ that were historically characteristic of these the previous listed property structure have also been excluded in this study. The debenture holders and equity holders are one and the same, and this structure more resembles quasi-equity than pure debt. As the objective in this study was to ascertain the true leverage within real estate firms, the debenture structures would overstate this, and therefore were excluded from the analysis.

3.3 Explanatory variables

The following section describes all the explanatory variables selected for the analysis. Table 2 provides all variables included in the study along with abbreviations used in regression results, definitions, and references to REIT literature supporting the use of these variables in capital structure analysis.

⁴⁶ Creditors, typically through loan covenants, consider the loan-to-value ratio, the ratio of net property investment to total debt. Given the inherently high proportion of property in a REIT's total asset base, the assumption is made that one approximates the other. Furthermore, the real estate portfolios of listed property firms are generally revalued by external independent third parties annually, so their book values should be fairly close to market values. This creates a sense of comfort for creditors.

⁴⁷ A linked debenture in this context is a linked unit consisting of a share and debenture. They cannot be separated and are traded together in a similar manner to the stapled structures used in Australian REITs. The debenture is often shown as a liability and attracts interest which is recognised at interest expense in the financial statements of a PLS. Without contesting technical status of the instrument too much, it is not considered debt when ascertaining leverage levels of a firm.

Table 2: Variables for determinants of capital structure used in study

Characteristic	Variables	Abbreviation	Definition	Used in REIT literature	Source
Firm specific	Book leverage	<i>Lev</i>	Ratio of Total interest bearing Debt to Total Assets	Chikolwa (2011), Jakobsen & Olsson (2015); Versmissen & Zietz (2017); Breuer et al (2018)	Annual financial statements
	Tangibility	<i>Tang</i>	Ratio of Net Property Investments to Total Assets	Harrison et al (2010); Ooi & Le (2012); Versmissen & Zietz (2017); Breuer et al (2018)	Annual financial statements
	Growth Opportunities	<i>Growth</i>	Market to Book ratio [ratio of Market Capitalisation to book value of equity]	Rovolis et al (2014); Ooi & Le (2012); Versmissen & Zietz (2017);	Bloomberg database
	Profitability	<i>Prof</i>	Ratio of EBITDA to Total Assets	Ooi & Le (2012); Alcock & Steiner (2017); Morri & Artegiani (2015); Breuer et al (2018)	Annual financial statements
	Firm Size	<i>Size</i>	Natural log of Total Assets	Ooi & Le (2012); Jakobsen & Olsson (2015); Rovolis et al (2014); Breuer et al (2018); Yousef (2019);	Annual financial statements
	Firm Age	<i>Age</i>	Years since firms initial listing on JSE	Hardin & Wu (2010); Harrison et al (2010); Versmissen & Zietz (2017); Sant (2018)	Bloomberg database
	Share Volatility	<i>Vol</i>	Standard deviation of firms traded equity for the 12 months preceding the leverage observation	Howton et al (2003); Jakobsen & Olsson (2015); Versmissen & Zietz (2017)	Bloomberg database
	Share Performance	<i>Perf</i>	Share price movement in firms traded equity for the 12 months preceding the leverage observation	Harrison et al (2010); Jakobsen & Olsson (2015); Versmissen & Zietz (2017); Breuer et al (2019)	Bloomberg database
	Interest Cover Ratio	<i>ICR</i>	Ratio of net property income to interest expense for the year of observation	Harrison et al (2010); Dogan et al (2019) [adapted]	Annual financial statements
Lagged Leverage	<i>LagLev</i>	Book Leverage of the firm, the dependent variable, in the preceding year of observation	Harrison et al (2010);	Annual financial statements	
Industry Specific	Organisational Type	<i>OTypePUT</i> <i>OTypePLS</i>	Dummy variables, jointly 0 for REIT, OTypePUT = 1 for PUT zero otherwise, OTypePLS = 1 for PLS zero otherwise.	Harrison et al (2010), Morri & Artegiani (2015)	Annual financial statements
	Property Type	<i>PType</i>	Dummy variable, value of 0 for Diversified property portfolio, value of 1 for single strategy property portfolio	Bond & Scott (2006); Chikolwa (2011); Dogan et al (2019);	Annual financial statements
Country Specific	Inflation	<i>Inf</i>	South African annual inflation rate, measured by Consumer Price Index (CPI) in the year of observation	Howton et al (2003); Le and Ooi (2012); Breuer (2019); Erol & Tirtiroglu (2011)	Bloomberg database
	Market Interest Rates	<i>MRate</i>	Average yield over 12 months in the South African R186 government bond yield in the year of observation, aligned to each firm's financial year end	Harrison et al (2010); Morri & Artegiani (2015); Cashman et al (2016)	Bloomberg database

3.3.1 Traditional firm specific variables used in the regression model

In line with extant literature as discussed in the previous chapter, all traditional firm specific determinants, with the exception of operating risk, were selected for this study. Typically, operating risk is calculated by the variation or standard deviation of a firm's earnings. Given the small sample size, inclusion of this variable in any effective form would have resulted in a significant loss of observations, and it was thus omitted as an explanatory variable in this study.

The definitions of the variables also follow that of existing literature. Thus, tangibility (*Tang*) is the ratio of net property investment over total assets, growth opportunities (*Growth*) is the market-to-book ratio, firm size (*Size*) is the natural logarithm of total assets, and profitability (*Profit*), is EBITDA scaled by total assets.⁴⁸

3.3.2 Additional firm specific variables used in the regression model

The additional firm specific determinants found in capital structure literature that were included in the regression models were firm age (*Age*), calculated as years since a firm's listing, share price performance (*Perf*), being the last 12 months movement in a firm's traded equity, share price volatility (*Vol*) proxied by the standard deviation of the firm's share price for the previous 12 months, and interest cover ratio (*ICR*), calculated as the net property income over interest expense for a given year being observed.⁴⁹ In addition, an autoregressive variable, lagged leverage (*LagLev*), which is the dependent variable lagged by one year, was included.

3.3.3 Industry specific variables used in analysis

The first industry specific variables selected for the model is the organisational structure of the firm, *OTypePUT* and *OTypePLS*. These dummy variables with the base case (zero value), representing a REIT under the South African REIT regime implemented in 2013. *OTypePUT* takes on a value of 1 if the company is a PUT (i.e. neither REIT nor PLS). Similarly, *OTypePLS* takes on a value of 1 if the company is PLS (i.e. neither REIT nor PLS). This is an important inclusion, as it aims to test for possible material differences in leverage between the pre-REIT

⁴⁸ EBITDA was adjusted for non-recurring and exceptional items - effectively net property related income and fair value adjustments on investment properties. Harrison et al (2010) use funds from operations, which was not an easily obtainable metric for this sample. Morri and Artegiani (2015) and Breuer et al (2018), amongst others, use EBITDA as a proxy for profitability.

⁴⁹ The use of net property income instead of EBITDA differs slightly from some of the literature. The ICR serves as a measure of a firm's regular and ongoing ability to repay a level of debt. It is the author's opinion that this is better measured by assessing only the net property income (cashflows) streaming off the property portfolio, and not included non-cash flow fair value profits that will skew this ratio. Furthermore, interest expense associated with debentures in PLSs has also been excluded as it is not reflective of a firm's ability to repay creditors.

and REIT organisational structures, and thus whether the implementation of REIT legislation had an impact of leverage in the South African listed property sector.

Similarly, a dummy variable (*PType*) for differentiation of a firm's underlying property type was included. Unlike other studies that differentiate across various property segments, the categorisation for this study is simplified into either diversified (a firm's property portfolio consisting of more than one segment), or single strategy (a firm's property portfolio consisting purely of one segment), with the base case being the former (dummy variable = 0), and the alternative case the latter (dummy variable = 1).

3.3.3 Country specific variables used in analysis

Country factors specific to South Africa are also included to ascertain any potential influence of country specific macroeconomic factors on the capital structures of the sample firms.

Thus South African inflation (*Inf*), as approximated by the Consumer Price Index, was included as an independent variable. The prevailing market interest rates in South Africa (*MRate*) are represented by the 12 month average R186 government bond yield in the year of observation, aligned to each firm's financial year end date.

Same period explanatory variables were preferred to one period lagged explanatory variables, save for *LagLev*. It is the author's contention that the variables in the current period are more appropriate as management know, at all times, the inner workings and performance of the firm. Management can react to information not yet public and make capital structure decisions on the most up to date information. One period lagged variables have an inherent delay and can be based on outdated information, possibly undermining their accuracy in assessing capital structure choices. Harrison et al (2010), Yousef (2019) and Sant (2018) use same period explanatory variables.

3.4 Model Specification

A panel regression model is constructed to ascertain the effect of specified capital structure determinants, the explanatory variables, on the dependent variable of the sample firms over the specified sample time period. The use of panel data has the advantage of controlling for heterogeneity across groups or categories in this case the group of sample firms with the South African listed property sector. Put differently, each firm within the category would have idiosyncratic differences that would not be controlled for in an ordinary regression.

The use of panel regression controls for heterogeneity within the group being analyzed and also controls for any unobservable firm specific effects. Lemmon et al (2008) state that the majority of variation in a firm's capital structure is explained by unobserved firm specific effects and failure to control for these can lead to omitted variable bias. Failing to take this into account can lead to model misspecification.⁵⁰ Possible firm specific or unobserved factors not explicitly taken into account in the model and not easily measurable within the sample firms are firm culture, the risk appetite or conservatism of management, managerial skill and ability, or 'desire' to maintain either a target debt ratio or financial flexibility in the capital structure, or the external imposition of debt covenants and creditor monitoring. Having considered the theoretical and empirical literature the following panel regression is constructed, hereafter referred to as the "full model":⁵¹

Book Leverage = f(traditional firm specific variables, additional firm specific variables, industry specific variables, country specific variables, error term)

$$\text{Formulaically: } LEV_{it} = \alpha + \beta_X X_{it} + \beta_{X'} X'_{it} + \beta_Y Y_{it} + \beta_Z Z_{it} + \varepsilon_{it} \quad (1)$$

Where:

α = Constant/intercept

i = Firm

t = Year of observation

LEV = The dependent variable, Book Leverage

X = Vector of explanatory traditional firm specific variables for firm i over time t , including Tang, Growth, Profit, Size

X' = Vector of explanatory additional firm specific variables for firm i over time t , including Age, Perf, Vol, ICR, LagLev

Y = Vector of explanatory industry specific variables for firm i over time t , including OTypePUT, OTypePLS, PType

Z = Vector of explanatory country specific variables for firm i over time t , including MRate, Inf

β = Coefficients of the explanatory variables

ε = Error term, where the ε takes into account the residual error term and unobserved firm specific effects

⁵⁰ Matemilola (2013) find higher R squared ratio in a panel fixed effects model versus OLS model when assessing capital structure determinants in a South African sample of firms. They ascribed this to unobservable firm specific effects, such as managerial ability, and cite observable determinants do not capture all variation capital structure across firms.

⁵¹ Vermissen and Zietz (2017), Breuer et al (2018), Morri and Artegiani (2015) use panel regression in their analyses. Table 2 summarises the variables used with supporting literature.

Before running the full model a regression is performed on just the traditional firm specific variables (X) and the organizational type dummy variables OTypePUT and OTypePLS. The remaining variables are then added to this initial regression, hereafter referred to as the “simplified model”. Extant literature focuses chiefly on select firm specific variables influencing capital structure, in some cases dismissing any other possible explanatory options. This approach helps analyze whether additional variables add any explanatory power to the traditional model and whether the sign and significance of the traditional firm specific variables change.

3.5 Appropriateness and diagnostic tests

The sample data was tested for normality using the Shapiro Wilk test. The results of the test show that the data is not normally distributed. Histogram charts of each variable were also reviewed which showed approximate normal distributions. The non-normality of data can cause issues in interpretation of regression results. However, for large enough samples the Central Limit Theorem indicates that regression coefficients do in fact tend to normality even without residuals that are normally distributed (Wooldridge, 2013).⁵² For the purposes of this study, this sample set of 314 observations is deemed large enough to prevent any non-normality of the residuals from hindering the regression results analysis.

Tests for multicollinearity are performed using pairwise correlation matrix and Variance Inflation Factor (VIF) indicators. The variables *Size* and *Age* show a degree of correlation which is not unexpected. Both the correlation matrix, Appendix 8, and VIF indicators, indicate that multicollinearity is not an issue in the sample. The modified Wald test was performed and showed the presence of heteroskedasticity within the sample. Heteroskedasticity occurs when the variances of the error terms in a regression are not constant. This can result in misestimation of the standard errors of independent variable coefficients which can lead to misleading inferences. The Wooldridge test for autocorrelation of residuals was also performed which revealed that autocorrelation was detected within the sample. Autocorrelation refers to the correlation of observations of variables over a time period and in the context of regression analysis correlation of error terms over time. In the presence of autocorrelation conclusions in respect of statistical significance of coefficients can be

⁵² Wooldridge (2013) states that sample sizes as low as 30 are sufficient for the Central Limit Theorem to apply. Many studies in relevant literature use similar sample sizes with similar variables in similar models. See Nhung et al (2017) that use 204 observations, Suciati et al (2018) use 256 observations, and Chikolwa (2011) use 199 observations.

misleading due to the invalidity of regular t and F tests of significance. The heteroskedasticity and autocorrelation problems are addressed by the use of robust standard errors within the regression.

Within panel data there are options of fixed effects, random effects or OLS regressions. Fixed effects are time-invariant and often unobserved effects specific to each individual observation within a group in a study, in this case firms, and can be correlated with the other explanatory variables in the model. The fixed effect model can address omitted variable bias thereby improving the model. Random effects assumes that the individual specific effect is uncorrelated with the explanatory variables in the model.

Tests to determine which options of panel regression are appropriate were performed for both the full model and simplified model. The first test, F-test, checks the suitability of fixed effects regression versus OLS regression and whether heterogeneity is present in the cross section of firms in the sample. Assuming fixed effects is appropriate the Hausman test is performed to test whether a fixed effects model or a random effects model is the better model. If the result confirms fixed effects, then fixed effects is used. If the Hausman test confirms random effects use then the Breusch Pagan Lagrange multiplier test is performed to select between random effects regression or OLS regression. At this point a further F-test is performed to check whether time fixed effects are potentially significant. Time fixed effects are interpreted as heterogeneity between time periods or the time series element of this sample. In chapter four the results of these tests are discussed and fixed effects, random effects and OLS regressions are performed and compared in accordance with the appropriateness test results outlined above.

CHAPTER 4: RESULTS AND ANALYSIS

This chapter discusses the descriptive statistics and results of the regression models, as this pertains to the research questions and theories of capital structure.

4.1 Descriptive statistics

The summary statistics of the data used for this study are presented in Table 3. The mean leverage ratio for South African listed property over the sample period was 28.2%. The mean leverage ratio for REITs only is 31.2%, for PUTs it is 16.8%, and for PLSs is 29.8%. The majority of the leverage ratio observations in the distribution lie within the 20% to 40% range. The maximum REIT leverage ratio is 62.2%.⁵³ Figure 1 depicts the leverage ratios over the sample period timeline. Understandably, due to their debt restrictions, PUTs exhibited lower leverage than PLSs before the introduction of the REIT regime. After the introduction of REITs in South Africa in 2013, PUTs that converted to REITs took advantage of the additional allowance for debt with their leverage ratios increasing. PLSs converting to REITs had a similar reaction, but to a lesser degree. The mean leverage ratio for REITs only of 31.2% suggests that the REIT status has on average increased the overall usage of debt in the South African listed property space since its introduction.

On average, REITs in South Africa operate well below the REIT regulatory debt limit of 60%. The gap between the observed leverage and this prescribed debt limit suggest more scope for increasing leverage should the firms wish to. That prescribed debt limit does not appear to be hampering firms' ability or desire to take on more debt. Considering just the borrowing capacity available, relative to the prescribed debt limit, it appears that REITs in South Africa err on the side of conservatism with regard to debt usage in their capital structures. A possible reason for this is that firms may wish to maintain larger buffers relative to the limits in case of external shocks, market downturns, or liquidity issues.⁵⁴ By maintaining a buffer firms have the financial flexibility to withstand market fluctuations and also maintain the ability to use debt for investment. Furthermore, it is a possibility that a firm's debt level congruent to its level of financial distress simply lies below the prescribed debt limit.

⁵³ Rebois (REB) had a leverage ratio of 62.2% (above the 60% limit) in 2019. This was largely attributable to heavy write-offs of real estate assets over the previous few years trading – a period of general decline for the entire South African listed property sector. This company was not the only one to experience write-offs and increases in leverage, but was the only one to breach the regulatory leverage restriction. Appendix 9 shows selected larger firms from the sample and their leverage ratios over the sample period.

⁵⁴ The large write offs of real estate assets in recent years in South Africa are a good example of this. On average the leverage ratio in South African REITs has increased over the last 3 years some of which is attributable to a reduction of asset value amidst difficult market conditions.

Table 3: Descriptive statistics

Variables	Mean	Standard deviation	Minimum	Maximum	25th P'tile	Median	75th P'tile
Leverage	0.282	0.111	-	0.623	0.210	0.298	0.367
Tangibility	0.851	0.123	0.365	0.996	0.803	0.890	0.943
Growth	0.938	0.179	0.067	1.522	0.848	0.942	1.040
Size	8.863	1.223	4.836	11.862	8.137	8.908	9.523
Profitability	0.100	0.073	0.110	0.811	0.067	0.086	0.116
PUT	0.169	0.375	-	1.000	-	-	-
PLS	0.395	0.490	-	1.000	-	-	1.000
Lagged Leverage	0.211	0.080	-	0.449	0.162	0.228	0.269
Interest Cover Ratio	3.782	2.040	-	8.000	2.372	3.235	4.685
Age	9.637	6.860	1.000	32.000	4.000	8.000	13.000
Property Type	0.404	0.492	-	1.000	-	-	1.000
Performance	0.082	0.254	0.954	1.170	0.066	0.076	0.228
Volatility	0.061	0.039	0.003	0.326	0.040	0.053	0.075
Inflation	0.054	0.016	0.020	0.093	0.044	0.052	0.063
Market Interest Rate	0.083	0.005	0.074	0.089	0.079	0.083	0.087

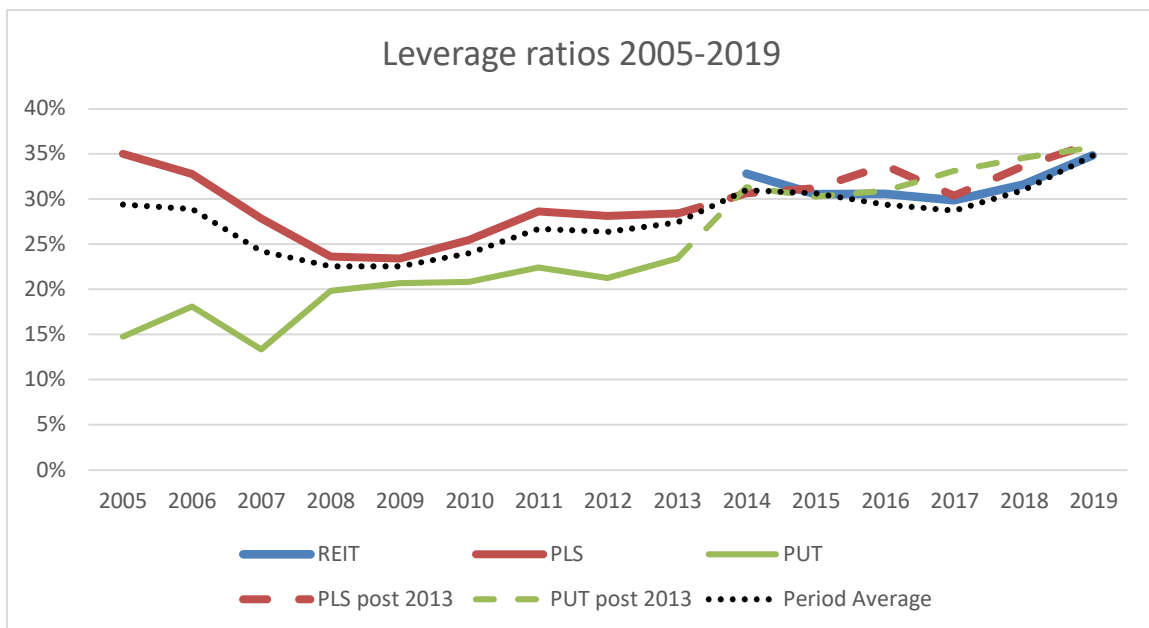


Figure 1: Average leverage ratios of South African PUTs, PLSs and REITs 2005 - 2019

4.2 Regression results

The appropriate panel regression tests were conducted for both the simplified and full models. For the simplified model the F-test (p value < 0.000) and Hausman test (p value = 0.08) indicated that a random effects model is appropriate. This was further confirmed by the Breusch Pagan test (p value < 0.000), which eliminated an OLS regression as an option. The same approach was followed for the full model, resulting in a fixed effects regression being selected as the most appropriate (F test p value < 0.000; Hausman test p value < 0.006).

Time fixed effects tests were also conducted to check whether time fixed effects would be suitable. Whilst the tests prove time fixed effects may be suitable, multicollinearity with the industry and country specific variables resulted in time fixed effects not being included in the models. The full model with fixed effects shows a higher R-squared than that of the simplified random effects model with just the traditional variables. All else equal the addition of additional variables improves the goodness of fit of the sample. The regression results for both the simplified and traditional models are presented in Table 4 (see next page).

The *Size* variable is found to be statistically significant at the 10% significance level, with a positive coefficient in both the simplified and full models. South African listed property firms in the sample thus exhibit higher levels of leverage the larger they are in size - in this case measured by total assets. This follows the trade-off theory that larger firms with larger asset bases will have a higher capacity for debt, and therefore higher leverage ratios. This result is consistent with the findings of Rovolis et al (2014), Yousef (2019), and Versmissen and Zietz (2017).

Tangibility (*Tang*) has a positive coefficient but is not found to be statistically significant. The directionality of the coefficient suggest support for the trade-off theory, as was found by Breuer et al (2018), and Alcock and Steiner (2017). A possible explanation of the lack of statistical significance is that listed South African property firms are inherently rich in tangible assets, with very limited intangible assets, which possibly limits the variation in this factor across the sample. In their research in multiple REIT jurisdictions, Dogan et al (2019) also find a positive and insignificant results for book leverage in the UK, Singapore, Hong Kong and Canada.

Table 4: Regression output for determinants of capital structure

	Simplified Model Random Effects	Full Model Fixed effects
Tangibility (<i>Tang</i>)	0.102 (0.77)	0.0687 (0.64)
Growth Opportunities (<i>Growth</i>)	0.0473 (1.18)	0.0674** (3.08)
Firm Size (<i>Size</i>)	0.0249* (2.45)	0.0427* (2.22)
Profitability (<i>Profit</i>)	-0.157** (-2.67)	0.0225 (0.34)
PUT (<i>OTypePUT</i>)	-0.137*** (-7.89)	-0.0825** (-3.37)
PLS (<i>OTypePLS</i>)	0.0052 (0.32)	0.0079 (0.49)
Lagged Leverage (<i>LagLev</i>)		0.497*** (3.81)
Interest Cover Ratio (<i>ICR</i>)		-0.0117** (-2.93)
Firm Age (<i>Age</i>)		-0.006 (-1.61)
Property Type (<i>PType</i>)		- -
Share Performance (<i>Perf</i>)		-0.0571*** (-4.19)
Share Volatility (<i>Vol</i>)		0.382* (2.50)
Inflation (<i>Inf</i>)		-0.888*** (-4.39)
Market Interest Rate (<i>MRate</i>)		-0.294 (-0.40)
Constant	-0.0239 (-0.14)	-0.158 (-0.77)
Observations	314	314
R^2	0.271	0.485

The profitability (*Prof*) variable is negative and statistically significant at the 5% level in the simplified model, but after the addition of the other variables of the full model the coefficient changes to positive with no significance. The simplified model result is in line with pecking order theory predictions, and consistent with the findings of Harrison et al (2010) and Sant (2018). However, the lack of statistical significance of the full model is consistent with the findings of Feng et al (2007) and Breuer et al (2018). Given that in most cases near-full profits are paid out on a mandatory basis, there is a possible irrelevance of profitability as a determinant of REIT capital structure, at least within the context of this study.

Growth opportunities, represented by *Growth*, is statistically significant at 5% with a positive coefficient for the full model, but not statistically significant in the simplified model. It would thus appear that when growth opportunities are high, as measured by high market to book ratios, leverage levels for South African listed property firms tend to increase. High growth firms may, as suggested by Feng et al (2007), experience higher information asymmetry costs, and prefer to lean towards debt than to be exposed to an adverse selection problem when issuing equity. This result provides support for the pecking order theory, in line with results found by Le and Ooi (2012) and Zarebski and Dimovski (2012). The finding is, however, contrary to the negative relationship found by Chikolwa (2011), Breuer et al (2019) and Dogan et al (2019).

The dummy variables for organisational type *OTypePUT* and *OTypePLS*, behave as expected. *OTypePUT* is negative and statistically significant (at the 1% or 5% level, depending on the model), meaning that PUTs exhibited lower leverage than REITs over the sample period. Given that PUTs had a regulatory enforced leverage restriction of 30%, as opposed to the 60% of REITs, this result was expected. *OTypePLS* has a positive coefficient but it is not statistically significant. The positive sign of the coefficient is credible, given the lack of any regulatory debt restrictions that existed on PLSs, as opposed to the restriction on debt in REITs.

The lagged leverage variable, *LagLev*, is positive and significant at a 1% level consistent with Harrison et al (2010). The interest cover ratio, *ICR*, is negative in sign and significant at a 5% level. The result is opposite to that expected in the trade-off theory and that found by Rovolis and Feidakis (2014) but is consistent for with the findings of Dogan et al (2019) and Handoo and Sharma (2014) supporting pecking order theory. Another explanation is perhaps South African REITs with high interest cover ratios either choose to maintain a certain level of debt regardless their greater ability to afford debt. This may be attributable to having a clear

leverage policy that involves financial flexibility and prudence or due to restrictions imposed by covenants of debt. Alternatively they may choose to reduce debt from excess profits when there are no imminent return yielding projects available for investment.

Firm age, *Age*, is found to be statistically non-significant, with negative sign. This suggests that the age of a South African listed real estate firm does not have any correlation with its leverage levels, and there is therefore no evidence of any capital structure theory at play with regards to this variable. Harrison et al (2010) and Sant (2018) report the same result and lack of statistical significance.

The property type variable, *PType*, was omitted from the fixed effects regression due to collinearity. That is, *PType*, is constant over time for each firm. A fixed effects approach inherently accounts for time-invariant elements, and this explains the existence of collinearity with regards to *PType*. Given its omission from the fixed effects regression, its random effects result was considered. *PType* under the random effects regression exhibits a negative coefficient, and is found to be strongly statistically significant at a 1% level. The interpretation is that South African listed property firms with a single property type focus use less leverage. This is plausible if one considers that a diversified property portfolio is less risky than a focused property portfolio, and hence can both afford and obtain potentially more debt. This result is consistent with Harrison et al (2010) and Chikolwa (2011) who find that property type has an effect on the leverage ratio.

The twelve-month performance of a firm's shares (*Perf*) is shown to be negatively correlated to its percentage debt of used. This result is statistically significant at a 1% significance level. This finding is consistent with those of Versmissen and Zietz (2017) and Breuer et al (2019), and supports the market timing theory with regards to the sample firms. Thus, firms in the South African listed property sector exhibit lower leverage in times of appreciating share prices, suggesting that managers may try to time the market and issue equity, or at least relatively more equity than debt, in these favourable conditions.

The share price volatility of a firm, *Vol*, yields an interesting result. A positive coefficient with significance at the 10% level is reported which suggests that firms with more volatile share prices have higher leverage. The result offers support for pecking order theory consistent with the findings of Versmissen and Zietz (2017) and Jakobsen and Olsson (2015). To the extent a

firm's equity is considered more volatile and risky, managers may be reluctant to issue equity with an additional risk premium and will opt for debt financing instead.

The country specific determinant of Inflation (*Inf*) displays a negative coefficient with high degree of statistical significance (1% level) consistent with the result of Erol and Tirtiroglu (2011) for Turkish REITs. The result is contrary to the prediction of Frank and Goyal (2009) and also opposite to the findings of Le and Ooi (2012). The negative sign is consistent with the results of Howton et al (2003) of US REITs that suggests equity is preferred over debt when inflation is considered higher. A possible explanation may be that the demand for REIT equity may be greater than REIT debt in periods of high inflation, the holders of REIT equity are seeking inflation hedging investments driving a preference for equity over debt which managers may act on.

The level of prevailing market rates (*MRate*) is found to have a negative sign and to be statistically non-significant. The sign of the coefficient is in line with trade-off and market timing theories, as found by Harrison et al (2010) and Cashman et al (2016). A possible explanation for the lack of significance is that firms in this sector are generally committed to long-term maturity funding, and cannot easily refinance without incurring exit costs. Furthermore, firms engage in hedging strategies to mitigate against fluctuations of market interest rates, and thus negate the detrimental effects of interest rate movements. Thus, the prevailing interest rate environment seems not to significantly affect the level of leverage within the South African listed property sector.

Not all determinants used in the models play a significant role in explaining capital structures within the South African listed property. Of the determinants that are significant, not one capital structure theory dominates the others. Instead, the statistically significant determinants found on this study support different capital structure theories. Notwithstanding the use of fixed effects regression in the full model, omitted variable bias and other unobserved contributing factors cannot be ruled out. Hence, the results of the regression model cannot be assumed to be exhaustive, and can only partially explain the capital structure question in the South African listed property sector. Table 5 (see next page) summarises the regression results.

Table 5: Summary of regression results and capital structure theories

Determinant	Result [significance]	Theory supported	Similar result in literature
Tangibility	+ [non-significant]	Trade-off theory	Dogan et al (2019)
Growth opportunities	+ [non-significant] <i>(simplified model)</i>	N/A	
	+ [5% significance level] <i>(full model)</i>	Pecking order theory	Feng et al (2007); Rovolis et al (2014); Le & Ooi (2012); Zarebski & Dimovski (2012)
Profitability	- [5% significance level] <i>(simplified model)</i>	Pecking order theory	Rajan & Zingales (1995); Gwatidzo & Ojah (2009); Harrison et al (2010); Sant (2018)
	+ [non-significant] <i>(full model)</i>	N/A	Feng et al (2007); Breuer et al (2018)
Firm size	+ [5% significance level]	Trade-off theory	Deesomsak et al (2004); Gwatidzo et al (2016); Rovolis et al (2014); Yousef (2019)
Firm age	- [non-significant]	N/A	Harrison et al (2010); Sant (2018)
Corporate structure (PUT)	- [5% significance level]	N/A (No clear connection to CS theories)	Harrison et al (2010); Morri & Artegiani (2015);
Corporate structure (PLS)	+ [non-significant]	N/A (No clear connection to CS theories)	Harrison et al (2010); Morri & Artegiani (2015);
Lagged Leverage	+ [1% significance level]	N/A (No clear connection to CS theories)	Harrison et al (2010);
Share performance	- [1% significance level]	Market timing theory	Deesomsak et al (2004); Harrison et al (2010); Versmissen & Zietz (2017); Breuer et al (2019)
Share Volatility	- [10% significance level]	Pecking order theory	Versmissen & Zietz (2017); Jakobsen & Olsson (2015)
Interest cover ratio	- [5% significance level]	Pecking order theory	Dogan et al (2019); Handoo & Sharma (2014)
Property type	- [5% significance level] <i>(random effects model)</i>	N/A (No clear connection to CS theories)	Chikolwa (2011); Harrison et al (2010); Dogan et al (2019)
Market interest rate	- [non-significant]	Market timing theory	Harrison et al (2010); Morri & Artegiani (2015); Rovolis and Feidakis (2014); Rovolis et al (2014)
		Trade-off theory	
Inflation	- [1% significance level]	N/A (No clear connection to CS theories)	Howton et al (2003); Erol & Tirtiroglu (2011)

CHAPTER 5: CONCLUSION

5.1 Key findings

This study provides insight into the drivers of capital structure in the South African listed property sector, before and after the introduction of South Africa's REIT regime. REITs have unique characteristics that differentiate the capital structure debate from that of general firms. Having conducted panel regression analysis on firm specific, industry specific and country specific determinants over the period 2005 to 2019, the findings show support for certain determinants and the prevalence of the major capital structure theories - trade-off theory, pecking order theory and market timing theory – with no single theory dominating as an explanatory framework.

Firm size, supporting the trade-off theory, and growth opportunities, supporting the pecking order theory, were found to be statistically significantly positively correlated with leverage levels. Share performance also demonstrated a high degree of negative correlation with leverage levels, which supports market timing theory behavior. Share volatility (positive correlation) and interest cover ratios (negative correlation), provide support for further possible pecking order influence in leverage levels. Inflation, a country specific determinant, was found to have a strong negative correlation with leverage levels. The regression models, and possible determinants, provide a partial explanation of the drivers of South African listed property capital structure.

The adoption of, and transition to, REIT status has seen former PUTs increase leverage from previously lower debt thresholds, while PLS leverage ratios remained fairly consistent. Overall, South African listed property after REIT implementation operated at a slightly higher level than before REIT status, but well below the South African REIT regulatory minimum of 60%. Relative to other REITs countries, South Africa exhibits lower levels of leverage versus jurisdictions that have debt restrictions or unlimited debt allowance. Without knowing the optimal debt ratio, South African REITs err on the side of debt conservatism and financial prudence relative to their worldwide peers, and relative to the South African REIT prescribed debt limit.

5.2 Limitations of the study

One of the main limitations of the study is the small sample size of 314 observations. Given the size of the South Africa listed property sector, the sample was limited. Previous similar studies used larger samples when either considering other major REIT markets, or combining REIT

markets in cross country analysis. However, some studies have been conducted with similar or fewer observations.⁵⁵ The study may have been more informative if separate regressions could have been performed for each organisational type – REIT, PUT and PLS – as opposed to the dummy variable approach used. However, the small sample size limited this option.

One of the traditionally used explanatory variables, operating risk, was not included in the regression analysis. Given the limited available data for the sample the metric for operating risk could not be calculated in accordance with previous literature or in any meaningful form and was thus omitted. It is possible that this may have been a significant explanatory variable and could have contributed to the overall fit and betterment of the model specification. In other literature the dividend or distribution yield (or variation thereof) was considered and shown to be a significant determinant of leverage.⁵⁶ Missing data meant this variable could not be included in the model. Similarly, the roles of debt covenants, financial flexibility, managerial ability and debt conservatism are only addressed in possible unobserved effects of the analysis. It cannot be said with conviction that one or any of these factors possibly explain leverage in South African REITs. In summary, despite the use of fixed effects panel regression to control for omitted variable bias unobserved effects, there remain factors outside of the specified model that may have a material influence on capital structure decision making in South Africa's listed property sector.

5.3 Further research areas

This study put forward a few questions regarding the leverage used by South African REITs as regulated entities in an emerging market. It has used an approach used in existing literature considering traditional capital structure variables with commonly used regression analysis. A survey of South African REIT managers like that of Graham and Harvey (2001) may be the best approach to truly understand the leverage decisions for REITs in South Africa. Such a survey may address both traditional capital structure determinants and provide insight into other unobservable aspects of capital structure decision making.

Future studies may want to compare leverage of the South African REIT market to that of other South African industries or possibly dig deeper into the large differences in leverage in South African REITs relative to other REIT markets. Future researchers can improve on this study by

⁵⁵ Bond and Scott (2006) use 126 observations, Nhung et al (2017) use 204 observations, and Suciati et al (2018) use 256 observations.

⁵⁶ See Harrison et al (2010)

addressing, in more detail, aspects such a target debt ratio, the role of covenants and financial flexibility, and the apparent debt conservatism of South African REITs.

Another interesting area not elaborated on in this study is the relationship between leverage and return - specifically whether particular leverage levels lead to an optimum return to shareholders. Such an analysis, where return is a function of leverage, would be structurally different from the one performed in this study. Giacomini et al (2015), for example, investigate whether there are differences in returns of US REITs that are under- or over-levered relative to their target debt ratios or industry averages.

Other than to provide a leverage range within which South African REITs operate, this study does not conclusively predict or propose a target debt ratio for the sample, and thus makes no statistical inference about target debt ratios or the reversion thereto for South African REITs. Studies using partial adjustment models or GMM models can possibly be used in future to assess target debt ratios in the South African REIT market.⁵⁷

5.4 Concluding comments

This study contributes to the overall topic of capital structure and specifically that of listed property in South Africa. The findings add to the existing literature of capital structure of listed property and REITs, that possess unique characteristics relative to traditional firm research in the capital structure arena. This study will hopefully motivate further research in the area of South Africans REITs, particularly in the areas of debt usage and capital structure decision making.

⁵⁷ See Versmissen and Zietz (2017), Giacomini et al (2015)

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APPENDIX 1: Table of major developed countries with REIT status vs South Africa

Country	Market Cap USD m	Market Cap ZAR m	No. of REITS	Commencement Year
USA	1 144 066	17 160 990	200	1960
Japan	130 710	1 960 646	66	2000
Australia	95 454	1 431 804	44	1985
UK	70 387	1 055 802	55	2007
France	56 111	841 665	30	2003
Canada	58 487	877 305	46	1994
Singapore	64 794	971 916	37	1999
Netherlands	23 665	354 981	5	1969
Hong Kong	37 266	558 987	9	2003
Spain	25 249	378 741	71	2009
South Africa	22 700	340 494	33	2013

APPENDIX 2: Table of developing countries with established REIT status

Country	Market Cap USD m	Market Cap ZAR m	No. of REITS	Commencement Year
South Africa	22 700	340 494	33	2013
Thailand	14 373	215 589	60	2007
Brazil	14 300	214 500	199	2007
Mexico	14 150	212 256	14	2004
Malaysia	7 022	105 336	17	2005
Saudi Arabia	3 235	48 527	16	2006
Turkey	2 844	42 653	33	1995

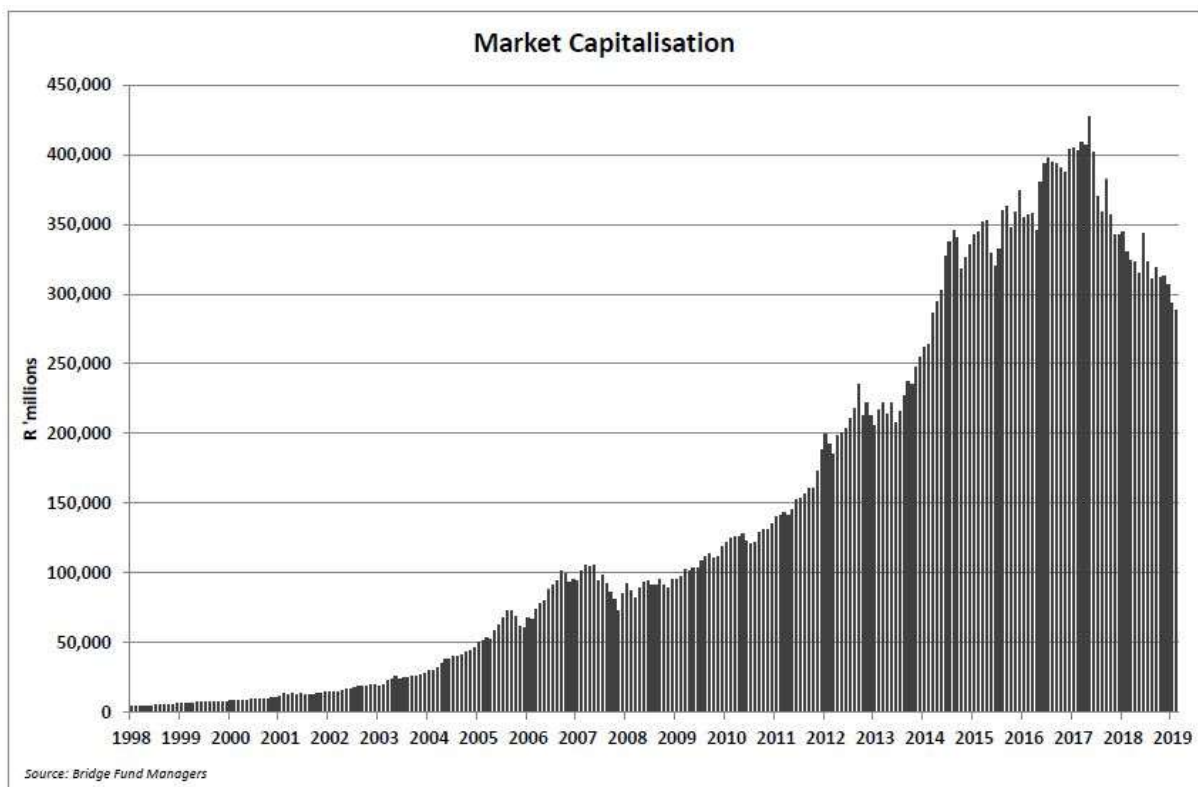
APPENDIX 3: Table of comparative REIT regime regulatory requirements

Country	Minimum Real Estate Income	Minimum Real Estate Assets	Leverage Limit	Minimum Distribution
USA	75%	75%	Unlimited	90%
Japan	N/A	50%	Unlimited	90%
Australia	N/A	N/A	Unlimited	100%
UK	75%	75%	ICR Test 1.25x ~ 65%	90%
France	N/A	Max 20% non Real Estate	Subjects to specific rules	95%
Canada	N/A	N/A	Unlimited	100%
Singapore	90%	75%	45%	90%
Netherlands	N/A	N/A	60%	100%
Hong Kong	N/A	Max 10% non Real Estate	45%	90%
Spain	80%	80%	Unlimited	80%
South Africa	75%	N/A	60%	75%
Brazil	N/A	N/A	Unlimited	95%

APPENDIX 4: Table of comparison between PUTs, PLSs, and REITs in South Africa

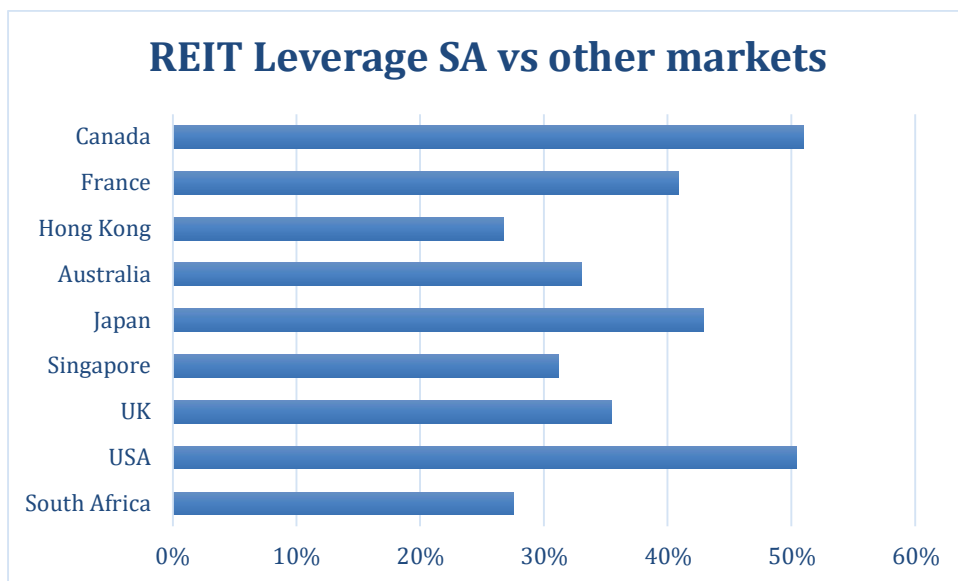
Determinant	Property Loan Stock (PLS)	Property Unit Trust (PUT)	Real Estate Investment Trust (REIT)
Description	<ul style="list-style-type: none"> *Set up as a company where the shareholders hold linked units consisting of shares and debentures *Shareholders would receive the majority of income via interest on the debenture *Essentially a synthetic structure designed to minimise tax *Managed either internally by board of directors or externally by management company or fund manager 	<ul style="list-style-type: none"> *Set up as a Unit Trust where the unit holders are the shareholders *Shareholders would receive income distributions on units held *Managed externally by management company or fund manager 	<ul style="list-style-type: none"> * Company REIT or Unit Trust REIT with common shareholders *Shareholders receive income distributions on shares held *Managed either internally by board of directors (Company REIT) or externally by management company or fund manager (Trust REIT) *Must distribute at least 75% of its taxable earnings available for distribution to its investors each year *Must earn 75% of its income from rental or investment income from indirect property ownership
Legal Entity	*Company	*Trust (Unit Trust fund structure)	*Company or Trust
Regulatory Legislation/ Governance	<ul style="list-style-type: none"> *Companies Act *Income Tax Act *Must abide by rules of Johannesburg Stock Exchange 	<ul style="list-style-type: none"> *Collective Investment Schemes Act (CISA) *Income Tax Act *Financial Services Board of South Africa *Must abide by rules of Johannesburg Stock Exchange 	<ul style="list-style-type: none"> *Must abide by rules of Johannesburg Stock Exchange *Companies Act *Income Tax Act *Collective Investment Schemes Act (CISA)
Investment Universe	*Can invest in direct property, property companies and listed companies	*Can invest in direct property and property companies *Cannot invest in listed companies	*Can invest in direct property, property companies and listed companies
Leverage	*Unlimited, prescribed in company articles of association	*30% of underlying assets, prescribed by CISA	*60% of gross total assets
Tax Treatment	<ul style="list-style-type: none"> *Liable for company income tax and dividends tax (before April 2012 STC tax) on any residual profits after debenture interest *Interest received tax in the hands of linked unit holder *Liable for Capital Gains Tax on disposals 	<ul style="list-style-type: none"> *No tax liabilities within the Trust *Income distributions taxed in the hands of the unit holder 	<ul style="list-style-type: none"> *Fully tax exempt subject to maintaining REIT status *Income distributions taxed in the hands of the share holder
Comparison	<ul style="list-style-type: none"> *More flexibility with leverage and governance *Considered more aggressive and riskier *Complicated structure, excessive interest rates on debentures in search of tax minimisation *Not ideal tax treatment *More popular (more PLSs than PUTs prior to REIT legislation change) 	<ul style="list-style-type: none"> *More favourable tax treatment *Better regulatory governance and oversight but no shareholder control *More conservative *Has more resemblance to modern day REITs 	<ul style="list-style-type: none"> *Favourable and consistent tax treatment *Alignment of debt limits, investment universe and rules *Alignment of regulatory bodies *Internationally recognised and transparent by international standards
Issues	<ul style="list-style-type: none"> *Disparate tax treatments between two options *Different leverage limits between two options, one too liberal and one too conservative *Different regulatory bodies for each option *Different management and ownership structure with implications on corporate control *Differences in allowable investments *Differences considered inequitable to one investor relative to other *Neither internationally recognised nor transparent by international standards 		

APPENDIX 5: Market capitalization of South African listed property sector



Source: SAREIT

APPENDIX 6: Average book leverage ratios of REIT countries 2005 to 2018



Source: Author's calculations with data from Bloomberg database

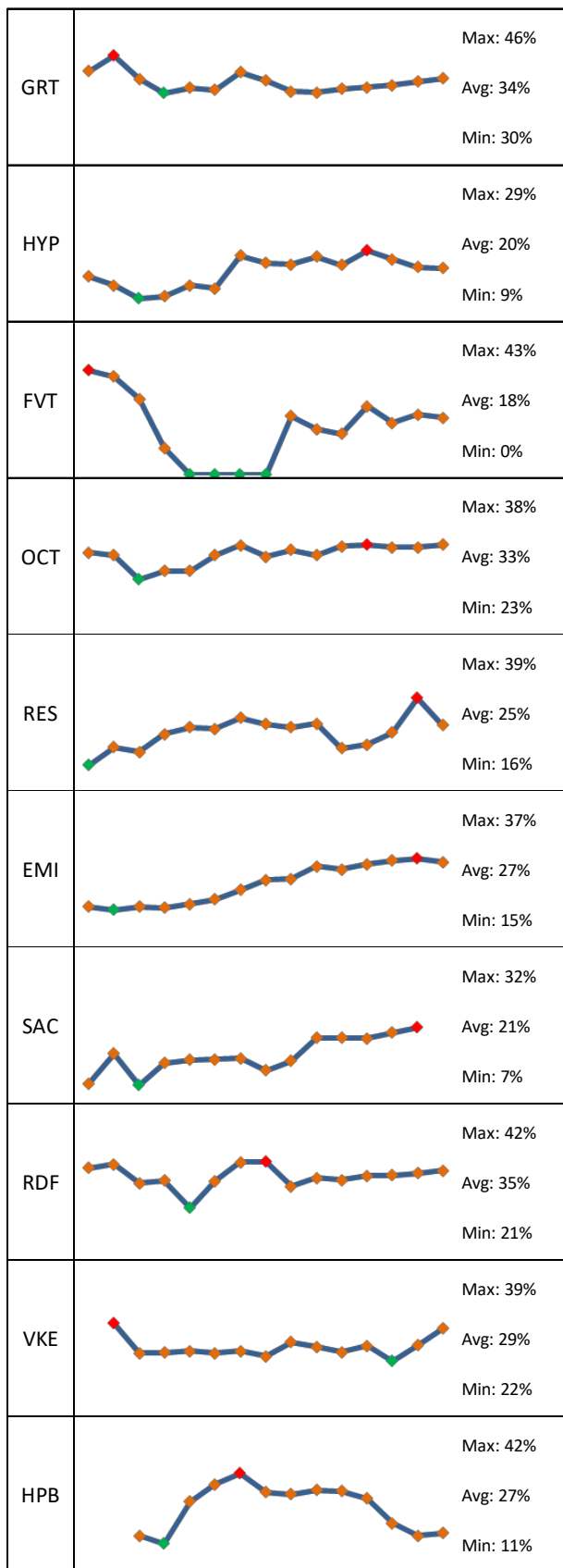
APPENDIX 7: Table of South African firms and firm years used in study


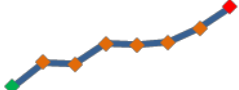




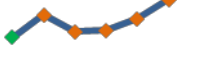
Code	Company Name	REIT Years	PLS Years	PUT Years	Total Years
GRT	Growthpoint	6	9	-	15
HYP	Hyprop	6	9	-	15
FVT	Fairtree	6	9	-	15
OCT	Octodec	6	9	-	15
RES	Resilient	6	9	-	15
EMI	Emira	4	-	11	15
SAC	SA Corporate	4	-	10	14
RDF	Redefine	6	9	-	15
VKE	Vukile	6	8	-	14
HPB	Hospitality	6	7	-	13
FFA	Fortress	6	3	-	9
TEX	Texton	6	2	-	8
DIA	Dipula	6	2	-	8
IPF	Investec	6	1	-	7
REB	Rebosis	6	2	-	8
DLT	Delta	5	2	-	7
AWA	Arrowhead	6	1	-	7
GPA	Gemprop	5	1	-	6
TWR	Tower	5	-	-	5
APF	Accelerate	5	-	-	5
SAR	Safari	5	-	-	5
EQU	Equites	4	-	-	4
SSS	Stor Age	4	-	-	4
ILU	Indluplace	4	-	-	4
L2D	Liberty 2 Degrees	-	-	2	2
TPF	Transcend	2	-	-	2
SEA	Spear	2	-	-	2
SYC	Sycom	-	-	11	11
FPT	Fountainhead	1	-	9	10
CPF	Capital	-	-	10	10
ACP	Acucap	-	10	-	10
PMM	Premium	-	9	-	9
PAP	Pangbourne	-	6	-	6
APB	Apex Hi	-	4	-	4
MYT	Monyetla	-	4	-	4
AIA	Ascension	3	1	-	4
IFR	Ifour	-	3	-	3
SYA	Siyathenga	-	2	-	2
VIF	Vividend	-	2	-	2
TOTAL		137	124	53	314

APPENDIX 8: Correlation matrix table of explanatory variables

	Tangibility	Growth	Size	Profitability	PUT	PLS	Lagged Leverage	Interest Cover Ratio	Age	Property Type	Share Performance	Share Volatility	Inflation	Market Interest Rate
Tangibility	1													
Growth	-0.11	1												
Size	-0.35	0.15	1											
Profitability	-0.06	0.2	-0.09	1										
PUT	-0.06	0.01	0.1	-0.16	1									
PLS	0.18	0.14	-0.07	0.46	-0.5	1								
Lagged Leverage	-0.13	-0.02	0.53	-0.11	-0.01	-0.14	1							
Interest Cover Ratio	0.22	0.08	0	0.14	-0.5	0.38	0.02	1						
Age	-0.09	-0.02	-0.34	0.14	0.19	-0.1	-0.1	-0.37	1					
Property Type	-0.04	-0.14	-0.19	0.01	-0.15	-0.04	0.1	-0.22	0.15	1				
Share Performance	-0.04	0.38	-0.23	0.26	0	0.21	-0.03	0.07	0.32	0.03	1			
Share Volatility	0.06	-0.14	-0.28	-0.08	0.16	-0.12	-0.06	-0.02	0.09	0.14	-0.03	1		
Inflation	0	-0.11	0.01	-0.02	-0.11	0	0	0.04	0.13	0.01	-0.23	0.07	1	
Market Interest Rate	-0.09	-0.21	0.26	-0.29	0	-0.26	0.13	-0.13	-0.39	0.06	-0.29	-0.18	-0.22	1

APPENDIX 9: Graphs of leverage ratios of selected sample firms over the study period



FFA	 <p>Max: 32% Avg: 25% Min: 19%</p>
TEX	 <p>Max: 50% Avg: 36% Min: 22%</p>
DIA	 <p>Max: 40% Avg: 38% Min: 35%</p>
DLT	 <p>Max: 47% Avg: 42% Min: 39%</p>
IPF	 <p>Max: 37% Avg: 27% Min: 10%</p>
REB	 <p>Max: 62% Avg: 44% Min: 25%</p>
AWA	 <p>Max: 40% Avg: 30% Min: 22%</p>