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UNIVERSITY OF THE WITWATERSRAND

Drivers of direct commercial real estate returns: Evidence from South Africa

Research Report

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761573

A research report submitted to the University of the Witwatersrand, Faculty of Engineering and the Built Environment, School of Construction Economics and Management in partial fulfilment of the requirements for a Master of Science degree in Building.

March 2016

Updated August 2016

DECLARATION

I declare that this report is my own work submitted in partial fulfilment of the requirements of the degree of Master of Science in Building at the School of Construction Economics and Management in the University of the Witwatersrand, Johannesburg. It has not been submitted before for any degree or examination in any other University.



Nikiwe Mkhabela

18 March 2016

ACKNOWLEDGEMENTS

I would like to express my gratitude to my supervisor, Dr Kola Akinsomi for his time, guidance and insights in my research. A special thanks to my husband, Prince Khandabila and son, Smilesihle Khandabila for their love, support, understanding and allowing me time to focus on my studies. I am grateful to my parents and my brothers and sisters for their love, motivation and prayers. I would also like to thank my employer, STANLIB and my managers; Alex Phakathi and Amelia Beattie for funding my studies, leadership and unwavering support.

Thank you.

DEDICATIONS

This is dedicated to my father and mother Sam and Esther Mkhabela, who love studying but did not have the opportunity to study further their life. They worked very hard to ensure that all their children have the opportunity to go to school, follow their dreams and breakaway from poverty.

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ABSTRACT

Background – The South African (SA) real estate sector lacks transparency and there is limited research and robust data on the performance drivers of underlying commercial real estate assets in investment portfolios as opposed to the residential and listed property sectors in the SA context. SA real estate competes internationally and the rapid growth in emerging countries is creating new real estate players and growing competition for real estate investment opportunities (PwC, 2015). It is important for investors in the industry to understand the factors that affect the sector's performance to be able to plan, review investment strategies, allocate resources efficiently, understand past trends and manage future risks.

Purpose - The purpose of the study is to understand the performance of the SA direct commercial real estate sector and identify the key factors that drive the sector's total returns in the country. Literature review is conducted to identify factors that drive direct commercial real returns in other countries and the identified drivers are tested for relevancy in the SA market. The study applies SA annual commercial real estate returns published by the International Property Databank (IPD) over the past 20 years, from 1995 to 2014, as dependent variables.

Findings - Using Pearson's correlation analysis, the study tests for correlations between CRE returns and independent variables; macroeconomic indicators (exogenous factors) and property performance variables (endogenous factors). The study finds gross rental escalation and real Gross Domestic Product (GDP) growth rates to be highly positively correlated with direct real estate returns. The results provide evidence that gross rental escalation and real GDP have high explanatory values of commercial real estate returns. The study concludes that rental income growth and economic growth are the key drivers of direct commercial real estate total returns.

Value - The findings provide evidence of the correlations that exist between exogenous, endogenous variables and CRE returns and assist in understanding the behaviour of the direct commercial real estate sector. This study sets a basis for real estate investments analysis and the results can be applied in asset allocation strategies by guiding investors on the direction CRE returns could take based on performance of the widely published macroeconomic and property performance variables under study.

Limitations - The limitation to this study is that the dependent variables, SA annual commercial real estate returns, has time series data of 20 variables in its existence and this has restricted the quantitative methodology choice, hence the use of correlation analysis to quantitatively analyse the relationships that exist between CRE returns and the exogenous and endogenous factors. Further research in the topic would include regression analysis to test for causality. This study has implications on real estate investment decision making and contributes to real estate market literature in SA.

1. INTRODUCTION AND RESEARCH PROBLEM

1.1 Background

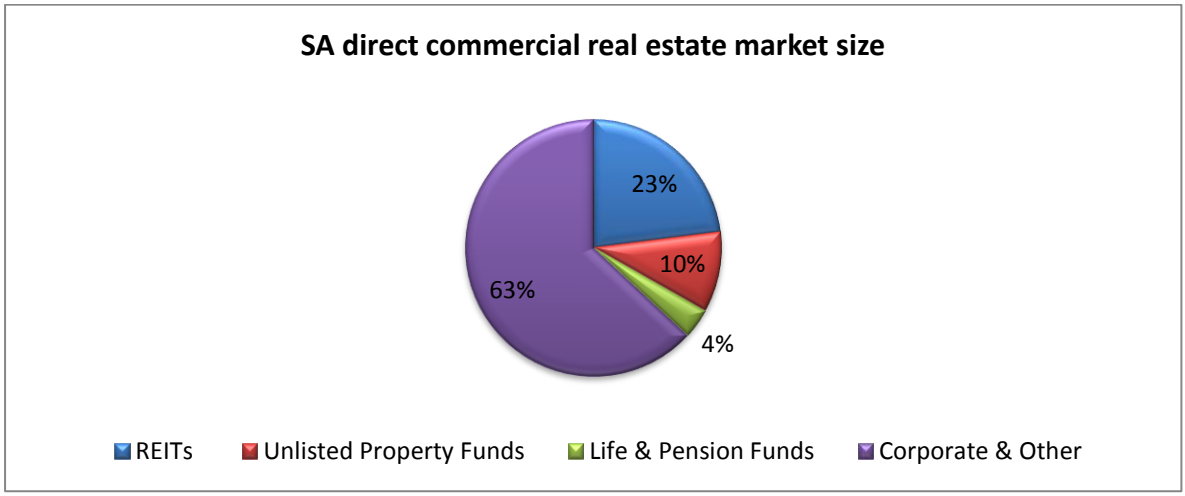
Investors make investments to get a return at the end of the investment period. There are various investment classes with different levels of risk, yielding different returns over an investment period. The economy fluctuates and real estate markets, like any other market, are dynamic. Direct commercial real estate (hereafter referred to as CRE) returns are characterised by fluctuations and cyclical behaviours caused by various factors and the different CRE types have different performance traits. The CRE market lacks transparency and frequent performance information compared to the mostly tracked and researched Real Estate Investment Trusts (REITs) and stock markets in SA (Boshoff, 2013).

Macroeconomic information and some property performance variables are widely reported on but what do they really mean to CRE investments and how can property professionals and investors use the available information in making real estate investment decisions? This report investigates the factors that are correlated with direct CRE returns in SA. Real estate is a basic human need and it provides shelter and space for general trade and commercial activities to take place. The sector does not exist in a vacuum and its performance is linked to the performance of the economy and capital markets (Baum, 2009).

Extensive body of literature exist in exploring factors that explain REITs, listed stocks and bonds total returns. Past literature in SA have examined the listed markets and performance of the residential property sector in South Africa (Akinsomi et al., 2015 & 2016 and Sibanda and Mhlanga, 2013). The performance of the Broad Based Black Economic Empowerment compliant listed property firms in South Africa. Journal of Property Investment & Finance, 34(1) and none have statistically examined the performance of the country's direct real estate returns using the IPD SA annual returns index.

Real estate has a significant contribution to the SA economic activity and in 2014; it contributed 5.15% of economic activity in the country (Boshoff, 2014). The commercial real estate market in SA is worth about R1,293 trillion which is approximately 30% of the total SA real estate sector (MSCI, 2015). The SA CRE market attracts local and international public and private investors such as life and pension funds, financial institutions, retailers, property developers and syndications. Some of the major role players in the SA CRE market are listed property funds, amongst others; Growthpoint, Redefine, Hyprop, Resilient, etc. and unlisted property funds, for example; Public Investment Corporation (PIC), Liberty Property Portfolio, Pareto, Old Mutual Properties and others.

Figure 1: SA Direct commercial real estate ownership by value



Data source: MSCI 2015

Figure 1 indicates the SA CRE market size by ownership type. Corporate real estate and REITs have the highest exposure to CRE and life and pension funds have the lowest exposure to CRE investments but some of the country's biggest shopping centres and iconic offices.

Of the R1,293 trillion SA commercial real estate value, the retail sector has the highest allocation at R534 billion (bn) which is 42% of the total CRE value, R357bn (28%) for offices, R231bn (22%) for industrial with the hotels and other properties having the lowest allocation at R74bn (6%) and R20bn (2%) respectively as indicated in Figure 2 below.

This study focuses on the performance of the underlying CRE in real estate funds or portfolios, both listed and unlisted. CRE refers to income producing properties; retail, office and industrial properties in SA. Real estate performance is measured by total return which is a sum of capital growth and income return over a period of time. Investment exposure to commercial real estate can be achieved through direct ownership of real estate assets or through owning shares in Real Estate Investment Trusts (REITs).

Properties are unique and so are investors but the common goals in real estate investments are to gain profits in a form of returns and diversify risks. It is essential for investors to know the factors that affect the sector's performance to make informed investment selections for the required level of risk. Both direct and listed property investments should provide investors with the required rate of return over the investment period (Baum, 2008 and Georgiev, et al. 2003).

Motivation of the study

The aim of aim of this study is to understand the dynamics of the South African direct real estate market. It is important to understand if the South African real estate market is homogenous or heterogeneous. The heterogeneity of the South African direct real estate market is currently unknown. This would aid fund managers to make better informed decisions.

There is limited research and publications on the performance drivers of the underlying commercial real estate assets in investment portfolios as opposed to the residential and listed property sectors in the South African context. The SA direct commercial real estate sector lacks transparency and frequent performance measurement data for analysis which may be the reason for the limited public research in the market. SA real estate competes internationally. The rapid growth in emerging countries is creating new real estate players

and growing competition for real estate investment opportunities (PwC, 2015). It is important for investors in the industry to understand the factors that affect the sector's performance to be able to plan and revise investment strategies, to allocate resources efficiently and to understand past trends and manage future risks.

Direct commercial real estate returns (CRE) are characterised by fluctuations and cyclical behaviours caused by various factors and South Africa being an emerging market lacks transparency and has limited research on the factors that drive the returns. Investments in emerging markets are often riskier than in developed markets and the quality of policies; political stability and governance in emerging markets have been found to be related to CRE market risk (Kumbirai & Webb, 2010). Developed markets generally have discerned CRE investments and equity market risk due to stable and well established economies, policies and regulations (Mittnik et al., 2015 and Lieser & Groh, 2014).

Direct real estate performance differs per country and the South African Real Estate sector is believed to compete internationally. Figure 2 below shows total returns for various countries, developed and emerging markets, in the IPD Global Annual Property Index from the year 2012 to 2014.

Figure 2: Direct real estate annual returns in country currency - 2012 to 2014



The variations of the returns across the different countries imply that the factors that affect the performance of the real estate sector may be different per country. In 2014, Ireland posted the highest total return, followed by the United Kingdom and South Africa as shown in Figure 2. Although South Africa's 2014 total return was higher than most countries' returns, it had declined from 2012 and 2013 whereas the trend was different for other countries.

The study seeks to use data that are widely publicised such as the gross domestic product (GDP), inflation rate, interest rates, vacancy rates, market rentals etc., to provide evidence of the key drivers of CRE returns in SA for various stakeholders in the real estate sector to understand the relevancy and the applicability of the information on investments decisions and analysis.

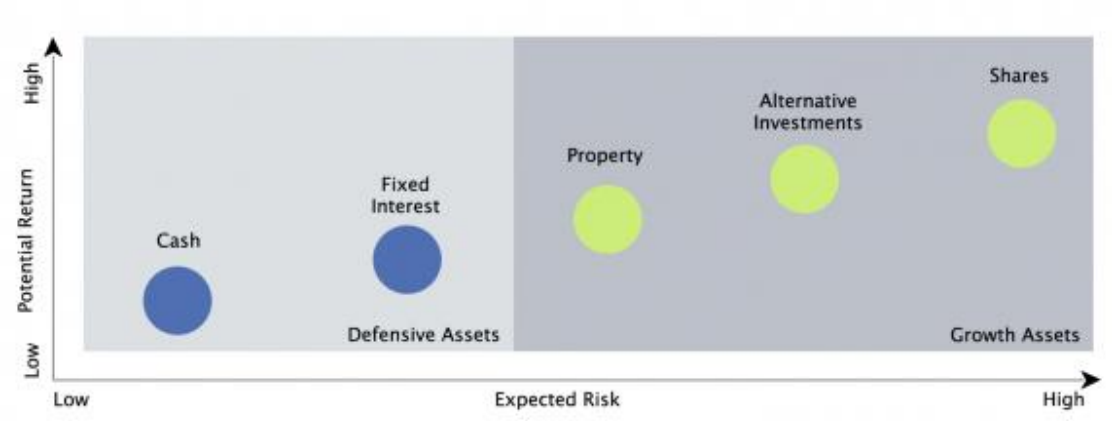
Why direct commercial real estate?

Since commercial property in South Africa plays a major role in the country's economic and investments activity and contributes about 5% to the country's economic activity, (Boshoff, 2014), sustainable performance of the sector is vital to stimulate the economy's growth; therefore, investors need to make informed investment and asset allocation decisions for optimal performance through peaks and troughs of business cycles (Grover and Grover, 2013).

Investors ultimately invest in real estate to earn returns that compensate for the period of time it takes the investment to deliver the required rate of return, the expected rate of inflation and the anticipated risk levels (Brown and Reilly, 2009). Real estate investments are alternatives to stocks, bonds, cash and other types of investments and in a multi-asset portfolio; real estate can be a risk diversifier, inflation hedge offering stable cash flows overtime (Hudson-Wilson, et al. 2005). Figure 2 shows the predicted levels of return per

asset class based on the perceived risk. Real estate offers higher returns at lower risk levels compared to alternative investments and shares.

Figure 3: Asset classes predicted return versus perceived risk



Source: (SuperSavvy, 2013)

A well-chosen property portfolio has the potential to deliver favourable returns and in order to maximise returns on commercial property investments; investors must invest in the right properties, at the right price, right time in the property cycle and right location. The CRE market has no one-size-fits-all investment strategy. Versatile processes and analysis should be conducted in investment selection and to improve understanding of property performance and the drivers of total return on investments when making property investment decisions, it is important to study different appraisal models taking into account factors such as market rent expectations, vacancy rates, market yield and capitalisation rates (Öhman et al, 2013).

Commercial real estate is an important component of the wealth of nations and they house most business operations (Karakozova, 2005). CRE investment involves the acquisition and management of actual physical properties or investing in an unlisted property company. Direct commercial property investments are generally fixed, illiquid, long term capital intensive investments and are characterized by low transparency and heterogeneous transactions (Georgiev, et al. 2003). It is important for investors in the direct commercial property sector to understand the drivers of commercial property returns when conducting

investments analysis in order to make informed investment and asset allocation decisions. The lack of transparency in the CRE sector may result in potential distorted information for investment decision making. Shimizu (2014) studied the reliability and distortion of information available to investors in the Japan commercial property market and found that considering property investment returns estimates based on asset market information only can lead to poor investment decisions and this confirms the need for the study.

Direct property performance is measured by total returns and understanding the key factors that drive the commercial property sector is important in performing assessments of potential investments. There is limited understanding of performance drivers of direct commercial property as opposed to the residential property sector and listed property returns in the South African context. Low transparency and unavailability of frequent transaction information in the direct commercial property sector may be a cause for the limited research on the subject.

It is crucial that investors in direct commercial property understand the drivers of the commercial property returns when conducting investments analysis in order to make informed investment decisions and put together asset allocation and management strategies that optimize and sustain returns. Lack of understanding of the drivers of commercial real estate returns may negatively affect investments selection and asset allocation decisions and consequently compromise the profitability of investments. Knowledge of the factors that drive sector returns would help investors forecast performance by studying historic trends and behaviours (Svets, 2010). Understanding of the factors that affect CRE returns may assist investors in constructing well diversified property portfolios of good quality assets for optimal capital and income growth (Macgregor and Gregory, 2003).

The drivers to be tested in the study are changes in macroeconomic variables such as GDP movements, employment rate, inflation, interest rates and property performance aspects such as rental growth rates, vacancies, capitalisation rates and capital value growth rates and their impact on commercial property returns (proxy) as identified in studied by Svets

(2010), De Wit (2003), Groh (2014), Morawski (2014), Matysiak (2011), Huston (2014), Reddy et al. (2014), etc.

1.2 Research objectives

The objectives of the study are to:

- Understand the performance dynamics of the SA direct commercial real estate sector;
- Statistically identify the key factors that drive the sector's total returns in the country.
- Determine if the factors that affect the national commercial real estate returns are the same across different commercial real estate types in different geographic regions in the country.
- Contribute to the SA real estate literature and set a basis for further research and analysis using direct real estate total returns indices.

Literature suggests that direct real estate returns and macroeconomic indicators; GDP, inflation rates and unemployment rates are highly correlated. This stems from research from other countries, mainly developed markets such as the United Kingdom, United States of America and European markets. The study will statistically test for relationships between macroeconomic indicators, property performance variables and the direct commercial real estate returns as measured by the International Property Databank (IPD) over the past 20 years from 1995 to 2014.

This study focuses on performance of the underlying or direct commercial real estate assets (CRE) in property funds both listed and unlisted and the findings would assist investors and interested stakeholders in understanding of the behaviour of the direct commercial real estate sector returns and provide a basis for property investments analysis and asset allocation decisions at different property and economic conditions.

1.3 Research problem

There is widely available data on the performance of the economy (GDP, inflation, interest rates, employment rates, etc.) mainly reported by Stats SA and some property performance factors such as vacancy rates, average rentals and cap rates mainly reported by the South African Property Owners Association (SAPOA) and Rode's Report but there are limited reports documenting the links between these factors and the underlying commercial real estate returns. SA is regarded as an emerging market and investments in emerging markets are often riskier than in developed markets (Kumbirai & Webb, 2010); the quality of policies, political stability and governance in emerging markets have been found to be related to CRE market risk. Developed markets generally have minimal CRE investments and equity market risk due to stable and well established economies, policies and regulations (Mittnik et al., 2015 and Lieser & Groh, 2014). For successful investments, it is critical for investors to have an understanding of the factors and trends that affect performance of the sectors they invest in in a country (Baker and Chinloy, 2014).

Due to the lack of research on the subject in the SA real estate market, investors and possible new investors may not be aware of the drivers of CRE returns and this may affect investment decisions, strategies and management of real estate portfolios.

CRE returns are characterised by fluctuations and cyclical behaviours caused by various factors and the different CRE types have different performance traits. The CRE market lacks transparency and frequent performance information compared to the mostly tracked and researched REITs and stock markets in SA (Boshoff, 2013). CRE return characteristics differ to some extent from REITs and general stock market returns due to the different performance characteristics and valuation methodologies. REITs and listed stocks are highly liquid and volatile investments. Their market prices and performance are based on investor sentiments on the future performance of the investments (Cotter & Roll, 2015).

The research will contribute to literature in CRE and provide statistical evidence of the factors that drive CRE returns by analysing the relationships between the IPD SA annual

returns index, economy and property performance factors in SA over two decades. It will give investors an indication of how CRE returns are impacted by changes in economic and property specific variables over cycles.

1.4 Research questions

The study aims to answer the following questions:

1. What are the drivers of direct commercial real estate total returns? Morawski (2014), Matysiak (2011), Huston (2014), Reddy et al. (2014), etc.

2. How do the drivers of direct commercial real estate total returns differ across regions and the different commercial property types (Retail, Office and Industrial)? De Wit (2003), Kohlert (2010), Hin et al., (2010), etc.

1.5 Research hypotheses

The study has been based on the following hypotheses derived from literature review that has analysed drivers of CRE returns in various countries:

Hypothesis 1

Direct commercial real estate total returns are positively correlated to growing rentals (rental escalation rate), capital value (fund size) and economic growth (GDP) at national, property type and regional level.

Hypothesis 2

Direct commercial real estate total returns are negatively correlated to vacancy rate, cap rates, inflation, unemployment and prime interest rates at country, property type and regional level.

1.6 Practical implications of the study

Understanding of the drivers of CRE returns will benefit investors and fund managers in investment decision making, asset allocation, portfolio diversification and active asset management for the best possible returns at any point in the property cycle.

Real estate investors need to know the factors that affect the direct assets they invest in, the risk, significance and the direction of the relationship so that they can respond accordingly during different cycles in the economy.

1.7 Conceptualisation

The direct commercial property sector is a significant contributor to the South African economy. Asset selection, investments timing and active asset management are crucial to the success of the sector and investors in this sector need to be informed of the factors that drive returns when conducting investments analysis in order to make informed investment decisions.

1.8 Limitations of the study

The study focuses on South African professionally managed direct commercial real estate investments being retail, office and industrial properties covered by the IPD South Africa Annual Property Index. IPD aggregated annual returns, vacancy rates, capitalisation rates, market rentals and capital values are used and no specific property fund data is assessed.

The IPD data used for the dependent variables in the study provides 20 observations which is limiting on the statistical method selection for the research. SA total returns for direct commercial real estate are reported by IPD on an annual basis and were compiled in the country from 1995.

1.9 Definitions of keywords

Term	Description
Investor	Public or private entities, asset managers, fund managers, property developers, potential new investors, etc.
IPD	Investment Property Databank (also known as MSCI) a company that analyses property performance and produces indices and market benchmark data.
Total return	Total return derived from capital growth and income return, as defined by IPD where capital growth measure the valuation uplift of real estate and income return refers to the net income receivable as a percentage of capital employed.
CRE	Direct commercial real estate being retail, office and industrial properties.
Direct real estate	The underlying (physical) real estate assets.
Rate/m²	Measure per square metre.
Endogenous factors	Property specific performance variables such as vacancy rates, rentals, escalation rates, capitalisation rates, capital values and fund sizes.
Exogenous factors	Macroeconomic performance indicators such as the gross domestic product, inflation, unemployment and interest rates.

1.10 Assumptions

The study assumes that the IPD data sample is representative of the SA direct commercial real estate market for conclusive findings to be based on. The IPD data covers 67% of professionally managed direct commercial real estate in the country (IPD, 2015), comprising of 57% retail, 28% office and 14% industrial real estate.

1.11 Research structure

The study has six chapters as indicated in the table below.

Table 1: Research structure

Chapter 1	Introduction and objectives
Chapter 2	Literature review
Chapter 3	Research methodology
Chapter 4	Data selection and specification
Chapter 5	Data analysis and explanation of results
Chapter 6	Conclusion

Chapters 1 & 2 introduce the research subject and literature review. The study develops research hypotheses and identifies factors that have been found to have a relationship with CRE returns in other countries from literature review. To get evidence from SA, the main factors that have been identified to have a relationship with CRE returns are statistically analysed using correlation coefficient methods, to measure the strength of the correlations between that exists between CRE returns and the identified factors (Chapters 3 to 5). Chapter 6 provides a conclusion based on the factors that have significant correlations with CRE in SA.

1.12 Ethical Considerations

The study has been carried out in an ethical manner according to the University of the Witwatersrand's ethics rules and regulations. The study's sample mainly consist of IPD aggregated data and economic data available to the public on Stats SA and the International Monetary Fund (IMF), World Economic Outlook Database. No specific property or individual fund data has been used.

Consent has been obtained for MSCI for the use of the IPD SA Annual Property Returns Index. The report is properly referenced and plagiarism is ruled out.

2. LITERATURE REVIEW

There is limited research on the drivers of direct commercial property total returns as opposed to the residential property and listed property (REITs) market returns in the South African context. Low transparency and unavailability of frequent transaction information in the direct commercial property sector may be a cause for the limited research on the subject. In SA, direct commercial property returns indices were composed from 1995 by IPD (International Property Databank) and academic literature has not yet used the IPD data for research as the data period has not been long enough to conduct regression models and make conclusive findings. As at December 2014, the IPD annual property index covered 67% of the professionally managed direct commercial property funds in the country (IPD, 2014). Research based on the IPD total returns analysis would be beneficial to investors in making informed investments decisions based on local evidence rather than international studies alone.

Most recent studies in Africa focus on factors that affect the residential property market. Sibanda and Mhlanga (2013) studied the interaction between residential property returns and interest rates, inflation and disposable income in SA using a vector autoregressive model to establish the relationships among the variables and found that residential property returns are largely influenced by changes in macroeconomic variables, inflation and short-term interest rates in the short run and by disposable income in the long-run. Disposable income and interest rates differentials were found to strong explanatory power on residential property returns.

Ojetunde et al. (2013) studied the interaction between the Nigerian residential property market and the macroeconomy and found that macroeconomy explains 28% of variations in residential property rents and returns with GDP being the major contributor of the variation at 16% with interest rates accounting for 10% of the variations. The balance of the variations, 72%, was accountable to microeconomic impacts which consequently affect property performance specific factors.

Risk exposure, values and yields for direct commercial real estate are generally higher than those of residential property (Kan et al., 2004). In SA, not many property funds have remarkable residential property complement. Residential property accounts for about 2% of professionally managed funds in SA (Anderson, 2015). The drivers of residential property returns in SA may be different from those of the commercial property sector which the study is aiming to identify.

2.1 Behaviour of direct commercial property returns

Direct commercial property returns are characterised by fluctuations and cyclical behaviours and knowledge that commercial property market returns are nonlinear can help understand the behaviour and movement of real estate returns and forecasts (Liow & Webb, 2008). Grover and Grover (2013) in their study to determine whether property cycles are caused by exogenous or endogenous shocks reported that a series of property cycles of different durations exist and that past academic literature and empirical studies recognized the existence of property cycles but no conclusive explanation of the drivers of the property cycles has been documented and whether the cycles are generated from their exogenous shocks or endogenous causes. Grover and Grover (2013) concluded that further research is required in the different property sectors like retail, leisure and industrial property to unpack the real causes of property cycles and this affirms the need for studying the drivers of commercial property returns to understand how property cycles impact returns.

Plazzi (2008) investigated the cross-sectional dispersions of commercial real estate returns and net rental growth rates on U.S. metropolitan areas and found commercial property returns to be fluctuating counter-cyclically. The study also found that cross-sectional returns dispersions respond irregularly to economic shocks. Commercial property market returns are characterised by fluctuations and cyclical behaviours caused by exogenous and endogenous factors and the different commercial property types have different performance traits and returns. Wheaton (1999) and Macgregor (2003) confirmed that there are commonalities in direct property returns across regions and sectors and the

returns are influenced by factors such as interest rates, bond yields, inflation and capital markets.

2.2 Drivers of direct commercial real estate returns

Performance of the commercial property sector is linked to the performance of the economy and capital markets (Baum, 2009). Baum (2009) identified the following factors to have an influence in total returns of direct commercial real estate:

- Depreciation – physical deterioration and obsolescence of properties over time.
- Cashflow – sustainable income generated net of operating costs
- Supply and demand – supply is impacted by planning regulations and demand is driven by macroeconomic activities
- Valuations – returns of properties are affected by valuation methodology applied and valuer sentiment.

Lieser & Groh (2014) studied the determinants of international commercial real estate investment by exploring how socio-economic, demographic and institutional characteristics affect commercial real estate investment activity. The study was done over a period of 9 years, from 2000 to 2009 in 47 countries. The study found economic growth, demographic changes, political and socio-cultural factors to have an impact in real estate investment performance and returns.

Morawski (2014) conducted a similar study to the subject research where the performance drivers of German unlisted institutional property funds were analysed using panel regression analysis on IPD returns and considered the impact of fund size, leverage, liquidity, management costs, geographic and sector factors on returns over a period of five years from 2006 to 2010 covering three property cycles; boom phase from year 2006 to 2007, decline phase from 2008 to 2009 and recovery phase in 2010. The results of the study indicated that there are remarkable differences in the drivers of returns over the different

property cycles. Drivers of the 2008 to 2009 boom phase (where leverage and global portfolio allocation positively affected returns and allocation to German funds negatively affected the returns) were different from the 2010 upturn where local allocation and allocation across all property types had a positive impact on returns whilst over allocation in retail negatively impacted the returns. With regards to sector allocations, Morawski (2014) found that during the bust phase, office focused funds underperformed other property types.

To determine factors that drive total returns of non-listed real estate funds across sectors and countries, Fuerst & Matysiak (2009), using panel data to analyse performance of large funds, found level of gearing, net asset value (size of fund) and style of fund to have an impact on total returns for non-listed real estate funds. In another similar study, Matysiak (2011) analysed European non-listed property funds using panel data over a period seven years to determine the drivers of total returns on commercial property funds across all sectors and found economic activity, geographic allocation, property sector diversification, fund sizes and investment styles to be important factors in performance of direct unlisted property portfolios. The studies by Fuerst & Matysiak (2009 & 2011) did not analyse performance drivers of the underlying properties in the funds but specifically analysed the funds' performance. To understand performance of a property fund, it is important to study the performance of the underlying properties as they ultimately drive the funds returns.

Crowe et al. (2012) investigated the impact of monetary and macro-financial stability on the performance of real estate over real estate booms and busts. The study found that monetary policies and macro-financial tools such as limits on loan-to-value ratios have a remarkable direct impact on performance of the direct real estate market and these factors often lead real estate cycles as the vast majority of direct real estate activity (investment, acquisitions, developments, etc.) involve borrowing of funds. Property taxes were also found to have a relationship with direct real estate returns.

To unpack the impact of endogenous factors on direct real estate returns, Chau & Yiu (2012) investigated the impact of rental growth escalation (rental escalation rate) on direct and

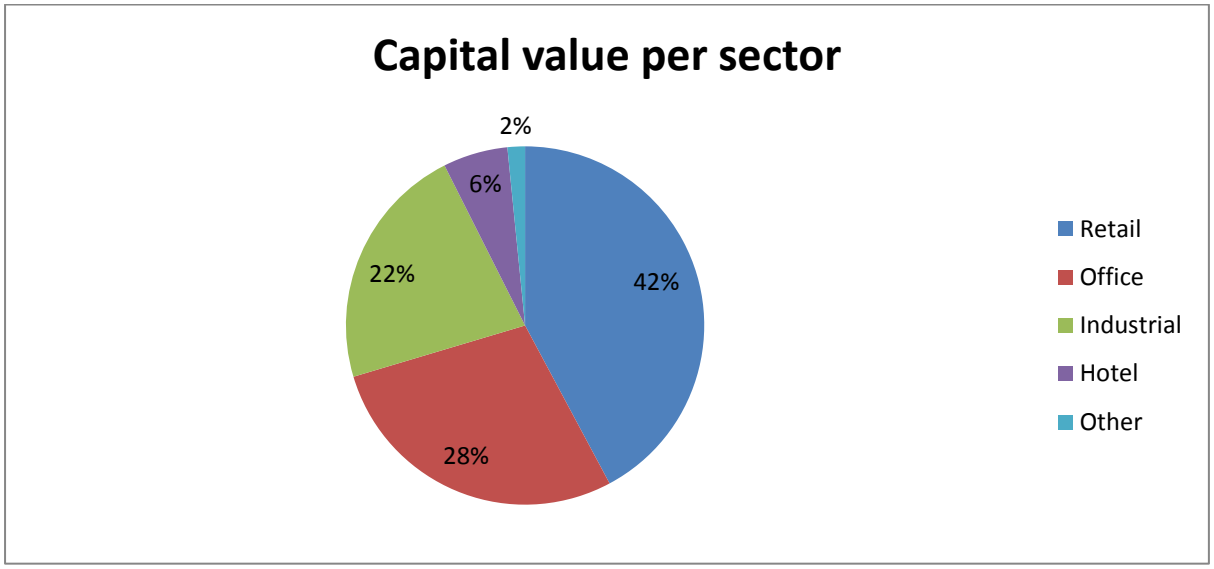
listed real estate returns in Hong Kong. Using Granger causality test, Gordon Growth Model and regression tests of time-series data, the study found that the expected rental growth rate, not the actual rental, lead change in real estate asset price consequently impacting total returns of direct commercial real estate. The study further tested for relationships between interest rate spread and direct real estate total return and found total returns to be positively correlated to the changes of spot rent and expected rental income growth and negatively correlated to interest rate and its term structure movements.

Real estate valuations play major role in the determination of total returns. The valuations take into account property income and capitalisation rates (cap rates). Cap rates are influenced by capital markets and valuers sentiments. According to Chaney and Hoesli (2012), direct commercial real estate returns have a relationship with cap rates and vacancy rates and investors tend to be concerned with the cost of capital than valuations, linking cap rates to capital markets. The higher the vacancy rate for a property, the lower the income generated and the higher the cap rate thus leading to a lower valuation and consequently a lower return.

2.3 Are the drivers of direct commercial property total returns the same across different commercial property sectors?

The study seeks to identify the drivers of commercial real estate returns per sector to understand what informs sector and asset allocation decisions in real estate investments. Most real estate funds, listed and unlisted, tend to take an overweight position in retail properties. As indicated in figure 2 below, 42% of South Africa's commercial property by value is retail, followed by office at 28%, industrial at 22% with hotels and other property types at 6% and 2% respectively.

Figure 4: SA direct commercial real estate value per sector



Data source: MSCI 2015

To understand the impact and relationships of fundamental factors that drive retail property returns, Svets (2010) investigated the impact of macroeconomy and global investment market factors in the UK retail property market. Using correlation analysis to study the components of real estate total returns (rentals and yield), the study found rents to be significantly positively correlated to short term interest rates, disposable income, consumer confidence index and inflation which consequently affect total returns. A negative correlation was recorded between retail rental growth and the unemployment rate change suggesting that consumer spending power is impacted by unemployment levels. The study found negative correlation between cap rates and rental growth. Investors expecting sustainable income growth can settle for lower yields (cap rate) and pay more for the investment properties.

De Wit (2003) studied the drivers of direct office real estate returns by studying the relationship between economic growth, district specific factors and commercial property market performance on a global level. The study tested for correlations between changes in GDP, capital values, rents, vacancy rates, unemployment rates and total returns and found that positive correlations exist between GDP, capital values and rentals in direct office properties which proves the nexus that the higher the economic growth the higher the returns. The study also found that a significant positive relationship exists between current

return and previous period's return and that economic growth prospects and supply and demand determine attactiveness of offices as an investment. The unemployment rate was found to be perfectly negatively related to the office sector total return. The main aim of this study was to identify the most important determinants of changes in rents and office prices which consequently impact on office returns.

Kohlert (2010) studied the drivers of regional property returns in the United Kingdom focusing on relationships between regional office real estate and macroeconomic variables being gross GDP, total investment and unemployment rates. The results indicated that there are causal relationships between regional office real estate returns and the economic variables.

In a contrasting study, Chui & Chau (2005) examined the relationships between real estate prices, real estate investments and economic indicators in Hong Kong. Quarterly indices of the study variables over a period of 30 years were composed and Granger causality tests were conducted to test for lead-lag relationships between the variables. The study found no relationship to exist between GDP and commercial real estate investments returns. GDP movements were found to be led by property prices, particularly residential property prices. The reason for this may be that economies like Hong Kong tend to rely heavily on foreign direct investment flows for most sectors, including real estate.

The most crucial part of property investment decisions is the selection of property sectors to invest in and specific properties in each sector. Lee and Devaney (2007) analysed the influence of sector and regional factors on direct commercial property returns and found that sector-specific factors often dominate region-specific factors and more so during volatile periods of the real estate cycle. Direct commercial property returns can also be affected by socio-economic, demographic, policies and institutional factors.

Timing of commercial real estate investments is important as the commercial property sector is characterised by boom and bust cycles which have an impact investment returns. An understanding of the factors that affect returns for different types of commercial

properties at the different stages of the business cycle is important and it improves investors to analyse trends and forecast changes in the economy and the probable impact on direct commercial property returns. Huston (2014) reviewed major types of cycles found in literature and explored the basis behind the cycles. The author identified, amongst others, about 20 years long cycles related to building and transport investments influenced by GDP growth, migration, low unemployment, interest and inflation rates and concluded that cycles are important in understanding underlying forces of the property market.

Economic growth has been acknowledged as a key factor influencing performance of direct commercial properties. Hin et al., (2010) explored the interaction between the macro economy and retail property and found that the retail property sector is more prone to GDP growth policy and its performance has an effect on the opportunities of office rents and returns. Understanding of the factors that affect direct commercial property returns is important for investors in asset allocation decisions. Reddy et al. (2014) noted that, in conducting research for asset allocation decision on prospective direct commercial property investments, fund managers study the endogenous factors (property market fundamentals) such as rentals, vacancy rates, demand and supply, historical risk and return analysis, valuations, capitalisation rates and market benchmark and exogenous (macroeconomic factors) such as interest rates, GDP, consumer price index, retail sales, unemployment rates and demographic statistics.

The study questions whether the drivers of direct commercial property returns influence returns of the different commercial property types and geographic regions in similar patterns. The office property market is generally viewed to be more prone to cyclical fluctuations than other types of commercial properties. Hin & Addae-Dapaah (2014) studied Hong Kong's real estate market forces focusing on prime office sectors of Kuala Lumpur and found that commercial property performance moves in cycles which are different from common business cycles and somewhat not dependent on the underlying local economy's business cycles and that office rents, capital values and returns for Singapore and Hong Kong are more volatile than those for Kuala Lumpur implying that returns differ from one region to another. The authors also noted that "the real estate market cycle is more

overstated in the construction and development industry than rents and vacancy, vacancy cycle tend to lead the rental cycle and new developments tend to peak when vacancy rates are at peak" (Hin & Addae-Dapaah 2014). Furthermore, the study indicated that rents and vacancies are negatively correlated and capital values and returns were also found to be negatively correlated in Hong Kong.

Koon & Lee (2013) studied the causal relationship between inflation and property returns in Hong Kong. Using alternative autoregressive distributed lagged co-integration method for testing long-term relationships between inflation, property prices and returns, the study found that "inflation leads property returns, but not vice versa", meaning that the inflation rate can be used to predict and explain real estate returns.

Inflation is noted to be the main macroeconomic viable found to be impacting real estate returns and real estate in multi-asset portfolios is used to hedge inflation in many countries. Park and Bang (2012) studied the relationship between inflation and direct commercial real estate in the Korean market to establish whether direct commercial real estate is an inflation hedge and found co-movements between short and long run inflation and commercial property prices and returns indicating that inflation serves as an inflation hedge.

2.4 Direct commercial property returns forecasting

Frequent economic data and outlooks are widely available than information on the direct commercial property market. In assessing whether drivers of direct commercial property returns be used to forecast performance of the commercial property market, Tsolacos (2012) studied the behaviour of economic indicators on property rents and their ability to forecast turning points in property rentals and found that certain forecasting models that include economic indicators can successfully predict property rentals turning points but the outcomes differ by sector and market. This supports the nexus that there is no one-size-fits-all investment strategy in real estate.

Hay and Chan (2011) in a study to identify methods of forecasting return of commercial property in South Africa using macroeconomic factors, identified the macroeconomic factors that affect the return of commercial property in South Africa to be interest rate, gilt-equity yield ratio, manufacturing index, employment index, building plans passed, inflation and GDP. Both indirect (listed property returns J255 and J256) and direct property return (IPD total return) were investigated in the study. Using quantitative methods, ARMA, GARCH, VAR and MLP, the study found that using the identified macroeconomic variables that have an impact on commercial property returns, South African commercial property return can be forecasted especially the direct property return. This study focused on the effect of macroeconomic factors (exogenous factors) on commercial property returns. The subject study takes into account the impact of both property specific performance indicators (endogenous) such as vacancy rates, rental escalation rates and capital value growth rates and macroeconomic variables on commercial real estate returns.

Commercial real estate returns fluctuate and are time-varying and with the right tools they can be forecasted. Plazzi et al. (2010), in a study on estimation of expected returns of commercial properties in the United States, found that expected returns account for about 30% of the unpredictability of realized returns of commercial real estate and that rental growth rates can be used to forecast returns and capitalisation rates cannot forecast returns.

2.5 Conclusion of literature review

Previous studies acknowledge that fluctuations in direct commercial property returns are influenced by changes in exogenous and endogenous factors over property cycles but there is no consistency in the identified drivers of CRE returns and no conclusive explanation of the relationships that exist between the identified factors that affect CRE returns. Studies have also indicated that the drivers of CRE returns over different property cycles are different for the various commercial property types and different geographic regions. Most studies focus on the impact of economic factors on CRE prices without linking to returns and

some studies highlight macroeconomic drivers of the REITs returns than the underlying direct real estate assets. This study will gather the various quantifiable drivers of CRE returns identified in the literature review and analyse their relationships in the SA context to give evidence. Further research on the subject can consider the causal effects of the identified drivers of CRE returns in SA.

SA commercial real estate competes globally therefore it is important for investors in the industry to understand the factors that affect the sector's performance to be able to plan and revise investment strategies, to allocate resources efficiently and to understand past trends and manage future risks.

Morawski (2014) and Matysiak (2011) found fund size, leverage, liquidity, management costs, geographic and sector factors to have an impact on direct commercial property returns and offices were found to underperform other property types during downturns in the property cycle. Kohlert (2010) and De Wit (2003) established that there are causal relationships between commercial real estate returns and changes in economic variables; GDP, unemployment rates and interest rates.

Hin & Addae-Dapaah (2014) found GDP, interest rates, rents and vacancies to be negatively correlated to commercial real estate returns and capital values and returns were also found to be negatively correlated in Hong Kong. Contrary to the findings of similar studies, Chui & Chau (2005) found no relationship to exist between GDP and CRE returns but a relationship was found to exist between GDP and residential property prices. Although the study by Chui & Chau (2005) is old, the results cannot be ignored. This will be further analysed to understand the variances.

Table 2: Summary of literature review findings

Author	Country	Findings
Lieser & Groh (2014)	47 Countries	Economic growth, demographic changes, political and socio-cultural factors to have an impact in real estate investment performance and returns.
Morawski (2014)	Germany	Fund size, leverage, liquidity, management costs, geographic and sector allocation have an impact on real estate returns.
Fuerst & Matysiak (2009 & 2011)	Europe	Economic activity, geographic allocation, property sector diversification, fund sizes and investment styles drive property funds' returns.
De Wit (2003)	Asia and Europe	Changes in GDP and level of Inflation have a positive relationship with office total returns (real estate provides an inflation hedge). Negative relationship between total returns for offices and changes in vacancy and unemployment rates. Positive relationship between current return and previous period's return.
Koon & Lee (2013)	Hong Kong	Inflation leads property returns but not vice versa.
Park & Bang (2012)	Korea	Inflation and GDP move together with commercial real estate prices and returns.
Crowe et al. (2012)	United States of America	Property taxes, monetary policy, loan to value ratios and interest rates have a relationship with real estate activity and CRE returns.
Kohlert (2010)	United Kingdom	There are causal relationships between regional office real estate returns, GDP, total investment and unemployment rates.
Chui & Chau (2005)	Hong Kong	No relationship exists between GDP and commercial real estate investments returns.

Lee and Devaney (2007)	United Kingdom	Sector and regional factors on direct commercial property returns and found that sector-specific factors often dominate region-specific
Huston (2014)		GDP growth, migration, unemployment, interest and inflation rates
Hin et al., (2010)	Singapore	Retail property sector is more prone to GDP growth policy and its performance has an effect on the opportunities of office rents and returns.
Hin & Addae-Dapaah (2014)	Hong Kong	Commercial property performance moves in cycles which are different from common business cycles and somewhat not dependent on the underlying local economy's business cycles.
Plazzi et al. (2010)	United States	Positive relationship between rental growth rates and direct commercial property returns. A negative relationship exists between capitalisation rates and returns.
Chaney and Hoesli (2012)	Switzerland	Real estate returns have a relationship with cap rates, vacancy rates and change in capital values.
Chau & Yiu (2012)	Hong Kong	Lead lag relationship between expected rental growth and real estate prices. Positive correlation between real estate returns and changes of spot rent. Negative correlation between real estate returns and interest rate and its term structure movements.
Svets (2010)	United Kingdom	Positive correlation between rents and short term interest rates, disposable income, consumer confidence index and inflation which consequently affects total returns. Negative correlation between retail rental growth and the unemployment rate change.
Park and Bang (2012)	Korea	Co-movements between short and long run inflation and commercial property prices and returns.

The main drivers identified to have a relationship with CRE returns in literature markets and quantifiable in the SA context are:

Table 3: The key drivers identified to have a relationship with CRE returns in literature review

Exogenous factors	• Real GDP growth rate • Inflation rate • Change in inflation • Unemployment rate • Prime interest rate
Endogenous factors	• Cap rates • Vacancy rates • Change in capital values • Change in rents • Fund size

This study tests for relationships between the key drivers of direct commercial real estate returns listed in Table 3, identified in literature and apply them in the South African context. Further to the endogenous factors identified in literature, this study introduces gross rentable area, gross rent/m² and capital value/m² in the analysis.

This study will add to the SA body of knowledge as limited reasearch exist on the subjuct and the IPD SA real estate return indices have been rarely applied in previous academic literature. A few studies have been conducted on the relationship between macroeconomic factors and real estate returns. This study will consider the macroeconomy and whole real estate system, including factors identified in the four real estate quadrants by DiPasquale & Wheaton (1996).

Since the commercial real estate sector lacks transparency, understanding of the factors that affect direct commercial property returns may assist investors in the sector to build well diversified property portfolios and evaluate current performance to forecast

investments future performance. Further research in the subject would be to determine whether historic performance patterns of the drivers of direct real estate returns can be used to forecast future returns.

3. RESEARCH METHODOLOGY

3.1 Research method

To answer questions about relationships among the measured variables, the study applies a quantitative approach, Pearson correlation method as previously applied by De Wit & Van Dijk (2003), Tyrrell & Jowett (2008) and Schindler (2009). Correlation coefficient method quantifies the strength and direction of a linear relationship between two or more numerical variables. Correlation is statistically referred to as correlation coefficient and it is symbolized by the letter "r". The method draws a line of best fit through the variables and determines how the variables fit line. A correlation coefficient of +1 represents a perfect positive correlation and the study variables are significantly related; -1 represents a perfect negative correlation and 0 correlation means than the variables are independent (Saunders et al. 2012). Correlation analysis assists in understanding the direction of the relationship between the variables under study.

The correlation approach does not imply causation. Once the relationships between variables are identified, the streamlined results can be used in other statistical methods to determine causality of the relationships. This method is also called the traditional, positivist, or experimental method.

The study reviews literature to identify the factors that have a relationship and are likely drivers of CRE returns and then apply Pearson's correlation coefficient method to measure the strength of relationships that exist between direct commercial property returns and the identified drivers of the sector.

Formula for calculating correlation on (x_1,y_1), (x_2,y_2)…….(x_n,y_n)

$$rx,y = \frac{\sum(xi - \bar{x})(yi - \bar{y})}{\sqrt{\sum_{i=1}^{n}(xi - \bar{x})^2 \ \sum(yi - y)^2}}$$

(Archdeacon, 1994)

r = correlation coefficient

X = independent variable

Y = dependent variable

N = number of value in each data set

∑xy = sum of the products of paired scores

∑x = sum of x scores

∑y = sum of y scores

$\bar{y}$ = mean of y variables

$\bar{x}$ = mean of y variables

It would be beneficial to apply regression models for extended analysis in the study but the time series data available for the research only has 20 observations of the dependent variable, CRE returns, made up of SA annual property returns from the year 1995 to 2014. The number of observations are limiting in terms of the methodology choice. SA is a developing country and the real estate market still lacks transparency and frequent performance information. CRE returns are published by IPD and they were composed from the year 1995 in SA.

The data for the study is normally distributed hence the use Pearson's correlation coefficient in the analysis.

3.2 Why the quantitative approach

There are various types of research methods such as qualitative, quantitative and mixed methods research. Qualitative research approach mainly is subjective in nature and applies questionnaires and non-numeric data which are interpreted to arrive at a conclusion whereas quantitative approach is objective and generally associated with positivism. It analyses numerical data to test or validate a theory (Saunders et al., 2012). Mixed methods research combines both the qualitative and quantitative approach in a study.

The quantitative approach has been selected for this study because the study seeks to analyse data that are widely publicised in the country for objective findings in the

relationships they have with real estate returns performance and test the hypotheses developed through literature review.

The correlation method in the quantitative is commonly used by researchers to determine relationships between variables and set a basis for other kinds of studies in the research areas (Tyrrell and Jowett (2008), De Wit & Van Dijk (2003),

3.3 Application of correlation method in literature

Similar to this study, De Wit & Van Dijk (2003) employed correlation analysis between dependent variables; total returns, change in rent and capital value and independent variables; change in stock, vacancy rates, GDP, unemployment and inflation rates to identify the most important factors that affect changes in direct global office real estate prices and returns and found high correlations between change in capital values and change in rentals and low correlations between change in capital value and vacancy rates. Change in GDP was found to be significantly positively related to change in capital value and change in rentals. The study also found that a significant positive correlation between total returns and inflation indicating that real estate is inflation hedge overtime.

In an attempt to understand global private real estate markets, risks, returns and correlations in efficient portfolios, Tyrrell and Jowett (2008) applied cross-correlation analysis to study relationships between real estate returns in markets in 21 countries to help with global diversification. A high positive correlation was noted between North America and Western Europe indicating that Central and Eastern Europe may provide diversification opportunities for North America and Eastern Europe.

3.4 Pitfalls of correlation

The disadvantage of correlation analysis is that it always assumes linear relationship and the value of the correlation coefficient can be affected by outliers.

3.5 Research design

The study is based on epistemology and positivism philosophy and a deductive research approach. Epistemology refers to what is generally known and the subject topic has been researched before, mainly in developed countries therefore literature findings will be reviewed and empirically tested with statistical methods (deductive approach) on South African data to answer the research questions. Positivism refers to observable reality and focuses on causality and uniformities to create generalisations (Saunders, 2012). The positivism approach to the study is that the research somewhat replicates approaches used by other researchers in on similar studies in other countries.

The study employs a deductive approach by developing hypotheses from literature about the relationships between returns for direct commercial property and its drivers. The hypotheses will be tested in the South African context.

3.6 Population and sample and data collection

IPD (International Property Databank) SA Annual Property Index data has been used for aggregated annual commercial property returns and property performance variables over a twenty year period, from inception of the IPD index in 1995 to 2014. The observations have been broken down into three focus areas; SA national annual total returns, annual sectorial returns (retail, office and industrial) and annual regional returns.

As at December 2014, the IPD annual property index covered 67% of the population of professionally managed property funds in the country (IPD, 2014) and it measures and

reports on the performance of the direct assets in property funds. Economic data was obtained from Statistics SA and IPD data will be obtained directly from IPD.

4. DATA SPECIFICATION

4.1 Dependent variables

The study uses IPD SA annual CRE returns data for the dependent variables. The IPD SA Annual Property Index reports on aggregated annual CRE returns and property performance variables. In SA, data on CRE returns was compiled annually by IPD from 1995 and provides 20 observations in 2014. The observations have been broken down into three focus areas; (i) SA national annual total returns; (ii) annual returns per property type (retail, office and industrial) and (iii) annual returns per property type by region. At a national level, the IPD sample covers 67% of professionally managed direct commercial real estate in the country. Retail makes up 53% of the sample, 28% offices and 14% industrial properties. The 20 observations of CRE returns presented by the available time series data in SA has restricted the methodology choice to correlation analysis not regression models.

SA has 11 provinces and at a regional level, the study focuses on three regions, namely; Gauteng (GP), KwaZulu Natal (KZN) and Western Cape (WC) Provinces which dominate the IPD SA annual total returns index and they are the only regions that have been represented in the index over the study period. The selected regions make up 88% of the IPD annual returns index with Gauteng being the major contributor at 61% and Western Cape and KwaZulu Natal contributing 16% and 11% respectively. These regions fairly developed compared to other regions in the country and they have sufficient allocation of retail, office and industrial properties.

Table 4: Summary of dependent variables

Dependent variables	Description
SA commercial real estate total return	South African national total return for all real estate assets and all property types in all regions.
Total returns by property type	Retail, office and industrial property returns
Total returns by property type per region	Gauteng, KwaZulu Natal and Western Cape retail, office and industrial property returns

Data for the dependent variables are obtained from the IPD SA annual property returns time series available for a period of 20 years in 2014. The sample is representative of the SA real estate market. A longer and more frequent time series data on the dependent variables would provide more rigorous analysis of the data and present an opportunity for the application of advanced quantitative research methodologies.

Table 5: Descriptive statistics of the CRE total returns at a national level

	SA Commercial Real Estate total return %	*SA Retail total return %*	*SA Office total return %*	*SA Industrial total return %*
Mean %	15.5	17.0	13.1	16.1
Standard Deviation %	6.7	6.8	6.9	9.0
Minimum %	5.0	9.0	1.4	2.1
Maximum %	30.0	32.7	30.5	34.8
Skewness	1.0	0.8	1.1	0.9
Kurtosis	0.4	-0.1	1.4	0.2
Count (n)	20	20	20	20
Contribution of constituents %	67	53	28	14

Table 5 shows the descriptive statistics of the dependent variables and gives an overview of the performance of SA CRE returns over the past 20 years. The trend indicates that returns for the different CRE types move together in similar directions. Over the 20 year study period, the retail sector has outperformed the other CRE sectors at a mean return of 17.0%, followed by the industrial sector at 16.1% and the office sector at 13.1%. The industrial sector has the maximum return ever recorded at 34.8%, followed by the retail sector at 32.7%. The statistics indicate that the office sector returns underperform other CRE types and the national CRE returns.

Table 6: Descriptive statistics of the CRE total returns by property type per region

	GP Retail total return %	*GP Office total return %*	*GP Industrial total return %*	*WC Retail total return %*	*WC Office total return %*	*WC Industrial total return %*	*KZN Retail total return %*	*KZN Office total return %*	*KZN Industrial total return %*
Mean %	16.7	13.2	15.4	17.6	13.6	17.5	17.7	11.2	17.6
Standard Deviation %	6.5	6.7	9.7	8.6	7.1	8.1	8.4	10.6	8.1
Minimum %	7.9	0.4	1.0	9.6	3.7	4.9	4.8	-5.9	3.6
Maximum %	31.4	30.6	35.9	40.4	31.6	33.8	31.7	35.7	34.7
Kurtosis	-0.1	1.7	0.4	2.0	1.1	-0.7	-1.1	0.5	0.1
Skewness	0.8	0.9	0.9	1.6	1.1	0.5	0.2	0.6	0.7
Count (n)	20	20	20	20	20	20	20	20	20
Contribution of constituents %	31	20	10	11	4	2	7	2	2

Table 6 outlines the descriptive statistics of CRE per property type by region. The means of the CRE returns vary per property type and by region. The differences in the returns suggest that the different CRE types and different regions respond differently to certain factors in

the property cycles. There are no extreme cases of skewness and kurtosis which indicates that the data is normally distributed.

Of the three regions, Western Cape Province delivered the highest average return across the three property types at 16.3% (mean of retail, office and industrial returns), followed by KwaZulu Natal at a mean of 15.5% and Gauteng Province at 15.1%.

Retail

In retail, average retail returns in KwaZulu Natal (17.6%) and the Western Cape (17.7%) outperformed Gauteng (16.7%) retail returns over the study period.

Office

Office returns underperformed retail and industrial returns in the 20 years under study with the Western Cape office returns, at a mean of 13.6%, outperformed Gauteng and KwaZulu Natal returns at 13.2% and 11.2% respectively. KwaZulu Natal office returns recorded the lowest returns over the study period.

Industrial

KwaZulu Natal industrial returns recorded the highest mean returns over the study period, recording a mean of 17.6%, followed by Western Cape industrial returns at 17.5% and Gauteng at 15.4%.

4.2 Independent variables

The selected independent variables have been identified from literature as factors that have a relationship with CRE returns. The independent variables are broken down into exogenous and endogenous factors. The endogenous factors refer to property performance variables such as vacancy rates, market rentals, rental escalation rates, capitalisation rates and gross rentable areas. These property performance variables are widely reported on by property

bodies such as the South African Property Owners Association (SAPOA), Jones Lang LaSalle (JLL), Rode's Report and other private publications.

The exogenous factors refer to macroeconomic indicators being Gross Domestic Product (GDP) growth, inflation rates, change in inflation, unemployment and prime interest rates. The exogenous factors are widely and frequently publicised in private and public domains and data has been obtained from the Statistics SA (StatsSA), IMF World Economic Outlook Database and the South African Reserve Bank (SARB) publications. These economic indicators are widely analysed and reported on in various platforms and publications such as business news, magazines and online financial news but the link between them and the real estate sector may not be well understood. What do these indicators simply tell ordinary people and potential investors about the expected performance of the real estate sector?

Table 7: Endogenous factors

Independent variables	**Description**
Vacancy rate - All property	South African national vacancy rate for all regions and property types
Vacancy rate by property type	Retail, office and industrial vacancy rates
Vacancy rate by region per property type	Gauteng, KwaZulu Natal and Western Cape retail, office and industrial vacancy rates
Gross rentable area (Total stock in m^2)	Total supply of space in million square metres by sector and by region
Gross rent per m^2	Gross rental (price) per square metre by sector and by region
Gross rental escalation rate	Gross rental annual growth rate by sector and by region
Capital value (fund size)	Total value of properties in the index by sector and by region
Cap value/m^2	Total value of properties per square metre by sector and by region

Table 8: Exogenous factors

Independent variables	Description
Real GDP growth %	SA annual gross domestic product growth rate
Real GDP growth rate per province	Gauteng, KwaZulu Natal and Western Cape annual gross domestic product growth rate
Inflation %	Consumer price increase rate per annum
Change in Inflation %	Change in consumer price increase rate per annum
Unemployment rates %	National rate of unemployed individuals per annum
Prime interest rates	Annual average of prime lending rate determined by the SA Reserve Bank

The independent variables time series data are published frequently and are available in various public publications. Although the endogenous and exogenous independent variables are available at more frequent time intervals, the study applies annualised values for the independent variables to match the frequency of the dependent variables.

Table 9: Descriptive statistics for the independent variables

	Endogenous factors						*Exogenous factors*				
	Vacancy rate	*Gross rentable area (R'mn)*	*Gross rent/m²*	*Gross rental escalation rate*	*Cap rate %*	*Capital value (fund size) R*	*Real GDP growth %*	*Inflation %*	*Change in Inflation %*	*Unemployment rates %*	*Prime Interest Rates (annualised)*
Mean	6.8	16.8	57.6	10.1	9.3	113 939	3.1	6.1	51.9	23.8	13.8
Standard Deviation	3.4	2.9	29.1	7.9	1.1	77 679	1.7	2.8	175.8	2.6	4.2
Minimum	1.4	11.7	17.3	-3.2	7.7	25 325	-1.5	0.4	-96.8	16.7	8.5
Maximum	13.5	21.0	103.2	28.8	11.3	264 381	5.6	12.4	725.0	27.8	22.7
Count	20	20	20	20	20	20	20	20	20	20	20

Table 9 shows the descriptive statistics of the independent variables over the 20 year study period.

The endogenous factors

To answer the research questions, it is crucial to understand the dynamics of the SA commercial real estate market. Vacancy rates measure of supply and demand for space available to let. When the demand for CRE space is high, vacancy rates are expected to decrease and trigger supply of additional space. When the new supply of CRE space, gross rentable area, exceeds the demand, an increase in vacancy rates develop. This has an impact on market rentals. When there are high vacancy rates in the market, competition for landlords increase in a battle to let space and are likely to settle at lower rentals. Capital value refers to the market value of SA CRE funds over the past 20 years. There has been steady growth in capital value of the CRE market over the study period. This study will establish if there is a link between movements in the capital value and the total returns achieved.

The exogenous factors

A strong economy, measured by GDP, is generally expected to drive economic activities which result in growth in employment, population, consumer confidence, manufacturing, building activity and investments and a weak economy reflects the contrary where high unemployment rates, interest rates, decreased property demand, etc. become obvious.

Figure 5: SA CRE returns and exogenous factors

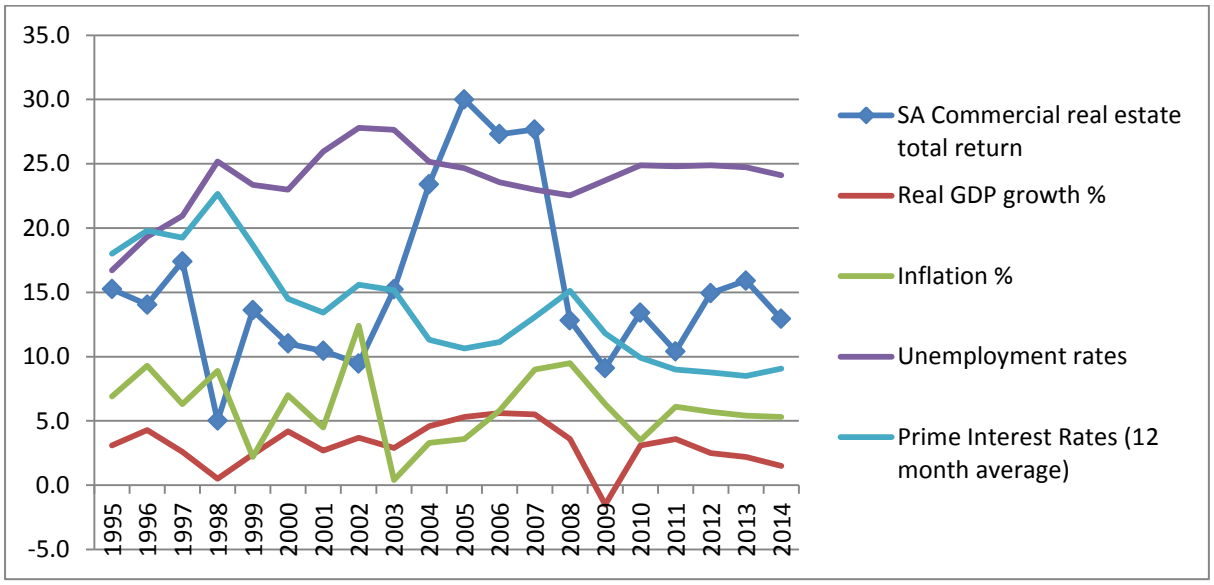


Figure 4 shows the fluctuations of the macroeconomic variables in the past 20 years and highlights the troughs and peaks of the SA key economic performance indicators over the period. The graph indicates that GDP has a positive relationship with inflation and an inverse relationship with unemployment rates and prime interest rates. This simply confirms the hypothesis that when the economy is not growing, increases in interest and unemployment rates are likely experienced. Unemployment and prime interest rates have been consistently high over the study period.

Prime interest rates are set and governed by the South African Reserve Bank to mainly to control inflation. Direct real estate investing is often capital intensive and interest rates impact the credit affordability where credit is used.

Inflation causes an increase in the costs of goods and services. High inflation leads to interest rates increases to minimise buying power and contain inflation levels and this has an impact on investor appetite and investments capacity.

Poor economic growth leads to increased unemployment rates which may impact performance real estate performance. Higher employment rates likely improve consumer disposal income which may promote spending and benefit some sectors of the real estate sector. In SA, unemployment rates have consistently been high as indicated in Figure 8. A wide spread is seen between GPD and unemployment rates and it is evident that unemployment rates increase when GDP growth decreases.

4.3 Other variables

Literature review identified numerous variables that are related to CRE returns; such as taxes, loan-to-value ratios, migration, and disposable income as indicated in section 2.5 above. This study analyses the variables that have been found to be the main factors that have a relationship with CRE returns in countries covered in literature. The selected variables are most commonly and frequently reported property (endogenous variables) and macroeconomic statistics (exogenous variables) in SA. The endogenous variables under study are commonly reported by the South African Property Owners Association (SAPOA), Broll, Rode's Report, Jones Lang LaSalle and IPD and the exogenous variables are published by StatsSA, SA Reserve Bank, SA Treasury and various financial and business publications.

5. DATA ANALYSIS AND RESEARCH FINDINGS

Pearson's correlation was conducted to assess the relationship between SA CRE returns and the identified key drivers of CRE returns. The identified variables that have been identified to have a relationship with CRE returns have been grouped into endogenous and exogenous factors where endogenous factors refer to property performance specific drivers and exogenous factors refer to macroeconomic factors. Significant correlations are denoted by an asterisk (*) and double asterisks (**) where r is closer to +/-1 in a two tailed test. A positive correlation indicates that variables move in the same direction and a negative correlation means that the variables move in opposite directions.

The study applies the following parameters on the strength of relationships that exist between the variables under study:

Correlation (r)	**Strength of correlation**
-1.0 to -0.5 or 1.0 to 0.5	Significant or high
-0.4 to -0.3 or 0.3 to 0.4	Moderate
-0.2 to -0 or 0 to 0.2	Weak or low

5.1 SA national CRE returns

Table 10: Correlation results for SA national direct commercial real estate return

Independent variables	*SA national CRE total return %*
Endogenous factors	
Vacancy rate %	-0.377
Gross rentable area m²	0.008
Gross rent/m²	0.117
Gross rental escalation rate %	0.463 *
Cap rate %	-0.368
Capital value R (fund size)	0.028
Exogenous factors	
Real GDP %	0.700**
Inflation %	-0.247
Change in Inflation %	0.223
Unemployment rates %	-0.114
Prime interest rates %	-0.310

*. Correlation is significant at the 0.05 level (2-tailed).
**. Correlation is significant at the 0.01 level (2-tailed).
n = 20

Table 10 shows correlation results between CRE returns and the independent variables; the endogenous and exogenous factors. In the endogenous factors, SA CRE total returns are found to be moderately positively correlated with gross rental escalation rate at r = 0.463. The correlation coefficient of determination, r^2, is equal to 0.21, which indicates that 21% of SA national CRE returns are explained by gross rental escalation rates. Weak negative correlations are found between SA CRE returns and vacancy and cap rates at -0.377 and -0.368 respectively. This means that higher the cap rates and vacancy rates are associated with lower CRE returns and vice versa. The other endogenous variables, gross rentable area, gross rent/m², capital value (fund size) have very weak positive correlation to SA CRE returns.

In the exogenous factors, there is a significant positive correlation between SA CRE returns and real GDP growth at r = 0.700. This implies that 49% (0.700^2) of CRE returns are explained by GDP growth in SA. This is in line with the research hypothesis that GDP is significantly positively related to CRE returns. Prime interest rates have been found to be moderately negatively correlated with SA CRE returns at -0.310 and Inflation, change in inflation and unemployment rates have been found to have low negative correlations to CRE returns at -0.247, 0.223 and -0.114 respectively.

The other variables; gross rentable area, gross rent per m² and fund size have been found to be insignificantly correlated with CRE returns at a national level.

5.2 Correlations per sector or property type

Literature indicates that performance of the real estate market is largely driven by property type (Lee, 2001). For real estate investments decision, it is important for investors to understand performance of the different property types in asset allocation to be able to construct ideal and well diversified portfolios through different property cycles.

The IPD time series data covers 67% of professionally managed real estate assets in SA and in 2014, the time series presented 20 observations of CRE annual returns. The retail sector makes up 53% of the data, followed by the office sector at 28% and industrial at 14%.

Table 11: SA CRE returns per sector

	SA National CRE returns per sector		
Independent variables	*SA Retail total return %*	*SA Office total return %*	*SA Industrial total return %*
Endogenous factors			
Vacancy rate %	-0.260	-0.390	-0.687**
Gross rentable area m²	-0.089	0.046	0.047
Gross rent/m²	-0.067	0.283	0.254
Gross rental escalation rate %	0.479*	0.436*	0.451*
Cap rate %	-0.190	-0.544*	-0.528*
Capital value R (fund size)	-0.120	0.177	0.143

Exogenous factors			
Real GDP %	0.629**	0.696**	0.690**
Inflation %	-0.313	-0.104	-0.125
Change in Inflation %	0.215	0.127	0.181
Unemployment rates %	-0.126	-0.214	-0.100
Prime interest rates %	-0.157	-0.392	-0.352

*. Correlation is significant at the 0.05 level (2-tailed).
**. Correlation is significant at the 0.01 level (2-tailed).
n = 20

5.2.1 Retail sector

At a national retail sector level, low correlations exist between SA Retail returns and the independent variables except for gross rental escalation and GDP growth rates as indicated in Table 11. Gross rental escalation rate is moderately positively correlated to the SA Retail returns at 0.479 and a significant positive correlation exists between SA Retail returns and GDP growth at 0.629, indicating that 40% ($r^2 = 0.629^2$) of SA retail returns are attributable to GDP growth and 23% ($r^2 = 0.479^2$) of SA retail returns are attributable to gross rental escalation rates. These results are in line with the findings in the SA national CRE returns and are in line with the research hypothesis that a growing economy contributes to investments performance and annual rental escalation rates improve the rental income which positively affects returns.

Very low correlations exist between SA Retail returns and the other variables under study.

5.2.2 Office sector

The results for the SA Office returns indicate that the sector to performs differently from the retail sector. Similar to the retail sector, moderate positive correlations were found between gross rental escalation rate at r = 0.436 and significant positive correlation between GDP and SA Office returns at r = 0.696 as indicated in Table 11. Over and above the correlations between gross rental escalation, GDP growth rates and SA Office returns, sensible negative correlations were found between SA Office returns and vacancy rates, cap and prime interest rates which is different from SA Retail returns. Moderate negative

correlations have been found between vacancy and prime interest rates and SA Office returns at -0.390 and -0.392. A significant negative correlation is found between cap rates and SA Office returns at -0.544, implying that 30% of SA Office returns are attributable to the cap rate. These results indicate that the office sector is more vulnerable to changing economic conditions than other real estate types (De Wit & Van Dijk, 2003).

5.2.3 Industrial sector

The strengths and directions of correlations between SA Industrial returns and the independent variables are similar to the SA Office sector results. Similar to the office sector, sensible correlations were found between vacancy rates, cap rates, gross rental escalation, GDP growth and prime interest rates. The major difference between SA Office and Industrial returns is the strength of the correlation between vacancy rates which is significantly negatively correlated with SA Industrial returns at -0.687, suggesting that 47% (r^2) of SA Industrial property returns are explained by vacancy rates. The correlation between vacancy rates and SA Office returns is moderate at -0.390 and low in SA Retail returns at -0.260.

5.3 Results on CRE returns by region per property type

The study seeks to determine if the identified drivers of CRE returns per property type at a national level are the same across different regions. At a regional level, this study focuses on three provinces in SA, namely; Gauteng (GP), Western Cape (WC) and KwaZulu Natal (KZN). SA has 11 provinces and the three provinces under study were selected for their consistent dominance contribution to the SA economy and IPD sample used in the study. IPD covers 67% of professionally managed real estate funds in SA and the three provinces under study make up 88% of the IPD data sample. Gauteng province contributes 61% of the data, followed by Western Cape at 16% and KwaZulu Natal at 11%.

Table 12: Correlation results for SA national direct commercial real estate return

	Regional returns per sector								
Independent variables	*GP Retail total return %*	*GP Office total return %*	*GP Industrial total return %*	*WC Retail total return %*	*WC Office total return %*	*WC Industrial total return %*	*KZN Retail total return %*	*KZN Office total return %*	*KZN Industrial total return %*
Endogenous factors									
Vacancy rate %	-0.144	-0.334	-0.678**	-0.106	-0.515*	-0.531*	-0.406*	-0.437*	-0.677*
Gross rentable area m²	-0.127	0.074	0.081	-0.062	-0.109	-0.152	-0.008	0.145	0.068
Gross rent/m²	-0.122	0.313	0.304	-0.115	0.017	0.031	0.086	0.403*	0.205
Gross rental escalation rate	0.477*	0.418*	0.415*	0.423*	0.464*	0.577*	0.459*	0.302	0.434*
Cap rate %	-0.123	-0.543*	-0.575*	-0.055	-0.303	-0.314	-0.351	-0.657*	-0.446*
Capital value R (fund size)	-0.177	0.196	0.188	-0.173	-0.033	-0.061	0.062	0.315	0.117
Exogenous factors									
Real GDP %	0.527*	0.700**	0.588**	0.651**	0.739**	0.777**	0.447*	0.499*	0.688**
Inflation %	-0.320	-0.104	-0.088	-0.281	-0.101	-0.183	-0.315	-0.185	-0.226
Change in Inflation %	0.128	0.158	0.152	0.440*	0.105	0.261	0.140	-0.089	0.176
Unemployment rates %	-0.091	-0.184	-0.090	0.002	-0.275	-0.177	-0.244	-0.201	-0.076
Prime interest rates	-0.116	-0.437*	-0.369	-0.134	-0.124	-0.153	-0.174	-0.396	-0.409*

*. Correlation is significant at the 0.05 level (2-tailed).
**. Correlation is significant at the 0.01 level (2-tailed).
n = 20

Consistent across all property types and regions, gross rental escalation and real GDP growth rates have significant positive correlations to CRE return as indicated in Table 12.

In the Retail sector, the results indicate that the strengths and direction of the correlation that exist between Retail returns across the three regions are in line with the overall SA Retail returns.

In Office returns, the results show that the office sector returns perform differently per region and other CRE types. The study found moderate to strong negative correlations between vacancy and cap rates in the three regions with the Western Cape recording the strongest correlations.

With regards to Industrial returns, the strengths and directions of correlations between SA Industrial returns and the independent variables are similar to the SA Office sector results. Similar to the office sector, sensible correlations were found between vacancy rates, cap rates, gross rental escalation, GDP growth and prime interest rates. The major difference between SA Office and Industrial returns is the strength of the correlation between vacancy rates which is significantly negatively correlated with SA Industrial returns.

5.4 How do the results compare with previous studies?

Consistent in all the CRE types and regions, gross rental escalation and real GDP growth rates have significant positive correlations to CRE return. The high correlation between CRE returns and GDP is supported by Tyrrell & Jowett (2008), using correlation methods; GDP was found to have a significant positive correlation with real estate returns and could be used to estimate real estate returns. Fuerst & Matysiak (2011) found GDP growth to be a positive forecaster of annual commercial real estate fund performance. The results on the correlation between CRE returns and both gross rental escalation and GDP growth rates are also similar to a study by De Wit & Van Dijk (2003) on the global determinants of office returns where GDP was found to be significantly correlated with office returns.

The findings of the study are also in line with Chau & Yiu (2012) who investigated the impact of rental growth escalation (rental escalation rate) on direct and listed real estate returns in Hong Kong. Using Granger causality test, Gordon Growth Model and regression tests of time-series data, the study found that the expected rental growth rate, not the actual rental, lead change in real estate asset price consequently impacting total returns of direct commercial real estate.

At a regional level, the strengths and direction of the correlations that exist between the dependent and independent variables similar and consistent across the three regions. At a sector level, the results show that office and industrial returns perform slightly different per region and compared to other CRE types. These results are confirmed by Morawski (2014) in a study to understand the performance drivers of German unlisted institutional property funds found that during the bust phase, office focused funds underperformed other property types. The results of the study indicate that there are remarkable differences in the drivers of returns over the different property cycles. Lee (2001), indicated that performance of the real estate market is largely driven by property type. As cited by Lee (2001), Lizeeri and Macgregor 2000 found property type diversification to be more beneficial than regional type diversification.

The overall results on all the variables used in the study are in line with the literature findings and the study's hypotheses that direct commercial real estate total returns are positively correlated to growing rentals (rental escalation rate), capital value (fund size) and economic growth (GDP) at national, property type and regional level and negatively correlated to vacancy rate, cap rates, inflation, unemployment and prime interest rates.

6. CONCLUSION

The main objective of the study is to analyse common property performance factors and macroeconomic variables that have been found to be significantly correlated with direct commercial real estate returns in developed markets to understand the performance dynamics of the SA direct commercial real estate sector, identify and provide evidence of key drivers of direct commercial real estate returns in SA.

Due to limitations in the availability of longer time series data for the dependent variable, the South African direct commercial real estate annual total returns, the study applied Pearson's correlation to test for correlations between SA annual commercial real estate total returns and the independent variables being widely reported macroeconomic and property performance variables such as vacancy rates, market rentals, cap rates, rental escalation rates, gross rentable areas, fund size, GDP, inflation, interest rates and unemployment rates.

Consistent across all three regions under study; Gauteng, Western Cape and KwaZulu Natal and all three CRE types; Retail, Office and Industrial sectors, two factors are found to be significantly positively correlated to CRE returns, namely gross rentable area and real GDP growth. The high correlations between the variables suggest that gross rental escalation and GDP have the most explanatory power on commercial real estate returns.

The use of the correlation method does not imply cause and effect but identifies the strength and direction of relationships that exist between the variables, therefore the study has not achieved the goal of identifying the key drivers of CRE returns in SA due to data time series limitations on methodology choice but provides an understanding of the relationships that exist between SA's commonly publicised endogenous and exogenous factors. It provides evidence that gross rental escalation and real GDP growth rates have a significant relationship with direct commercial real estate total returns and the other variables such as vacancy rates, cap rates, fund size, inflation, unemployment, etc., have low correlation with direct commercial real estate returns. As the real estate sector is heterogeneous and

competes internationally, the results will assist real estate investors to know which information to focus on for investment analysis and forecasting of future performance of CRE returns based on reported information on levels of gross rental escalation and real GDP growth rates. These findings guide investors in the sector to focus on properties and nodes with growing rentals and review investment strategies in line with GDP movements and forecasts.

The study also sought to determine if the factors that affect the national commercial real estate returns are the same across different commercial real estate types in different geographic regions in the country. With regards to property type and regional level, the results show that office and industrial sector returns perform slightly different compared to retail returns in the different regions. This confirms the importance of understanding the performance of the different CRE types in different regions in real estate investment decisions and management.

The results of the correlations that exist between national SA CRE returns and all variables under study are in line with literature findings on the subject in developed markets and the hypotheses that SA CRE returns are positively correlated to growing rentals (rental escalation rate), capital value (fund size) and economic growth (GDP) at national, property type and regional level and negatively correlated to vacancy rate, cap rates, inflation, unemployment and prime interest rates at country, property type and regional level.

This study is important in the South African context because it applies direct commercial real estate returns which are still less researched in the country due to lack of transparency in the unlisted real estate market and it provides evidence that the strengths and direction of the correlations between property performance and macroeconomic factors and direct commercial real estate returns in South Africa, being an emerging market, are in line with findings in developed countries. This implies that the South African direct commercial real estate market competes globally.

Understanding the key factors that drive direct commercial real estate returns is important for investors and investments managers to forecast and evaluate potential investments.

As literature has confirmed that the real estate sector is heterogeneous and competes internationally, the results will assist real estate investors to know which information to focus on for investment analysis during business cycles and in forecasting of future performance of CRE returns based on reported information on levels of gross rental escalations and real GDP growth rates.

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