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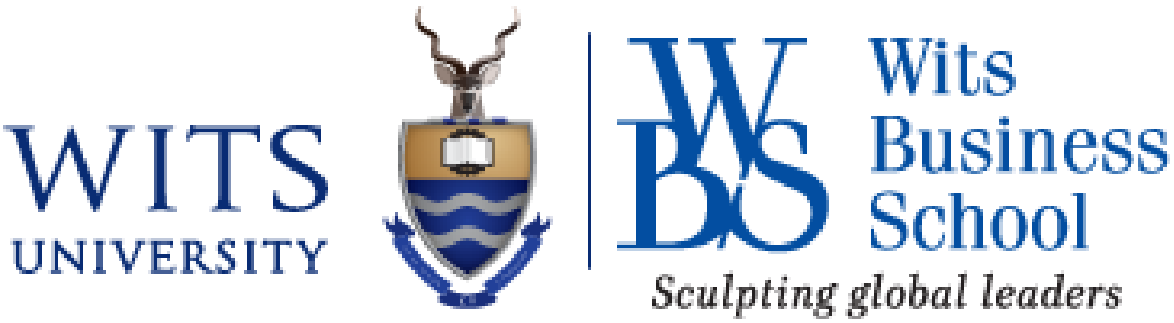

MASTER'S DEGREE IN MANAGEMENT FINANCE AND

INVESTMENT RESEARCH WORK IN THE FIELD OF:

The Impact of Monetary Policy Related Variables on the performance of the South African Real Estate Investment Trust (REIT)

BY

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DECLARATION

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Title: **The Impact of Monetary Policy Related Variables on the performance of the South African Real Estate Investment Trust (REIT)**

I declare that the research work is my own original work and where secondary material has been used, it has been properly acknowledged and referenced.

I understand what plagiarism is and I am aware of the university policy and the implications in this regard.

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SIGNATURE DATE

DEDICATION

I would like to dedicate the research work to my late parents, Norman and Basani Mbhokota, my aunt, Mavis Khosa, my ever-supportive wife, Fikile Mbhokota, and my lovely kids, Risana and Mixo and my brothers Musa, Sipho and Lunghile. Thank you for all the support I have received in the past year.

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ABSTRACT

Since the introduction of the Real Estate Investment Trust (REIT) in the Johannesburg Stock Exchange (JSE), there has been huge interest from both local and international investors to invest in the SA REIT. The reason for this rise in interest is that the SA REIT offers investors ownership of tangible assets that are backed by rental income and capital growth in the underlying asset value. In recent years this has been a good diversification strategy for investors, especially in emerging markets like South Africa.
Whilst the SA REIT has given investors good returns since its inception in 2013, there is still not enough literature on the factors that affect the performance of the SA REIT in relation to monetary policy movements.

Capital market movements in most emerging countries are dependent on macroeconomic factors like monetary policy movements, political stability, the input and output of production, etc. Most studies on how these macroeconomic factors impact on the performance of the REIT have been done in developed markets, and most of them have focused on monetary policy variables, e.g. interest rates, inflation, exchange rates, and GDP. This has necessitated this study on "The impact of monetary policy related variables on the performance of the South African Real Investment Trust (REIT)".

The purpose of the study was to determine the impact of monetary policy related variables in the short and long run on the performance of the SA REIT to assist investors and other role players as a tool to make investment decisions.

The data gathered consisted of information on the overall performance of the SA REIT in the last nine years, and the source of this information was the SA REIT Association, which is a statutory body of the SA REIT that represents international REIT. SA REIT data was taken from the SA REIT Association's database and was compared against each monetary policy variable taken from Statistics South Africa, which is deemed to be a reliable source.

Unit root testing, the Autoregressive Distributed Lag (ADRL) model, and Bound tests were utilised to test if the monetary variables impact the performance of REIT returns in the short and long run to answer the hypothesis.

The findings were presented in a graphical representation of the analysed data using time series plots in the short and long run. Methods used are as follows: unit root testing, the ADRL model, and Bound test

The outcome of the research results showed that none of the variables have a significant relationship with the performance of the SA REIT in the short run, but interest rates and exchange rates have a significant relationship with the performance of the SA REIT in the long run. This may prompt other studies to investigate how interest rate and exchange rate can be used positively to maximise returns in the SA REIT for investors, since it has been established that the two variables impact on the performance of the REIT.

Key words: Real Estate Investment Trust; Johannesburg Stock Exchange; monetary policy related variables.

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ADF test	Augmented Dickey-Fuller test
AIC	Akaike information criterion
ALSI	All-Share Index
ARDL model	Autoregressive Distributed Lag model
ECM	Error correction model
EPRA	European Public Real Estate Association
FFO	Fund from Operations
GDP	Gross domestic product
HFC	Home Finance Company
JSE	Johannesburg Stock Exchange
NAV	Net Annual Value
PLS	Property Loan Stock
PP test	Phillips-Perron test
PUT	Property Unit Trust
REIT	Real Estate Investment Trust
RSA	Republic of South Africa
SA	South Africa
SARB	South African Reserve Bank
SAREITA	South African Real Estate Investment Trust Association
SRAS	Sloping Keynesian aggregate supply curve
TAR model	Threshold Autoregressive model
UK	United Kingdom
USA	United States of America
VAR model	Vector autoregressive model
VAR	Vector auto-regression

CHAPTER ONE: INTRODUCTION

1.1 INTRODUCTION

The behaviour of financial markets in relation to monetary policy has attracted the attention of academics, policymakers, and investors over the years. Most studies reveal a strong relationship between monetary policy shocks and stock market returns (Fatnassi, Slim, Zied & Ben Maatoug, 2014). Fatnassi et al. (2014) also indicate that whilst studies have shown a strong relationship between monetary policy shocks and the stock market, this relation needs to be broken down into monetary policy variables (e.g. interest rates, inflation, and exchange rates) in order to understand each variable's impact. Simpson, Ramchander and Webb (2007) validate the notion of determining the effects of individual monetary policy variables, as well as stress that it will be a more correct analysis if the stock market returns were based on industry and geographical location. Monetary policy varies from country to country based on different socioeconomic and macroeconomic factors that impact on the movements of monetary variables.

The monetary policy decision is mainly based on each country's outlook, which usually considers two paths of either expansionary or contractionary policy as a control mechanism for monetary policy. Contractionary policy is often perceived as bad news and slows the growth of the economy with high interest rates which make the cost of borrowing high and reduces the money supply. As a result, it reduces economic growth and the output of firms. This in turn directly affects stock market returns negatively (Sibanda & Mhlanga, 2013). Expansionary policy is perceived as good news, as it encourages growth and lowers interest rates to enable consumers to borrow more cheaply and loosens the grip on the money supply side. This encourages consumer spending and growth in the output of firms, which in turn positively affects the economy.

Kabundi and Mlachila (2018) indicate that whilst expansionary policy encourages lowering interest rates, in emerging economies currency, value, and inflation may be negatively affected due to two reasons:

- the currency of emerging markets like South Africa (SA) are closely linked to bigger economies due to high dependency on the importation of goods from the United States of America (USA), China, and European countries, which all largely denominate their exports in US dollar; and
- lowering interest rates may lead to an increase in inflation via supply demand pull that will result in the eventual loss of purchasing power.

Hung, Chen and Lin's (2014) research shows a relationship between monetary policy and Real Estate Investment Trust (REIT) returns. However, there is confusion on which monetary policy variables impact it most, and it is not clear how REIT (stock) returns are impacted in the short and long run based on policy announcements, monetary policy certainty, and expansionary or contractionary policies. These unknowns suggest that more studies are required to answer the questions raised by Hung et al. (2014).

More studies are required to determine the relationship between monetary policy and stock returns in emerging economies, as most emerging economies have different macroeconomic problem factors than first world economies (Sibanda & Mhlanga, 2013). Most of the available relevant studies have focused on matured markets and, more importantly, on matured REIT markets.

"The South African REIT regulation was introduced on 1 April 2013 and expected to change the listed Property Unit Trust (PUT) into modern REIT and transform the property market" (Naidoo, 2014; p. 60). The new REIT model has become fully operational with the purpose of increasing the existing property investment structures, while at the same time increasing foreign investors' participation in the SA REIT.

The implementation of the internationally recognised REIT framework in several main property markets is expected to regenerate SA's Property Loan Stock (PLS) and PUT systems

by implementing a scheme that has been developed and tested internationally (Naidoo, 2014; p. 84). An entity which intends to register as a REIT must be listed on the Johannesburg Stock Exchange (JSE) and comply with all the listing regulations, with a minimum gross holding of R300 million direct or indirect property assets.

1.1.1 Overview of REIT types

REITs are classified into three types: equity, mortgage, and hybrid.

- **Equity REIT:** "Invest in and own property and are therefore responsible for the equity or appreciation of their assets in real estate. Revenue comes primarily from property leases" (Naidoo, 2014; p. 12).

- **Mortgage REIT:** "Invest in the ownership of property and wealth. Such REITs source money from real estate owners for loans or purchase current mortgages or mortgage-backed securities. Revenue accumulates from interest earned on home loans to Loan REITs" (Naidoo, 2014; p. 15).

- **Hybrid REIT:** Combines Equity REIT and Mortgage REIT investment strategies. Hybrid REITs invest both in real estate and in mortgages. Hybrid REIT revenue includes rentals from properties owned, as well as interest on mortgage loans.

In this study we will focus on the combined SA REIT performance index over several years and not necessarily on the different REIT structures stated above, and it will be tested with monetary policy variables.

REIT law has succeeded in creating an identifiable and coherent system that has drawn foreign investment. As an asset class, the REITs have grown significantly and now account for 4% of the JSE. The REIT market is liquid and active, enabling deal flow and considerable business activity (RebelGroup, 2019). As of September 2017, there were 31 listed REITs on the SA REIT market, with a market capitalisation of R422 billion (Carstens, 2018). Moreover, growth opportunities in SA's broader REIT industry have reduced. Economic

growth has weakened, and capital costs have increased. It is also becoming ever more difficult to drive up rent in the commercial, retail, and manufacturing sectors due to market oversupply (Carstens, 2018).

Since the SA REIT has been growing rapidly and the average returns are above most matured REIT markets, most foreign investors have become increasingly interested in SA REIT markets. But very few studies have been done in SA on the impact of macroeconomic factors and monetary policy on monetary policy variables, and hence the study that was undertaken is very important. It is also worth noting that the REIT industry differs from other securities on the basis of dynamics – profits depend on real property valuations and stock market perceptions. Simpson et al. (2007) argues that REIT stock returns are determined by both real asset valuation and stock market sentiments, and the REIT helps to diversify portfolios, because it differs from other asset classes.

1.2 PROBLEM STATEMENT

The SA REIT has been a good investment and financial asset for local and foreign investors due to the good returns and investment fundamentals of the underlying tangible real estate assets that generate rental income and the general publicly listed asset features (risk-return relations). Since the inception of the SA REIT in 2013, there has been tremendous interest from the financial community to invest in the SA REIT, but some have listed the political instability and policy uncertainties of the country as reasons for their scepticism (SA REIT Association, 2018).

Whilst other countries have concluded similar studies to detect the effects of monetary policy changes on the REIT stock market, the outcome of the findings differ from one country to another due to different monetary policy strategies and the nature of each country's REIT market. This study will be focussing on the SA REIT's performance in relation to key variables in South African monetary policy (interest rate, inflation, and exchange rate). To establish what the movements or changes in these variables do to the performance of REITs that are listed on the JSE, this study will provide evidence on the special relationship between monetary policy and the REIT's asset class in SA.

The outcome of the research will assist monetary policy teams, politicians, academics, and local and foreign investors to make a better investment decision about the SA REIT, and perhaps in other emerging markets that have a similar monetary policy structure of inflation targeting and similar macroeconomic factors. It is highly likely that the lack of this information limits investors' capacity to make investment decisions about REITs, as monetary policies have a major effect on investments in every economy. The research will also assist real estate practitioners to close the gap on the knowledge base of how monetary policy impacts REIT performance in SA in particular.

1.3 OBJECTIVE OF THE STUDY

The objective of the study is to determine the effect of monetary policy related variables on SA REIT profits in both the long and short term. SA REIT stock returns will be measured against monetary policy related key variables (interest rates, inflation, and exchange rate) based on the South African inflation targeting policy set by the SARB in 2000. The study will provide relevant information to all role players so that they can gain a deeper understanding of the impact that monetary policy variables have on the SA REIT's performance. This information will also assist local and foreign investors to make more informed investment decisions about the REIT asset class.

1.4 RESEARCH QUESTIONS

In order to address the identified problem, the following research question underlies the focus of this work:

- What is the influence of the variables related to the South African monetary policy on the JSE-listed SA REIT returns in both the short and long run?

1.5 RESEARCH HYPOTHESES

The following research hypotheses are tested in this study:

$\boldsymbol{H_{01}}$**:** There is no substantial link between SA **interest rate** and the performance of SA REIT returns in the short and long run.

$\boldsymbol{H_{01}}$**:** There is a significant relationship between SA **interest rate** and the performance of SA REIT returns in the short and long run.

$\boldsymbol{H_{02}}$**:** There is no relevant correlation between SA **inflation** and the short- and long-term performance of SA REIT returns.

$\boldsymbol{H_{02}}$**:** There is a significant relationship between SA **inflation** and the performance of SA REIT returns in the short and long run.

$\boldsymbol{H_{03}}$**:** No relationship exists between the SA **exchange rate** and the performance of SA REIT profits in the short and long run.

$\boldsymbol{H_{04}}$**:** There is a significant relationship between SA **exchange rate** and the performance of SA REIT returns in the short and long run.

1.6 FRAMEWORK OF THE RESEARCH STUDY

The sentiments in this research are that the REIT is another investment tool for real estate assets in SA and has a tax waiver as an additional advantage as compared to other investment institutions. It also has specific prerequisites, which include the distribution of 90% of the profit as a dividend to shareholders for the REIT fund to qualify for a tax concession. Therefore, this dissertation restricts itself to analysing to what extent monetary policy variables influence the output of SA REITs (listed on the JSE).

The scope of the study covers, amongst others: (i) an overview of SA monetary policy variables and their respective impacts on the SA REIT market; (ii) an overview of the SA REIT and performance of the stock index; (iii) an assessment of the investment performance level of the existing SA REITs in terms of market return and dividends on the JSE in line with SA monetary policy; and (iv) a literature review of similar studies in mature markets with a mature REIT structure and different monetary policy thrusts or strategies.

1.7 RESEARCH LIMITATIONS

The study is limited to the SA REIT market and does not consider other REIT markets or other real estate investments not listed under the REIT.

The study is also limited to SA monetary policy and variables (interest rate, inflation, and exchange rate) and will not consider other macroeconomic factors like political uncertainties, rental collection, real estate asset valuations, confidence in the market, or unemployment, or any other factors that may have a direct or indirect impact on the performance of SA REIT returns.

The study will, however, use the literature of other similar studies in other countries with different REIT structures and different macroeconomic factors.

1.8 OUTLINE OF STUDY

The study will be conducted, and the paper will be presented as follows:

- **Introduction and background of the study:** This section will give an executive summary and the overview of the study.
- **Literature review:** This section will review publications such as theses, journals, and papers concerning studies already conducted on the impact that monetary policy has on REITs in other countries, as no research has been conducted on the SA REIT.

- **Research methodology:** This section will select a methodology (qualitative or quantitative methodology) to analyse data and information, and it will also include the hypotheses.
- **Results of the study:** This section will outline the results of the data analysis and the impact of the variables on the independent variable.
- **Conclusions of the study:** This section will give conclusions to the study based on the research questions and objective of the study.

CHAPTER TWO: REVIEW OF LITERATURE

2.1 INTRODUCTION

This section of the research study forms the heart and the most significant part of any social and management research, simply because it provides a comprehensive context of previous, related or relevant works in the chosen area. In view of this understanding, this section provides a critical literature base for the research study and covers both academic- and industry-related literature in the area under study, concentrating on SA's REIT output using the main variables of the South African monetary policy (interest rate, inflation rate, and exchange rate) to assess what the movements or changes in these variables are doing to REIT performance.

This chapter thus reviews the current Real Estate Investment Trust (REIT) literature, examining the meaning, history, and development of the SA REIT. Furthermore, this section provides the critical literature base for the research and covers both academic and industry-related literature in areas concentrating on South Africa's REIT performance in relation to monetary policy variables such as interest rate, inflation, and exchange rate.

2.2 REAL ESTATE INVESTMENT TRUST

“A REIT is an entity that invests primarily in real estate and qualifies for special tax treatment for investors in REIT to declare dividends in a yearly basis to avoid double taxations and providing a conduit for earnings to be taxed at the investor level and not at the entity level” (Olanrele, Said & Daud, 2015; p. 32). “It is expected that REITs will own, operate, acquire, develop and manage real estate assets and/or offer related services” (Kwon & Shin, 1999; p. 201-206). The REIT has been defined differently by various scholars, practitioners, and professional bodies.

“REIT is an investment trading on major exchanges including (the stock exchange market) as a product and investing directly in real estate, either through properties or mortgages”

(SAREITA, 2013a; p. 38). The REIT offers high returns to investors, gains special tax recognition, and provides a highly liquid form of real estate investment (FMI, 2010). The single benefit of investing in REITs is the fact that many follow an equity reinvestment plan (SA REIT Association, 2016). According to Newell and Peng (2012, p. 23):

> Under the Federal Income Tax Law of the United States, a REIT is any corporation, trust or association that acts as an investment agent, specializing in property development and home loans. A REIT is entitled to subtract dividends paid to its investors (shareholders) before tax, thereby reducing any or all of its US obligations.

To avoid double taxation law for investors, REIT investors are required by law to distribute at least 90% of their taxable income to investors as a dividend. A REIT is a company that owns and operates various types of income-generating real estate, ranging from offices to warehouses, hospitals, shopping centres, hotels, and apartments. However, some REITs (hybrid or mortgage) indirectly engage in real estate financing. Newell, Lee and Kupke (2015, p. 46) state that "the REIT structure, however, was originally intended to provide an investment structure for real estate, such as the mutual fund structure to provide for investment in stocks".

Based on previous studies done, most REIT concepts require that REIT companies qualify for tax exemption. Therefore, a REIT is defined for the purpose of this statement as (SAREITA, 2018):

> …a company or corporation registered by stock exchange which invest its fund (in a manner like a mutual fund) but on income-generating real state products (property), shares of property company and real estate mortgages, generates its income from the property investment and distribute almost all its revenue before tax (net income) to its investors in form of dividends with little provision for re-investment.

According to Oreagba (2010, p. 493), a "REIT is a company listed on the stock exchange, but its core business is the ownership, purchase, sale and development of real estate". In other words, REITs are often referred to as corporate entities whose shares are publicly traded on the secondary market. However, as stated by the SAREITA (2018, p. 42), it must be noted that:

> …the difference between an investment trust and a quoted company is that the former must distribute a larger percentage of its profits to shareholders, and

> REITs are free of corporate income tax in return for distributing 90 percent of their annual profits as a dividend to shareholders.

The "REIT is a real estate investment instrument intended to make the fund available for real estate and to model the growth and financing of real estate" (Anderson, 2015; p. 15). This could be facilitated in two ways. Firstly, by making the funds available for the immediate acquisition of real estate products developed by real estate developers, who will have the money and time to develop more or reimburse their development loan, making the fund available to developers for another project. Secondly, REITs can buy loan-backed securities via loan REITs and thus release funds for loan activities. Although the available findings focused more on the performance of Equity REIT (Newell & Peng, 2015; Ong, Teh & Chong, 2011; Carstens & Freybote, 2018), some findings focused on diversifying real estate development. Moreover, the aim of each REIT company today is to purchase real estate assets that guarantee capital appreciation tomorrow, while paying out most of its annual income as a dividend.

The history and development of the modern REIT regime throughout the world can be traced back to the 1960s and the characteristics of the different REIT markets as provided by their respective REIT laws. Chong, Ting and Cheng (2017, p. 78) state that "the 1960 amendment of the tax law by the US Congress gave real estate trusts similar tax treatment and created a modern REIT". As per EPRA (2012), as at mid-2012, the global REIT index comprised 414 public (commercial) real estate companies from approximately 37 countries with a market capitalisation of approximately US$ 1 trillion, with approximately 68% of REIT capitalisation. Only three years later, the European Public Real Estate Association (EPRA) (2015, p. 9) stated that "by the end of September 2015, with a capitalisation of US$ 2,18 trillion, the number of listed property securities, including both REITs and property companies across 37 countries, increased to 1050".

In Africa, the REIT was first introduced in Ghana in August 1994 through the Home Finance Company (HFC), which metamorphosed into HFC Bank. Omokhomion, Egbu and Robinson (2018, p. 17) state that "since HFC Bank transformed into a bank, it has been in frontlines of mortgage financing in Ghana". Many corporate finance products as well as corporate

bonds have been used to support its mortgage lending activities. The Securities and Exchange Commission of Ghana currently supervises the collective investment scheme, of which the REIT is a member. The REIT market in Ghana is still growing.

REIT law has managed to create a distinctive and recognisable framework which has attracted foreign investment. The new structure of the REIT has become fully operational, profiting from the development of existing local property markets and at the same time increasing incentives for foreign investment. The application of the REIT framework, which is internationally recognised in most main property markets, is intended to reinvigorate the South African PLS and PUT structures through the introduction of an internationally proven scheme (Carstens, 2018).

Despite the introduction of the REIT in Ghana and Nigeria, the two countries do not have a publicly accessible review of the REIT. REIT legislation has been successful in creating a distinctive and understandable structure that has been able to attract foreign investment. REITs have grown significantly as an asset class and now comprise 4% of the JSE. The REIT industry is competitive and active, and has given rise to a significant volume of trade and corporate activity (RebelGroup, 2019). As of September 2017, the South African REIT market consisted of 31 listed REITs with a market valuation of R422 billion (Carstens, 2018).

2.3 OPERATIONS AND REGULATORY FRAMEWORK OF THE SA REIT

Operations of the REIT specific to any country are regulated within the framework of laws that established it. Kantilal (2016, p. 24) states that “reviewing SA REIT organizational requirements reveals that a company REIT can be managed internally or externally with a choice of having property administration or not and the shareholders of these companies being active participants”. The SAREITA (2013b, p. 44) goes on to say that “these shareholders are allowed to vote on specific issues during general meetings with no limitation placed upon them”.

The SAREITA (2013b, p. 42) specifies the following:

> The law that created the South African REIT made it mandatory, first of all, for a company registered to comply with the requirements of the Tax Administration Act (28 of 2011) on the filing of an annual income tax return. Second, it must meet the JSE Limited Listing Requirements continuously.

The SAREITA (2013b, p. 59) then goes on to say the following:

> Compliance with the criteria are set out in sections 13.49 to 13.53 of the JSE Limited Listing Criteria is mandatory until eligible as a business REIT or a trust REIT… The responsibility to ensure compliance with the JSE Limited Listing Requirements and Companies Act by a REIT company resides with the directors of such a company. The shareholders of such a company are therefore entitled to protection under the Takeovers Regulations of the Panel and of the Companies Act.

Furthermore, according to the SAREITA (2013b, p. 24):

> The Act specifically stated that Trust REITs should comply with all JSE Limited Listing Requirements subject to the Takeover Regulations or the Companies Act and that Trustees are responsible for reporting to the Registrar to ensure that all requirements of the Collective Investment Schemes Control Act are met.

Trust REITs are managed externally and should therefore have an external asset and asset manager under the Collective Investment Schemes Control Act (SAREITA, 2013a). The SAREITA (2013a, p. 24) also states that "Trust investors REITs are secured by an act of trust, while trustees are responsible for ensuring compliance with the Collective Investment Schemes Control Act and safeguarding the interests of investors".

REITs generally do not pay tax at the corporate level, subject to a set of qualifying rules specifying the nature of the activities and the asset base, the concentration of ownership, the alignment structure, and the distribution policy (Kantilal, 2016). "REIT rules vary from nation to nation, but similar features are the requirement that creditors are primarily property owners and that a high proportion of net operating income should be allocated to shareholders" (Hoesli & Lizieri, 2007; p. 20). REITs enable anyone to invest in large-scale property portfolios in the same way they invest in other industries – through stock buying. In addition, the unlisted property market is not part of the SA REIT system as is the case with the USA's REIT structure. "Nevertheless, according to the then Minister of Finance, Mr Nhlanhla Nene, when unlisted property companies attain the REIT status, the same tax law

applies to both listed and unlisted REITs as provided for in Section 25BB of the Act" (National Treasury, 2015; p. 144). It is, however, not general practice for governments to differentiate between listed and unlisted companies at tax level. Choosing whether to list should be based on obtaining access to capital markets and the opportunity to raise capital to finance business operations and stimulate growth, rather than merely obtaining a tax benefit (Akinsomi, Balcilar & Gupta, 2017; p. 774-793).

2.4 REIT PERFORMANCE IN RELATION TO MONETARY POLICY MOVEMENTS

Geltner, Miller, Clayton and Eighholtz (2007, p. 3) adopted the three REIT evaluation methods, namely Discounted Cash Flow, Fund from Operations (FFO), and Net Asset Value, and conclude that REIT trading at high or low premium, or even at discount, has been discovered to be a result of investors' "sentiments" (Chang, Chou & Fung, 2012).

Hardin III and Hill (2008) concluded that excess dividends are a function of the company's ability to generate cash flows from operations. This view is supported by Feng, Price, and Sirmans (2011). Capozza and Seguin (1999, p. 2) analysed cash flow volatility and dividend pay outs and concluded that there is a negative relationship between cash flow volatility and the level of dividends. The degree of influence to leverage returns was found to be significant, which was both positive and negative investment returns, resulting in pronounced gains and losses (Allen, Madura & Springer, 2000; p. 141-152).

A short-term interest rate has an inverse relationship with a return, while a long-term interest rate has a positive relationship with a return (Allen et al., 2000; Delcoure & Dickens, 2004). However, in their study of a sample in Australia, Dimovski, Lombardi, Christopher and Cooper (2016, p. 18-28) found a contrasting result, namely that there is a significant negative relationship between long-term interest rates and returns, with a negligible positive relationship with short-term interest rates.

Some other scholarly work (Yong, Allen & Lim, 2009; Chaudhry, Maheshwari & Webb, 2004) considered the market size of REITs and revealed that there is an inverse relationship between returns and size, implying that smaller REITs tend to yield more return than the

larger REITs. Chaudhry et al. (2004) also stated that larger REITs are found to be more geographically diversified, but less diversified across property types and this could result in a negative relationship in size versus return. Yong et al. (2009) found and concluded that the size factor harmed return and was only found to be a determinant of returns before 1996 (before the Asian financial crisis of 1997). Alias and Soi Thoi (2011) agree with Ambrose and Linneman (2001) and confirm that REIT size, revenue, and profit have a positive relationship.

Some other studies have confirmed that the performance of immovable securities shows extraordinary returns on foreign real estate markets, as well as significant returns on different markets and over different periods (Abdullah & Wan Zahari, 2008; Amidu, Aluko, Nuhu & Saibu, 2008; Bond, Karolyi & Sanders, 2003; Ong, Teh, Soh & Yan, 2012). The paradox in the findings of the researchers, as discussed above, clearly indicates that there are other elements outside the market indices that could affect REIT return. Daud, Ali, Sipan and Wilson (2012) studied the impact of location attributes on REIT return. Their findings attributed a strong correlation between location attributes and REIT return. Their argument is supported by the fact that the REIT return is strongly determined by property income (FFO) and that any factor affecting property income will have an effect on REIT return. The researcher followed the Multiple Regression Analysis, which took into account the significant effect of each of the positional attributes. Nevertheless, location is just one of the external factors that could have an effect on the REIT return.

2.5 LITERATURE ON SOUTH AFRICA'S REIT PERFORMANCE

Research on the South African property market is minimal, particularly with regard to the SA REIT and the impact of monetary policy on its performance. Most of the work available in the literature focused mainly on performance in the residential sector. One model outlines a period from 1974 to 2003 and the other model covers the period from 1994 to 2003. Standish, Lowther, Morgan-Grenville and Quick (2005, p. 41-48) state that "from 1994 to 2003, the ratio of household debt to income (negative relationship), foreign direct investment (positive relationship) and the actual Rand gold price (positive relationship) was important".

Clark and Daniel (2006, p. 27-33) developed a projection model for the South African housing market and identified the following variables for the South African housing market forecast: All-Share Index (ALSI) (positive relationship), gross domestic product (GDP) (positive relationship), First Interest Rate (negative relationship), Rand/US Dollar (negative relationship), and Transfer Cost (positive relationship). Franken, Bloom and Erasmus (2011) identified eight indicators that could be used as predictors of future price cycles for residential properties. Variables included: construction costs, consumption, debt-to-income ratio, GDP, inflation, interest rate, JSE ALSI, and affordability. All factors make a positive contribution to the prices of residential properties.

The economic effect of residential prices in SA using a panel of data covering all nine provinces from 1996 to 2010 was investigated by Simo-Kengne, Bittencourt and Gupta (2012, p. 97-118). They found proof that economic growth affects house prices. Simo-Kengne et al. (2013) found that changes in house prices in SA have had a significant impact on regional economic growth. The paper applied a vector auto-regression (VAR) model to investigate the degree to which the common variable of house price fluctuations is responsible for macroeconomic shocks. The results show that all macro shocks have significant influences on real house prices, with portfolio shocks having the largest fraction of the total variability in real house prices, followed by monetary policy shocks. These results show the user-cost principle, which emphasises the importance of interest rates and anticipation in the dynamics of driving house prices. Thus, there is reason to believe that interest rates fall steadily during times of high volatility in house prices, and people expect growth in house prices, leading to lower housing costs, which in turn increases property prices (Lee & Lee, 2012).

The analysis showed that changes in repo rate levels are important for explaining mean volatilities of return and export. As the repo rate has a considerable negative coefficient, this indicates that theoretically postulated contractionary monetary policy tends to lower stock returns. Nevertheless, the effect of changes in the repo rate was found to be asymmetrical, i.e. the impact of changes in the repo rate varies from negative rate change

to positive rate changes (Mangani, 2011). The results suggest that JSE yields are more responsive to monetary contraction than to expansionary policies.

A correlation was introduced by Boshoff and Cloete (2012) to assess the relationship between the price of the property shares and economic variables. They found that the share price of PLS correlates with employment (in the private, public, and non-agricultural sectors), disposable income, national government revenue and expenditure, GDP (at market prices) and gross value added at basic construction prices (a measure of the activity of the construction industry used in the calculation of GDP), and repo rates. They pointed out, however, that their work has drawbacks, as they applied a simple linear correlation and thus omitted the combined effect of more than one variable.

According to Ntuli and Akinsomi (2017, p. 365-288), "REITs show that it is a commodity and an immovable physical object, and that 'duality' is the reason why REITs do not perform exactly the same thing as the stock market or the same thing as the direct property market". It was favoured by Hoesli and Oikarinen (2012, p. 8) that "in the long-term property exhibits behavioural characteristics that are more similar to that of the underlying asset than that of a stock market where REITs and direct assets exhibit a stronger relationship than REITs and stock markets." Furthermore, the study finds that REIT success is not heavily influenced by significant occurrences within the direct property and equity markets.

In a study of individual investor portfolios that take into account the investor's risk sensitivity and risk premiums, it was found that the degree of allocation of REITs in a portfolio and the returns of REITs and stocks are far more important for portfolio performance for an individual investor than the levels of correlation between REITs and stocks (Bhuyan, Kuhle, Ikromov & Chiemeke, 2014; p. 104-112). In addition, Bhuyan et al. (2014, p. 104-112) go on to say that "it is found that the optimum allocation of a REIT in a portfolio does not vary based on the investor's risk tolerance, although investors with a higher risk appetite may benefit from holding portfolios with high REIT-stock correlations".

2.6 REIT RESPONSE TO MONETARY POLICY SHOCKS

Bredin, O'Reilly and Stevenson (2007, p. 315-331) examined the impact of monetary shocks on REIT returns, with an emphasis on unexpected policy changes. Chang, Chen and Leung (2011) used a time-varying structural VAR system to examine the monetary policy effect on the real estate markets. The rate of the federal funds and the spread of interest rates are used as measures for monetary policy actions. Their research results have shown that the negative impact of monetary policy shocks on REIT returns is much stronger in high-volatility regimes than in low-volatility regimes. Using quantile regression, Chen, Peng, Shyu and Zheng (2010) found that monetary policy shocks had an effect on REIT returns during predetermined stock market bull periods. In other words, policy changes may have different effects at different points on the conditional distribution of REIT returns in the stock market of a country. Finally, Goukasian and Majbouri (2010) looked at the impact of monetary policy changes on the equity returns of real estate related industries. They found that industries with higher returns and volatility, such as mortgages and banking, respond more strongly to monetary shocks, while REITs have the weakest reactions to policy changes.

Zhou and Anderson (2012, p. 158) uses Markov-switching inaccuracy tools to evaluate the possible asymmetric impacts of monetary policy on cross-section REIT returns. They pinpointed two REIT return regimes: upper and lower variance regimes and found that the impacts of monetary policy are greater under the high variance regime. They also found that REIT markets are twice as responsive to monetary shock as large equity markets.

The single equation method was used instead of using error correction models (ECMs). Markov-Switching models were used to specifically identify the market states of REIT returns to provide a more detailed analysis of the impacts utilising multiple monetary policy indicators with a specific focus on whether monetary policy has different impacts on REIT returns in different market states, and thus to equate them with a variety of stock market analyses in which monetary policy effects are analysed.

Lee and Lee (2014), Battinelli and Reid (2013), and Chisadza, Dlamini, Gupta and Modise (2016) all deduced that there is a strong relationship between macroeconomic factors and JSE stock price indices. This relationship to stock indices relates to real GDP, interest rates, and inflation (Chinzara & Aziakpono, 2009). Furthermore, Battinelli and Reid's (2013) study does not underline the impact of the relationship on stock returns. The return shocks are also not defined in the short and long run, and the nature of the return shocks is not known if it is based on market sentiments. Other research argues that while monetary shocks imply a relationship with stock returns, due to different monetary policies and factors affecting the industry, it must be dependent on market orientation and country-based (Fatnassi et al., 2014).

A recent study in the UK shows a relationship between monetary policy and UK REIT returns, but it was not split into monetary policy variables (interest rates, inflation, exchange rate, and GDP) and focused on the British monetary policy (Fatnassi et al., 2014; p. 15). It was scientifically proven by Fatnassi et al. (2014, p. 15) that the relationship between monetary policy and UK REIT returns was not split into variables and cannot be used in other countries, because all the macroeconomic factors in the world were not taken into account. Johnson (2013) has shown a strong relationship between monetary policy and REIT returns, but maintains that stock return shocks are not the only factor in REIT returns, suggesting that the underlying value of the real estate assets lies in rental income and the quality of the real assets. "One might claim that all REIT companies are valued at share prices, taking into account all valuation factors, rental income, market sentiments and macroeconomic factors, and that it would be fair to use stock returns as an indicator of REIT returns" (Johnson, 2013; p. 18). The legitimacy of the monetary policy relationship and the impact thereof must be based on the country's monetary policy position, the variables used in that monetary policy, and the REIT returns for the specific listing (Simpson et al., 2007).

Even though the effect of monetary shocks on REIT returns has been discussed in the research, there is still a lack of formal reviews on the REIT's asymmetric response to monetary policy shocks, subject to specific REIT market states. Moreover, given the states of the REIT, whether monetary policy alters the likelihood of moving from one country to

another is particularly relevant for comparing existing empirical studies on the impact of monetary policy actions on REIT returns.

2.7 SOUTH AFRICAN RESERVE BANK MONETARY POLICY AND SA REIT

The main objective of the SARB's monetary policy (n.d.) is to achieve and maintain price stability for sustainable economic development and growth. Price stability reduces economic uncertainty and therefore provides a favourable environment for growth and job creation. In addition, low inflation protects the purchasing power of citizens and investors in SA, especially the poor who have not been able to stand up to constant price hikes (SARB Report, 2018).

In order to pursue its primary monetary policy objective, namely price stability, the South African monetary authorities (government and bank) have chosen inflation targeting as the monetary policy framework amongst many others, such as a discretionary monetary policy framework; nominal frameworks such as fixed gold prices; targeting of exchange rates; aggregate money; inflation; interest rates; and of nominal income (SARB Policy Formulation Report, 2019). The inflation targeting framework was introduced in February 2000. Before the adoption of the inflation targeting framework, the SARB had adopted several frameworks, such as exchange rate targeting, discretionary monetary policy, monetary-aggregate targeting, and an eclectic approach (SARB Policy Formulation Report, 2019). This model is a monetary policy framework in which the central bank announces an explicit inflation target and implements policy to achieve this target directly, and it brought a greater degree of transparency to monetary policy (SARB Policy Formulation Report, 2019).

It is key to acknowledge that monetary policy cannot add directly to economic growth and employment creation in the long term. Hence, this study focussed on SA REIT performance in relation to South African monetary policy key variables (interest rate, inflation, and exchange rate), to explore what the movements in these variables do to the performances of REITs that are listed on the JSE, drawing evidence on the special relationship between monetary policy and the REIT's asset class in SA.

Many organisations use long-term capital, equity capital, or preferred share capital to expand their business. This is particularly true in the case of REITs, because they work in a highly capital-intensive sector. REITs may promote support for a variety of reasons, but the minimum distribution of dividends according to statutory standards are a universal rule unique to REITs. It is challenging for REITs to accrue enough capital for developments and acquisitions purely using reserves from income and hence they mainly depend on external funding (Li and Yung, 2014).

According to Li and Yung (2014, p. 22):

> Capital borrowing comes at a cost, namely the cost of using money from another company to fund one's operations. The use of borrowed capital is a good thing in a business that can maximise its market value. Executive management is required to minimize the cost of financing operations.

The cost of capital must be significantly smaller than the return from the investments made. Otherwise, the value of the company will be lowered. If funding is available, the appropriate investment must be made by the management committee. This requires a comparative review of the different cost of capital available. “The company is required to develop a financing policy to act as a benchmark for future financing decisions” (Li and Yung, 2014; p. 27).

Li and Yung goes on to say (2014, p. 24):

> In the case of REITs, a stable rental income is apparent. This is a benefit as well as a chance to leverage the company sometimes above the normal business leverage ratios. A number of factors may influence the decision to finance a company; some are difficult to gage, for example, the attitudes, experience and expertise of the management committee, the financial flexibility of the company and the internal business environment.

One can divide the funding decision-making process to four quantifiable figures: the cost of financing, financial returns of investments made, actual payments, and the excess of the cash flow of the company.

2.8 THE SOUTH AFRICAN MONETARY POLICY: A CONTEXTUAL OVERVIEW

The subjective application of the South African monetary policy was viewed since the relationship between monetary policy and demand, and the supply of money in the South African economy. Structuralists therefore asserted that in a developing open economy such as SA, money supply cannot be controlled by monetary authorities (government and central bank) because it is considered exogenous, which makes it difficult for monetary authorities to reduce inflation locally (Kasai, 2011).

However, other neo-liberal economists consider money supply to be endogenous and therefore controllable by monetary authorities and believe that inflation has been positively affected by changes in money supply locally. As a result, the imperative nature of these positions prompted the study to look at the process of money supply in SA's monetary policy decisions (Bordo, 2010). Monetary policy is defined as a country's macroeconomic policy, projected by the monetary authorities (government through the finance ministry and central bank). It is an essential function of the SARB to channel money supply and manage interest rates and the demand side of economic policy towards maintaining macroeconomic objectives such as employment, consumption, productivity, and liquidity (SARB, 2019). The Republic of South Africa's (RSA) central bank was created by a special Act of Parliament, the Currency and Banking Act (No. 31 of 1920), and renamed the SARB, which became operational in June 1921 (SARB, 2011a).

2.8.1 Structural organisation of the South African Reserve Bank

The SARB is distinct from most central banks around the world, in that it is purely private owned as opposed to government ownership among more than 600 shareholders (SARB, n.d., “About Us”). It was formed by the legislative Act and can only be influenced by the same Act that created it (SARB, n.d., “About Us”).

Structurally, therefore, the South African Reserve Bank Act (No. 90 of 1989) makes provision for a board of 15 administrators, which includes the Governor and three Deputy Governors, appointed by the President of the RSA after due session with the Minister of Finance and the Board, to serve for a five-year term. The President also, after due session

with the Finance Minister, appoints four different administrators for a three-year term. The ultimate seven administrators are elected through shareholders at an annual general meeting of shareholders. Among these seven directors elected by the shareholders, one is required to have knowledge and experience in the subject of agriculture, another in the subject of labour, one in the field of mining, two in the subject of enterprise, and two in the subject of commerce or finance (SARB, n.d., “About Us”).

2.8.2 South African Reserve Bank Mandate

The SARB has the obligation "to achieve and maintain price stability in the interests of balanced and sustainable South African economic growth" (SARB, 2011b). Section 224 of the Constitution of the RSA (1996) stipulates that “the bank must carry out its functions independently and without fear, favour, or prejudice in pursuit of its primary purpose, but there must be regular consultation between the bank and the Cabinet member responsible for the national financial matters”. With such autonomy, the SARB can use any monetary policy instruments at its disposal to achieve the price stability policy objective entrusted to it. This means that in determining monetary policy targets, the SARB has the freedom to pick the instrument but not the independence (SARB, n.d., “About Us”).

The SARB has established an internal Financial Stability Committee, which includes all the members of the Monetary Policy Committee, which has been extended by other members. For instance, one of the primary objectives of the SARB is to protect the value of the currency and to achieve and maintain financial stability. This mandate is consistent with the existing literature (De Grauwe, 2008; Papademos, 2009) which gives rise to an increasing debate on the view that a policy rule that addresses inflation and output stabilisation by ignoring movements in asset prices and other financial variables may be too restrictive (SARB, n.d., “Monetary policy”).

The SARB’s main objective is to achieve and maintain price stability in order to ensure balanced and sustainable economic growth in SA. It also plays a central role, along with other financial institutions, in ensuring financial stability. Like most central banks, the SARB is designed to perform a number of important functions.

In addition to the primary function of price stability, the SARB has the following responsibilities:

- Acts as an administrator of the cash reserves that the banks are legally required to hold, supervise, and regulate in order to ensure that the funds received from the public are used responsibly and to protect the general public. The Bank Supervision Department of the SARB plays an important role in this regard (SARB, n.d., “Monetary policy”).
- Manages the security and soundness of the national payment system by implementing risk-reduction measures to reduce systemic risk in the payment system. It also offers an inter-bank settlement mechanism through a real-time electronic settlement system, the South African Multiple Options Settlement system, and serves as a "last resort lender" when banks face liquidity problems and are not able to default.
- Issues notes and coins (P. Mohr & L. Fourie, 2015), guided by public cash requirements in determining the amount of cash to be issued and injected into the financial system through the purchase of financial assets from commercial banks and other financial institutions (M1 money supply).
- Develops and implements the inflation-targeting monetary policy of the country (SARB, n.d., “Monetary policy”). The refinancing system linked to the repo rate tender system (P. Mohr & L. Fourie, 2015) is the main tool being used by the SARB to implement monetary policy.
- Manages the gold and foreign reserves, as it has been doing since 1925, and purchases almost all the gold produced locally.

2.8.3 Determinants of the South African interest rates (Taylor rule)

The monetary policy thrust of SA is based on the Taylor Rule theory, with variables (such as interest rate, inflation, and exchange rate) that relate to the monetary policy. SA has adopted an inflation targeting policy of between 3-6% inflation rate with a view to protect currency stability (Kabundi & Mlachila, 2018). Most economists have challenged the inflation targeting policy as a major constraint on economic growth and employment in SA,

and it is said that it, at times, causes a contractionary effect on the South African economy (Aron & Muellbauer, 2007).

According to (The Quarterly Projection Model(QPM), September 2017) indicates that long term interest rates are mostly determination of future path of short term interest rates especially for investments and government spending. This as results forms a big determination of asset pricing in South Africa especially real estate assets that are traded in the JSE as REIT.

The benchmark of Taylor rule policy adopted in South African Reserve bank is subject to intense debates in the last few years as recent economic events have turned the attention on the behaviour of certain asset prices(stock prices, exchange rates, house prices) and concern by reserve bank over the maintenance of financial stability.

Kabundi and Mlachila (2018) report that the inflation targeting policy has shown growth in the economy since the adoption of the policy in 2000 and that it should be viewed as an expansionary policy, as the South African economy is highly dependent on the import and export markets and thus a stable currency is extremely important. However, Aron and Muellbauer (2007) argue that inflation targeting has proven to elicit a high interest rate which reduces the supply of money and increases the cost of capital, which in turn negatively affects the expansion of firms and lowers consumption since consumers have less money to spend.

The Taylor Rule indicates that if interest rates are high, inflation will reduce as consumers have less money to spend. If interest rates are low, inflation will be high as consumers will have more money to spend and that will push up the prices of goods. This high inflation contrasts with the monetary policy of SA. In this study we will not be discussing the correctness of the inflation targeting policy position, but rather we will be reviewing the impact of monetary policy variables (interest rates, inflation, and exchange rate) on SA's REIT returns, which have not previously been tested.

2.9 THE INTEREST RATES AS THE MAIN INSTRUMENTS OF SOUTH AFRICA'S MONETARY POLICY

Worldwide, there are three key monetary policy instruments and a few minor ones (P. Mohr & L. Fourie, 2015). Limited policy instruments include the ability to implement selective credit limits and the ability to use coercion to direct business banks and financial institutions to behave in a particular and desirable way. Accommodation policy and open market policy are the primary instruments implemented in SA. These strategies are not separate; they are merely complementary (Mohr & Fourie, 2004).

2.9.1 Accommodation (refinancing) policy

The word “accommodation” within the context of the monetary policy refers to the SARB's willingness to accommodate (or agree to) the requests of commercial banks for short-term loans. Here, monetary authorities ensure that there is a constant shortage of liquidity (cash) in the money market, therefore, commercial banks often need to make up any shortage of funds by selling their financial assets (bonds, etc.) or by borrowing money from each other at the interbank overnight rate (Mohr & Fourie, 2004). This incapacitates commercial banks and the SARB, as a lender of last resort, can then advance short-term loans to commercial banks.

The SARB established the accommodation policy through the repurchase (repo) tender system. A "repo" refers to the sale of financial security (such as government bonds, Treasury Bills, Land Bank Bills, and SARB debentures). An agreement by the seller to buy back (repurchase) the same security on a specified future date (normally not more than a week later) forms part of the sale agreement. Included in the repurchase price of the security is an amount of interest which represents the cost of having the funds for a week (Mohr & Fourie, 2004). Commercial banks apply for accommodation or refinancing by tendering for SARB funds at the weekly auctions of repos that have short-term maturities of no longer than seven days.

The SARB’s accommodation/refinancing policy thus consists of changes in the repo rate, as well as changes in other conditions on which funds are made available to the commercial banking sector (Mohr & Fourie, 2004). Thus, the repo rate is an important tool that the SARB employs to vary the cost of credit and in so doing regulate the quantity of money

inserted into the economy. Money market interest rate changes follow repo rate changes announced by the SARB. The cost of credit is thus directly influenced by the repo rate.

2.9.2 Open Market Policy

Open market policy refers to the sale or purchase of domestic financial assets, such as government bonds and Treasury Bills, by the central bank with the objective of influencing interest rates and the quantity of money being printed. The effectiveness of open market policy depends on the minimum cash reserve requirement that all commercial banks in SA are subject to (Mohr & Fourie, 2004). The sale of financial assets/securities to commercial banks will reduce their reserves of cash and also the amount of credit they can grant in line with the minimum cash reserve requirement. More so, commercial banks may be forced to borrow funds from the SARB at the repo rate to comply with the existing minimum cash reserve requirement if they are short of cash due to their purchases of financial assets/securities on the open market (Mohr & Fourie, 2004).

Open market sales of financial assets/securities are used to support a required increase in the repo rate. In this way, an open market policy is used to support or reinforce the accommodation/refinancing policy. Tighter monetary policy is aimed at cooling down aggregate expenditure by raising the cost of credit (borrowing). Open market sales of securities will force a cash shortage and so force banks to borrow at the higher repo rate intended by the SARB.

Figure 1 below shows, in practical terms, how the open market works. It depicts the balance sheet of Rocket Bank before the Reserve Bank sells bonds on the open market.

> When Rocket Bank purchases R30 million in bonds, Rocket Bank sends R30 million of its reserves to the SARB, but now holds an additional R30 million in bonds, as shown in Figure 1(b). However, Rocket Bank wants to hold R40 million in reserves, as in Figure 1 (a), so it will adjust down the quantity of its loans by R30 million, to bring its reserves back to the desired level, as shown in Figure 1 (c).

This means that a bank can easily reduce the quantity of its loans and at the same time receive payments on loans that it made previously, while making new loans. A decrease in

the quantity of loans also means fewer deposits in other banks, and other banks reducing their lending as well, as the money multiplier takes effect (P.Mohr & J.Fourie, 2004).

Assets		Liabilities + Net Worth	
Reserves	40	Deposits	400
Bonds	120		
Loans	300	Net Worth	60

(a) The original balance sheet

Assets		Liabilities + Net Worth	
Reserves	40 - 30 = 10	Deposits	400
Bonds	120 + 30 = 150		
Loans	300	Net Worth	60

(b) The central bank sells bonds to the bank

Assets		Liabilities + Net Worth	
Reserves	10 + 30 = 40	Deposits	400
Bonds	150		
Loans	300 – 30 = 270	Net Worth	60

(c) The bank makes fewer loans

Figure 1: Open market sales of government securities – an example

Another example is the SARB's open market purchases of financial assets, named quantitative easing, which implies loosening monetary policy or easier credit to improve aggregate spending. Such sales increase commercial banks' cash reserves, enabling them to raise their credit loans to businesses and the size of their loan books. Open market securities purchases usually follow the SARB's policy decision to cut the repo rate (P.Mohr & J.Fourie, 2004).

This aids to increase the supply of money, as shown in Figure 2 of Rocket Bank's balance sheet. Section (a) of Figure 2 shows that Rocket Bank begins with R460 million in assets, divided between equity, bonds, and loans, and R400 million in liabilities in the form of deposits, at a net value of R60 million. When the SARB purchases R20 million in Happy Bank bonds, bond holdings in Happy Bank fall by R20 million, and bank reserves increase by R20 million, as shown in Section (b) of Figure 2.

Nevertheless, Rocket Bank only wants to hold R40 million in reserves (the amount of reserves that it began with in Section (a) of Figure 2), so the bank chooses to raise the extra R20 million in reserves and its loans increase by R20 million, as shown in Section (c) of Figure 2. The SARB's open market activity allows Rocket Bank to make loans, rather than keeping its reserves in the form of government bonds that increase the money supply. As the new loans are deposited in banks across the economy, these banks in turn will lend out some of the deposits they receive, triggering the money multiplier (Aron & Meullbauer, 2007).

Assets		Liabilities + Net Worth	
Reserves	40	Deposits	400
Bonds	120		
Loans	300	Net Worth	60

(a) The original balance sheet

Assets		Liabilities + Net Worth	
Reserves	40 + 20 = 60	Deposits	400
Bonds	120 – 20 = 100		
Loans	300	Net Worth	60

(b) The central bank buys bonds

Assets		Liabilities + Net Worth	
Reserves	60 – 20 = 40	Deposits	400
Bonds	100		
Loans	300 + 20 = 320	Net Worth	60

(c) The bank makes additional loans

Figure 2: Open market purchases of government securities: an example

Certain minor monetary policy instruments, such as selective credit management, are at the fingertips of the SARB. In addition to the effect of SARB discretionary acts, the margin requirement on stock purchases is also varied. Stock is marginally purchased when the purchaser borrows a fraction of the funds needed to purchase the stock. A 40% margin requirement would enable a buyer to provide funds equal to 40% of the stock price. The margin requirement is used to eliminate widespread purchases of margins, since a large drop in the stock price can cause problems in the repayment of loans and thus cause problems for the financial sector as a whole.

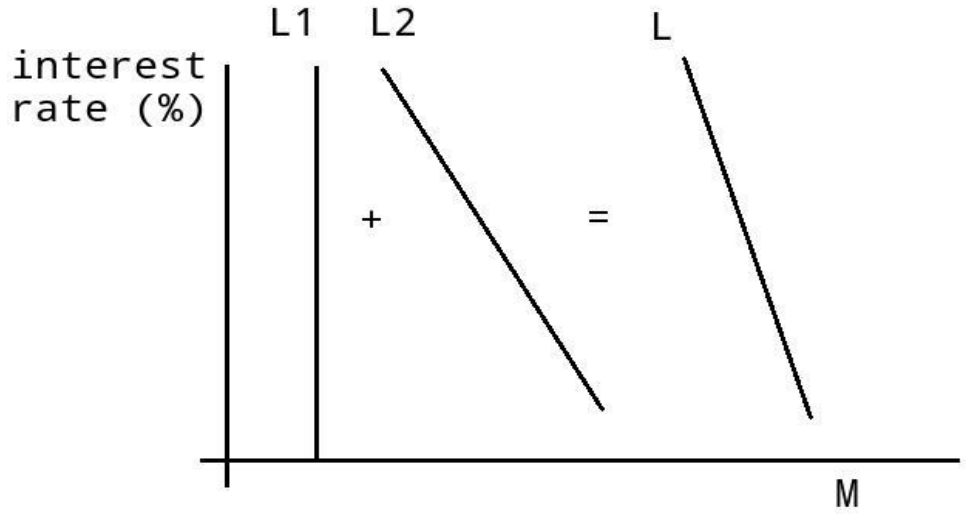
2.10 THE SOUTH AFRICAN MONETARY POLICY APPLICATION

2.10.1 The demand for money

Monetary policy is carried out primarily via the money market. One cannot talk about markets without talking about supply and demand. Practically speaking, the study reveals how money is exchanged in interbank deals where the money is sought, and the same money is being supplied. In quantitative economic theory, liquidity preference refers to the demand for money or liquidity. The concept was first formulated in John Maynard Keynes' book “The General Theory of Employment, Interest and Money” (published in 1936) to explain the determination of interest rates by supply and demand for money (Tily, 2007). According to Keynes, demand for liquidity (money) is determined by three motives (P. Mohr & J. Fourie, 2004):

- The *transactions* motive: people opt to have liquidity to ensure basic transactions, because their income is not readily available. The proportion of liquidity required depends on the level of income – the higher the income, the higher the demand for increased expenditure. The transactions of money demand are also referred to as the demand for *active balances, L1*.
- The *precautionary* motive: individuals want to have money available to meet social demands. The amount of funds expected to be used for this purpose increases as income increases. The precautionary demand for money, like the transactions demand for money, is also referred to as demand for *active balances, L1*.
- The *speculative* motive: here people want money in anticipation that bond prices will fall. With a decrease in the interest rate, people demand more money to hold and this implies that when the interest rate raises, it will bring down the price of an existing bond that will eventually yield in line with the interest rate. The speculative demand for money is alternatively known as the demand for *passive balances, L2*.

Total demand for money (L) is the sum of active (L1) and passive balances (L2) and hence depends on both income (Y) and interest (I) (Mohr & Fourie, 2015) levels. The interest rate



is regarded as the price of the borrowed money (loanable funds) paid. It is important to note that the economy has varying interest rates (depending on the various financial products). All the interest rates, however, shift in the same direction, whether upwards or downwards.

Figure 3: Money Demand Graph

The total demand for money (L) is the sum of the transactions/precautionary demand for money (L1, active balances) and asset/speculative demand for money (L2), passive balances).

Therefore, in essence, while the market for passive balances is not responsive to the interest rate, the overall (total) demand for money/liquidity, (L), is. This has critical financial implications on policy. The fact that the overall demand for money depends on the interest rate indicates that interest rates can be an important tool to control money demand.

2.10.2 The supply of money

The money supply here suggests the amount of money in circulation which does not depend on the rate of interest. Figure 4 suggests the financial authorities can influence the interest rate either by increasing or decreasing the money stock. So, for example, if the SARB wanted to raise interest rates in the economy from i1 to i2, it would need to somehow decrease the money stock from M1 to M2. Alternatively, if it wanted to lower interest rates then it would need to increase the money stock from M2 to M1. In this view, it is believed that the SARB controls the money supply, and that its supply is not contingent on the interest rate (hence the vertical money supply). So, the money supply is exogenously determined (that is, outside of the money market) by the SARB (Mohr & Fourie, 2004).

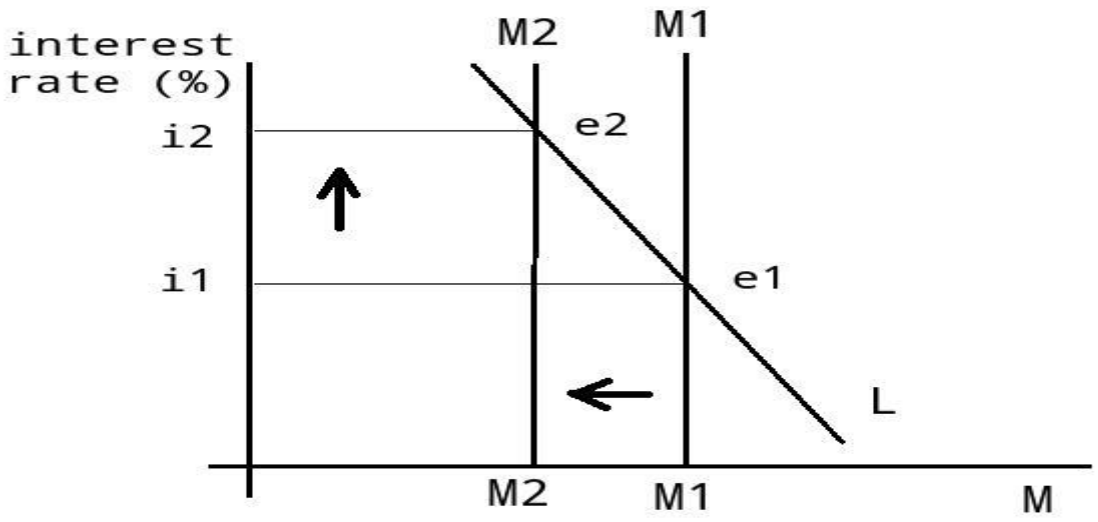


Figure 4: Money market equilibrium

Meanwhile, the view that interest rates are dictated by demand and money supply is quite theoretical. In practice, there is no independent money supply graph. Alternatively, the stock of money is calculated by the relationship between demand for money and interest rate (Mohr & Fourie, 2004), with interest rates regulated by the SARB. In that perception, the amount of money that finds its way into the economy is dependent on the demand for money and interest rate (credit cost). So, in fact, the money stock is demand-determined or endogenously determined (that is, within the money market, according to money

demand and the cost of credit). Whichever view is used to explain monetary policy, it comes down to the same thing in the end: central banks regulate money creation by influencing the demand for credit/loans via the prices of these borrowed funds, i.e. interest rates.

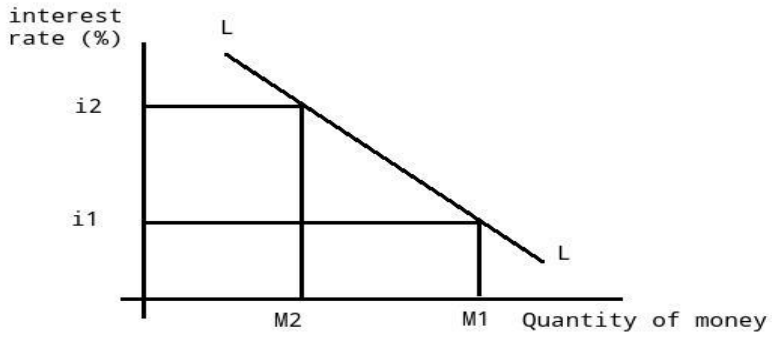


Figure 5: Total market demand for liquidity (money)

Figure 5 reveals that the quantity of money is determined by the interest rate interaction and the demand for money. At interest rate i1 the amount of money demanded will be M1. If the SARB increases interest rates to i2, then – *ceteris paribus* (all things being equal) – the quantity of money demanded will fall to M2 (Mohr & Fourie, 2004).

A modern market economy requires its money stock to match its level of economic activity. Too little money to service transactions may stifle or otherwise hold back spending, production, and income-earning activities. Too much money in circulation may cause overheating, that is too much spending, as well as inflation and the other economic

problems that go with that. Monetary policy is about managing the amount of money to suit the country's required level of economic activity.

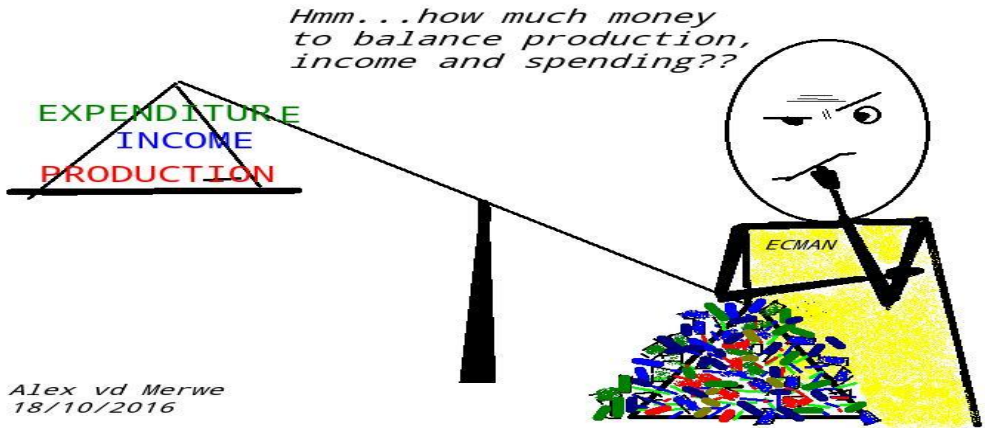


Figure 6: The amount of money to suit the country's required level of economic activity

Monetary policy essentially means matching the amount of money released into the economy with the amount of economic activity.

2.10.3 The effect of monetary policy on interest rates

Note the market for lendable bank funds as shown in Figure 7. The original balance (E0) is 8% interest rate and R10 billion is borrowed. Simulative monetary policy shifts the supply of creditable funds to the right from the original supply curve S0 to S1, resulting in a balance (E1) with a lower interest rate of 6% and a loan of R14 billion. In comparison, a contractionary monetary policy would move the supply of loanable funds to the left from the original supply curve S0 to S2, resulting in a balance (E2) with a 10% higher interest rate and a R8 billion loan amount (Mohr,2018)

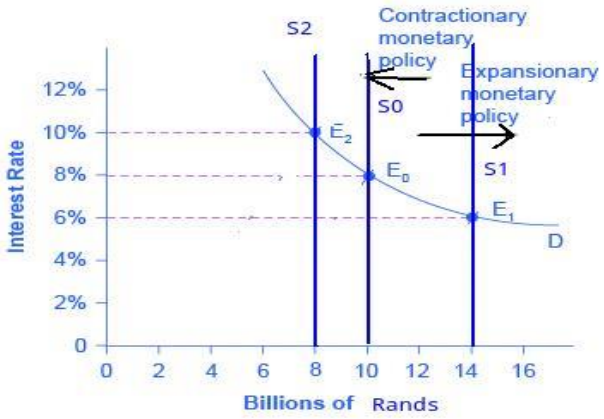


Figure 7: Expansionary/contractionary monetary policy graph

The original balance occurs at E0. Expansionary monetary policy should change the supply of monetary expansion from the original supply curve (S0) to the new supply curve (S1) and the new E1 balance from 8% to 6%. Contractionary monetary policy would adjust the supply of creditable funds from the original supply curve (S0) to the new supply curve (S2) to the left and raise the interest rate from 8% to 10%.

In SA, the decision to raise interest rate lies with the Monetary Policy Committee of the SARB. The SARB then carries out open market operations to support the accommodation/refinancing decision to increase or decrease the repo rate. Open market sales of securities will be undertaken to support a decision to increase the repo rate and, conversely, open market purchases of securities by the SARB will be offered to commercial banks to support a lower repo rate policy. Changes in the repo rate affect all other interest rates in the financial/monetary sector. “Despite this, financial markets exhibit a wide range of interest rates, representing borrowers with different risk premiums and loans to be repaid over different periods” (Mohr & Fourie, 2004; p. 84).

Generally, when the repo rate declines significantly, other interest rates drop too, and some interest rates rise when the repo rate increases. Furthermore, a 1%-point drop or increase in the repo rate — which allows for a borrowing period of no more than 7 days or so — typically will have an effect of less than 1% on a 30-year loan to buy a house or a

three-year loan to buy a car. Monetary policy can propel up or down the whole spectrum of interest rates, but the specific interest rates are set by the supply and demand forces for lending and borrowing in those specific markets.

2.10.4 Why monetary policy influences aggregate demand

Fiscal policy affects interest rates and the amount of available loans that affect multiple components of aggregate demand. Restrictive or contractionary monetary policy leading to higher fiscal policy affects interest rates and the amount of funds available that affect multiple components of aggregate demand. Interest rates and a reduced amount of loanable funds will reduce two aggregate demand components. Business investment will decrease, because borrowing money is less attractive to firms and even firms with money will notice that, at higher interest rates, putting these funds into financial investment is relatively more attractive than investing in physical capital (Mohr & Fourie, 2004). In addition, higher interest rates would deter household borrowing for big-ticket items such as homes and cars. In contrast, a loose or expansionary monetary policy, leading to lower interest rates and a higher amount of loanable funds, will tend to increase business investment and consumer borrowing for big-ticket items.

If the economy collapses from a recession and high unemployment with output below potential GDP, an expansionary monetary policy will help restore the economy to the potential GDP. Part (a) of Figure 8 illustrates this situation. This example uses a short-run, upward-sloping Keynesian aggregate supply curve (SRAS). The initial balance during the E0 recession is at the output level of 600. An expansionary monetary policy will minimise interest rates and stimulate investment and consumption spending, causing the original aggregate demand curve (AD0) to shift to AD1 so that the new equilibrium (E1) is at the potential GDP level of 700 (Mohr & Fourie, 2004).

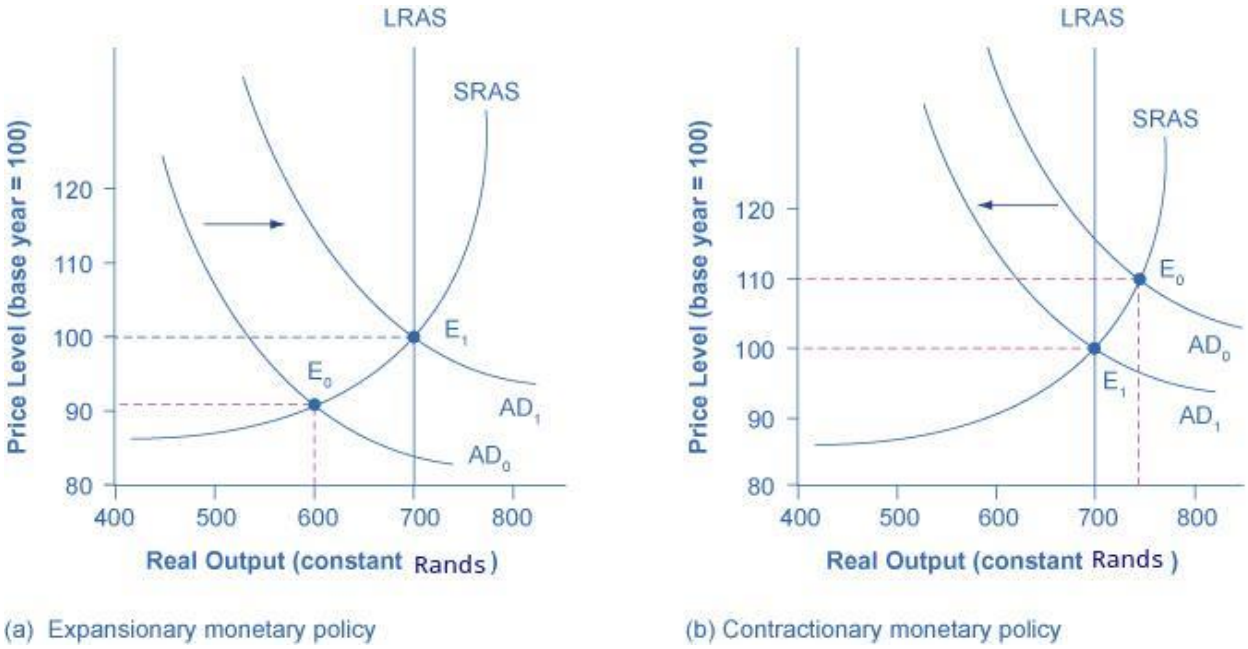


Figure 8: Monetary policy aggregate supply/demand graph

Part (a) of Figure 8 indicates that the economy was initially in a recession with the balanced output and the price level shown at E0. Expansionary fiscal policy will reduce interest rates and shift aggregate demand from AD0 to AD1, leading to a new equilibrium (E1) at the potential GDP output level with a relatively small price level rise. Part (b) of Figure 8 indicates that the economy originally generates above the potential GDP output level at equilibrium E0 and is under pressure for an inflationary rise in the price level. Contractionary monetary policy will shift aggregate demand to the left from AD0 to AD1, thus leading to a new equilibrium (E1) at the potential GDP level of output.

Conversely, if an economy produces above its potential GDP is a quantity of production, a contractionary monetary policy may reduce inflationary pressures at rising price rates. Part (b) of Figure 8 shows the original equilibrium (E0) at an output of 750, above potential GDP. Contractionary monetary policy would increase interest rates, deter investment borrowing and consumer spending, and trigger the original demand curve (AD0) to change to AD1 so that the new equilibrium (E1) is at a possible GDP of 700.

These instances suggest that monetary policy should be countercyclical; that is, work to counterbalance economic downturns and upswings in the business cycles. Monetary policy should be loosened when the recession has caused unemployment to increase and inflation to rise. In addition, countercyclical strategies pose a risk of overreaction by the public. If a loose monetary policy aimed at ending a recession goes too far, it can drive aggregate demand to the right so far that it inflates. If a restrictive monetary policy aimed at reducing inflation goes too far, it could drive aggregate demand to the left to the point where a recession starts. Part (a) of Figure 9 summarises the chain of effects that link loose and tight monetary policy to production and price changes.

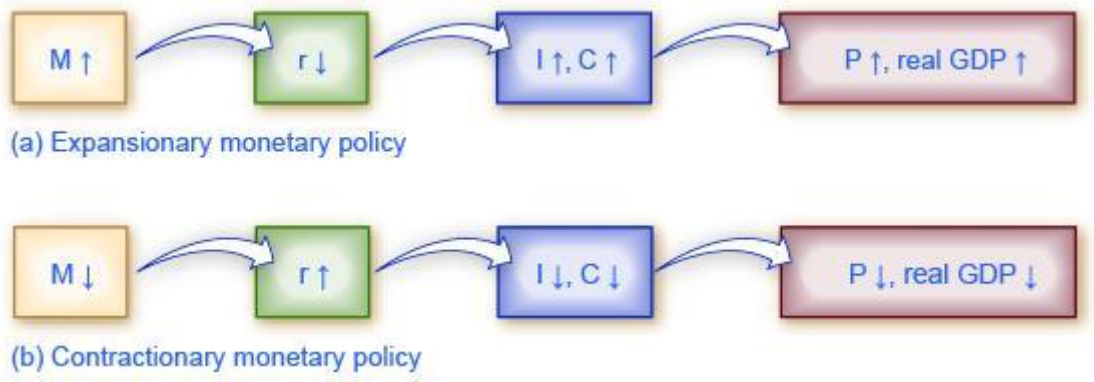


Figure 9: Monetary policy versus real GDP graph

Part (a) of Figure 9 demonstrates that in expansionary monetary policy the central bank increases the supply of money and loanable funds (M), which decreases the interest rate (r), stimulating additional borrowing for investment (I) and consumption (C), and shifting aggregate demand right. The outcome is a higher price level (P) and, at least in the short run, higher real GDP. Part (b) of Figure 9 demonstrates that in contractionary monetary policy, the central bank causes the supply of money and credit in the economy to lessen, which raises the interest rate, dissuading borrowing for investment and consumption, and shifting aggregate demand left. The result is a lower price level and, at least in the short run, lower real GDP.

2.11 INFLATION IMPACT ON THE SA REIT

The relationship between inflation and real estate returns have had extensive empirical results to highlight the use of real estate investment as an inflation hedging tool and to determine a positive and negative relationship of inflation to REIT returns. This relationship predates Fisher's 1930 theory of interest, popularly known as the 'Fisher effect' (Glascock, Lu & So, 2002). The premise of this theory was that the expected nominal return on an asset is equal to its expected real return plus the expected rate of inflation. Hence, if the real return is to be kept constant, higher inflation requires a higher nominal return (Glascock et al., 2002). By implication, therefore, if investors want to maintain the same level of real returns or purchasing power, investors must demand higher nominal returns in periods of high inflation. Judging from this understanding, inflation becomes a significant determinant force in asset returns and a key factor to be considered in investment decisions (Glascock et al., 2002).

The existing literature in the 80s revealed a scholarly consensus that unsecuritised real estate could serve as an inflation hedge (see Sirmans, 1987; Hoag 1980; Miles & McCue 1984; Gyourko & Linneman, 1988), as the underlying assets of REITs are primarily inflation hedges. However, the existing research outcomes revealed mixed feelings about REITs' abilities to hedge inflation. Some scholars (Gyourko & Linneman, 1988; Titman & Warga, 1989) conclude that REIT returns have a negative relationship with inflation and this suggests two conditions. First, that REITs act more like common stocks as perverse inflation hedges and, second, that the behaviour of REITs deviate from that of traditional real estate.

Because unsecuritised real estate provides good inflation hedging and REITs are securitised forms of real estate, it is counter-intuitive to find that REITs are preserving inflation hedges. One possible explanation for this positive relationship between unsecuritised real estate and inflation could be that it contains more recent data than studies conducted in the past decade (Glascock et al., 2002). Simpson et al. (2007) concludes that inflation has a positive and negative relationship to stock returns; when inflation rises the real estate prices will reduce and when inflation falls the real estate prices rise.

Most institutions (pension funds, insurance) use inflation hedging by investing in real estate assets, as it is deemed as a long-term investment (Sirmans, 1987). Some literature indicates that inflation hedging works in unsecuritised assets. REIT has proven to be the most preferred real estate investment since its inception, and Glascock et al. (2002) conclude that this is due to spurious regressions between REIT and inflation in previous studies. Geske and Roll (1983) conclude that most economies that use an inflation targeting monetary policy show an impact on stock returns in the short and long run, but they also argue that this policy must be industry-specific to give a more accurate assessment. Some studies argue that the rise of inflation will have an indirect negative effect on the REIT prices, as the buying power becomes less and affordability for rentals become less (Gupta & Hardik, 2018). There is a positive and negative relationship between inflation and the REIT, however, the accuracy of the impact is based on a country's macroeconomic factors (Glascock et al., 2002). This is an indicator that the impact of inflation on the REIT must be country-specific, as every country has different macroeconomic factors.

2.12 INTEREST RATE EFFECTS ON THE SA REIT

"Current literature has shown that more work has been done on the impact on REIT returns of monetary policy actions, particularly on the effect on REITs of interest rate variables" (See He, Webb & Myer, 2003; p. 12). Liang and Webb (1995, p. 461-470), on the other hand, presented contradictory evidence that the interest rate risk for equity REITs appeared insignificant. Specifically, they emphasised that interest rate sensitivities changed over time during 1973–1989 and were subject to various fundamental adjustments, such as tax reform and improvements to the monetary system (Bredin et al., 2007; p. 3-9).

To define the possibility of a non-linear structure in REIT returns, several strategy-shift models have been applied to the real estate markets. Lizieri and Satchell (1997) used a Threshold Autoregressive (TAR) model and found that in US REITs, there are two distinct regimes defined by the real interest rate. Liow, Zhu, Ho and Addae-Dappah (2005, p. 147–165) found that "regime switching in international REIT markets results in different market states with different patterns of risk-return behaviour and state interactions". In sum, Markov-switching models are particularly appealing because they allow this switching

process to be indigenised, and allow for inferences regarding the timing and nature of such switches (Bredin et al., 2019).

Nevertheless, these studies overlooked cyclical variations such as REIT returns, and concluded that REITs' reaction to monetary policy adjustments remains the same over various episodes on the REIT market (Lee & Lee, 2012). Chen (2007) analysed the uneven reaction of stock returns to monetary policy across the bear and bull markets. The concept of some articles has shown that REITs' exposure to interest rate results is both time-varying and contingent on the rate used (Devaney, 2001; He et al., 2003). He et al. (2003) also confirm previous findings showing that REITs are most sensitive to changes in long-term returns and low-grade corporate bonds, although, as with other methods used, these findings also vary in time.

Gupta and Hardik (2018) also acknowledge that interest rate adjustments are affected by interest rate changes, suggesting that one variable may not be sufficient to determine monetary policy changes in REIT returns, arguing that further studies need to be carried out separately in different market segments, mature markets, emerging markets, etc.

Chang et al.'s (2012) empirical analysis showed that there is no impact on interest rate sensitivities to REIT returns and the only impact is based on the cost of borrowing that impacts on the underlying performance of the real estate assets, especially new real estate developments. As a result, this indicates more study is required to identify the impact based on location and time horizon. Whilst few studies have been done to test the impact of the exchange rate and GDP on the performance of REIT returns, this study will test the impact based on these variables in the SA REIT (Bredin et al., 2019).

Previous investigations have also found several proxies for the impact of interest rates concerning REIT performance. Huang and Lee (2009, p. 301, 305) used the nominal interest rate, defined as "the rate of return plus a forecasted inflation premium". Some other studies used the real interest rate, defined as the slower growth nominal Treasury Bill rate (see Chen, Roll & Ross, 1986; Standish et al. 2005).

Other studies used the term configuration, described as the variance between long-term government yields less the rate of Treasury Bills (see Chen et al., 1986; Naranjo & Ling, 1997; Chen, Hsieh & Jordan, 1997; Chen, Hsieh, Vines & Chiou, 1998; Swanson, Theis & Casey, 2002; He et al., 2003; Payne, 2003; Nittayagasetwat & Buranasiri, 2012). He et al. (2003) note that, for the majority of the 27-year sample period (1972 – 1998), average changes in corporate bond yields have the greatest explanatory power for REIT returns.

South African intermediaries used for short-term interest rates include the 3-month South African Treasury Bill (see Das, Gupta & Kanda, 2010) and the negotiable deposit certificate (see Hassan & Van Biljon, 2010; p. 23-39). "Long-term interest rate proxies include JSE Actuaries All-Bond Index", as stated by Hassan and Van Biljon (2010, p. 23-39). "The R1 869 bond used by the majority of corporate financiers (PwC 2012) and the prime interest rate" (Clark & Daniel, 2006; Franken et al., 2011).

Two big derivatives are also used in the sense of SA as a proxy for interest rates. The first is the 10-year government bond yield, which is considered a risk-free interest rate index, as return investors can gain by investing in a long-term South African Government bond. The other is the prime overdraft rate set by the SARB, also known as the Prime Interest Rate. Most commercial bank interest rates in SA are linked to the Prime Interest Rate.

Listed assets are an asset class that is often compared to government bonds, because "the long-term return on real estate is between the return on bonds and the return on stocks" (Ilmanen, 2012; p. 9). This can be seen from the views of many investment analysts and fund managers who have listed properties that are linked to long-term government bonds or used as a benchmark to determine the attractiveness of listed assets as an asset class (Ilmanen, 2012).

In particular, REITs were forced to accumulate a large part of the capital required by long-term debt due to tax incentives and regulations requiring a minimum dividend distribution (Lin, 2014). According to Lin (2014, p. 16):

> Long-term invested capital comes at the expense of using someone else's assets, known as interest. Interests levied by banks or financial institutions shall

> be determined by the rate of repo. The repo rate refers to the rate at which the country reserve bank lend funds to other commercial banks.

Commercial banks then lend funds to private citizens at a premium rate, which is the repo rate plus a benefit percentage for banks. The risk of rising interest rates means that the long-term debt of REITs will become more expensive. “This will have an impact on a number of aspects of the real estate industry, the first being REIT stock prices”, as stated by Pauley (2011, p. 3-4). The Pauley report (2011, p. 3-4) looked at the relationship between the increase in stock prices of REIT and the changes in interest rates.

“The study found that interest rate movements have a low and negative relationship with REIT values. It is safe to say that fluctuations in REIT prices cannot be clarified enough by increases in interest rates” (Pauley, 2011; p. 4). A further study identified the impact of interest rate fluctuations on REIT returns. Studies have shown that interest rate changes have a significant impact on REIT returns. “The strong association between the two variables is apparent regardless of the type of REIT, as the study included hybrid, mortgage and equity REITs” (Swanson et al., 2002; p. 322).

Much research has been carried out on the effect of interest rates on capitalisation rates used in the real estate sector. Lin (2014, p. 150) states the following:

> Studies have previously suggested that interest rate changes need to be associated with cap rates, but calculating the value of real estate is a very complicated field… capitalization rates will increase by 50 to 75 basis points for every 100 to 150 basis points of interest rate increase.

The findings have several strict limitations and the practical application of the above-mentioned ratio is not yet supported. Uncommon cap rates are available for almost every type of property in the real estate sector, including residential, retail, office, and industrial properties. It will be difficult to quantify the effect of shifts in interest rates on all types of properties.

2.13 EXCHANGE RATE

“One transaction involves investing in real estate in another country with a different currency, but the investors also enter two speculative foreign exchange markets” (Lin, 2014; p. 145). Additional uncertainty regarding the exchange rate is created, and the expected return must presumably be compensated. Researchers identified foreign currency risk elements, namely changes in cash flows and security values in one's currency or domestic market, as well as changes in the foreign currency relative to the domestic currency. “The rate of return on foreign investment is equal to the product of one plus the rate of return on security and the rate of end to start exchange rates is less than one” (Lin, 2014; p. 145).

Investors could investigate the link between the standard deviation of the foreign currency relative to the domestic currency and the standard deviation of the prices of the assets in their local currency. Co-movement or a positive relationship between the two standard deviations will result in a large variability of the security return of the holding period, which increases the risk of the investment. On the other hand, the inverse relationship between the foreign investment price standard deviation and the foreign currency relative to the domestic currency, in the case of one sector, reduces the risk of possible losses on the other. “This reinforces the principle of diversification of limited risk, reducing the portfolio standard deviation by investing in independent or negatively correlated markets. It is possible that the exchange rate risk can be diversified until only the market risk remains” (Lin, 2014; p. 140). Markedly, therefore, there is an opportunity not only for SA REITs to hedge their investment against a weak domestic currency, but also to hedge their investment against foreign currency fluctuations through forward-purchase contracts and futures currency markets if they feel uncertain about foreign currency risk.

The rate of exchange provides a guide to the cash flow of the company's operations, the security interest, as well as the discount rate used to measure these estimated cash flows for the valuation of the projects. Investment value after deployment is highly reliant on foreign currency fluctuations in terms of historical cost reporting; future impairments that can either profit or negatively influence investment values can arise.

2.14 FOREIGN EXCHANGE RATE

Foreign exchange rate risk is an important part of international investments. Exchange rate exposure links stock market returns and exchange rate changes. Specifically, it predicts the impact of foreign exchange rate risk on stock prices (Kola & Kodongo, 2017). Pursuant to the principle of purchasing power parity, exchange rates are adjusted to reflect inflation levels, thus upholding the law of one price. This would imply that the exchange rate will not be separately priced. Should there be deviations from the purchasing power parity, the exchange rate risk is priced to the extent that it must be borne by the investor.

Bansal, Kiku, Shaliastovich and Yaron (2014) studied the impact of money supply, goods prices, real activity, and exchange rates on equity returns in emerging markets. The study revealed that the exchange rate is the most influential macroeconomic variable. Exchange rate exposure is expected to be an equally important risk for real estate, because investing in international real estate exposes investors to multiple currencies with differing instabilities.

Mattarocci (2014) investigated the role of exchange rate exposure in the European real estate markets before and after the introduction of a single currency. The study investigated whether asset holding and weights of an international real estate portfolio using exchange rate adjusted returns are essentially the same or different from those based on unadjusted returns. The results indicate that exchange rate exposure is significant in explaining excess returns rather than unadjusted returns. Furthermore, the study indicates that the differences in portfolio compositions are reduced after the introduction of a single currency. Before the introduction of the single currency, investors needed to incorporate foreign exchange rate risk expectations into international investment strategies, unless they are fully hedged or are using an exchange rate overlay program. After the introduction of the single currency in European markets, foreign exchange rate risk was eliminated (Mattarocci, 2014).

Ellis, Wilson and Zurbruegg (2007) investigated possible risk reduction curtailing from international diversification benefits and the role of the exchange rate in the US, UK, and Australian markets. The study found that although international diversification may reduce the overall risk of a portfolio, risk-adjusted returns are maximised only when stocks are performing at similar levels in all markets. The study also found that, when faced with added foreign exchange rate risk, investors may be worse off by holding a well-diversified portfolio of domestic value stocks.

Kola and Kodongo (2017) investigated the national stock market exchange rate exposure in a time-varying content in 16 industrialised countries from 1973 to 2011. The study argues that foreign exchange rate exposure is time-varying and particularly depends on the long-run co-movement between stock markets and exchange rate markets. The findings indicate an inconsistent relationship between the stock market and the nominal effective exchange rate. The study also presents new evidence that the national foreign exchange rate exposure of stock markets is related to the cointegration of stock prices and effective exchange rates.

The study of currency volatility has been acknowledged for stocks, however, limited studies have investigated this within the real estate context. Additionally, emerging economies have been largely branded by volatile currency movements. Therefore, it becomes important to understand exchange rate movements within listed real estate in these markets.

2.15 SUMMARY

This study assessed and illustrated local and international literature related to the study area. It gave crucial contributions to the study of REITs' vulnerability to changes in monetary policy frameworks. It reviewed the SA REIT's performance pertaining to the South African monetary policy. The results on performance have been inconsistent. Some of the reasons may be the omission of adjustment for risk in return measurement, different model specification, and the lack of control in survivorship bias in database selection. The literature review justifies a further study of REIT performance.

Several key monetary policy variables were found to be critical to the performance of the stock market REITs (the majority of the studies reviewed found a good relationship between the return on assets and the performance of the stock market). The interest rate was also found to be the largest contributor to the precariousness of the listed return on assets (using VAR variance decomposition). Some other findings on interest rates were not consistent with theoretical arguments. The outcome of the negative relationship between the interest rate and the reported return on property is consistent with the majority of the previous studies cited (see Allen et al., 2000; He et al., 2003; Clark & Daniel, 2006; Huang & Lee, 2009; Mangani, 2011; Boshoff & Cloete, 2012; Buttimer, Jun & Chiang, 2012; Nittayagasetwat & Buranasiri, 2012) and inflation (most of the past studies have not found a significant relationship to this effect).

Similar to previous REIT interest rate sensitivity studies (Bredin et al., 2019), the study found significant responses in both returns and volatility to unanticipated changes in rates. The significance of specifying unforeseen changes in interest rates is critical when taking into account previous results where key monetary policy variables such as interest rate, inflation, and exchange rate changes have been introduced. Although the impact of the shock is significant on both returns and volatility, there is no evidence of asymmetry. There is also no evidence of a change in volatility that coincides with the announcements by the Federal Reserve. Although the lack of any behavioural effect may appear inconsistent with previous equity results reported, the Federal Reserve Banks also report results for both large-cap REIT and equities consistent with the lack of significant calm prior to the storm effect, which would indicate that the results previously reported are sensitive to the exact sample analysed.

CHAPTER THREE: RESEARCH METHODOLOGY

3.1 INTRODUCTION

This chapter focuses on the methodology upon which this research rests. Monthly time series data on the REIT, GDP, inflation, interest rate, and exchange rate were collected from January 2011 to August 2019 from the South African REIT Association for the purpose of achieving the research objective and aim. The various theoretical approaches discussed in this chapter focus on the suitable statistical analyses to carry out in chapter four. The graphical representation, order of integration of the variables, and appropriate cointegration methods are explained below.

3.2 UNIT ROOT TESTING

The importance of unit root testing in any time series based research has become more apparent in the academic domain. The regression of nonstationary series leads to a spurious regression which statistically cannot be considered reasonable (Bhusal et al., 2018). There are many methods of determining the stationarity of a series. The most commonly used ones are the Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) tests. This is due to the assumptions upon which they are based. The ADF test uses three different models, namely “none”, “intercept”, and “intercept with trends”, but does not take into consideration the serial correlation of the error terms. However, the PP test improves on the limitation of the ADF test by taking care of the possible serial correlation of the error terms. Hence, this research uses both methods to determine the stationarity (order of integration) of the series for better results.

3.3 AUTOREGRESSIVE DISTRIBUTED LAG (ARDL) MODEL

The cointegration test is used to determine the presence of co-movement among the time series variables. There are three major cointegration tests, namely the Engle-Granger approach, Johansen approach, and Bound test, which all use the Autoregressive Distributed

Lag (ARDL) model to estimate the short-run model, as opposed to the traditional vector autoregressive (VAR) model. Each one of these tests is preconditioned on the order of integration of each variable under consideration. The Engle-Granger approach is suitable for two variables when the error terms of the regression model of those two variables are themselves stationary. The Johansen approach is only applicable if all the variables are integrated of the same order, *I(1)*. Hence, if the variables are integrated of different order the appropriate cointegration test is the Bound test proposed by Pesaran, Shin and Smith (2001). The use of the ARDL model is inevitable, and none of the variables must be integrated of order two, *I(2)*. That is, if there are only *I(0)* and *I(1)* among all the variables.

This research uses the ARDL model, as all the variables are integrated of different orders, that is *I(0)* and *I(1)*. To specify the ARDL model the lag length is very important. There are many information criteria to use in selecting the appropriate lag length for the model. These are the Akaike information criterion (AIC), Schwarz information criterion, Hanna-Quinn information criterion, final prediction error, and sequential modified LR test statistic. The most significant of them all are the AIC and the Schwarz information criterion. The decision rule is to choose the appropriate lag length based on the information criterion with the lowest value.

The generalised ARDL (p, q) model is specified as:

$$Y_t = a_{0j} + \sum_{i=1}^{p} \alpha_j Y_{t-i} + \sum_{i=0}^{q} \beta_j' X_{t-i} + e_{jt} \qquad (3.1)$$

Where: $Y_t =$ dependent variable at time the current time, *t.* $X_t' =$ vector of exogenous variables which are allowed to be purely *I(0)* and/or *I(1)*, α and β are the coefficients, a is the constant/intercept, *j=1, …, k; p, q* are optimal lag lengths; and e_{jt} is a vector of the error terms which are serially uncorrelated. The serial correlation is checked under the model diagnostic tests:

- The dependent variable is a function of its lagged values and the current and lagged values of other exogenous variables in the model.
- The lag lengths for *p, q* may not necessarily be the same.
- *p lags:* used for the dependent variable.

- *q lags:* used for the exogenous variables.

3.4 BOUND TEST

To perform the Bound test for cointegration, the conditional ARDL ($p,\ q_1,\ q_2\ ,\ q_3, q_4$) model with five variables is specified as:

Hypotheses:

$H_0: b_{1j} = b_{2j} = b_{3j} = b_{4j} = b_{5j} = 0, \quad (where\ j = 1, 2, 3, 4, 5)$

$H_1: b_{1j} \neq b_{2j} \neq b_{3j} \neq b_{4j} \neq b_{5j} \neq 0, \quad (where\ j = 1, 2, 3, 4, 5)$

$$\Delta \boldsymbol{Y}_t = a_{01} + b_{11} Y_{t-i} + b_{21} X_{1\,t-i} + b_{31} X_{2\,t-i} + b_{41} X_{3\,t-i} + b_{51} X_{4\,t-i} + \sum_{i=1}^{p} a_{1j}\, \Delta Y_{t-i} + \sum_{i=1}^{q_1} a_{2j}\, \Delta X_{1\,t-i} + \sum_{i=1}^{q_2} a_{3j}\, \Delta X_{2\,t-i} + \sum_{i=1}^{q_3} a_{4j}\, \Delta X_{3\,t-i} + \sum_{i=1}^{q_4} a_{5j}\, \Delta X_{4\,t-i} + \boldsymbol{e}_t \quad (3.2)$$

- If there is no cointegration (that is, if there is no long-run relationship), the ARDL is specified as:

$$\Delta \boldsymbol{Y}_t = a_0 + \sum_{i=1}^{p} a_{1j}\, \Delta Y_{t-i} + \sum_{i=1}^{q_1} a_{2j}\, \Delta X_{1\,t-i} + \sum_{i=1}^{q_2} a_{3j}\, \Delta X_{2\,t-i} + \sum_{i=1}^{q_3} a_{4j}\, \Delta X_{3\,t-i} + \sum_{i=1}^{q_4} a_{5j}\, \Delta X_{4\,t-i} + \theta ECT_{t-1} + \boldsymbol{e}_t \quad (3.3)$$

- If there is cointegration (that is, if there is a long-run relationship), the ECM representation is specified as:

$$\Delta \boldsymbol{Y}_t = a_0 + + \sum_{i=1}^{p} a_{1j}\, \Delta Y_{t-i} + \sum_{i=1}^{q_1} a_{2j}\, \Delta X_{1\,t-i} + \sum_{i=1}^{q_2} a_{3j}\, \Delta X_{2\,t-i} + \sum_{i=1}^{q_3} a_{4j}\, \Delta X_{3\,t-i} + \sum_{i=1}^{q_4} a_{5j}\, \Delta X_{4\,t-i} + \boldsymbol{e}_t \quad (3.4)$$

Model (3.3) is just the short-run model which is the ARDL model and (3.4) is called the ECM due to the presence of the error correction term (ECT), which measures the speed of adjustment of the system back to the equilibrium.

CHAPTER FOUR: DATA ANALYSES AND OVERVIEW OF FINDINGS

4.1 INTRODUCTION

Nine years' monthly data of key monetary policy variables (inflation, interest rate, exchange rate, and GDP) and the REIT are analysed to investigate the significant impact each one of these variables has on the latter, in both the short and long term. This monetary policy data is based on SA statistics and SARB data collected between 2011-2019 and it is data used in validation to monetary policy tracking in South Africa. The monetary policy data collected will be compared to SA REIT returns collected from SA REIT association in a monthly basis from 2011- 2019 and both data sources are valid and reliant. This chapter will present a graphical representation of the analysed data using the time series plot; the results of the unit root testing to determine the order of integration of each variable; an estimation of the ARDL model; the Bound test; and the long- and short-run model estimations.

4.2 GRAPHICAL REPRESENTATION OF THE DATA

The time series plots of each key monetary policy variable and the REIT are shown in Figure 10 through 13.

Figure 1: Time series plot of REIT and inflation

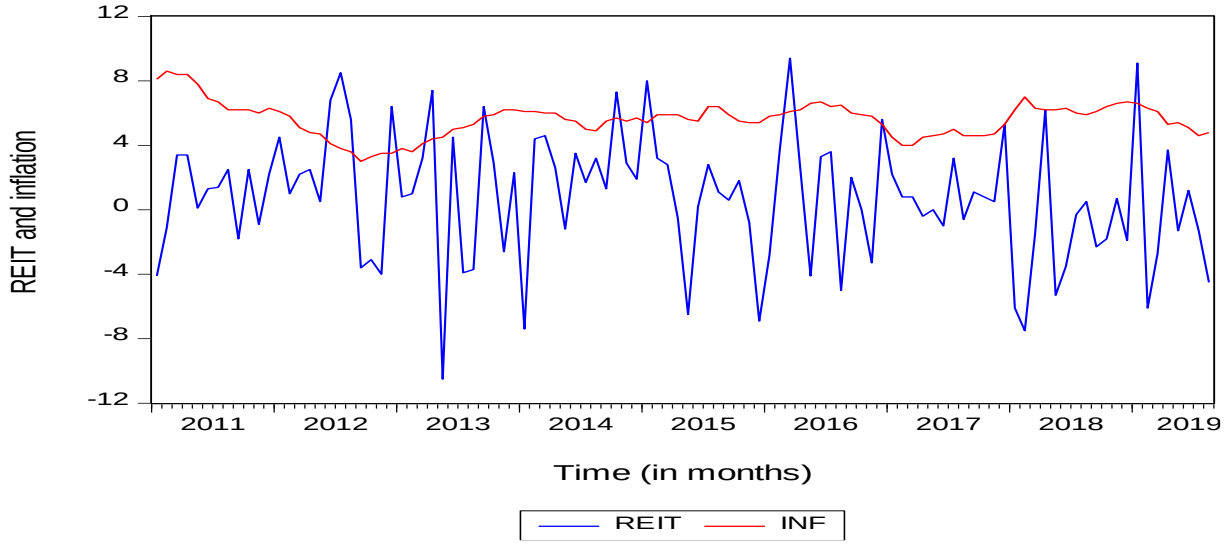


Figure 10: Time series plot of the REIT and inflation

Figure 10 above is the time series plot of the REIT and inflation. The two series do not exhibit any trend and no evidence of co-movement is seen.

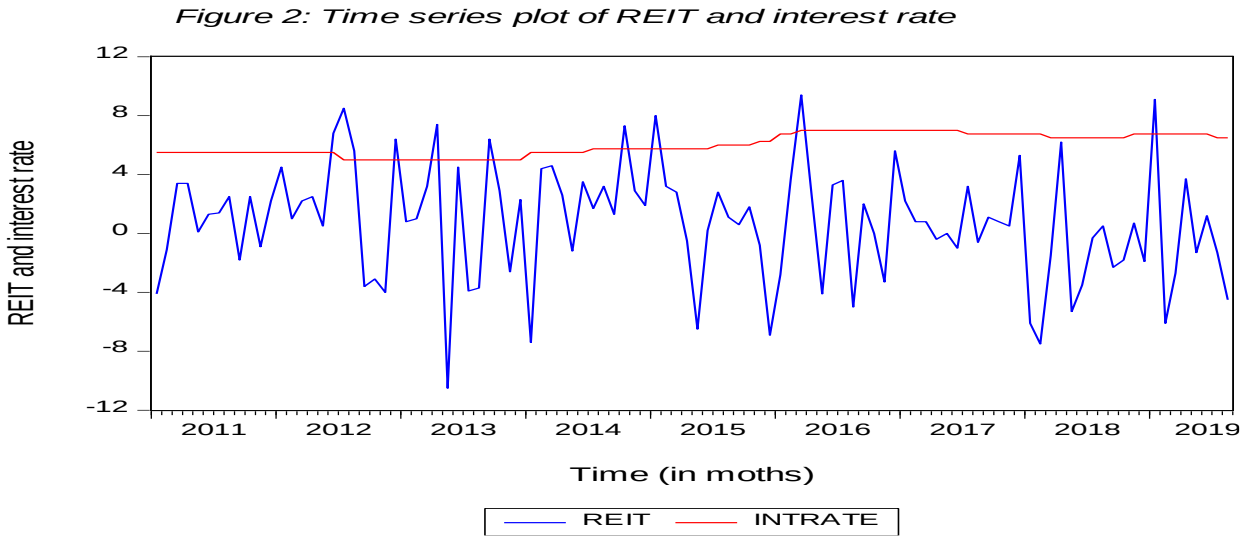


Figure 11: Time series plot of the REIT and interest rate

Figure 11 above is the time series plot of the REIT and interest rate. The two series do not exhibit a trend and evidence of co-movement is absent.

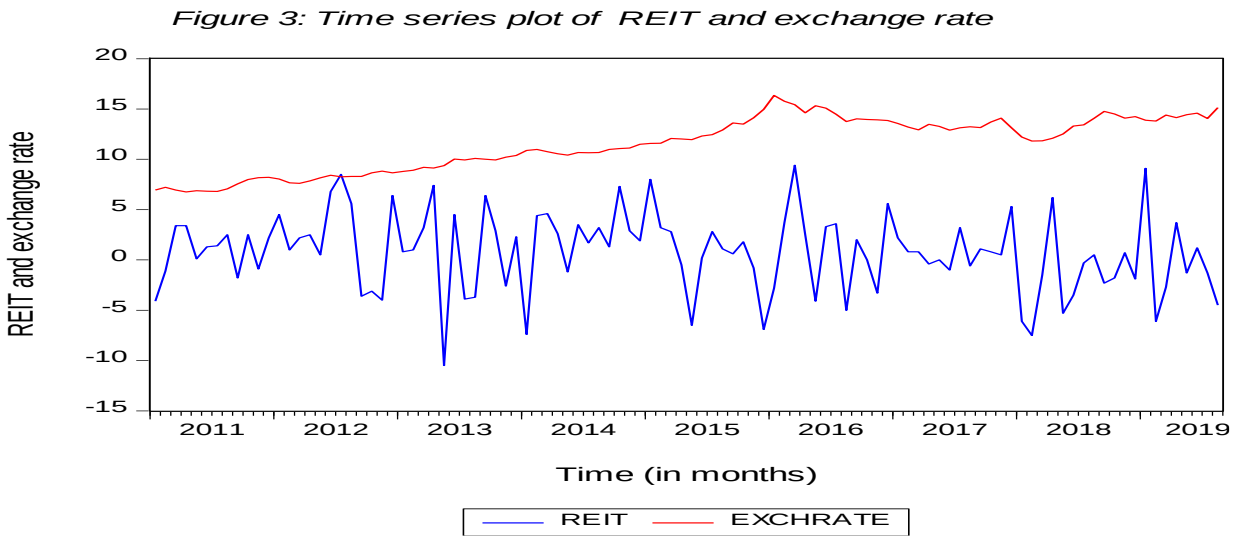


Figure 12: Time series plot of the REIT and exchange rate

Figure 12 above is the time series plot of the REIT and exchange rate. The exchange rate shows an upward trend, while no trend is seen in the REIT. However, no evidence of co-movement is seen in the two series.

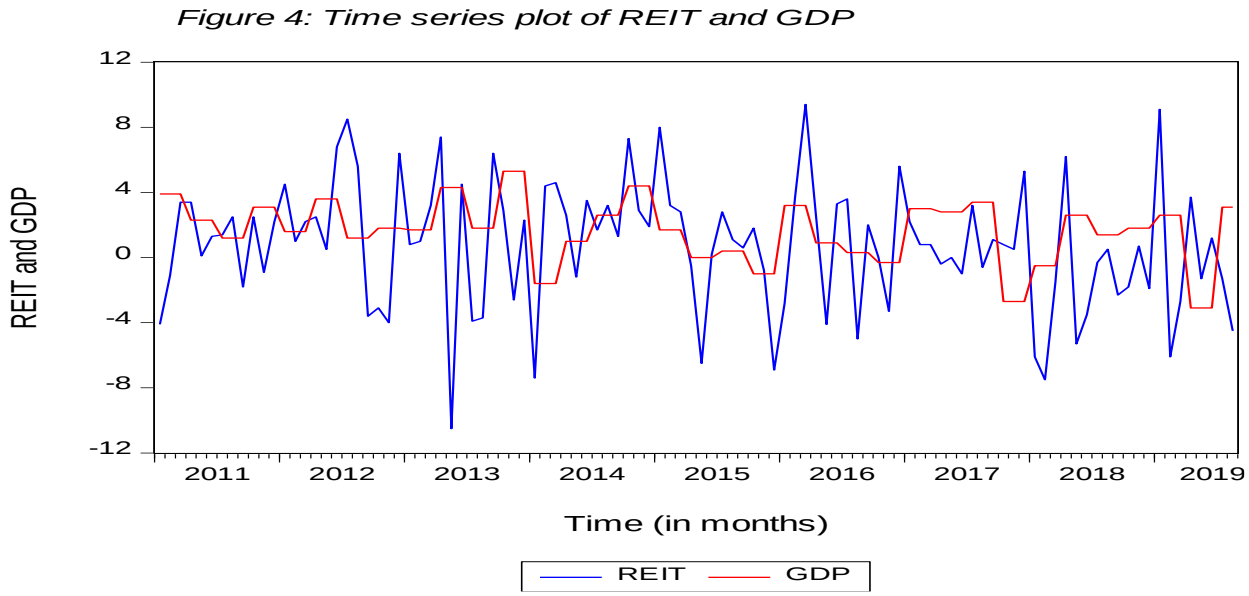


Figure 13: Time series plot of the REIT and GDP

Figure 13 above is the time series plot of the REIT and GDP. The two series do not exhibit any trend and no evidence of co-movement is seen.

4.3 UNIT ROOT TESTING

Table 1: Unit root test outcomes

	Augmented Dickey-Fuller Test			Phillips-Perron Test		
Variable	t-stat	Critical value (5%)	p-value	t-stat	Critical value (5%)	p-value
$REIT$	-9.8216	-1.9440	0.0000	-9.8216	-1.9440	0.0000
INF	-1.3996	-1.9440	0.1496	-7.5360	-1.9440	0.1986
ΔINF	-7.5360	-1.9440	0.0000	-7.5636	-1.9440	0.0000
$IntRate$	0.7922	-1.9440	0.8824	0.6737	-1.9440	0.8598
$\Delta Intrate$	-10.0499	-1.9440	0.0000	-10.1612	-1.9440	0.0000

$ExchRate$	1.7138	-1.9440	0.9786	1.7138	-1.9440	0.9786
$\Delta ExchRate$	-7.9378	-1.9440	0.0000	-7.9378	-1.9440	0.0000
GDP	-1.1389	-1.9440	0.2303	-3.3391	-1.9440	0.0010
ΔGDP	$-6{,}7483$	-1.9440	0.0000	-22.7627	-1.9440	0.0000

Source: Appendix A

The results of the ADF and PP tests based on "none" (i.e. no trend, no intercept) used in testing for the presence of unit root are reported in Table 1. These results indicate that the REIT is integrated of order zero, *I(0)*, while each of the remaining variables is integrated of order 1, *I(1).* This implies that the ARDL model is appropriate for the variables under consideration.

4.4 AUTOREGRESSIVE DISTRIBUTED LAG MODEL

The estimated general ARDL models for each of the key monetary policy variables and the REIT are given in the equations below. Each key monetary policy variable is considered to be an explanatory variable, while the REIT is the dependent variable. The appropriate lag order for each variable was chosen based on the AIC, which is the least among the six criteria reported by the Eviews (see Appendix B). These lag orders are specified in estimating each ARDL model, however, the ARDL model uses the most appropriate one in the estimated model.

$$REIT_t = 1.9545 - 0.0213REIT_{t-1} - 0.2055INF_t \quad (1)$$

Table 2: ARDL model of the REIT on inflation

Variable	Coefficients	Std. Error	t-stat	p-value	Decision
$REIT_{t-1}$	-0.0213	0.1008	-0.2110	0.8333	Not sig.
Inf_t	-0.2055	0.3720	-0.5524	0.5819	Not sig
Constant	1.9545	2.1206	0.9217	0.3589	Not sig.

Source: Appendix B

Model (1) is the ARDL estimated model of the REIT on inflation, and its coefficients, standard error, test statistic, and p-values are reported in Table 2 above. The significant

test results are reported in Table 6. There is a negative relationship between the REIT and inflation. Though the unit test shows an increase on average in inflation yields and a 20.6% decrease in the REIT *ceteries paribus,* this effect is not statistically significant based on the Wald significance test result in Table 6.

$$REIT_t = 5.7593 - 0.0399REIT_{t-1} - 8.0135INTRATE_t + 7.1561INTRATE_{t-1} + 10.5442INTRATE_{t-2} - 10.5151INTRATE_{t-3} \quad (2)$$

Table 3: ARDL model of the REIT on interest rate

Variable	Coefficients	Std. Error	t-stat	p-value	Decision
$REIT_{t-1}$	-0.0399	0.0992	-0.4026	0.6881	Not sig.
$Intrate_t$	-8.0135	3.4812	-2.3020	0.0235	Sig
$Intrate_{t-1}$	7.1561	4.8344	1.4802	0.1421	Not sig
$Intrate_{t-2}$	10.5442	4.9103	2.1474	0.0343	Sig.
$Intrate_{t-3}$	-10.5151	3.5756	-2.9408	0.0041	Sig.
Constant	5.7593	3.2216	1.7878	0.0770	Not sig.

Source: Appendix B

Model (2) is the ARDL estimated model of the REIT on interest rate, and its coefficients, standard error, test statistic, and p-values are reported in Table 3 above. The significant test results are reported in Table 6. There is a mixed impact on the REIT by the different lagged interest rate. According to Mangani(2011) indicates that interest rates are asymmetrical to REIT performance in contractionary monetary policy and REIT performance will reduce as repo rates reduces.The original and third lagged interest rate each individually has a significant negative impact on the REIT, while the first and second lagged interest rate combined have a positive impact on the REIT. Only the second lagged interest rate has a significant positive impact on the REIT. However, the joint significance of all levels of interest rate was tested using the Wald test and it was found that they jointly have a significant negative impact on the REIT.

$$REIT_t = 4.0488 - 0.0812REIT_{t-1} - 3.0765EXCHRATE_t + 4.9330EXCHRATE_{t-1} - 2.1242EXCHRATE_{t-2} \quad (3)$$

Table 4: ARDL model of the REIT on exchange rate

Variable	Coefficients	Std. Error	t-stat	p-value	Decision
$REIT_{t-1}$	-0.0812	0.1016	-0.7991	0.4262	Not sig.
$Exchrate_t$	-3.0765	0.9664	-3.1834	0.0020	Sig.
$Exchrate_{t-1}$	4.9330	1.4428	3.4189	0.0009	Sig.
$Exchrate_{t-2}$	-2.1242	0.9776	-2.1728	0.0320	Sig.
Constant	4.0488	1.7371	2.3308	0.0218	Sig.

Source: Appendix B

Model (3) is the ARDL estimated model of the REIT on exchange rate, and its coefficients, standard error, test statistic, and p-values are reported in Table 4 above. The significant test results are reported in Table 6. According to (Li and Yung,2014)indicated in the literature review that the investment values are highly reliant on current fluctuations, therefore the depreciation of the currency will negatively impact on the performance of REIT in a short run and positively impact in a long run depending on currency movements. The different lagged exchange rate has a mixed impact on the REIT. The original and second lagged exchange rate each individually has a significant negative impact on the REIT, while only the first lagged exchange rate has a significant positive impact on the REIT. The joint significance of all levels of exchange rate was tested using the Wald test and it was found that they jointly have a significant impact on the REIT.

$$REIT_t = -0.4472 - 0.0655REIT_{t-1} - 0.5160GDP_t - 0.4529GDP_{t-1} + 0.2807GDP_{t-2} + 0.4520GDP_{t-3} \quad (4)$$

Table 5: ARDL model of the REIT on GDP

Variable	Coefficients	Std. Error	t-stat	p-value	Decision
$REIT_{t-1}$	-0.0655	0.1019	-0.6429	0.5218	Not sig.
GDP_t	0.3160	0.2776	-1.8591	0.0661	Not sig
GDP_{t-1}	-0.4529	0.3268	-1.3860	0.1690	Not sig.
GDP_{t-2}	0.2807	0.3418	0.8210	0.4137	Not sig.
GDP_{t-3}	0.4520	0.3033	1.4904	0.1394	Not sig.
Constant	-0.4472	0.6201	-0.7212	0.4725	Not sig.

Source: Appendix B

Model (4) is the ARDL estimated model of the REIT on GDP, and its coefficients, standard error, test statistic, and p-values are reported in Table 5 above. The significant test results are reported in Table 6 below. The different lagged GDP has a mixed impact on the REIT. The original and second lagged GDP each individually has an insignificantly negative impact on the REIT, while the first and third lagged exchange rate each has an insignificantly positive impact on the REIT. However, the joint significance of all levels of GDP was tested using the Wald test and it was found they jointly do not have a significant impact on the REIT.

Table 6: ARDL models significant tests

Variable	F-stat	p-value	Decision
$Inflation$	0.3052	0.5819	Not sig.
$Intereate\ rate$	3.6810	0.0148	Sig
$Exchange\ rate$	5.1943	0.0023	Sig.
GDP	2.2816	0.0662	Not sig.

Source: Appendix B

Table 6 shows the Wald test results of the joint significant tests of each estimated model in (1), (2), (3) and (4).

4.5 BOUND TEST

The ARDL long-run form and Bound tests are carried out in order to study the possibility of cointegration among each of the monetary policy variables and the REIT. Table 7 below shows the F-Bound test statistic and 5% critical value.

Table 7: F-Bound test

		Critical value (5%)	
Variable	F-stat	I(0)	I(1)
$REIT\ and\ inflation$	51.61	4.94	5.73
$REIT\ and\ intereate\ rate$	50.05	4.94	5.73
$REIT\ and\ exchange\ rate$	56.64	4.94	5.73
$REIT\ and\ GDP$	54.69	4.94	5.73

Source: Appendix C

The time series plots in Section 4.2 (graphical representation section) show no evidence of cointegration among any of the key monetary policy variables and the REIT. However, based on the results of the Bound test in Table 7 above, there is cointegration among each of these variables and the REIT. Hence, this necessitates estimating the ECM which includes both the long- and short-run components.

4.6 LONG-RUN AND SHORT-RUN MODELS

The lag length to use for each variable in the ECM is chosen based on the AIC, and this is found to be the same, that is, 1 (one) for each variable (see Appendix D). Model (5), (6), (7) and (8) below are the estimates of the ECM of the REIT on inflation, interest rate, exchange rate, and GDP respectively.

$$\Delta REIT_t = 6.88 \times 10^{-05} + 0.1216\Delta REIT_{t-1} - 0.6955\Delta Inf_{t-1} - 1.1533ECT_{t-1} \quad (5)$$

Table 8: REIT and inflation ECM estimates and diagnostics

Variable	Coefficients	Stad. Error	t-stat	$p-value$
Constant	6.88×10^{-05}	0.3902	0.0002	0.9999
$\Delta REIT_{t-1}$	0.1216	0.0992	1.2254	0.2234
ΔInf_{t-1}	−0.6955	1.0879	−0.6393	0.5241
ECT_{t-1}	−1.1533	0.1434	−8.0414	0.0000

Diagnostic test	Test statistic value	$p-value$
A: Serial correlation	$Obs\ R-squared = 0.0821$	0.7744
B: Heteroskedasticity	$Obs\ R-squared = 7.5953$	0.0552
C: Normality	$Jarque-Bera\ = 0.6551$	0.7207
Significant test	$F-statistic = 0.4088$	0.5226

Breusch-Godfrey Serial Correlation LM Test
Heteroskedasticity Test: Breusch-Pagan-Godfrey
Normality Test: Jarque-Bera
Wald Test

Source: Appendix D and E

Table 8 reports the estimates with the t-statistic, diagnostic, and significant tests of the REIT and inflation ECM. Model (5) is the estimate of the REIT and inflation long-run and short-run model. There is a significant long-run relationship between the two variables, but inflation has no significant short-run impact on the REIT, although a unit increase in inflation causes a 69.55% decrease in the REIT on average *ceteris paribus*. An approximately 115.33% departure from the long-run equilibrium is corrected each period (that is, each month). The model diagnostic test results show that the REIT and inflation ECM is free of problems and stable (see Appendix E).

$$\Delta REIT_t = 0.0326 + 0.1176\Delta REIT_{t-1} - 0.1816\Delta Intrate_{t-1} - 1.1593 ECT_{t-1} \quad (6)$$

Table 9: The REIT and interest rate ECM estimates and diagnostics

Variable	Coefficients	Stad. Error	t-stat	$p-value$
Constant	0.0326	0.3877	0.0841	0.9331
$\Delta REIT_{t-1}$	0.1176	0.0978	1.2033	0.2318
$\Delta Intrate_{t-1}$	−0.1816	3,5613	−0.3318	0.7408
ECT_{t-1}	−1.1593	0.1427	−8.1262	0.0000

Diagnostic test	Test statistic value	$p-value$
A: Serial correlation	$Obs\ R-squared = 0.1177$	0.7315
B: Heteroskedasticity	$Obs\ R-squared = 1.4401$	0.6962
C: Normality	$Jarque-Bera\ = 1.9465$	0.3779
Significant test	$F-statistic = 0.1101$	0.7408

Breusch-Godfrey Serial Correlation LM Test
Heteroskedasticity Test: Breusch-Pagan-Godfrey
Normality Test: Jarque-Bera
Wald Test

Source: Appendix D and E

Table 9 reports the estimates with the t-statistic, diagnostic, and significant tests of the REIT and interest ECM. Model (6) is the estimate of the REIT and interest rate long-run and short-run model. There is a significant long-run relationship between the two variables, but interest rate has no significant short-run impact on the REIT, although a unit increase in inflation causes an 18.16% decrease in the REIT on average *ceteris paribus*. An

approximately 115.93% departure from the long-run equilibrium is corrected each period (that is, each month). The model diagnostic test results show that the REIT and inflation ECM is free of problems and stable (see Appendix E).

$$\Delta REIT_t = -0.0703 + 0.0853\Delta REIT_{t-1} + 1.2492\Delta Exchrate_{t-1} - 1.0983ECT_{t-1} \quad (7)$$

Table 10: The REIT and exchange rate ECM estimates and diagnostics

Variable	Coefficients	Stad. Error	t-stat	$p-value$
Constant	-0.0703	0.3880	-0.1812	0.8566
$\Delta REIT_{t-1}$	0.0853	0.1000	0.8526	0.3960
$\Delta Exchrate_{t-1}$	1.2492	1.0592	1.1794	0.2411
ECT_{t-1}	-1.0983	0.1489	-7.3768	0.0000

Diagnostic test	Test statistic value	$p-value$
A: Serial correlation	$Obs\ R-squared = 0.0938$	0.7595
B: Heteroskedasticity	$Obs\ R-squared = 2.1391$	0.5440
C: Normality	$Jarque-Bera\ = 1.3334$	0.5134
Significant test	$F-statistic = 1.3910$	0.2411

Breusch-Godfrey Serial Correlation LM Test
Heteroskedasticity Test: Breusch-Pagan-Godfrey
Normality Test: Jarque-Bera
Wald Test

Source: Appendix D and E

Table 10 reports the estimates with the t-statistic, diagnostic, and significant tests of the REIT and exchange rate ECM. Model (7) is the estimate of the REIT and exchange rate long-run and short-run model. There is a significant long-run relationship between the two variables, but the exchange rate has no significant short-run impact on the REIT, although a unit increase in exchange rate causes a 124,92% increase in the REIT on average *ceteris paribus*. An approximately 109.83% departure from the long-run equilibrium is corrected each period (that is, each month). The model diagnostic test results show that the REIT and inflation ECM is free of problems and stable (see Appendix E).

$$\Delta REIT_t = 0.0245 + 0.1268\Delta REIT_{t-1} - 0.2648\Delta GDP_{t-1} - 1.1598ECT_{t-1}$$

(8)

Table 11: The REIT and GDP ECM estimates and diagnostics

Variable	Coefficients	Stad. Error	t-stat	$p-value$
Constant	0.0245	0.3802	0,0644	0.9488
$\Delta REIT_{t-1}$	0.1268	0.0963	1.31678	0.1910
ΔGDP_{t-1}	-0.2648	0.2314	-1.1442	0.2553
ECT_{t-1}	-1.1598	0.1389	-8.3473	0.0000

Diagnostic test	Test statistic value	$p-value$
A: Serial correlation	$Obs\ R-squared = 0.0088$	0.9251
B: Heteroskedasticity	$Obs\ R-squared = 1.9921$	0.5740
C: Normality	$Jarque-Bera\ = 0.9422$	0.6243
Significant test	$F-statistic = 1.3093$	0.2525

Breusch-Godfrey Serial Correlation LM Test
Heteroskedasticity Test: Breusch-Pagan-Godfrey
Normality Test: Jarque-Bera
Wald Test

Source: Appendix D and E

Table 11 reports the estimates with the t-statistic, diagnostic, and significant tests of the REIT and GDP ECM. Model (8) is the estimate of the REIT and GDP long-run and short-run model. There is a significant long-run relationship between the two variables, but GDP has no significant short-run impact on the REIT, although a unit increase in GDP causes a 26.48% decrease in the REIT on average *ceteris paribus*. An approximately 115.98% departure from the long-run equilibrium is corrected each period (that is, each month). The model diagnostic test results show that the REIT and inflation ECM is free of problems and stable (see Appendix D and E).

4.7 CONCLUSIONS

The REIT and GDP show evidence of seasonal variation with no trend. The inflation and interest rate show neither trend nor seasonal variation, while the exchange rate is the only variable with trend variation. Graphically, there is no cointegration between any of the key monetary policy variables and the REIT. Also, neither inflation nor GDP has a significant impact on the REIT, while the interest rate and exchange rate each individually has a significant impact on the REIT.

The Bound test carried out shows that each of the key monetary policy variables and the REIT are cointegrated. Inflation, interest rate, and exchange rate will have an adverse relationship with the REIT, while only the GDP has an advantageous relationship with the REIT.

The null hypothesis that there is no significant correlation between interest rate and the REIT in SA can be rejected, as the p-value is greater than the 5% alpha significant level (see Table 6 and 9). Interest rate has an insignificant negative relationship to REIT in the short-run, but has a significant relationship in the long-run. This suggests that the two variables, that is the REIT and interest rate, are only cointegrated in the long run.

The null hypothesis that there is no substantial relationship between inflation and the REIT in SA cannot be rejected, as the p-value is less than the 5% alpha significant level (see Table 6 and 8). Inflation has an insignificant relationship with REIT in the short run and has a significant relationship in the long run. This suggests that the two variables, that is the REIT and inflation, are only cointegrated in the long run.

The null hypothesis that there is no significant relationship between the exchange rate and the REIT in SA can be rejected, as the p-value is greater than the 5% alpha significant level (see Table 6 and 10). The exchange rate has an insignificant short-run impact on the REIT and a significant long-run impact on the REIT. This suggests that the two variables, that is the REIT and exchange rate, are only cointegrated in the long run.

The null hypothesis that there is no significant relationship between inflation and the REIT in SA cannot be rejected, as the p-value is less than the 5% alpha significant level (see Table 6 and 11). GDP has an insignificant short-run impact on the REIT and a significant long-run impact on the REIT. This suggests that the two variables, that is the REIT and interest rate, are only cointegrated in the long run.

However, only the interest rate and exchange rate have a significant negative causal effect on the REIT based on the ARDL model. This means that as each of these two key monetary

policy variables increase, the REIT value decreases. None of the key monetary policy variables have a significant short-run impact on the REIT based on the ECM. But there exists a significant long-run relationship among each of these variables and the REIT. The REIT-GDP ECM has the highest speed of adjustment, followed by the REIT-interest rate ECM, and finally the REIT-exchange rate has the lowest speed of adjustment. It can therefore be concluded that interest rate and exchange rate are barriers to REIT performance.

CHAPTER FIVE: OVERVIEW OF FINDINGS AND REPERCUSSIONS

5.1 INTRODUCTION

This chapter outlines the methodological (estimation) approach, the conclusions based on the analysis of the data, and the interpretation of the tests conducted.

5.2 SUMMARY OF RESEARCH FINDINGS

The ARDL model is used to evaluate the measurable influence of each primary monetary variable on the REIT. The ARDL Bound test is used to assess whether there is co-integration between each primary monetary policy element and the REIT. Ultimately, the error correction function was calculated on the basis of the results of the ARDL Bounds check. The Wald test is used to test the significant joint and individual impact of each key monetary variable on the REIT.

Each core monetary parameter is identified as being integrated of order one, *I(1)*, while only the REIT is integrated of order zero, *I(0)*. At the level of each key monetary policy variable, the REIT has a significant impact. In other words, there is an undesirable relationship between the monetary variable and the REIT. And this suggests that as the value of each key monetary variable increases, the REIT value decreases. Furthermore, it is only the rate of interest and the exchange rate that have a major negative causal impact on the REIT. Premised on the estimated ECMs, none of the key monetary variables have a significant short-term impact on the REIT. However, there is a significant long-term relationship between the REIT and each key monetary policy parameter.

5.3 CONCLUSIONS AND IMPLICATIONS OF THE RESEARCH FINDINGS

Statistically, the exchange rate and the interest rate are hurdles to the development of the REIT. The decision makers, the SARB and other stakeholders, therefore, need to put in place a strong measure to govern the interest rate charged by the banking institutions. Also, to

attract both local and foreign investors to boost the South African economy, fluctuations in the exchange rate should always be kept at a minimum.

Additional research is needed to examine the mutual relationships between and effect of all these main monetary policy variables on the REIT. It is also worth exploring the effect the REIT has on the South African economy.

REFERENCES

Abdullah, N.A. & Zahari, W.M. (2008). *Performance of Property Listed Companies in Malaysia: 1996-2007.* M.Sc thesis, Universiti Utara Malaysia, Malaysia.

Akinsomi, O., Balcilar, M., Demirer, R. & Gupta, R. (2017). The effect of gold market speculation on REIT returns in South Africa: A behavioral perspective. *Journal of Economics and Finance, 41*, 774-793.

Alias, A. & Soi Tho, C.Y. (2011). Performance Analysis of REITS: Comparison between M-REITS and UK-REITS. *Journal of Surveying, Construction and Property, 2*(2), 38-61.

Allen, M., Madura, J. & Springer, T.M. (2000). REIT Characteristics and the Sensitivity of REIT Returns. *Journal of Real Estate Finance and Economics, 21,* 141-152.

Ambrose, B. W. and P. Linneman, REIT Organizational Structure and Operating. Characteristics, Journal of Real Estate Research, 2001

Amidu, A., Aluko, B.T., Nuhu, M.B. & Saibu, O.M. (2008). Real Estate Security and Other Investment Assets: A Comparison of Investment Characteristics in the Nigerian Stock Markets. *Journal of Property Investment and Finance, 26*(2), 151-161.

Anderson, A. (2015, 23 April 2015). Unlisted funds 'would benefit' from Reit status. *BusinessDay,* Retrieved 03 June, 2015, from https://www.businesslive.co.za/bd/companies/property/2015-04-23-unlisted-funds-would-benefit-from-reit-status/.

Ardakani, O.M., Kishor, N.K. & Song, S. (2018). Re-evaluating the effectiveness of inflation targeting. *Journal of Economic Dynamics and Control*, *90*(C), 76-97.

Aron, J. & Meullbauer, J. (2007). Review of Monetary Policy in South Africa since 1994. *Journal of African Economies, 16*(5), 705–744.

Bansal, R., Kiku, D., Shaliastovich, I. & Yaron, A. (2014). Volatility, the Macroeconomy, and Asset Prices. *The Journal of Finance, 69*(6), 2471-2511.

Battinelli, J. & Reid, J. (2013). *The Impact of Macroeconomic Surprises on Mergers & Acquisitions for Real Estate Investment Trusts*. Honours thesis, Duke University, Durham.

Bernanke, B.S. & Kuttner, K.N. (2005). What Explains the Stock Market's Reaction to Federal Reserve Policy? *The Journal of Finance, 60*(3), 1221-1257.

Bhusal, A., Cruz, V., De Santiago, J., Iddrisu, M., Levesque, E., Longoria, T., Mangelsdorf, K., Mansfield, S., Soria, L. & Weddell, J. (2018). *Multilingual Students in Writing Classes: A*

Guide for Teaching and Learning. Retrieved 19 January, 2020, from http://guidingmultilingualwriters.org/guide/.

Bhuyan, R., Kuhle, J.L., Ikromov, N. & Chiemeke, C. (2014). Optimal Portfolio Allocation among REITs, Stocks, and Long-Term Bonds: An Empirical Analysis of US Financial Markets. *Journal of Mathematical Finance, 4*(2), 104-112.

Bond, S.A., Karolyi, G.A. & Sanders, A.B. (2003). International Real Estate Returns: A Multifactor, Multicountry Approach. *Real Estate Economics, 31*(3), 481-500.

Bordo, M.D. (2010). Monetary policy, history of. In S.N. Durlauf & L.E. Blume (Eds.), *Monetary Economics: The New Palgrave Economics Collection* (pp. 205-206). London: Palgrave Macmillan.

Boshoff, D. & Cloete, C. (2012). Can listed property shares be a surrogate for direct property investment behaviour? *South African Journal of Economic and Management Sciences, 15*(1), 72-93.

Bredin, D., O'Reilly, G. & Stevenson, S. (2007). Monetary Shocks and REIT Returns. *Journal of Real Estate Finance and Economics, 35*(3), 315–331.

Buttimer, R., Jun, C. & Chiang, I.E. (2012). REIT Performance and Market Timing Ability. *Managerial Finance, 38*(3), 249-279.

Capozza, D.R. & Seguin, P.J. (1999). *Focus, Transparency and Value: The REIT Evidence*. Retrieved 03 June, 2017, from http://www.umich.edu/~reecon/restate/faculty/Capozza/Foc0799a.pdf.

Carstens, M. (2018). *Foreign Investment and South African Real Estate Investment Trusts (REITs).* PhD thesis, Stellenbosch University, Stellenbosch.

Carstens, R. & Freybote, J. (2018). The Impact of Introducing REITs on Foreign Investments and Liquidity in South Africa. *Journal of Real Estate Literature, 26*(1), 103-128.

Chang, C., Chou, J. & Fung, H. (2012). Time dependent behavior of the Asian and the US REITs around the subprime crisis. *Journal of Property Investment and Finance, 30*(3), 282-303.

Chang, K., Chen, N. & Leung, C.K.Y. (2011). Monetary Policy, Term Structure and Asset Return: Comparing REIT, Housing and Stock. *Journal of Real Estate Finance and Economics, 43*, 221-257.

Chaudhry, M., Maheshwari, S. & Webb, J. (2004). REITs and Idiosyncratic Risk. *Journal of Real Estate Research, 26*(2), 207–222.

Chen, M., Peng, C.L., Shyu, S. & Zheng, J. (2010). Market States and the Effect on Equity REIT Returns due to Changes in Monetary Policy Stance. *Journal of Real Estate Finance and Economics*, *41*(1), 1-19.

Chen, N., Roll, R. & Ross, S.A. (1986). Economic Forces and the Stock Market. *The Journal of Business*, 59(3), 383-403.

Chen, S. (2007). Does Monetary Policy Have Asymmetric Effects on Stock Returns? *Journal of Money, Credit and Banking, 39* (2/3)*,* 667–688.

Chen, S., Hsieh, C. & Jordan, B.D. (1997). Real Estate and the Arbitrage Pricing Theory: Macrovariables vs. Derived Factors. *Real Estate Economics, 25*(3), 506-523.

Chen, S., Hsieh, C., Vines, T.W. & Chiou, S. (1998). Macroeconomic Variables, Firm-Specific Variables and Returns to REITs. *Journal of Real Estate Research, 16*(3), 269-278.

Chinzara, Z. & Aziakpono, M.J. (2009). *Dynamic Returns Linkages and Volatility Transmission between South African and World Major Stock Markets*. Retrieved 25 October, 2016, from https://ideas.repec.org/p/rza/wpaper/146.html.

Chisadza, C., Dlamini, J., Gupta, R. & Modise, M.P. (2016). The impact of oil shocks on the South African economy. *Energy Sources, Part B: Economics, Planning, and Policy, 11*(8), 739-745.

Chong, W.L., Ting, K.H. & Cheng, F.F. (2017). Impacts of corporate governance on Asian REITs performance. *Pacific Rim Property Research Journal, 23*(1), 75–99.

Clark, A.E. & Daniel, T. (2006). Forecasting South African house prices. *Investment Analysts Journal, 35*(64), 27-33.

Das, S., Gupta, R. & Kanda, P.T. (2010). *Bubbles in South African house prices and their impact on consumption*. Retrieved 25 October, 2016, from https://repository.up.ac.za/handle/2263/14604.

Daud, S.Z., Ali, H.M., Sipan, I. & Wilson, A.J. (2012, 12-13 March). *The Impact of Location Attributes on REITs' Return.* Paper presented at the 3rd International Conference on Business and Economic Research 2012, Bandung, Indonesia.

De Grauwe, P. (2008). Animal Spirits and Monetary Policy. *Economic Theory, 47*(2/3), 423-457.

Delcoure, N. & Dickens, R. (2004). REIT and REOC systematic risk sensitivity. *Journal of Real Estate Research, 26*(3), 237-254.

Devaney, M. (2001). Time-Varying Risk Premia for Real Estate Investment Trusts: A GARCH-M Model, *Quarterly Review of Economics & Finance*, *41*(3), 335-346.

Dimovski, B., Lombardi, L., Christopher, R. & Cooper, B.J. (2016). Australian Real Estate Management and Development companies and women directors. *Property Management, 34*(1)0, 18-28.

Ellis, C., Wilson, P.J. & Zurbreugg, R. (2007). Real Estate 'Value' Stocks and International Diversification. *Journal of Property Research, 24*(3), 265-287.

European Public Real Estate Association. (2012). *Global REIT Survey 2012*. Retrieved 11 September, 2019, from https://prodapp.epra.com/media/EPRA_REIT_2012_GLOBAL_1378989249412.pdf.

European Public Real Estate Association. (2015, 14 September). *Global REIT Survey 2015*. Retrieved 11 September, 2019, from https://prodapp.epra.com/media/EPRA_REIT_2015_GLOBAL_1442307110562.pdf.

Fatnassi, I., Slim, C., Zied, F. & Ben Maatoug, A. (2014). Effects of monetary policy on the REIT returns: Evidence from the United Kingdom. *Research in International Business and Finance*, *32*(C), 15-26.

Feng, Z., Price, S.M. & Sirmans, C.F. (2011). An Overview of Equity Real Estate Investment Trusts (REITs): 1993-2009. *Journal of Real Estate Literature, 19*(2).

FMI. (2010). *Real Estate Investment Trusts: Is the Philippines Ready?* Capital Research: First Metro Investment Corporation.

Franken, M., Bloom, J.Z. & Erasmus, P.D. (2011). Factors That Affect South African Real Estate Price Growth. *Management Dynamics, 20*(2).

Geltner, D.M., Miller, N.G., Clayton, J. & Eighholtz, P. (2007). *Commercial Real Estate Analysis and Investments* (Second ed.). USA: South-Western.

Geske, R. & Roll, R. (1983). The Fiscal and Monetary Linkage Between Stock Returns and Inflation. *The Journal of Finance, 38*(1), 1-33.

Glascock, J.L., Lu, C. & So, R.W. (2002). REIT Returns and Inflation: Perverse or Reverse Causality Effects? *Journal of Real Estate Finance and Economics, 24*(3), 301-317.

Goukasian, L. & Majbouri, M. (2010). The Reaction of Real Estate–Related Industries to the Monetary Policy Actions. *Real Estate Economics, 38*(2), 355-398.

Gupta, R. & Hardik, A. (2018). The impact of unconventional monetary policy shocks in the U.S. on emerging market REITs. *Journal of Real Estate Literature, 26*(1), 175-188.

Gyourko, J. & Linneman, P. (1988). Owner-occupied homes, income-producing properties, and REITs as inflation hedges: Empirical findings. *The Journal of Real Estate Finance and Economics, 1*, 347–372.

Hassan, S., & Van Biljon, A. (2010). The Equity Premium and Risk-Free Rate Puzzles in a Turbulent Economy: Evidence From 105 Years of Data from South Africa. *South African Journal of Economics, 78*(1), 23-39.

He, L.T., Webb, J.R. & Myer, FCN. (2003). Interest Rate Sensitivities of REIT Returns. *International Real Estate Review*, 6(1), 1–21.

Hoag, J.W. (1980). Towards Indices of Real Estate Value and Return. *Journal of Finance, 35*, 569-580.

Hoesli, M. & Lizieri, C. (2007). *Real estate in the investment portfolio.* Report to the Ministry of Finance, Norway (Unpublished). Retrieved 03 June, 2017, from http://centaur.reading.ac.uk/20990/.

Hoesli, M. & Oikarinen, E. (2012). Are REITs Real Estate? Evidence from International Sector Level Data. *Journal of International Money and Finance, 31*(7), 1823-1850.

Huang, C. & Lee, Y. (2009). The Relationship between Oil Price Growth and REIT Returns. *International Research Journal of Finance, 33.*

Hung, C., Chen, M. & Lin, W. (2014). The relationship with REITs and bank loans: Capital structure perspectives. *Finance Research Letters, 11*(2), 140-152.

Ilmanen, A. (2012). *Expected Returns on Major Asset Classes*. Retrieved 25 October, 2016, from https://www.cfainstitute.org/en/research/foundation/2012/expected-returns-on-major-asset-classes.

Johnson, H. (2013). *Selected Essays in Monetary Economics (Collected Works of Harry Johnson).* London: Routledge.

Kabundi, A.N. & Mlachila, M. (2018). *Monetary Policy Credibility and Exchange Rate Pass-Through in South Africa*. Retrieved 19 January, 2020, from https://www.imf.org/en/Publications/WP/Issues/2018/07/30/Monetary-Policy-Credibility-and-Exchange-Rate-Pass-Through-in-South-Africa-46050.

Kantilal, H. (2016). *An analysis of the Real Estate Investment Trust tax regime on the South African property sector*. MComm dissertation, North-West University, Potchefstroom.

Kasai, N. (2011). *Analysis of monetary policy rules for South Africa*. PhD thesis, University of Pretoria, Pretoria.

Kola, K. & Kodongo, O. (2017). Macroeconomic risks and REITs returns: A comparative analysis. *Research in International Business and Finance, 42*, 1228-1243.

Kwon, C.S. & Shin, T.S. (1999). Cointegration and causality between macroeconomic variables and stock market returns. *Global Finance Journal*, *10*(1), 71-81.

Lee, C.L. & Lee, M. (2012). Hedging effectiveness of REIT futures. *Journal of Property Investment and Finance, 30*(3), 257-281.

Lee, C.L. & Lee, M. (2014). Do European Real Estate Stocks Hedge Inflation? Evidence from Developed and Emerging Markets. *International Journal of Strategic Property Management, 18*(2), 178-197.

Liang, Y. & Webb, J.R. (1995). Pricing Interest-Rate Risk for Mortgage REITs. *Journal of Real Estate Research, 10*(4), 461-470.

LIDD Yuangk; short term interest rate in real estate investment trust, 2014 Vol 55-70

Liow, K.H., Zhu, H., Ho, D.K. & Addae-Dappah, K. (2005). Regime Changes in International Securitized Property Markets. *Journal of Real Estate Portfolio Management, 11*(2), 147–165.

Lizieri, C. & Satchell, S. (1997). Property Company Performance and Real Interest Rates: A Regime-switching Approach. *Journal of Property Research, 14*(2), 85-97.

Mangani, R. (2011). Monetary policy, structural breaks and JSE returns. *Investment Analysts Journal, 40*(73), 27-35.

Mattarocci, G. (2014). *Anomalies in the European REITs Market: Evidence from Calendar Effects*. London: Palgrave Macmillan.

Miles, M. & McCue, T. (1984). Commercial Real Estate Returns. *Real Estate Economics, 12*(3), 355-377.

Mohr, P. & Fourie, L. (2004). *Economics for South African students* (Third ed.). Pretoria: Van Schaik.

Mohr, P. & Fourie, L. (2015). *Economics for South African students* (Fifth ed.). Pretoria: Van Schaik.

Mugo :an assessment of the opportunities and challenges facing future introduction of reit, 2013

Naidoo, H. (2014). *The Introduction of REITs to the South African Property Market: Opportunities for Fund Managers*. MM thesis, University of the Witwatersrand, Johannesburg.

Naranjo, A. & Ling, D.C. (1997). Economic Risk Factors and Commercial Real Estate Returns. *The Journal of Real Estate Finance and Economics, 14*, 283–307.

National Treasury. 2015. *Budget Review 2015*. Retrieved 11 September, 2019, from http://www.treasury.gov.za/documents/national%20budget/2015/review/FullReview.pdf

Newell, G. & Peng, H. (2015). The Impact of the Global Financial Crisis on A-REITs. *Pacific Rim Property Research Journal, 15*(4), 453-470.

Newell, G. & Peng, H.W. (2012). The Significance and Performance of Japan REITs in a Mixed-Asset Portfolio. *Pacific Rim Property Research Journal, 18*(1), 21-34.

Newell, G., Lee, C.L. & Kupke, V. (2015). *The opportunity of unlisted wholesale residential property funds in enhancing affordable housing supply*. AHURI Final Report 2015 No. 249. Retrieved 11 September, 2019, from https://www.ahuri.edu.au/research/final-reports/249.

Nittayagasetwat, A. & Buranasiri, J. (2012). Real Estate Investment Performance: The Test of the Impact of Additional Interest Rate Information from CIR Model. *International Journal of Business and Social Science, 3*(12), 134-143.

Ntuli, M. & Akinsomi, O. (2017). An overview of the initial Performance of the South African REITs Market. *Journal of Real Estate Literature, 25*(2), 365-388.

Olanrele, O.O., Said, R. & Daud N. (2015). Setting a Benchmark for REIT Performance in Malaysia. *International Journal of Property Sciences, 5*(1), 31-43.

Omokhomion, I., Egbu, C. & Robinson, H. (2018). Real Estate Investment Trusts (REITs): Management Structure and Performance. *International Journal of Real Estate and Land Planning*, 1, 143-154.

Ong, T.S., Teh, B.H. & Chong, M.P. (2011). A Study on the Performance of Malaysian Real Estate Investment Trusts from 2005-2010 by using Net Asset Value Approach. *International Journal of Economics Research, 2*(1), 1-15.

Ong, T.S., Teh, B.H., Soh, C.H. & Yan, Y.L. (2012). Malaysian Real Estate Investment Trusts: A Performance and Comparative Analysis. *International Journal of Economics and Finance, 4*(5), 73-84.

Oreagba, F. (2010). *Position paper on implementation of REITs in Nigeria (N-REIT)*. Retrieved 03 June, 2017, from https://www.proshareng.com/admin/upload/report/2749.pdf.

Papademos, L. (2009, 14 May). *Monetary policy and the 'Great Crisis': Lessons and challenges*. Speech given at the 37th Economics Conference "Beyond the Crisis: Economic Policy in a New Macroeconomic Environment", Österreichische Nationalbank, Vienna.

Payne, J.E. (2003). Shocks to Macroeconomics State Variables and the Risk Premium of REITs. *Applied Economics Letters, 10*(11), 671-677.

Pesaran, M.H., Shin, Y. & Smith, R.J. (2001). Bounds testing approaches to the analysis of level relationships. *Journal of Applied Econometrics, 16*(3), 289-326.

RebelGroup. 2019. *Case Study 15 – Raising Capital to Regenerate Inner Cities: the Case of TUHF Holdings (Pty) Limited.* Retrieved 19 January, 2020, from http://housingfinanceafrica.org/documents/case-study-15-raising-capital-to-regenerate-inner-cities-the-case-of-tuhf-holdings-pty-limited/.

Republic of South Africa. (1989). *The South African Reserve Bank Act, Number 90. Government Gazette Number 42359*. Pretoria: Government Printer.

Republic of South Africa. (1996). *The Constitution of the Republic of South Africa. Government Gazette Number 17679*. Pretoria: Government Printer.

Rigobon, R. & Sack, R. (2003). Measuring the Reaction of Monetary Policy to the Stock Market. *The Quarterly Journal of Economics, 118*(2), 639-669.

Roberto Rigobon and Brian Sack. Movements in the stock ... to measure the reaction of monetary policy to the stock market. We find a ... Technology. The Quarterly Journal of Economics, May 2003

Sibanda, M. & Mhlanga, R. (2013). The interaction between property returns and the macroeconomy: Evidence from South Africa. *International Journal of Business and Social Research, 3*(4), 146-152.

Simo-Kengne, B.D., Bittencourt, M. & Gupta, R. (2012). House Prices and Economic Growth in South Africa: Evidence from Provincial-Level Data. *Journal of Real Estate Literature, 20*(1), 97-118.

Simpson, M.W., Ramchander, S. & Webb, J.R. (2007). The Asymmetric Response of Equity REIT Returns to Inflation. *Journal of Real Estate Finance and Economics 34*(4), 513-529.

Sirmans, G. (1987). The Historical Perspective of Real Estate Returns. *The Journal of Portfolio Management, 13*(3), 22-31.

Soko, M. (2016, 25 February 2016). How to fix SA's labour market. *Finweek*. Retrieved 03 June, 2017, from https://www.fin24.com/Finweek/Opinion/how-to-fix-sas-labour-market-20160225.

South African Real Estate Investment Trust Association. 2013a. *What is SA REIT?* Retrieved 25 June, 2013, from http://www.sareit.com/101_WhatIsReits.php.

South African Real Estate Investment Trust Association. 2013b. *SA REIT brochure*. Retrieved 25 June, 2013, from http://www.sareit.com/docs/SA_REIT_brochure.pdf.

South African Real Estate Investment Trust Association. 2013b. *SA REIT brochure*. Retrieved 25 June, 2016 from http://www.sareit.com/docs/SA_REIT_brochure.pdf.

South African Real Estate Investment Trust Association. 2013b. *SA REIT brochure*. Retrieved 25 June, 2018, from http://www.sareit.com/docs/SA_REIT_brochure.pdf.

South African Reserve Bank. (n.d.). *About us.* Retrieved 2016, from https://www.resbank.co.za/AboutUs/Pages/About%20Us-Home.aspx.

South African Reserve Bank. (n.d.). *Monetary policy*. Retrieved 03 July, 2011a, from https://www.resbank.co.za/MonetaryPolicy/Pages/MonetaryPolicy-Home.aspx.

South African Reserve Bank. (n.d.). *Monetary policy*. Retrieved 03 July, 2011b, from https://www.resbank.co.za/MonetaryPolicy/Pages/MonetaryPolicy-Home.aspx.

South African Reserve Bank. (n.d.). *Monetary policy*. Retrieved 03 July, 2019, from https://www.resbank.co.za/MonetaryPolicy/Pages/MonetaryPolicy-Home.aspx.

Standish, B., Lowther, B., Morgan-Grenville, R. & Quick, C. (2005). The determinants of residential house prices in South Africa. *Investment Analysts Journal*, *34*(61), 41–48.

Swanson, Z., Theis, J. & Casey, K.M. (2002). REIT Risk Premium Sensitivity and Interest Rates. *Journal of Real Estate Finance and Economics*, *24*(3), 319-330.

Tily, G. (2007). *Keynes's General Theory, the Rate of Interest and 'Keynesian' Economics: Keynes Betrayed*. New York, NY: Palgrave Macmillan.

Titman, S. & Warga, A. (1989). Stock Returns as Predictors of Interest Rates and Inflation. *Journal of Financial and Quantitative Analysis, 24*(1), 47-58.

Van Wyngaard, D. (2019). *An analysis of monetary policy and its effect on inflation and economic growth in South Africa*. MCom dissertation, North-West University, Potchefstroom.

Wiley Online Library ... Real Estate Economics · Volume 36, Issue 2 · Real Estate Economics. REIT Dividend Determinants: Excess Dividends and Capital Markets.

BEN S. BERNANKE KENNETH N. KUTTNER Wiley Online Library ... What Explains the Stock Market's Reaction to Federal Reserve Policy? The journal of finance 2005:

William Hardin III ... Matthew D. Hill ... First published: 01 May 2008 ... above mandatory requirements in real estate investment trusts (REITs) are evaluated.

Yong, J., Allen, D.E. & Lim, L.K. (2009, 13-17 July). *AREIT returns from 1990-2008: A multi-factor approach*. Proceedings of 18th World IMACS Congress and MODSIM09 International Congress on Modelling and Simulation, Australia, Edit Cowan University.

Zhou, J. & Anderson, R. (2012). Extreme Risk Measures for International REIT Markets. *The Journal of Real Estate Finance and Economics, 45*(1), 152-170.