THE EFFECT OF INTEREST RATES ON COMMERCIAL REAL ESTATE PRICES: THE CASE OF COMMERCIAL LEASES IN NAIROBI COUNTY

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Declaration

This research project is my original work and has not been presented before for the award of a degree in any university.

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This research project has been presented for examination with my full approval as supervisor.

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DEDICATION

This project is dedicated to my wife and daughter for their continuous support and understanding.
ABSTRACT

The changes in interest rates do have a diverse effect across the economic spectrum in any country. The sectorial and economy wide effects of interest rates may ultimately be reflected in the commercial rent. The objective of this research was to examine how changes in interest rates (represented by the average lending rate by the Central Bank of Kenya) and Commercial rent (represented by the quarterly average rent per square foot in Nairobi’s commercial zones) are related to each other.

The study explored level of interest rates and property prices in Kenya and around the world. A review of the relationship between property prices and interest rates was also performed using empirically supported findings of various studies, locally and around the world. The study finally investigated the relationship between interest rates in Kenya and the commercial rent per square foot in the commercial zones of Nairobi County. To establish the relationship, data on commercial rent was collected using 50 commercial leases (within the commercial zones of Nairobi County) between January 2007 and December 2013. Using this data, we determined the average rent per square foot for each quarter in this period. We obtained the interest rate per quarter from the CBK website for the same period.

The research used Toda and Yamamoto (1995) method to determine the relationship between commercial rent and interest rates. This method is applicable “whether the Vector Auto Regression (VAR) may be stationary (around a deterministic trend), integrated of an arbitrary order, or co-integrated of an arbitrary order” (Toda and Yamamoto, 1995). The results therefore indicated that there was causal relationship
between interest rate and commercial rent albeit in one direction share price i.e Movement in commercial Rent causes changes in interest. There was however no evidence suggesting that movement in interest causes changes in commercial rent. As regards the sign of causality, positive causality exists in one direction. These findings are consistent with a Knight Frank report in 2013 which indicated that commercial real estate may be headed for an oversupply in Kenya due to the high returns from commercial real estate in recent times. The fact that rent does not respond to interest rate movement may be due to the rigid structure of commercial lease legislation in Kenya. The findings are however inconsistent with those of Conerly (2013) and Olick (2013) who concluded that real estate prices are responsive to changes in interest. A key recommendation of the study is a legislative change that should allow commercial leases to respond to economic stimuli such as interest rates.
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ABBREVIATIONS

AIC - Akaike Information Criterion

BOT - Bank of Thailand

CBD – Central Business District

CBR - Central Bank Rate

CIS – Commonwealth Independent States

CRR - Cash Reserve Ratio

ERS – Economic Recovery Stimulus

HNWI – High Net Worth Individual.

IRS – Interest Rate Spread

MWALD - Modified WALD

SSA – Sub-Saharan Africa

VAR - Vector Auto Regression
CHAPTER ONE

INTRODUCTION

1.1. Background

Property growth is on the rise in Africa. Africa is urbanising at a faster rate than India and China given the huge resource boom in various states propelling growth in an untapped middle class. In the direct property asset class, there is a strong supply-demand imbalance across retail, commercial, industrial and residential markets. This is particularly true for a majority of African cities where there is a massive retail shortage, lack of high grade office space, deficiency of industrial space and an increasing need for warehousing and logistics centres as retailers start to enter these budding markets (Stanlib, 2013).

African banks are among the most profitable in the world, shielded in the main from the collapse of global financial markets and much better-capitalised and regulated than a decade ago. Buoyed by deposit-taking and transaction fee income, and lending relatively little to the private sector, banks have managed to turn in returns on equity as high as 40% in some countries (Botswana, Ghana) and returns on assets well in excess of global norms. Spreads have been huge. In Zambia, loans yield 6.5 percentage points over the risk-free funding rate and there is a spread of about 10 percentage points between what banks pay their depositors and what they can earn on government bonds. Spreads in the East African countries have been high throughout the 2000’s, averaging 800 – 1,200 basis points (Napier, 2011).
1.1.1. Real Estate Prices

The growth of Africa’s technology sector is creating demand for office space, from occupiers including large multinational IT companies such as IBM and Oracle, as well as African telecom giants including MTN and Kenya’s Safaricom. Smaller start-up companies have been supported by the establishment of dozens of innovation and technology hubs over the last three years. These hubs provide collaborative work spaces for entrepreneurs and investors and are at the heart of Africa’s emerging technology clusters, which include those in Nairobi, Lagos and Cape Town, known respectively as “Silicon Savannah”, “Silicon Lagoon” and “Silicon Cape”. Kenya is at the forefront of Africa’s technology boom and its ambitions to establish itself as a global centre for the technology sector are encapsulated by Konza Technology City, a US$10 billion project marketed by the Kenyan government’s ICT Board, which is planned for construction over the next 20 years on a 2,000 hectare site, 60 km south east of Nairobi. The project is directly modelled on California’s Silicon Valley and is designed to include a technology park, university campus, science park and central business district, alongside residential properties (Welborn and Colbourne, 2013).

As the systemic threats in the global economy begin to recede, more private investors will start to view the low returns on triple-A government bonds and cash in the bank as unacceptable. Prime offices in a range of major global business centers now offer premiums of over 200 – and, in some cases, 300 – basis points above 10-year government debt in their respective markets. Government bonds trading at yields below inflation are loss-making in real terms. Investors will thus seek a real-terms profit, where they can also
drive greater returns by adding value. Sovereign wealth funds have been active in property investment in recent years, and increased activity in real estate has also been noted in the private equity funds. Private investors are expected to draw confidence from active involvement by institutional investors in commercial real estate. The Wealth Report’s Attitudes Survey of wealth advisors and private bankers confirms that HNWIs are taking a greater interest in commercial property. Globally, a net balance of 25% of respondents said their clients planned to invest more in 2012, with the strongest increases reported in the Middle East & Africa (52%), Australasia (33%), North America (33%) and Russia & CIS (33%). The increase was second only to that for equities. “This shows private investors plan to increase exposure to traditional recovery-play investments. Property in a rising economy can provide steady growth to balance against the volatility that equities experience,” says Deborah Watt of Knight Frank’s Global Wealth team (Knight Frank Research, 2013)

1.1.2. Interest Rates

Interest is a fee paid by a borrower of assets to the owner as a form of compensation for the use of the assets. It is most commonly the price paid for the use of borrowed money, or money earned by deposited funds (Sullivan and Sheffrin, 2003). Interest rate is the rate at which interest is paid by borrowers for the use of money that they borrow from a lender. An important interest rate statistic is the annual percentage rate of charge (APRC), which is an effective lending rate that covers the total costs of the credit to the consumer i.e. the interest payments as well as all other related charges (European Central Bank, 2003)
Interest rates are usually set by federal (national) governments or the central bank of a country. In the United states the Federal Reserve sets the federal funds rate as a guide to borrowing rates and this has varied between about 0.25% to 19% from 1954 to 2008 (Federal Reserve Bank of New York, 2013), while the Bank of England base rate varied between 0.5% and 15% from 1975 to 2013 (Bank of England, 2013). Germany experienced rates close to 90% in the 1920’s down to about 2% in the 2000’s. During an attempt to tackle spiraling hyperinflation in 2007, the Central Bank of Zimbabwe increased interest rates for borrowing to 800% (World Economies, 2007).

Kenya’s interest rates were fairly stable before 1990’s due to a combination of price controls and banking controls in the country. Interest rate volatility quickly set in after 1992 multiparty elections. Together with runaway inflation, sharp rise in interest rates were noted in most of 1993. Treasury bills interest rates at one time reached 84.67 % in July 1993 and the interbank rate exceeded 68 percent in March 1993. The lending rate also rose steadily, exceeding 30 percent for the period October 1993 to October 1994. Lending rates remained above or close to 30 percent through September 1998, but declined in 1999. The rates peaked again at 24 percent in November 1999 and that was the highest rate that preceded a decade of low and stable interest rates. Indeed the lending rates remained within 12 and 16 percent through September 2011 causing a huge expansion in credit to the private sector, rising government debt appetite, and growth in the economy. The spreads were narrower prior to 1992 due to a period of marked economic controls in the economy. The spreads rose to 17 percent by December 1994, and reached 20 percent by November 1995 due to macroeconomic problems associated
with excessive growth of money supply and the Goldenberg scandal. The spreads only declined after the 2002 elections. The new government had just taken office and keen to grow the economy under the ERS, the government reduced cash reserve ratios (CRR) sharply leading to a fall in interest rates and rate spreads. Due to the reduction of CRR, lending rates fell from about 18 percent in December of 2002 to close at 13.7 percent in December 2003. In 2012 CBR increase caused banks to adjust their rates from an average of 15 percent to about 24 percent. For some banks, actual lending rates rose to about 30 percent. (Parliamentary Service Commission, 2011)

A Central Bank of Kenya (CBK) report in 2013 showed that the six top banks were squeezing borrowers while using their dominance in the skewed market to pay less for deposits. The 10th report of CBK’s Monetary Policy Committee showed that the influential financiers enjoyed an average interest spread of 15.3 per cent compared to 11 per cent for the small banks. CBK data shows the major banks offered the most expensive credit at 19.7 per cent and paid the lowest for deposits at 4.4 per cent. The industry average lending rate was 17.87 per cent and deposit rate was 6.39 per cent in 2013. The wide margins have been key drivers of high profits reported by commercial banks as they are able to cater for their operational costs and retain much more. In the five months to May 2013, the banks had made profits before tax of Sh 48.7 billion during a period characterized by sluggish economic growth and surging bad loans (Business Daily, 2013).
1.1.3. The Relationship between Real Estate Prices and Interest Rates

Classical theories identify rent as income from natural agents, and that interest is the income from products used in production. However, the concepts of rent and interest are not developed along parallel lines. Nearly every concrete thing is a bit of natural material adapted artificially to some degree to man's use, everything according to this conception should have in it elements of capital and interest, and elements of land and rent. As a necessary result of the distinction between the land and the capital aspects of agents, rent must be expressed as an absolute amount, and interest as a percentage of a principal sum. In fact the expression of interest as a percentage marks interest as the form of income most connected with mobile agents; it makes of interest a "marginal" factor in price and connects with the element of time. Rent is the right of enjoyment (usufruct) attributable to any material agent. Whenever two nonsynchronous rents or series of rents, are exchanged, they must be discounted to their present worth to be made comparable. Here is required a theory of capitalization, of which central is the understanding of the concept of interest expressed as a rate (Fetter, 1976).

The real estate segment is a major sector of the economy in Kenya and has been largely affected by fluctuating interest rates. Investment in real estate requires significant capital injections that most ordinary Kenyans cannot raise as equity, therefore they turn to banks for financing. The cost of borrowing in all banks is driven by the real interest rate which driven by inflation. The banks are highly supervised and are under the obligatory role of the Central bank of Kenya which determines the base lending rate accommodating all factors in the economy. The CBK base lending rate is an indicative rate that signals
banks to adjust their own lending rates. A fall in the lending rate has traditionally been seen to result in a rise in real estate pricing and rental returns (Hassanali, 2013).

Using a discounting model, high interest rates are expected to reduce the present value of future income streams. This implies that the price of assets should be falling while the rates of interest rise. However interest rates are determined by two factors: inflation expectations and economic growth, which combine to set the supply and demand for credit. Interest rates only rise when the economy is strong or inflation is accelerating (and inflation is most likely to accelerate when the economy is strong). At these times, investors are confident. They borrow more because prospects for investments look good. The factors that push interest rates up are the same factors that push up investment values. Interest rates rise because of strong investment demand (Conerly, 2013).

Commercial real estate is very interest rate sensitive, credit dependent and long term. Those are not good formulas if you have a high interest rate environment or an environment in which credit is volatile (Olick, 2013).

1.1.4. The Leasing Industry in Nairobi

At the turn of 2013, demand for administrative offices for the government became the key driver of commercial space uptake in Nairobi’s CBD. There has been a search for space by state officers as new government structures due to devolution have taken up offices previously occupied by civil servants. Devolution was the result of the 2010 constitutional change. The government’s major competitors in CBD office uptake are
universities and colleges, which have been buying or renting whole buildings in the area. More private firms are however moving out of the CBD to business nodes such as Westlands, Upper Hill, Waiyaki Way and Ngong Road. Data from the Kenya National Bureau of Statistics however shows moderate confidence in office, retail and industrial space construction (The Star, 2013).

The Nairobi office space market has two tiers, with good corporate tenants being attracted to decentralized addresses such as Upperhill and Westlands, which are well recognized and combine good parking with leafy, uncongested environment leaving the CBD with smaller weaker covenant tenants and government offices. Good shopping facilities have also moved from the traditional locations to take advantage of the benefits offered by linear and decentralized locations such as Westlands, Kilimani, Lavington, Gigiri and Karen. Such benefits include ample space, reduced rent, proximity to residential areas and adequate parking facilities. The traditional ground floor retail unit in the CBD, however still command relatively high rents, far in excess of the floors above. Nairobi office rents in the commercial and office sectors have risen gradually over the past few years but this growth may be checked by an oversupply as there is considerable stock in the pipeline (Knight Frank, 2010).

1.2. The Research Problem

According to some scholars, property prices are expected to be inversely proportional to interest rates. The price of a commercial property is the present value of its net operating income (net rental income and terminal value) discounted at the property’s specific
discount rate which is also known as the Capitalization (CAP) rate. According to Geltner, Miller, Clayton & Eicholtz (2007), property-specific discount rates are determined by the interaction of the risk-free rate, investor risk premiums, and the risk profile of the specific property. However according to scholars such as Conerly (2013), interest rates rise when the economy is strong due to confidence in the market. Due to investor optimism, the prices of properties may tend to rise with interest rates. Other scholars such as Shilling and Sing (2007) find no relationship between real estate prices and interest rates. There is still thus no unanimity in the study of the relationship between real estate prices and interest rates.

Interest rates in Kenya have erratically varied between 32% and 16% in the period between 1991 and 2013. However returns from the real estate appear steady over the same period. This study intends to answer the question: Is there a relationship between real estate prices and interest rates in Nairobi?

According to the Bank of Thailand (2004), interest rates have a positive relationship with housing rent. However rising interest rates eventually have an adjusting effect on rents and the stock market. Analyzing cycles of the housing rent, the Minimum Lending Rate (MLR), and the stock market over the past 25 years (figure 3 in the appendix), two peaks are found. Rising wealth in the stock market leads to an acceleration in the real estate sector and subsequently to that of the real estate returns or housing rent. Results from the Vector Auto regression confirm the response of MLR to a change in housing rent that subsequently leads to a downward adjustment in the stock market index.
Mayer and Hubbard (2009) in their paper on the mortgage market meltdown recommend that the value of owners’ equity in real estate mortgages can only be improved by lowering interest rates. Using empirical evidence from Europe and USA, the duo make a strong case for a policy change of lowering interest rates to improve real estate prices. Economic growth leads to an increase in the middle class of a society. Hoskins, Higgins and Cardew (2004) find that GDP growth, inflation, and unemployment show significant correlations with composite property returns. In their study, Hoskins, Higgins and Cardew demonstrated that gross domestic product, unemployment, and inflation were identified as leading macroeconomic determinants affecting Australian, Canadian, U.K., and U.S. commercial property performance during 1985-1999. These macroeconomic links with commercial property returns revealed that over time, the economic relationships with property returns varied, generally becoming weaker.

The changes in interest rates have a diverse effect across the economic spectrum in any country. Interest rates impact the cost of doing business. The cost effect of interest rates is ultimately reflected in real estate prices as construction is financed by financial institutions. On the converse, as demand for commercial property changes and funds available for investment remain finite, the levels of interest rates will shift to reflect the cost of money. Policy makers, scholars, economists, business owners, regulators and the general Kenyan public face the challenge of figuring out the relationship of commercial real estate prices and interest rates.
1.3. Research Objective

This research aims at determining the relationship between interest rates and commercial real estate prices in Nairobi.

1.4. The Value of the study

This study will benefit commercial Real Estate developers and investors who rely heavily on leverage finance in understanding the effect of prevailing interest rates on property prices. Real estate agencies shall be able to better negotiate for leasing terms between their landlord principals and prospective tenants. Banking institutions will improve the appraisal process and understand the market before committing to project financing. Commercial office tenants will be aided in understanding and predicting rental trends based on interest rate movements. The study will also enable policy makers and market players understand the effect of changing interest rates on commercial property price
2.1 Introduction

Literature review was conducted to lay the conceptual foundation of this study. This chapter begins with the review of the theoretical background of Real Estate Pricing. Here we evaluate critical traditional approaches. The chapter also conceptualizes the Toda and Yamamoto model.

2.2 Theoretical Review

2.2.1 Direct Sales Comparisons Theory

Lusht (2007) states the sales (rental transactions) comparisons approach is predicated on two assumptions; market price is acceptable evidence of market value and that the properties that are substitutional will sell for similar prices in an identifiable price range. These assumptions presuppose that a market has both depth and resilience. That is to say the market has depth in participants, in which sufficient transactions occur to sustain price levels and tolerate the recovery of funds.

The chronological process in the analysis of sales transactions commences with the identification of the market of which the property is a component. Kummerow (2002) describes a valuer’s task as; choosing which sales are best to use to infer price, identifying price-affecting characteristics that differ between sales and the subject
property, estimating the dollar value of the differences for each pair-wise comparison of the subject sale and “Reconciling” to give a single price estimate, where indicated values of the subject from different adjusted comparable sales are not identical.

Property transactions in Kenya would vary based the nature of financing used to develop the property. Highly geared property developments would seek different returns from those funded by equity/ own capital. Such differences will require adjustments/reconciliations to arrive at a single comparable price estimate. The model can thus be used to establish the relationship between interest and real estate prices by determining the reconciling aspects such as interest on financing. However the assumption that markets are resilient and deep deals the model a fatal blow in the Kenyan context. It would also be difficult to establish and value other reconciling factors for each transaction in order to arrive at a single price for similar properties.

2.2.2 Sales Comparison Price Differences Regression Model

This model assembles recent transactions of comparable properties to the subject property that are substitutional but sufficiently varied to allow the decomposition of price by that markets response to a variation in the attributes. Therefore, allowing a component of price to be allotted to each of the major attributes. This decomposition of price can be used in the various price models including models for rental transactions. Real estate assets are heterogeneous, that is, their characteristics vary. Researchers and practitioners have found that hundreds of factors might affect prices in various situations. Moreover, properties trade infrequently, perhaps once every 5-10 years for the average
house. The amount of sales evidence varies widely in particular cases, but generally there are few sales of properties similar enough to be considered “comparable” and none of identical properties. So instead of looking up prices in the financial press, as one would do with a share or commodity price, people interested in prices of particular property assets consult valuers who collect and interpret recent sales evidence in order to arrive at a price estimate based on interpretation of differences between properties. The market has the same problem as the valuer—how to discover prices of heterogeneous assets where there are few similar transactions and many property characteristics that influence prices?

For any individual property at a particular point in time, different prices are possible due to different circumstances of sale, differing buyer preferences, different buyer information sets or other factors. We may call this variation “random error” because we don’t know its causes. This means that the observed prices used by valuers to infer value of a subject property by sales comparison include random variation. Po, the observed price, is equal to $P_{\mu+\varepsilon}$, the mean of the possible price distribution, plus a random error. We do not know $P_\mu$ or $\varepsilon$, we only know Po, the transaction price we observe.

Heterogeneity requires valuers to develop models of price differences. Instead of

$$P(t) = P(t-1),$$

(2)

where price of the subject property equals recent transaction prices, valuers have to use

$$P_{\text{subject}}(t) = P_{\text{comparable}}(t-1) + \text{Differences}. $$

(3)
“Differences” means the price implications, positive or negative, of the differences in hedonic characteristics between the properties. This “sales comparison price differences” regression model is mathematically equivalent to the “adjustment grid” used by American valuers (Colwell, Cannaday & Wu, 1983). Modelling price differences due to differing characteristics stems from Kevin Lancaster’s notion that utility and the price people pay for complex commodities like housing or automobiles is a sum of the utility of various characteristics (Lancaster, 1966, Rosen, 1974).

This model would present a challenge in application as it would be difficult to quantify the monetary value of differences between properties. The prices of different properties may vary due to the cost of financing (interest). However interest would just be one of the differences in the “adjustment grid”.

2.2.3 Capitalization Rate and Rental Growth Theory

In theory, rent growth has a negative relation with cap rate. In a static Gordon (1962) model, cap rate at time t is the difference between return and rental growth, i.e.

\[ C_t = r_t - g_t \]  

(4)

Recent studies including Shilling and Sing (2007), An and Deng (2009), Plazzi, Torous and Valkanov (2010) apply the Campbell and Shiller (1989) price-dividend model to commercial real estate and establish the relation between cap rate and rent growth in a dynamic setting:
However, the existing literature on cap rate has not confirmed the relation between cap rate and rent growth. Earlier studies such as Hendershott and Turner (1996) and Chichernea, Miller, Fisher, Sklarz and White (2008) discuss rent growth as a determinant of cap rate but do not include rent growth in the empirical analysis. Recent studies try to estimate the relation between commercial real estate cap rate, return, and rent growth but find that the relation between cap rate and (net) rent growth/NOI tends to be weak if there is any.

This model would be able to capture the relationship between rental growth and interest (cap rates) over time. However, while the model captures relevant variables such as price and interest, it would not be suitable for use in the study as documented studies have already indicated the perceived relationships between capitalization rate and rental growth to be weak.

### 2.2.4 Income Capitalization Model

The most common methods of estimating value have traditionally involved the discounting or capitalizing of an income stream. In the income approach, variables such as earnings or cash flows are utilized as a proxy for the expected benefits to the owners of the business. In a capitalization model for commercial properties, the $NOI_t$ (net rental income for the first year of operation) is capitalized into perpetuity at a capitalization rate $k$.

\[
 c_t = E_t \sum_{j=1}^{\infty} \rho^{j-1} \left( r_{t+j} - g_{t+j} \right) \frac{k}{1-\rho}.
\]

(5)
determined by the difference between the appropriate discount rate $r_t$ and a constant, sustainable level of growth $g_t$. 

$$P(t) = \frac{NOI_t}{(r_t - g_t)} \quad (6)$$

The equilibrium capitalisation rate at time $t$, $C_t$, is the difference between the discount rate and the rate of growth of net rental income streams as per equation (1).

The model would appropriately capture the rental income and sale prices of property and reliably compare these to interest. However, establishing net operating income would prove a challenge in making the model useful. The disclosures required from property owners or managers would be significant and difficult to analyse.

### 2.2.5 Alonso's bid rent theory:

The bid rent theory is based on a trade-off economic model designed by William Alonso in the 1960’s which explains the relations between property rent and accessibility in terms of land uses. The way economies are organised comes partly from the emergence of different centralities within a city. From a global scale point of view, transportation networks have the potential to increase sprawl depending on how the urban system evolves gradually. For example, faster transportation can increase convenience of commuting, increasing rent that commuters from the city centre are willing to pay, and
therefore increasing the area of developed land, but without this being necessarily corresponding to an increase in population (see Alonso’s Bid rent Curve in Appendix section).

The term bid rent refers to the amount of rent a user is willing to pay for a more central location, but is willing to accept a location further from the central built-up area at a lower rent cost in compensation. The reasoning behind the trade-off process of Alonso’s bid rent model (1964) is what follows: Property markets in retail and commercial use are willing to pay a higher cost to be in the centre, where there is a higher concentration of population and activity that tends to be more movement-rich than other parts of the city.

The model reduces commercial rent to a factor of distance from population clusters and can thus not be applied to the current study.

2.3 Determinants of Real Estate Prices

Gyourko (2009) found a strong relationship between leverage economic activity, improved infrastructure, capitalisation rate and commercial property prices. In the office markets that have experienced the largest increases relative to fundamental production costs, most of the price increase was due to falling cap rates (i.e., rising net rent multiples), not rent increases themselves. Office building prices in traditionally high cost and tightly regulated central business districts in the Boston, New York, and San Francisco metropolitan areas also have escalated sharply in recent years, including with respect to other, more typical markets in the country. This change was justified by local
amenities or productivity increased relative to those other markets, but the unfolding financial crisis casts doubt on the productivity part of that explanation. Where capital structure is weak (high average leverage) there is a relatively small equity cushion to absorb any losses. Ultimately, a thinly capitalized commercial real estate sector is further subject to the negative economic shock of a possibly severe recession. Baum, (2003) found that the main factors driving the required ‘compensation’ for a lease term amendment include expected rental volatility, expected probability of tenant vacation, and the expected costs of tenant vacation.

Avison Young, (2012) analysed commercial real estate Investments in Canada and the US. From their study it was noted that increased competition for assets generally elevated pricing - in some cases exceeding pre-credit crisis levels for well-leased, quality-grade properties in prime locations. In almost every asset category, Vancouver yields the lowest capitalisation rates followed by Toronto and Calgary. While the investor profile is varied Real Estate Investment Trusts (REITS) have emerged as aggressive buyers often competing with and outbidding the pension funds. Avison Young further found that a lack of available supply in New York and Los Angeles resulted in the movement of some institutional grade investors to consider middle market acquisition in order to meet the demand for assets. Overall sales volume in the first half of 2012 fell by nearly 20% in Metropolitan Washington (long considered to be a safe investment haven) compared with the same period in 2011. The trend was largely considered to be the effect of the impending U.S presidential election that were due to be held later that year.
According to PwC and the Urban Land Institute, (2013), yield, age and current productivity highly affect commercial property prices. Investors discouraged about high priced core properties in gateway markets inevitably will “chase yield,” stepping up activity in secondary markets and acquiring more commodity assets. These players will need to focus prudently on current income–producing investments and avoid the surfeit of properties edging toward obsolescence, especially certain suburban office parks and some half-empty second- or third-tier shopping centres. Most areas can sustain little if any new commercial construction, given relatively lack lustre tenant demand and the generally weak employment outlook.

PwC and the Urban Land Institute, (2013) also identified leverage as a major factor in determining real estate prices. The real estate capital markets maintain a turtle’s pace for resolving legacy-loan problems as the wave of maturing commercial mortgages gains force over the next three years. Low interest rates have bailed out lenders and underwater borrowers, but interviewees warn against complacency and recommend preparation for eventual rate increases. Under the circumstances, low rates and high core real estate prices lead investors to find the best risk-adjusted returns in the middle of the capital stack-mezzanine debt and preferred equity.

According to Welborn and Colbourne (2013), the price of commercial real estate properties in Kenya is rather demand driven and dependent on the strength of the economic and political environment. A high number of corporate entities have chosen to relocate their head offices to Nairobi due to the central position enjoyed by the Kenyan City making it a convenient business hub. Nairobi enjoys strong macroeconomic
environment such as competent labour supply, stable inflationary levels, infrastructure, high end residential housing and medical facility. Nairobi also has sufficient airline route conveniently connecting the city to the rest of the world.

2.4 Empirical Review

Gyourko (2009) sought to establish the similarities between pricing of commercial and residential real estate. In his study Gyourko recognised that sharp declines in the prices of owner occupied housing were similar to the nearly 60% decline in the share prices of publicly-traded, commercial property firms from their peak in early 2007. The core model of spatial equilibrium in urban economics suggests this should not be a surprise, as it shows that both real estate sectors are driven by common fundamentals, which should make them perform similarly. On the other hand, stronger limits to arbitrage in housing suggest wider swings in prices unrelated to fundamentals are feasible in that property sector. The simple correlation between appreciation rates on owner-occupied housing and commercial real estate is nearly 40%. Both sectors also exhibit similar time series patterns in their price appreciation, with there being persistence across individual years and mean reversion over longer periods. However commercial real estate capital structure looks to be quite weak due to high leverage combined with strong mean reversion in prices. The aggregate loan-to-value ratio on income-producing properties is about 75%. Estimated mean reversion in price appreciation of at least 25% over relatively short horizons suggests that normal change from the recent peak will leave little or no equity on average to cushion against any future negative shocks. The high leverage in commercial real estate leads to quicker correction in short term price fluctuation. The
presence of the borrowing costs in commercial real estate thus plays a strong role in the pricing of such assets.

Baum, (2003) conducted a research on pricing the options inherent in lease Commercial Property. The research used data derived from major databases maintained by IPD® and the Valuation Office of the United Kingdom, interviews and workshops with over 50 market participants (owners, letting and investment agents, valuers and rent review surveyors). A key conclusion of this study is that the relative stability of lease terms in the retail and office sectors reflects a widespread mutuality of interests between landlord and tenant in the status quo. Long leases were seen to provide important benefits for most retailers in terms of security of trading position and adequate write-off periods, and the fit-out costs for an office user also encouraged longer leases than might otherwise be optimal. From the landlord’s perspective, the main factors driving the required ‘compensation’ for a lease term amendment include expected rental volatility, expected probability of tenant vacation, and the expected costs of tenant vacation. Commercial leases in the Kenyan context are long term in nature and this is anchored on the laws of Kenya under the Land Act of 2012. Commercial leases are required to be longer than 5 years. Due to the long term nature of commercial leases, a majority of landlord require significant security deposit from tenants to cushion against rental default. Such deposits may be seen as a barrier of entry for many tenants and vacancy periods may be prolonged. For highly geared commercial property, periods of vacancy increase liquidity pressure on the landlord. Does a commercial property landlord adjust rent upwards for new leases to finance periods of vacancies or lower the rent to attract more tenants to reduce periods of vacancy?
Lasfer (2005) contrasts the costs and benefits of leasing, rather than owning real estate assets. The analysis starts by documenting the trend in the number of companies in the UK that recur to leasing rather than owning freehold property and shows that, over the period 1989-2002, about a third of companies in the UK report only leased property in their accounts. This leased property is in the form of either off-balance sheet financing as operating leases or leasehold property in their balance sheet. In contrast, companies that own only freehold property represents an average of 4.5% of the total number of observations and in 2000-2002 no single company in the sample reported only freehold property. Consistent with the financing and agency costs hypotheses, he find that large and high growth companies are likely to lease than to own real estate. The results also indicate that leasing companies are more efficient in using their real estate and that these benefits are compounded in share price valuation. The results indicate a strong and positive relationship between the leasing propensity and various measures of firm value, such as market-to-book, buy and hold stock returns. The proportion of companies that recur to operating leases on property increased substantially over the last few years, indicating that companies chose operating lease of property to reduce their debt. However, Lasfer also finds that the relationship between value and leasing propensity is an inverse U-shaped optimized at about 65% leasing, suggesting that the market is also considering the costs of not owning real estate. Lasfer's findings indicate a relationship between the cost of financing (interest) and buy or lease decisions in commercial real estate.
In her study on the relationship between interest rates and real estate investment in Kenya, Muthaura, (2012) analysed the problem using the use of the simple user cost model. The target population of this study was all 35 mortgage lending banks in Kenya as at November 2010, from which a sample of 18 was drawn to analyse the research problem. Data for the purpose of the study was collected using data collection forms to 18 mortgage lending banks that have been running the mortgage product from 2007-2011. Study findings indicated that indeed interest rates affect house prices, most real estate retail borrowers and investors alike are forced to increase the house prices to cater for the cost of borrowing and to also break-even.

Tireito (2011) in his research sought to find out how the loaneees had been affected by the increased instalments arising from the interest rate change. The study involved collecting financial statements for the various banks and analysing them to determine if there is any relationship between interest rates and non-performing loans. As a consequent, data for the past five years (2007-2011) was analysed with the help of SPSS statistical software and the results presented in form of correlations, regression and coefficients. Test of significance were further carried out. The results showed that there was no significant relationship between interest rate and non-performing loans in commercial banks in Kenya.

In her study Muguchia (2012) sought to establish the effect of flexible interest rates on the growth of mortgage financing in Kenya. The findings of this study conducted on 26 commercial banks in Kenya and the Housing Finance of Kenya relied on secondary data from annual reports of the banks. Regression analysis was mainly used to reveal that
flexible interest rates charged by the financial institutions have a negative effect on mortgage financing.

2.5 Summary of Literature Review

From the research reviewed, significant work has been done on the relationship between interest rates and the real estate industry. Borrowing costs (interest) exert pressure on the real estate sector and cause distortion in prices. Further real estate demand may also drive the cost of borrowing as real estate construction is a major consumer of financial resource available in any economy.

An opportunity however exists in establishing the causal relationship between interest rates and commercial real estate pricing. The findings of such a research will provide critical insight for commercial real estate and financing stakeholders.
CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This section looked at the manner in which the Toda and Yamamoto model can be used to determine the objective of the study which was to establish the relationship between interest rates and Commercial Real Estate Prices.

3.2 Research Design

A research design is a plan, structure and strategy of investigation so conceived as to obtain answers to research questions or problems. The study used an empirical design in which the secondary and primary data was analyzed and the research hypothesis tested. This design helped build on what was already known in the subject area. The research was designed to perform causality test. The Toda and Yamamoto (1995) method of testing causality was employed to test the relationship between commercial real estate prices and interest rates in Kenya. In summary, in order to apply Toda and Yamamoto method, firstly, the VAR order, k, and the maximum order of integration of the variables, d_{max}, was determined in the VAR model. To employ causality test, modified Wald test (MWALD), was applied to the first k VAR coefficients to investigate causality.
3.3 Population of the Study

The two variables used in the research were interest rates stated as the quarterly weighted average lending rate by commercial banks and the average commercial rent per square foot. Our population comprised commercial leases in zones 1, 2 and 3 (CBD, Westalnds and Upper Hill areas of Nairobi) as seen in the appendix section and quarterly weighted lending rates from the CBK.

Zones 1, 2 and 3 were selected as our population area as these areas have been demarcated for commercial and office development by the Department of City Planning, (2014). These areas have a permitted coverage ratio of more than 80% and plot ratio of more than 200%. Coverage ratio is a measure that indicates the proportion of ground that should be built up while plot ratio indicates the number of floors allowed.

3.4 Sample

50 commercial leases were selected at random from the population. This is the minimum sample size allowed when the researcher is using an MWALD test (Zapata and Rambaldi, 1997). Using our sample, we determined the average commercial rent per square foot for each quarter in the seven year period (2007 – 2013). The prevailing quarterly interest rates for the same time period were obtained from CBK publications for use in the research.
3.5 Data Collection

The data for this study was collected according to the study objectives.

To determine the level of commercial real estate prices primary data was collected. Data on quarterly rent per square foot was collected using data collection forms from commercial space tenants and commercial real estate agents managing contracts in the population zone (zones 1, 2 and 3 in Map 1, see appendix section).

To determine the level and trend of lending rates, secondary data comprising the quarterly weighted average lending rate by commercial banks was obtained from the CBK. The data collected span a period of seven years, covering 2007 to 2013. This period was chosen because the lending environment experienced significant variability of interest rates and there was significant commercial real estate development.

3.6 Data Analysis

To test for the causal relationship between two variables, the standard Granger (1969) test was employed. This test states that, if past values of a variable Y significantly contribute to forecast the value of another variable $X_{t+1}$ then Y is said to Granger cause X and vice versa. To analyze Granger causality between interest rate and commercial real estate prices the research used Toda- Yamamoto (1995) procedure.

We obtained the data for the commercial real estate prices and corresponding interest rates for the period between January 2007 and December 2013. Based on the quarterly
data obtained we generated the two series one for interest rates and the other for commercial rent per square foot.

3.6.1 Toda Yamamoto method for causality test

In this section we describe the Toda and Yamamoto (1995) model which enabled us analyze Granger causality between interest rate and Commercial Real Estate Prices. The integrated properties of the commercial real estate price series and interest rates series are not important in Toda and Yamamoto method, providing that the risk of misspecification of the order of integration of the series is minimized. Thus, the causality relationship between series which are integrated different orders can be investigated. In order to apply Toda and Yamamoto method, firstly, the VAR order, k, and the maximum order of integration of the variables, dmax, should be determined in the VAR model. The sum of k and dmax, is taken into consideration as the total order of VAR, that is (k+dmax)th order of VAR is estimated. Then, in order to employ causality test, modified Wald test (MWALD), proposed by Toda and Yamamoto (1995), is applied to the first k VAR coefficients to investigate causality. This test has an asymptotic chi square ($\chi^2$) distribution when a VAR (k + dmax) is estimated. A Monte Carlo experiment, presented in Zapata and Rambaldi (1997), provides evidence that the MWALD test has a comparable performance in size and power to the likelihood ratio and WALD tests if (i) the correct number of lags for estimating k + dmax is identified and (ii) no important variables are omitted, provided a sample of 50 or more observations is available. According to Zapata and Rambaldi (1997), the advantage of this procedure is that it does not require the knowledge of cointegration properties of the system. Moreover, according
to Toda and Yamamoto, the MWald statistic is valid regardless whether a series is I (0), I (1) or I (2), non-cointegrated or cointegrated of an arbitrary order. To analyse Granger causality between interest rate and commercial real estate prices per square foot by using Toda and Yamamoto procedure, the following VAR system should be estimated.

\[
\begin{align*}
\text{int}_t &= \alpha_0 + \sum_{i=1}^{k} \alpha_{1i} \text{int}_{t-i} + \sum_{j=k+1}^{d_{\text{max}}} \lambda_{2j} \text{stpt}_{t-j} + \sum_{i=1}^{k} \lambda_{2i} \text{stpt}_{t-i} + \mu_{1t} \\
\text{stpt}_t &= \beta_0 + \sum_{i=1}^{k} \beta_{1i} \text{stpt}_{t-i} + \sum_{j=k+1}^{d_{\text{max}}} \Phi_{2j} \text{int}_{t-j} + \sum_{i=1}^{k} \Phi_{2i} \text{int}_{t-i} + \mu_{2t}
\end{align*}
\]

(7)

Where int is the weighted average lending rate by commercial banks and stpt is the commercial real estate price per square foot.

The Granger test was originally based on asymptotic distribution theory. However, Granger and Newbold (1974) showed through Monte Carlo simulations that if the data generating process (DGP) of the variables is characterized by integration (non-stationarity), the regression analysis based on the asymptotic distribution theory does not work well and the estimated results can be spurious. Phillips (1986) provided an analytical basis for this assertion. To remedy this problem one can transform the data by differencing, but this will result in loss of long run information. Since the development of cointegration by Granger (1981), Engle and Granger (1987), and Johansen (1988), the vector error correction model (VECM) has become a useful tool for empirical research of
integrated variables. Granger causality tests can also be performed by using the VECM (Granger, 1988). This procedure, however, requires pretesting for unit roots and cointegration, which may not be of interest if the primary objective is to determine whether or not there is causality.

Sims et al. (1990) showed that the asymptotic distribution theory cannot be applied for testing causality of integrated variables in level form using the vector autoregressive (VAR) model even if the variables co-integrate. Based on augmented VAR modelling, Toda and Yamamoto (1995) introduced a Wald test statistic that asymptotically has a chi-square distribution irrespective of the order of integration or co-integration properties of the variables in the model. The test is very simple to apply and it is one of the most applied tests for causality between integrated variables in applied research.

Firstly, we performed unit root tests on the time series to investigate whether they are stationary or not. The Augmented Dickey-Fuller (ADF) unit root test was used for this purpose. The tests were based on two sets of the null hypothesis

\[ H_0: \text{Interest rate does not cause average rent per square foot} \]
\[ H_0: \text{Average commercial rent per square foot does not cause interest rates} \]

And the two sets of alternative hypothesis

\[ H_1: \text{Interest causes average rent per square foot} \]
\[ H_1: \text{Average commercial rent per square foot causes interest rates} \]
If the calculated ADF statistics are less than their critical values from Fuller’s table, then the null hypothesis ($H_0$) is accepted and the series are non-stationary or not integrated of order zero. The test was repeated until we obtained the level in which the series became stationary. We then determined $d_{\text{max}}$ as the maximum order of integration. The Results of the ADF unit root test in levels disclosed critical value statistic and the p-values of the critical statistic.

Having determined that $d_{\text{max}}$, we then proceeded in estimating the lag structure of a system of VAR in levels. The results indicated the optimal lag length (VAR order k) using AIC optimal lag technique. We then estimated a system of VAR in levels with a total of ($d_{\text{max}} + k$) lag. The MWALD test statistic was then computed using the systems of VAR computed above.

We then computed the MWALD test statistic. This statistic is asymptotically distributed as a Chi Square, irrespective of whether the series are I (0), I (1) or I (2), non-co-integrated or co-integrated of an arbitrary order. We then compared the MWALD Statistic to the critical values. If the MWALD test Statistic exceeded the critical values statistics, we rejected the null hypothesis. Otherwise we concluded that there was no reason to reject the null hypothesis at the selected level of significance.
CHAPTER 4

DATA ANALYSIS, RESULTS AND DISCUSSIONS

4.1 Introduction

This chapter provides a summary of the data analysis, results of the study and the discussion on the results of the study. The chapter is organized as follows: section 4.2 and 4.3 describe the data, section 4.4 outlines the data analysis while section 4.5 discusses the results of the study and implication of the findings of the study.

4.2 Descriptive Statistics

Table 1: Descriptive Statistics of Commercial Rent and Interest

<table>
<thead>
<tr>
<th>Variable</th>
<th>Observations</th>
<th>Mean</th>
<th>Standard Deviation</th>
<th>Min</th>
<th>Max</th>
<th>Coefficient of Variation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Commercial Rent per SQF</td>
<td>28</td>
<td>150.269</td>
<td>34.569</td>
<td>112.428</td>
<td>209.34</td>
<td>0.23004</td>
</tr>
<tr>
<td>Interest Rate</td>
<td>28</td>
<td>9.226</td>
<td>3.292</td>
<td>5.88</td>
<td>18</td>
<td>0.35683</td>
</tr>
</tbody>
</table>

The table above is a summary of means and proportions for the two variables under study.

Over the period of study the mean commercial rent per square foot was Kshs 150 while the mean interest rate was 9.22%. The Highest commercial rent per square foot was Kshs 209.34 while the lowest was Shs 112.43. The highest interest rate observed was 18% while the lowest was 5.9%. Interest was seen to have higher variability than commercial rent per square foot as measured by the coefficient of variation (Standard deviation divided by the mean). The coefficient of variation for interest was 0.36 while that of commercial rent was 0.23.
4.3 Correlation Analysis

We obtained the data for the quarterly commercial rent per square foot and corresponding interest rates for the period between January 2007 and December 2013. Based on the quarterly data obtained we generated the two series one for interest rates and the other for commercial rent per square foot and plotted on separate graphs.

By observing the trends on the two graphs in figures one and two below, one for interest rates and the other for commercial rent, we note an important relationship. The two series trend in the same direction. For example, between 2010 and 2011 the interest rates rose sharply while the commercial rent continued to trend upwards. However, for the period 2008/2010 the interest rate fell while the commercial rent continue to trend upwards.

The correlation coefficient is positive 0.343. This indicates weak positive correlation.

The figures below depict the graphical analysis of the commercial rent and interest rates series:

Figure 1: Graphical Analysis of Commercial Rent Series

The table above represents commercial rent movements between the period 2007 and 2013

Source: Knight Frank (Kenya) Limited, (2014)
Figure 2: Graphical Analysis of CBK Interest Rate

The table above shows the quarterly interest rate movements over between 2007 and 2013


We therefore perform causality test in order to empirically establish if there is any relationship between interest rates and commercial rent.

4.4 Toda Yamamoto method for causality test

Firstly, we perform unit root tests on the time series to investigate whether they are stationary or not. The Augmented Dickey-Fuller (ADF) unit root test is used for this purpose. The tests are based on the null hypothesis (H0): interest rate is not I(0) and Commercial rent per square foot is not I(0). If the calculated ADF statistics are less than their critical values from Fuller’s table, then the null hypothesis (H0) is accepted and the
series are non-stationary or not integrated of order zero. The test is repeated until we obtain the level in which the series become stationary. We then determine $d_{max}$ as the maximum order of integration. The results of the unit root tests are summarised below:

Table 2: Results of the Augmented Dickey-Fuller unit root test – Commercial Rent

```
. dfuller Rent, lags(0)
Dickey-Fuller test for unit root                Number of obs =        27
                  ------------------------------------------
                  Test Statistic  1% Critical  5% Critical  10% Critical
                  ------------------------------------------
  Z(t)           0.514       -3.736       -2.994       -2.628
                  ------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.9853
```

The results show that the series for commercial rent per square foot is not stationary i.e is not integrated at order zero, $I(0)$.

Table 3: Results of the Augmented Dickey-Fuller unit root test – Interest

```
. dfuller Interest, lags(0)
Dickey-Fuller test for unit root                Number of obs =        27
                  ------------------------------------------
                  Test Statistic  1% Critical  5% Critical  10% Critical
                  ------------------------------------------
  Z(t)           -1.618       -3.736       -2.994       -2.628
                  ------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.4739
```

The results show that the series for interest rate is not stationary i.e is not integrated at order zero, $I(0)$.

The results in table 1 above suggest that none of the variables are stationary, that is, integrated of order 0 since the variables are not statistically significant at 1%.
However, the results in table 2 below suggest that both variables are stationary, that is, integrated of order 1 since the variables are statistically significant at 1% in their first difference. Therefore maximum order of integration (dmax) is 1.

Table 4: Results of the Augmented Dickey-Fuller unit root test in first difference - Commercial Rent

```
. dfuller DRent, lags(0)

Dickey-Fuller test for unit root

<table>
<thead>
<tr>
<th>Test Statistic</th>
<th>1% Critical Value</th>
<th>5% Critical Value</th>
<th>10% Critical Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Z(t)</td>
<td>-5.354</td>
<td>-3.750</td>
<td>-3.000</td>
</tr>
</tbody>
</table>

MacKinnon approximate p-value for Z(t) = 0.0000
```

The results show that the series for commercial rent per square foot is stationary i.e is integrated at order 1, I(1).

Table 5: Results of the Augmented Dickey-Fuller unit root test in first difference – Interest

```
. dfuller DInterest, lags(0)

Dickey-Fuller test for unit root

<table>
<thead>
<tr>
<th>Test Statistic</th>
<th>1% Critical Value</th>
<th>5% Critical Value</th>
<th>10% Critical Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Z(t)</td>
<td>-6.762</td>
<td>-3.736</td>
<td>-2.994</td>
</tr>
</tbody>
</table>

MacKinnon approximate p-value for Z(t) = 0.0000
```

The results show that the series for interest rates is stationary i.e is integrated at order 1, I(1).

Having determined that dmax as 1, we then proceed in estimating the lag structure of a system of VAR in levels and our results indicate that the optimal lag length (VAR order
k) using AIC optimal lag technique to be 3. We then estimate a system of VAR in levels with a total of (dmax+k) lags. Therefore the lag length is determined to be 4 (3+1).

The MWALD test statistic is then computed using the systems of VAR computed above. The MWALD statistic will be asymptotically distributed as a Chi Square, irrespective of whether the series are I (0), I (1) or I (2), non-cointegrated or cointegrated of an arbitrary order. The result of the Toda-Yamamoto causality test is shown below:

Table 6: H_0- Rent does not Cause interest

<table>
<thead>
<tr>
<th>Equation</th>
<th>Excluded</th>
<th>chi2</th>
<th>df</th>
<th>Prob &gt; chi2</th>
</tr>
</thead>
<tbody>
<tr>
<td>_</td>
<td>ALL</td>
<td>25.966</td>
<td>5</td>
<td>0.000</td>
</tr>
</tbody>
</table>

Based on the results of the MWALD test statistic as well as its p-values we reject the null hypothesis at 5% significance level. This is because the Mwald Statistics (Chi2) is higher than the degree of freedom (df) and the P value (Prob>Chi2) is less than the level of significance. The results showed in the table 6 indicate that there is no reason to conclude that Commercial rent does not cause changes in interest rates.

Table 7: H_0- Interest does not Cause Rent

<table>
<thead>
<tr>
<th>Equation</th>
<th>Excluded</th>
<th>chi2</th>
<th>df</th>
<th>Prob &gt; chi2</th>
</tr>
</thead>
<tbody>
<tr>
<td>_</td>
<td>ALL</td>
<td>4.4038</td>
<td>5</td>
<td>0.493</td>
</tr>
</tbody>
</table>
Based on the results of the MWALD test statistic as well as its p-values we accept the null hypothesis at 5% significance level. This is because the Mwald Statistics (Chi2) is lower than the degree of freedom (df) and the P value (Prob>Chi2) is higher than the level of significance. The results showed in the table 7 indicate that interest has no significant effect on commercial rent.

### 4.5 Summary and Interpretation of Findings

The study has established two conflicting relationships between interest and commercial rent. Interest has no causal effect on commercial rent. Movements in interest rate will not result in subsequent changes on commercial rent. However on the other hand movement in commercial rent has a positive effect on interest. The findings have implications for Commercial Real Estate investors, agencies, tenants, financiers and policy makers.

Commercial Real estate stakeholders have a reason to carefully watch the rental trends as these exert pressure on the prevailing interest rates. Increase in commercial rent appears to drive up the cost of borrowing. This is hedged on the fact that as real estate returns become attractive, more investors and financial institutions are opting to move funds from conservative government bond portfolios to real estate investment vehicles. This conforms to findings by Knight Frank Research in 2013. A resulting boom in commercial space construction results in pressure on the financial system whose sources of funds remain finite. This ultimately drives up the cost of borrowing.

On the other hand the effect of rising interest does not have a strong effect on the levels of commercial rent. This may be likely due to the fact that commercial rents in Kenya is governed by medium term contracts embedded with difficult exit conditions. A large
number of commercial real estate tenants are legally locked in unfavourable contracts even in periods of economic slumps. The legislative rigidity in commercial rent law reduces the effectiveness of interest revision in causing changes to commercial rent. Regulators in the leasing industry who include the lands ministry, county governments and rent tribunals may need to evaluate the rigidity of commercial rent laws which reduce the industry’s responsiveness to changes in macroeconomic conditions such as interest rate movement. The slow response of commercial rent prices to interest lead to delays in industry corrections especially in pricing and supply. Nairobi continues to witness rapid development on commercial real estate spaces that is not necessarily matched by demand. An impeding oversupply predicted by major players such as Knight Frank may not be corrected in time by slowing down property development.
CHAPTER 5

SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

This is the last chapter of the study. The chapter ties the objectives of the study with study conclusions based on the outcome of the study. It contains the various recommendations in the form of policy interventions on lease legislation.

5.2 Summary of Findings and Discussions

The study examined the relationship between interest rates and commercial real estate prices in Kenya for the period between January 2007 and December 2013. Interest rates were represented by the quarterly lending rate from the CBK which commercial real estate prices were represented by quarterly rent per square foot from 50 leases in the commercial zone of Nairobi County. Based on the results of the MWALD test statistic as well as its p-values we accepted and rejected the two null hypotheses at 5% significance level. The results therefore indicated that there is a causal relationship between interest rate and commercial rent albeit in one direction. Movement in commercial rent causes changes in interest. However there is no evidence indicating that changes in interest result in changes in commercial rent. As regards the sign of causality positive causality exists in one direction.

The finding that movement in commercial real estate prices cause changes in interest rates mean that stakeholders need to watch the changes in these prices to make investment and policy decisions. As commercial rent rise, lending rates respond by a
corresponding increase which drives up the cost of borrowing especially for the purpose of construction. Higher borrowing cost may lead investors to have higher return expectation for their investments. This is however where the second finding becomes relevant. In our study we also conclude that there is no evidence that movements in interest rates cause changes in commercial rent. Commercial rent will not rise or fall due to changes in interest rates. Commercial rent is largely governed by leases that largely changes in economic variables such as interest.

The rigid nature of commercial leases may be the main cause of oversupply of commercial real estate in Kenya as known rental prices are not representative of actual market prices. Investors continue to shift funds from risk free securities such as government bond to commercial real estate as this segment continues to indicate high but distorted prices. These prices are likely to change over a longer time horizons as tenants exit restrictive leases at the end of the term or mid-term due to distress.

5.3 Conclusion

This paper has presented the relationship between interest rates and commercial real estate prices in Nairobi County. The research presented a study of interest rate trends and compared this trend to that of commercial real estate prices in the commercial zones of Nairobi County. The aim of the study was to understand using the Toda Yamamoto Model, the level of causality between commercial rent in Nairobi County and interest rates. The study allowed an interesting observation of how legislative changes would allow commercial rent to be more responsive to movements in interest rates.
The empirical evidence from the study shows that movements in commercial rent have an effect on interest rates. Findings by Bank of Thailand (2004) also concluded that real estate rent had an adjusting effect on interest rates. Evidence showed that the minimum lending rate was responsive to movements in rent. However results from our study disclosed no evidence supporting the converse that interest rate movements cause changes in commercial rent. This is consistent with findings of Knight Frank (2013) which indicated an impending oversupply of commercial office space in Nairobi. In the face of this oversupply construction still continues at a large scale. This is due to the long term nature of commercial leases within Kenyan legislation which requires commercial leases to outline rent and escalations for a period of five years. Therefore in the short run, commercial real estate returns may appear favourable as tenants continue to meet the legal obligations of their leases. Investors may perceive real estate booms in periods of economic stress or downturn marked by high borrowing costs (interest). This is because market reaction may be delayed and only becomes evident as commercial tenants ease out of restrictive lease covenants at the end of the lease term.

The findings are however inconsistent with those of Conerly (2013) and Olick (2013) who concluded that real estate prices are responsive to changes in interest. The study departs from traditional expectations that changes in interest rate would affect commercial real estate prices. This traditional view is the basis of the income capitalization model where commercial rent is expected to be responsive to changes in interest rates. Leasing legislation in the Kenya real estate sector may distort commercial rent in the short to medium terms as tenants continue to meet rental obligations that may
be above market rates. Commercial rent responsiveness may only become evident as tenants opt out of leases at the end of the 5 year lease term.

5.4 Limitations of the study

This research considered only two variables; interest rates and commercial rent. It would be useful to test the causality relationship between interest rates and other economic variables.

The data available on commercial real estate pricing is also largely limited to commercial real estate agent and owners of commercial real estate. There is no publication of rental trend in the commercial real estate segment over a long period. Indices such as the Hass Index only consider residential property and would not be useful in such a study.

The time period of the study was also limited to a shorter timeframe in order to ensure that relevant data was available to drive the study. Data older than 7 years proved difficult to obtain as tax legislation only require financial records to be retained for 7 years.

The study was limited to average quarterly data as opposed to more frequent data observations such as monthly which may have an impact on the findings.

The study was also limited to Nairobi County due to the limitation in time and resources available for the research. Increasing the population area across different counties would
facilitate better conclusion on the relationship between commercial real estate prices and interest.

5.5 Recommendations

5.5.1 Policy Recommendations

The law relating to commercial leases are guided in Kenya by three Acts of Parliament these being the Land Act 2012, the Land Registration Act 2012 and the Landlord and Tenant (Shops, Hotels and Catering Establishments) Act. These laws require that commercial leases be made as covenants between landlords and tenants for a period of at least five years. A key recommendation of this study is a legislative change that removes the requirement of long term leases in order to allow commercial real estate prices better respond to changes in the economic environment measured by factors such as interest rates.

5.5.2 Suggestion for Further Research

This research considered only two variables; interest rates and commercial rent. Another study may be done using additional variables. Other important macro-economic variables such as the level of inflation, foreign exchange, securities market index may be studied in relation to commercial real estate prices and broader conclusions made.

The data available on commercial real estate prices was also limited as this is held at propriety levels and has not been published. There have been active discussions amongst
players in the commercial real estate industry to publish long term data and establish a commercial property index. Where such an index is established, a study may be done to link such an index to macro-economic variables such as interest.

The time period of the study may also be expanded to cover a longer period. This would however require more market players to be involved in such a study to ensure that long term data is reliably gathered.

Although our study relied on the more quarterly data which is common in commercial real estate (as rent is billed quarterly), it is also important to study the variables over shorter intervals such as monthly. This may have an impact on the findings such as the level of significance of our findings.

Further research may also be done in other counties in Kenya. This will enable us make conclusions on the relationship between the variables under study at a country-wide level.
REFERENCES


Baum, A. (2003). *Pricing the Options inherent in Lease Commercial Property: A UK Case Study*. United Kingdom: University of Reading Business School


Knight Frank. (2010). *Property Market Study: Nairobi and its Environs.* Nairobi: Knight Frank


Appendix I: Figures and Maps

Figure 3: Land Use in Nairobi County
Figure 4: Alonso’s Bid Rent Curve

Figure 5: Relationship of House rent, Stock Exchange index and Minimum lending rate – BOT

Chart 3 Cycles of the stock market index, housing rent, and MLR
Table 8: Data Entered for Study

<table>
<thead>
<tr>
<th>PERIOD</th>
<th>COMMERCIAL RENT PER SQUARE FOOT (KES)</th>
<th>CBK INTEREST RATE (%)</th>
<th>COMMERCIAL RENT IN FIRST DIFFERENCE</th>
<th>CBK INTEREST IN FIRST DIFFERENCE</th>
</tr>
</thead>
<tbody>
<tr>
<td>QTR 1 2007</td>
<td>112.428</td>
<td>8.5</td>
<td>177.8049</td>
<td>-1.125361</td>
</tr>
<tr>
<td>QTR 2 2007</td>
<td>112.495</td>
<td>8.5</td>
<td>1.43062</td>
<td></td>
</tr>
<tr>
<td>QTR 3 2007</td>
<td>112.588</td>
<td>8.75</td>
<td>2.798003</td>
<td></td>
</tr>
<tr>
<td>QTR 4 2007</td>
<td>113.048</td>
<td>8.75</td>
<td>-249.2995</td>
<td>-0.4001087</td>
</tr>
<tr>
<td>QTR 1 2008</td>
<td>114.313</td>
<td>9</td>
<td>-0.315762</td>
<td></td>
</tr>
<tr>
<td>QTR 2 2008</td>
<td>113.465</td>
<td>9</td>
<td>0.7892776</td>
<td></td>
</tr>
<tr>
<td>QTR 3 2008</td>
<td>115.046</td>
<td>9</td>
<td>156.4866</td>
<td>0.495085</td>
</tr>
<tr>
<td>QTR 4 2008</td>
<td>115.494</td>
<td>9</td>
<td>-1.401908</td>
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</tr>
<tr>
<td>QTR 1 2009</td>
<td>126.112</td>
<td>8.38</td>
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<td>-105.2631</td>
</tr>
<tr>
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<td>126.223</td>
<td>8</td>
<td>-84.93981</td>
<td>62.10472</td>
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<tr>
<td>QTR 3 2009</td>
<td>125.907</td>
<td>7.75</td>
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<tr>
<td>QTR 4 2009</td>
<td>126.125</td>
<td>7</td>
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<tr>
<td>QTR 2 2010</td>
<td>139.767</td>
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<td>0.6816921</td>
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<tr>
<td>QTR 3 2010</td>
<td>141.011</td>
<td>6.38</td>
<td>-76.86863</td>
<td>-0.6426984</td>
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<tr>
<td>QTR 4 2010</td>
<td>141.721</td>
<td>6</td>
<td>-27.80344</td>
<td>-0.4840384</td>
</tr>
<tr>
<td>QTR 1 2011</td>
<td>163.787</td>
<td>5.88</td>
<td>-275.2514</td>
<td>1.148294</td>
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<tr>
<td>QTR 2 2011</td>
<td>166.182</td>
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<tr>
<td>QTR 3 2011</td>
<td>168.574</td>
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<td>7.913947</td>
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<tr>
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<td>169.389</td>
<td>15.17</td>
<td>-34.92199</td>
<td>11.06817</td>
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<tr>
<td>QTR 1 2012</td>
<td>182.468</td>
<td>18</td>
<td>0.722034</td>
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<tr>
<td>QTR 2 2012</td>
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<td>18</td>
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<td>-2.163182</td>
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<tr>
<td>QTR 3 2012</td>
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<td>-64.11808</td>
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<tr>
<td>QTR 1 2013</td>
<td>205.856</td>
<td>9.5</td>
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<td>-13.02248</td>
</tr>
<tr>
<td>QTR 2 2013</td>
<td>205.934</td>
<td>8.5</td>
<td>-249.2995</td>
<td>-12.4938</td>
</tr>
<tr>
<td>QTR 3 2013</td>
<td>208.908</td>
<td>8.5</td>
<td>0.7978315</td>
<td></td>
</tr>
<tr>
<td>QTR 4 2013</td>
<td>209.343</td>
<td>8.5</td>
<td>0</td>
<td></td>
</tr>
</tbody>
</table>

In this table we disclose the variables used for the study and show the same variables in first difference (at which they become stationary)
Appendix III: Lag Order Selection Criteria

Table 9: Lag Order Selection Using Akaike Information Criterion (AIC)

```
. varsoc DInterest DRent, maxlag(3)

Selection-order criteria
Sample:  12 - 25, but with a gap    Number of obs     =      10

<table>
<thead>
<tr>
<th>lag</th>
<th>LL</th>
<th>LR</th>
<th>df</th>
<th>p</th>
<th>FPE</th>
<th>AIC</th>
<th>HQIC</th>
<th>SBIC</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>-108.66</td>
<td>1.4e+07</td>
<td>22.1321</td>
<td>22.0657</td>
<td>22.1926</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>-105.44</td>
<td>6.4408</td>
<td>4</td>
<td>0.169</td>
<td>1.7e+07</td>
<td>22.288</td>
<td>22.0889</td>
<td>22.4696</td>
</tr>
<tr>
<td>2</td>
<td>-99.8347</td>
<td>11.211</td>
<td>4</td>
<td>0.024</td>
<td>1.4e+07</td>
<td>21.9669</td>
<td>21.635</td>
<td>22.2695</td>
</tr>
<tr>
<td>3</td>
<td>-88.3267</td>
<td>23.016*</td>
<td>4</td>
<td>0.000</td>
<td>5.2e+06*</td>
<td>20.4653*</td>
<td>20.0006*</td>
<td>20.8889*</td>
</tr>
</tbody>
</table>

Endogenous: DInterest DRent
Exogenous: _cons
```

We select the Lag Order with the lowest AIC value. AIC measure the suitability of a set of model and the lower the AIC Value.
Appendix IV: System of VAR with Interest as Dependent Variable

Table 10: System of VAR with Interest as a Dependent Variable and Rent as an Independent Variable

```
. var DInterest, lags(1/4) exog(DRent)

Vector autoregression

Sample: 7 - 25, but with gaps  No. of obs = 17
Log likelihood = -78.88951  AIC = 9.987001
FPE = 1314.013  HQIC = 10.01623
Det(Sigma_m1) = 628.4409  SBIC = 10.28108

Equation       Parms    RMSE  R-sq    chi2  P>chi2
DInterest       6 31.1645 0.6043 25.96641 0.0001

| DInterest | Coef. | Std. Err. | z     | P>|z| | [95% Conf. Interval] |
|------------|-------|-----------|-------|------|---------------------|
| DInterest  |       |           |       |      |                     |
| L1         | -.5614038 | .208766 | -2.69 | 0.007 | -.9705776  .1522301 |
| L2         | -.855251  | .2350514 | -3.64 | 0.000 | -1.315943  -.3945586 |
| L3         | -.2286915 | .2351132 | -0.97 | 0.331 | -.6895049  .2321219 |
| L4         | -.300923  | .2042573 | -1.47 | 0.141 | -.70126    .099414  |
| _cons      | -.0951135 | .0440438 | -2.16 | 0.031 | -.1814376  -.0087893 |

The system above represents a vector autoregression (VAR) up to 4 lags with CBK interest as the dependent variable and commercial rent as the independent (exogeneous) variable. This system of VAR is then analysed for Causality.
Appendix V: System of VAR with Rent as Dependent Variable

Table 11: System of VAR with Rent as a Dependent Variable and Interest as an Independent Variable

```
.D var DRent, lags(1/4) exog(DInterest)
Vector autoregression

Sample:  13 - 20  No. of obs = 8
Log likelihood = -44.70065  AIC = 12.67516
FPE = 29237.15  HQIC = 12.27331
Det(Sigma_ml) = 4176.736  SBIC = 12.73474

Equation                 Parms   RMSE   R-sq   chi2   P>chi2

DRent                    6   129.255  0.3550  4.403801  0.4929

|     | Coef.   | Std. Err. | z | P>|z| | [95% Conf. Interval] |
|-----|---------|------------|---|------|---------------------|
|DRent |         |            |   |       |                     |
|      |         |            |   |       |                     |
|L1.  | -.5618732 | .3514749 | -1.60 | 0.110 | -1.250751                         .1270049 |
|L2.  | .0741457  | .8118088  | 0.09  | 0.927 | -1.51697                          1.665262 |
|L3.  | .3112265  | .5783544  | 0.54  | 0.590 | -.8223273                         1.44478 |
|L4.  | .2550559  | .2210104  | 1.15  | 0.248 | -.1781166                         .6882283 |
|DInterest | 7.866758 | 14.67469| 0.54  | 0.592 | -20.89511                        36.62862 |
|_cons | -143.9071 | 116.098  | -1.24 | 0.215 | -371.455                         83.64085 |
```

The system above represents a vector autoregression (VAR) up to 4 lags with commercial rent as the dependent variable and CBK interest as the independent (exogeneous) variable. This system of VAR is then analysed for Causality.