

**DETERMINANTS OF DEMAND FOR CREDIT BY THE REAL  
ESTATE SECTOR IN KENYA**

**BY**

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**DECLARATION**

This research paper is my original work and has not been presented for a degree in any other university.

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This research paper has been submitted for examination with my approval as the University Supervisor.

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Date.....

**Dr Kennedy Osoro**

## **DEDICATION**

This research paper is dedicated to my loving family for their unending support throughout my course work.

## **ACKNOWLEDGEMENT**

I am grateful to God for the wisdom, grace and energy to undertake and complete this work.

My sincere gratitude goes to my supervisor Dr Kennedy Osoro who keenly and patiently guided me from the beginning to the end of this project.

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## **ABSTRACT**

The study investigates the determinants of Kenya's real estate sector demand for credit. The study used quarterly time series data for the period 2005 Q1-2018 Q4 and the Vector Error Correction model. The results indicate that GDP and inflation have a positive effect on the credit demanded by the real sector. Their impact was however found not to be significant. Real short- term and long term interest rates depicted a negative and positive impact respectively whereas increase in the exchange rate was found to negatively impact the credit to the real estate. The growth in the real estate sector has a positive and significant impact on the credit demanded by sector. However, credit to other sectors (households) has a negative effect which was also found to be significant. Domestic debt exhibited a negative and significant effect on the credit to the real estate sector whereas interest capping was found to have a positive effect on the credit demanded though the effect was insignificant. The study established that the macroeconomic environment plays a vital role in the determination of credit demand by the real estate sector in the country.

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## **LIST OF ABBREVIATIONS**

AfDB – African Development Bank

AHP – Affordable Housing Program

ARDL – Autoregressive Distributed Lag

CBK – Central Bank of Kenya

CEE – Central and Eastern Europe countries

GDP – Gross Domestic Product

ICT – Information and Communication Technologies

KBA – Kenya Bankers Association

LDC – Least Developed Countries

MPC – Monetary Policy Committee

NGDP – Nominal Gross Domestic Product

NPLs – Non-Performing Loans

OECD – Organization for Economic Co-operation and Development

OLS – Ordinary Least Squares

PPP – Purchasing Power Parity

RGDP – Real Gross Domestic Product

SDGs – Sustainable Development Goals

SMEs – Small and Medium Enterprises

VAR – Vector Autoregression

VECM – Vector Error Correction Mechanism



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# CHAPTER ONE

## INTRODUCTION

### **1.1 Background of the Study**

The private sector in Kenya is vital in contributing to the country's development agenda. Private sector investment is an engine to economic growth through growth in productivity, income generation and job creation among others. According to the World Bank, with the government playing a supportive role in terms of regulation, service provision and funding, private initiative can aid deliver the critical services and state of affairs that will empower the economy to achieve higher levels of development (World Bank, n.d). AfDB (2013) on the other hand, adds that a flourishing private sector is essential in attaining the goals of Kenya's Vision 2030. In reality, the success of that vision is largely reliant on the private sector's role in accomplishing the countries growth objectives and, in so doing, generating more wealth and also employment opportunities.

According to experts, the growth of Kenya's private sector has been on an upward trend although the growth is below full potential. This situation can be accredited to the numerous challenges that the sector is facing. These include but are not limited to the country's disruptive political cycle, widespread corruption, political interference in businesses and macro-economic volatility. The cost of capital is still considered high in Kenya and this has been exacerbated by a variable exchange rate and inflation rate over the years. Even with the introduction of the rate cap, growth of credit to the sector has stagnated at a single digit (CBK, 2017). The Monetary Policy Committee (MPC) conducted a Market Perception Survey in March 2017 and they found out that commercial bank credit officers believed that credit issued would remain constant despite introduction of the interest rate caps due to tighter credit standards. Banks are

obliged to start taking less risk as a result of increase in credit risk. Consequently, this has led to banks reducing their credit lines resulting into a slower rate of growth in gross loans.

Kenya's real estate sector is one arm of the private sector whose contribution towards economic growth cannot be ignored. In addition to providing housing, the sector's performance is of paramount relevance to the banking industry's stability and the financial sector as a whole. This is because houses being a long-term investment have been used as collateral for other credits advanced by banks. As such, any poor performance in the sector contributes in the general influx of non – performing loans. There exists several global examples demonstrating the “housing multiplier effect”. Every single dollar that is directly spent on any housing unit indirectly translates into various benefits to the country. The study focuses on the role of the real estate sector in providing affordable housing solutions.

The 2010 Constitution of Kenya established the right to housing as one of the enforceable socio-economic rights. Provision of affordable housing is therefore one of the government's top priority with a goal of providing at least 200,000 units per year. Nonetheless, according to the World Bank, housing production is currently below 50,000 units per annum which is lower than the target, resulting in a shortage of more than 2 million houses, with almost 61 percent of the urban families dwelling in the slums. The shortfall continues to increase as a result of essential constraints on both demand and supply sides of housing provision which is aggravated by an urbanization rate estimated to be 4.4 percent, corresponding to half a million new city dwellers per annum. Moreover, developers seemed to have concentrated too much in the past, on the high end residential market that they forgot to build those that suit the low and middle income earners. Consequently, the major cities such as Nairobi ended up having an oversupply of luxury houses and a deficit in the affordable houses. The surplus has resulted into high levels of vacancy in the rental fragment, putting pressure on rents with further reductions expected in

the top end of the housing market. As this happens, the deficit in low cost houses continues to persist.

The Kenya National Census results show that households have been increasing steadily since the year 1979 to 2009. Table 1.1. shows that household numbers have more than tripled between 1979 and 2009 when the last census was conducted.

**Table 1.1: Trend of Number of Households (1979-2009)**

Total Population and Household Numbers Over Time								
	1979		1989		1999		2009	
	Population	Households	Population	Households	Population	Households	Population	Households
Kenya	15,327,061	2,956,369	21,443,636	4,352,751	28,686,607	6,371,370	38,610,097	8,767,954
Rift Valley	3,240,402	647,953	4,981,613	1,020,772	6,987,036	1,494,981	10,006,805	2,137,136
Eastern	2,719,851	504,617	3,768,677	677,740	4,631,779	957,648	5,668,123	1,284,838
Nyanza	2,643,956	463,321	3,507,162	700,916	4,392,196	968,014	5,442,711	1,188,287
Central	2,345,833	466,687	3,116,703	664,241	3,724,159	924,545	4,383,743	1,224,742
Nairobi	827,775	200,474	1,324,570	382,863	2,143,254	649,426	3,138,369	985,016
Western	1,832,663	332,146	2,544,329	475,261	3,358,776	701,323	4,334,282	904,075
Coast	1,342,794	269,199	1,829,191	360,882	2,487,264	527,427	3,325,307	731,199
N/Eastern	373,787	71,972	371,391	70,076	962,143	148,006	2,310,757	312,661

Source: KNBS, Population Census Reports 1979-2009

The housing deficit is in fact expected to increase with time. It is projected that more than 80% of Kenyans will have migrated from the rural areas by 2030 and therefore shelter is expected to be one of their basic needs. Currently, slum dwellers are estimated to be 1/3 of the urban dwellers total population (KIM Special Report Nov – Dec 2017). As this migration occurs, extra houses need to be constructed to tackle the slum menace. These houses need to be the affordable/low cost type mainly because majority of Kenyans are classified as either low or middle income earners and cannot afford the luxurious type.

The real estate sector ought to be reinforced and also needs to grow faster than it currently is. The sector is advancing from general growth of the country. The government is also investing heavily in this industry in different ways. These include the creation of ministry of housing,

making funds available to the housing ministry, urban planning and regulatory laws governing license permits among others (Homes Expo Kenya 2012). In 2018, the Kenyan government launched the Affordable Housing Program (AHP), a Big 4 Agenda initiative whose aim is to ensure accessibility of affordable and decent homes to low and middle-income households. The houses will cost much lower rates as compared to the market rates. Kenyans can register for the program using the Boma Yangu platform which will then allow allocation of housing units to qualified applicants as soon as the construction begins. The government intends to make available to the public close to 150,000 units every year through the National Tenant Purchase Scheme. Subscribers will then channel their rent payments towards the securing of the housing units on a monthly basis. Homeowners will be given a 25 years grace period to clear their balances. This initiative is considered instrumental in containing the housing deficit issue in the country.

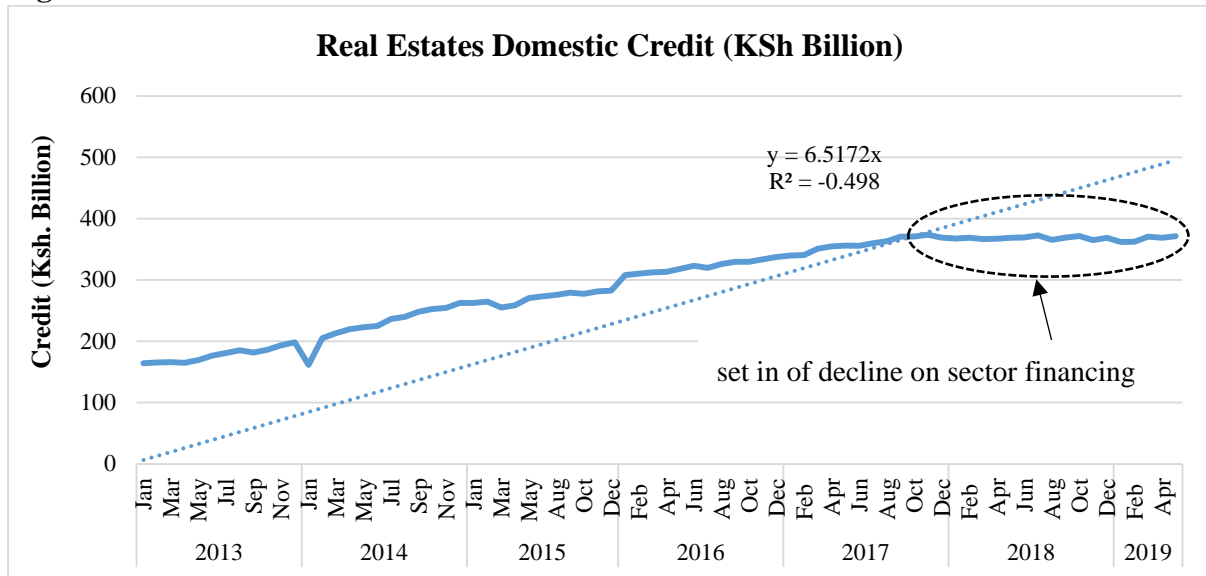
Even with such reforms, experts continue to argue that any policies geared towards improving housing affordability need to be founded on ensuring a sustainable supply of funding to housing investments (Buckley and Kalarickal 2005). This is due to the capital intensive nature of investment in housing. Different financing alternatives are available to housing developers in Kenya. Nevertheless, inadequate access to financial support is still a key barrier to affordable housing development. The main funding channels include commercial banks, microfinance institutions, cooperatives and housing finance institutions. These sources are however few and cannot be said to reach everyone being targeted (Kenya National Housing Survey 2012/2013). A constantly increasing housing market affordability gap is a critical aspect of the problem in addition to lack of financing for both investors in the sector and end users.

Consumers' decision to enter the credit market depends on demand and supply factors (Chen and Chivakul, 2008). On the demand side, consumers' desire to borrow determines their likelihood of engaging in the market for credit. On the supply side, lending decision and the

extent, is dependent on the ability to pay by the borrowers. This study focuses particularly on the demand side that is credit demand although the observed developments in the market for credit are a product of the interactions between the demand and supply factors.

A review of real estate financing from the banking industry, the largest financier of the sector, reveal that the credit advanced to the sector has been on an upward trend. From the Figure 1.1 it can be deduced that domestic credit to the real estate sector on monthly basis rose from as low as approximately Ksh. 151 Billion in 2013 to over Ksh. 350 Billion by 2017. The trajectory trend is in tandem with the expansionary growth registered by the sector with the sector rising to one of the big four sectors that account for 70 percent of the credit allocation (household, manufacturing, building & construction and real estate). Nonetheless, it is evident that a decline in the sector's financing seems to have set in, in October 2017. This can be attributed to the fact that the sector has been recording a decline in the growth rate thus attracting low credit allocation from the banks. In fact, the Quarterly Economic Review released in December 2017 by CBK shows that real estate exhibited the highest growth in non-performing loans in the three months period that ended in June 2017. Non-performing loans (NPLs) in that sector rose by Ksh 6.1 billion (15.8%) between April-June compared to the previous quarter even as property developers outperformed manufacturers (11.7 %) and traders (7.3 %) in the growth of defaulted loans.

**Figure 1.1: Trend of the real estate domestic credit**



Source: Central Bank of Kenya

The fluctuations in the sector’s financing have been attributed to factors affecting the sector such as economic slowdown due to prolonged electioneering period, slow uptake of housing units especially the luxurious type where majority of developers invested, complicated process of purchasing property and scarcity of land among others. It is however clear that if such decline persists then the country may not be able to cater for the housing needs of its citizens. This study therefore seeks to establish the factors that determine demand for credit by Kenya’s real estate sector.

## 1.2 Problem Statement

According to the United Nations country classification of 2014, Kenya joined the list of developing countries from the bracket of the Least Developed Countries (LDC). With this transition, provision of affordable housing is one of the government’s top priority with a goal of providing two hundred thousand housing units per annum for all income earners. However, according to the World Bank, construction of housing units currently stands at less than fifty thousand units per year which is below the target level, resulting in a deficit of more than two million units, with close to sixty one percent of urban households dwelling in slums. Kenya



has also not met the SDGs in terms of guaranteeing access to safe and affordable housing, and advancing slum settlements. The shortage in affordable and decent housing can be largely attributed to lack of access to cheap credit.

Real estate development is capital intensive and developers need cheap and accessible credit to be able to make meaningful investment in the sector. Credit is crucial in business financing because it provides investment capital. It is also key in providing finances to households to purchase capital goods which may include cars, homes, and appliances which consumers may be unable to finance using their current incomes (Joseph 2010).

Although financial institutions have increased in Kenya, credit rationing by use of high interest rates has excluded the disadvantaged people/developers because they cannot afford the high cost associated with borrowing even with interest rate capping which became effective in Kenya in September 2016. Consequently, real estate development continues to be limited despite increased demand for affordable housing arising from growth in population.

The CBK bank supervision annual reports show that the real estate sector has not been favoured in terms of gross loans issued to the sector by commercial banks as well as loan accounts that are specific to the sector. Number of loan accounts and gross loans specific to the sector have continued to fluctuate since 2014 with a significant decline in 2017.

Given that real estate sector seems to be a lucrative one as a result of the significant gap between the units demanded and the supply of housing and the ever increasing rental cost, why are real estate developers not subscribing to credit? Why is the demand for credit not increasing as expected?

The purpose of this study is therefore to establish the factors that determine Kenya's real estate sector demand for credit.

### **1.3 Research Questions**

The study sought to address the following questions:

- i. What factors influence demand for credit by the real estate sector in Kenya?
- ii. How has interest rate capping affected the demand for credit by the real estate sector in Kenya?
- iii. What policy recommendations can be drawn from the study?

### **1.4 Objectives of the Study**

The main objective of the study is to establish the determinants of demand for credit by the real estate sector in Kenya.

The specific objectives are:

- i. To establish the determinants of demand for credit by the real estate sector;
- ii. To examine the effect of interest rate capping on the demand for credit by the real estate sector;
- iii. To make policy recommendations grounded on the findings of the study.

### **1.5 Significance of the Study**

Several studies have analysed the relationship that exists between the credit demand and output, inflation, interest rates, public investment, exchange rate and employment as dependent variables (Calza 2001, Hofmann 2001, Nagy, Kiss and Vonnak 2006, Guo and Stepanyan 2011, Chebet 2014). However, the studies are general to the private sector. This study therefore focusses on the real estate sector; a sub-set of the private sector.

This study will be of relevance in 3 fronts.

Firstly, the study will provide a good base and reference point for policy makers when formulating new policies based on the findings of the study and/or improving the existing

policies in a bid to enhance availability and access to credit by the real estate sector in Kenya. More specifically, it will be useful to the National Treasury and the Central Bank as these are the bodies mandated to formulate and implement monetary and fiscal policies. For instance, the study seeks to establish the impact of the interest rate capping on the demand for credit which has been an area of debate in the recent past.

Secondly, commercial banks would find the results of the study relevant when making decisions on the sectoral allocation of credit. This will allow them to perform their role of financing in a manner that is beneficial to all the sectors in the economy as each sector has a unique role it plays in the Kenyan economy. Given the role that the real estate plays in ensuring stability in the general financial market because houses are used as collateral for securing other loans, then the banks will be better placed to make informed decisions when it comes to credit allocation to this sector.

Thirdly, this study will make a contribution to knowledge gap that currently exists in Kenya as regards the determinants of demand for credit by Kenya's real estate sector overtime. The findings of the study will be of research and scholarly value, as future researchers and scholars may find it a useful reference as they undertake additional investigations to augment the existing literature on the subject.

## **1.6 Organisation of the Study**

Following the introduction is Chapter two which is the literature review. It gives a summary of the information gathered from selected literature and is classified into theoretical and empirical literature. Chapter three outlines the methodology adopted to achieve the study's objectives. Chapter four provides the analysis of the data, reports on the results and discussion of the results obtained. Chapter five gives the summary of the findings of the study, talks about the conclusion and finally the recommendations thereof.

## **CHAPTER TWO**

### **LITERATURE REVIEW**

#### **2.1 Introduction**

In this section, review of both the theoretical and empirical literature considered relevant to the study was undertaken. This chapter provides information extracted from selected literature materials and articles on credit and the real estate sector's demand for credit which is the main aim of this study. The factors considered include per capita GDP growth rate, inflation, real short-term interest rates, real long-term interest rates, exchange rates, sectoral credit, sectoral growth, interest rate capping and domestic debt.

#### **2.2 Theoretical Literature**

##### **2.2.1 Life Cycle Model (LCM)-Franco Modigliani (1966)**

Franco Modigliani in his Life Cycle Model hypothesized that “households decisions relating to consumption as well as saving at any given time reflects a conscious effort to achieve the most preferred consumption distribution over their life cycle, but is subject to resource constraint faced by the household over its entire lifetime” (F. Modigliani, 1966). According to this model, households make consumption decisions based on both their current status and available resources over time.

According to Soman & Cheema (2002), intertemporal allocation of resources can be achieved by using savings (past income) in the future. Another method is to use future income in the present time. This can only be possible if consumers are able to access some temporary money which they can use and replenish in future. This role is performed by credit available to consumers. However, their study emphasizes on prior findings that indicate the inability of consumers to accurately value their incomes in the future. Also, they are short of the cognitive capabilities to solve intertemporal maximization problem which is required by life cycle hypothesis. Rather, these two are of the opinion that information relating to credit limit is used

by consumers as a pointer to their future incomes potential. They continue to argue that, if people can access significant credit, they would likely deduce that their total lifetime income will be more. Consequently, they will be more willing to use credit meaning their spending will also increase. Equally, consumers who are subject to lower amounts in terms of credit would probably suppose lower total lifetime income and therefore their spending will be much lower. The levels of savings in developing countries are low compared to developed countries and consequently, there is little available for investment in assets that will aid in smoothing consumption at an acceptable level even in future hence sourcing for credit.

### **2.2.2 Permanent Income Hypothesis - Friedman (1957)**

According to Hall (1978), the Permanent Income hypothesis is founded on the premise that consumers first estimate their long run consumption ability and then go ahead to set their current consumption based on that estimate.

In this theory, consumer's consumption behaviour is explained by the variations in their permanent income expectations as opposed to variations in their temporary income. The assumption is that households have an opportunity to borrow (perfect capital markets). Thus, with availability of information regarding the current and future earnings, credit plays a key role in smoothing consumption especially for the low income populace. The theory argues that, individual's current consumption is dependent on expected future consumption which depends on individuals' characteristics (Hall, 1978).

The hypothesis also postulates that individual's real wealth significantly influences consumption and not his current disposable income in real terms (Hall, 1978). Furthermore, temporary or transitory shifts in consumers' income levels have low impact on their spending behaviour, while changes that are permanent can have significant influence on the spending behaviour of consumers (Hall, 1978).

### **2.2.3 Credit Channel Theory – Bernanke and Gertler (1995)**

This is a theory of how monetary policy is transmitted. This mechanism is explained by two channels namely the bank lending channel and the balance sheet channel (Bernanke and Gertler 1995). Thornton (1994) argues that lending problems arising from information asymmetry form the basis of these two channels. The costs associated with obtaining information as well as controlling borrowers' behaviour creates disparity between the cost of internally generated and externally obtained finance. According to this theory, external changes in external finance premium intensifies the impact of monetary policy on interest rates. This premium is the difference in costs between internal and external finance. These could be retained earnings and debt/ equity respectively. The magnitude of the premium indicates imperfections that exist in the credit market which causes disparity between expected returns by lenders and costs that potential borrowers are faced with. Any change in monetary policy which lowers or raises interest rates in the open market tends to be in tandem with the change in the finance premium of external finance. Therefore, monetary policy impacts cost of borrowing, real activity and real spending significantly (Bernanke and Gertler, 1995).

The two researchers, emphasize four underlying realities on how the economy responds to monetary policy shocks. First: Tightening of the monetary policy that is not anticipated has effects on the rates of interest; a monetary tightening is typically accompanied by continuous decline in real GDP and price levels. Second: The impact of a monetary tightening is initially absorbed by final demand which falls rather quickly after the policy change. Production is downward sloping just like final demand, however with a lag only. This implies that in the short run inventory stocks rise. Eventually, inventories decline. This disinvestment of inventory explains a significant percentage of the decline in real GDP. Third: Most advance and sharpest reductions in final demand happen in residential investment. Spending on consumer goods (non-durables and durables) close behind. Fourth: There is an eventual decline in fixed

investment in response to monetary tightening. However, this fall lags behind those of consumer durables, housing and certainly, behind much of the decline in interest rates and production.

According to the two researchers, the balance sheet channel is grounded on the prediction that premium relating to external finance that a borrower faces should be dependent on his/ her financial position. Since premium on external finance is affected by borrowers' financial positions, and hence the overall credit terms, quality variations in their balance sheets need to equally affect their spending and investment decisions.

They continue to postulate that monetary policy, beyond the impact it has on borrowers' balance sheets, may in a similar way influence the premium on external finance by causing the supply of intermediated credit to shift, mainly loans that banks provide. This is referred to as the bank lending channel. In most countries, the leading source of such credit remain to be commercial banks. These banks have specialized in overcoming frictions in credit markets as well as informational problems among others. Should the supply of loans be interrupted for any reason, borrowers who depend on banks (SMEs for instance) may not necessarily be excluded from credit, but they will definitely incur costs that come with obtaining a new lender, trying to establish a credit relationship etc. Thus, a decrease in credit supply by banks, compared to other forms, will most likely increase the premium of external finance and reduce real activity.

### **2.3 Empirical Literature**

Calza et al (2001) conducted a study to establish the factors that affect private sector loans in the euro area. They used the Johansen methodology. Their study identified a unique cointegrating relationship between real loans, the GDP and the interest rates. The relationship implied that real loans in the long run are related to real GDP positively and negatively related to real short-term and real long-term interest rates. Stability tests of the model parameters did

not give an indication of structural breaks throughout the sampled period (1980 Q1 - 1999 Q2). This suggested that the changes in the real loans channelled to the euro area private sector were reasonably explained by the model.

Hofmann (2001), in his study of sixteen industrialised countries, examined the factors influencing credit to the private non-bank sector. Hofmann's study was done on the basis of a cointegrating VAR. Tests of cointegration suggested that standard credit demand factors cannot explain the long run credit development. Identification of long-run relationships that link real property prices positively to real GDP and negatively to interest rates however becomes possible when real property prices are included in the model. Analysis of the impulse response based on Cholesky decomposition of a standard nature showed that a significant two-way dynamic interaction exists between prices of property and bank credit.

Amanoo, Acquah and Asmah (2003) examined the presence of a relationship between interest rates and demand for credit as well as repayment of loan by poor people and SMEs and interest rates in one of Ghana's rural regions using regression analysis based on OLS procedures.

Christensen (2004) scrutinised the role that markets for domestic debt play in sub-Saharan Africa (SSA). They used dataset that covered twenty seven countries between 1980 and 2000. Finding of the study was that these countries debt markets are small in size, short term in nature and characterised by thin investor base. According to the study, a significant burden is put on the budget by domestic interest payments. Lending to the private sector was also found to have been crowded out significantly by domestic debt.

Kiss, Nagy and Vonnak (2006) analysed the growth of credit in a macroeconomic framework. They endeavoured to find out the equilibrium credit level to the private sector by use of panel estimation. The long-run relationship existing between credit stock and its determinants was obtained using pooled mean group estimators. The selected panel error-correction model



reasonably explained the credit aggregates evolution in Eurozone countries from 1980. PPP-based GDP per capita, inflation and the real interest rate were the major determinants of credit. These represented the effect of economic development, effects of inflation liquidity constraints and volatility and cost of credit respectively. Results revealed a positive relationship between PPP- based per capita GDP and private credit, whereas, inflation and real interest rate depicted a relationship that is negative with private credit/ GDP ratio. The estimated parameters were found to be in line with theoretical expectations and estimations by previous researchers. The long-run coefficients that were estimated were found to be in line with the Eurozone's previous estimations for credit demand.

In 2006, Egert, Backé and Zumer examined the factors that determined domestic credit to the private sector as a fraction of Gross Domestic Product in eleven Central and Eastern Europe countries (CEE) including the equilibrium level of private credit to GDP ratio. In their study, they evaluated the empirical specifications for various panels composed of developed small and large OECD countries, transition economies and market economies considered to be emerging from America and Asia. The study used panel estimates of emerging market economies and small open OECD from the two continents to determine the equilibrium credit for 11 countries of the CEE. Their outcomes indicated that public sector credit, the inflation rate, nominal rates of interest and the range between deposit and rates of lending intended to capture competition and financial liberalization in the banking sector ended up being the main causes of growth in credit in the CEE, whereas GDP per capita was the single variable that entered the equation being estimated in a strong manner. Moreover, they found out that the estimated coefficients related to transition economies were considerably higher than those of emerging market economies and OECD. An additional fascinating outcome was that in countries characterised by high house price inflation, house prices led to an increase in private credit.

Guo and Stepanyan (2011) examined the factors that determine bank credit in emerging markets. The data used covered quarter 1 of 2001 to quarter 2 of 2010 and covered thirty eight countries. Their analysis focused on banking sector's private credit as the dependent variable, domestic deposits in banks, foreign liabilities, real GDP, exchange rate, deposit rate, US federal funds rate, inflation, non-performing loan ratio and US M2. The study found that both liabilities to non-residents and domestic deposits positively contributed to growth in private credit. Furthermore, point estimates for these variables were found to be significantly similar, both were around 0.5. This gave an implication that banks treated foreign funding and domestic funding symmetrically i.e. half of every penny of additional funding, whether from foreign sources or domestic sources, will on average be lent out to the private sector. Similarly, private credit increased with inflation, implying that inflation dampens real growth in private credit. More demand for credit is driven by higher Gross Domestic Product growth thus higher credit growth, whereas a higher rate of deposits indicates tighter monetary conditions translating to less growth in credit.

Gerti and Irini (2013) focussed on the factors that determined bank lending to the private sector in Albania, in the long run. They applied the Vector Error Correction Mechanism (VECM) approach. This approach was established on indicators on the demand and supply fronts. The estimations revealed that there existed one adjustment mechanism that brought back the bank credit to its equilibrium level. The results suggested existence of a positive link between lending and economic growth. Furthermore, banking intermediation, financial intermediation, and also financial liberalisation would instigate higher demand for lending. Additionally, lower cost associated with lending, declining domestic borrowing by the government and a more qualitative credit by banks would provide additional incentives for lending. Equally, some consumption smoothing effects and demand valuation were found to be picked by the exchange rate.

Assefa (2014) analysed the short-run and long-run effects of macroeconomic variables and bank specific, monetary policies on banks' lending to Ethiopia's private sector. The supply side approach that covered the period 1978/79-2010/11 following Imran and Nishat's (2012) work done for Pakistan was used. Their study included private sector's credit as the dependent variable whilst explanatory variables were domestic deposit, lending interest rate, foreign liabilities, reserve requirement, RGDP, M2 expressed as a fraction of NGDP and rate of inflation. The findings indicated that real lending interest rate, domestic deposits, foreign liabilities, GDP, inflation and M2 have significant influence on private sector credit in the long run. However, reserve requirement did not impact private sector's credit in long-run and in the short run. Furthermore, in the short run, economic growth and domestic deposits were found not to affect credit to the private sector by commercial banks. The coefficient showed speedy adjustment process following previous period shocks. The long-run results and the short-run one failed to show strong evidence of the influence of banking sector reforms on the credit growth to Ethiopia's private sector.

Chebet (2014) studied how the demand for credit by the Kenya's private sector was effected by selected macroeconomic variables. The study applied the OLS method and used time series data spanning between 1980 and 2012. The findings were as follows; short-term interest rate, public investment, long-term interest rate, domestic debt as well as employment positively affect the private sector demand for credit, whereas exchange rate and GDP per capita negatively affected the private sector demand for credit.

Boako, Acheampong and Ibrahim (2017), applied ARDL (Autoregressive Distributed Lag), to examine the factors that influence allocation of commercial banks credit to Ghana's private sector between 1970 and 2011. Their findings showed that bank deposits, bank assets, broad money supply and lending rate were major determinants of credit in the short-run and long-run. Inflation also exhibited a significant and positive influence but in the short-run only. Their

findings also disclose that increase in bank deposits may not translate into increased credit supply to private sector. It can also be deduced that a reduction in government borrowing, lower cost associated with borrowing and lower reserve requirements for banks by the central banks are primary in stimulating higher credit demand and lending in Ghana.

## **2.4 Literature Overview**

Extensive review of the literature indicates that several studies have been conducted to establish the short-run and long-run factors that affect bank credit to the private sector. However, it is evident that there exists some gaps in the literature. First and foremost, majority of the studies have included an economic activity variable (mainly real GDP) and cost of financing such as interest rate and/or lending rates as the main determinants (Calza et al., 2001 and Amanoo et al., 2003). Others however, decided to include additional variables such as domestic debt, inflation and exchange rates in their studies (Egert et al., 2006; Guo & Stepanyan, 2011 and Chebet, 2014). It is notable that none of the researchers included sectoral growth and allocation of credit to other sectors which are factors that are expected to affect the demand for credit by any other competing sector.

Secondly, the findings of the empirical studies showed that the demand for credit is affected negatively by interest rates (Calza et al., 2001; Amanoo et al., 2003; Kiss et al. 2006 and Gerti & Irini, 2013) whereas a negative relationship exists between interest rates and payment of loans (Amanoo et al., 2003). Reducing interest rates therefore increases demand for bank credit by the poor and SMEs and repayment of loan at banks and non-bank financial institutions. However, the consensus in the literature is not clear on how real loans are linked to real GDP in the long-run. Whereas, some of the researchers established a positive relationship between GDP and credit to the private sector (Calza et al., 2001; Hofmann, 2001; Amanoo et al., 2003; Kiss et al. 2006; Guo & Stepanyan, 2011 and Gerti & Irini, 2013), others concluded that the relationship was actually negative (Chebet, 2014).

Finally, most of the studies are not within the Kenyan context and none has been narrowed down to the real estate sector which is a subset of the private sector. It is therefore important to conduct a study that is specific to Kenya's real estate sector. This is because sectoral analysis allows a more refined modelling of how the credit demand by the real estate sector in Kenya behaves.

## CHAPTER THREE

### METHODOLOGY

#### 3.1 Theoretical Framework

The Credit Chanel Theory developed by Bernanke and Gertler in 1995 forms part of the basis for this study. The theory argues that there exists costs related to obtaining information and controlling how borrowers behave as a result of information asymmetry in the market for credit. A change in monetary policy intended to lower or raise interest rates in the open market is always in tandem with the change in the cost of finance. Monetary policy thus impacts cost of borrowing, real activity and real spending significantly. Since interest rate is not the only factor that affects the level of borrowing by consumers, this study also borrows from the work of other scholars whose studies have shown that other additional factors also have a direct impact on the credit demanded especially by the private sector. These additional factors include GDP, domestic debt, inflation and exchange rate.

Therefore, in this study, we have adopted the model used by Calza et al (2001) who build up on the Credit Chanel Theory and also improved on it. According to the model, GDP, short term interest rate and long term interest rate are the main determinants of loans advanced by commercial banks to the private sector i.e.  $LOANS = f(GDP, ST, LT, \epsilon)$ ..... 1

The model was based on a long run relationship that was specified in semi log-linear form:

$$LOANS = \alpha + \beta_1.GDP + \beta_2 .ST + \beta_3.LT + \epsilon$$
.....

2

LOANS and GDP represented logarithms of real loans to the private sector and real GDP; whereas ST and LT denoted the real short-term and long-term interest rates.

#### 3.2 Empirical Model

This study will include additional macroeconomic variables to the ones used by Calza model. The relationship is therefore expressed as follows:

$$DCPSe = f(GDPPCGR, INF, SIR, LIR, EXRT, SC, SG, DDT, IRC \epsilon_t) \dots \dots \dots 3$$

Where;

DCPSe= Private sector demand for credit expressed as a % of GDP

GDPPCGR= per capita GDP growth rate

INF= Inflation

SIR= Real short term Interest rate (applicable to Treasury bills)

LIR= Real long term interest rate (applicable to bonds)

EXRT= Exchange rate

SC= Credit to other major sectors

SG= Growth in the sector

DDT= Domestic debt

IRC= Interest rate capping

$\epsilon_t$  = Error term

The adoption of the model is informed by its incorporation of real GDP, short-term and long-term interest rates as the main determinants of aggregate private sector's demand for credit and also it considers the long-run effects of such determinants on private sector's aggregate credit demand.

The model takes two assumptions that: the relationship indicates a demand (and not supply) function; and that the effect originates from explanatory variables to the total amount of credit advanced to the private sector.

Narrowing down to the real estate sector, the relationship is specified as follows:

$$DCRES = f(GDPPCGR, INF, SIR, LIR, EXRT, HHC, SG, DDT, IRC \epsilon t) \dots \dots \dots 4$$

From equation 4, model estimation is then done in order to determine the percentage change on the dependent variable arising from 1% change in the explanatory variables. This equation therefore becomes:

$$DCRES = \alpha + \beta_1 GDPPCGR + \beta_2 INF + \beta_3 SIR + \beta_4 LIR + \beta_5 EXRT + \beta_6 HHC + \beta_7 SG + \beta_8 DDT + \beta_9 IRC + \epsilon t \dots \dots \dots$$

5

Where;

DCRES= Real Estate Sector demand for credit (% of GDP)

GDPPCGR= per capita GDP growth rate

INF= Inflation

SIR= Real Short-term interest rate

LIR= Real Long-term interest rate

EXRT= Exchange rate

HHC= Credit to households

SG= Sector growth

DDT= Domestic debt

IRC= Interest rate capping

$\alpha$ = intercept

$\beta_1 - \beta_9$ = parameters

$\epsilon t$  = error term; captures effect of all relevant variables not included in the model





### 3.3 Definition and Measurement of Variables

The variables used in the model were defined and measured as summarized in the table below:

**Table 3.1: Summary of variables, measurement and predicted effect**

Variable	Measurement	Predicted Effect	Reference
<b>Dependent Variable</b>			
DCRES	Total credit issued by commercial banks to the real estate sector and denotes the amount that developers are willing and able to subscribe to at different costs at any given point in time.	N/A	
<b>Independent Variables</b>			
GDPPCGR	It measures the economic output per person in the country. It is arrived at by dividing the gross domestic product by the country's total population.	Positive	Calza et al (2001)
INF	Quarterly moving average inflation rate	Negative	Kiss, Nagy and Vonnak (2006)
SIR	Rate applicable to a 91 days Treasury bill	Negative	Calza et al (2001)
LIR	Rate applicable to 10 years government bond	Negative	Calza et al (2001)

EXRT	Quarterly moving average exchange rate between Kshs and US Dollar	Negative	Chebet (2014)
HHC	Bank credit advanced to Households	Negative	Author
SG	Quarterly growth rate of the real estate sector	Positive	Author
DDT	Total credit borrowed by the government from commercial banks	Negative	Gerti and Irini (2013)
IRC	Dummy variable that captures interest rate capping as follows:  0= Period before interest rate capping  1= Period after interest rate capping	Positive	Author

### 3.4 Data and data Sources

The researcher used time series data on a quarterly basis from secondary sources spanning the period 2005-2018, to meet the study's objectives. The data relating to the dependent variable (real estate sector demand for credit) as well as the explanatory variables; GDP per capita, exchange rate, inflation rate, interest rate, domestic debt, sectoral credit and real estate sector growth was sourced from available issues of economic surveys augmented by Central Bank of Kenya data base.

### 3.5 Estimation and Diagnostic Tests

Testing for integration properties of time series was done before estimation of the model. These include test for correlation, stationarity test and cointegration analysis. VECM method was then used to estimate equation (5) above.

### **3.5.1 Correlation Test**

To check whether there existed any variables which are highly correlated in the model, the Pearson's correlation test was carried out. Such correlation may lead to the estimators being biased on doing the regression of the model. Consequently, if one of the variables was found to be correlated it would be dropped to avoid the issue of multicollinearity when performing the estimation the empirical model.

### **3.5.2 Stationarity Test**

Given that many of the macro data series in most developing countries are non-stationary (the series have no finite variances asymptotically and the mean changes with time), many of the standard theories of asymptotic analysis are invalid. Spurious regression arises as a result of estimates of such variables. They also lead to inconsistent regression problems. As such, unit root tests examine stationarity of each variable used.

The Augmented Dickey Fuller test was performed to test for unit root.

### **3.5.3 Cointegration Analysis**

In case of non- stationarity, cointegration tests are performed. Cointegration test by use of Johansen Test was done when estimating the empirical model. Existence of any cointegrating equation implied a long run relationship between the independent variables and the dependent variable. This justified estimation of another model called the Error Correction Model (ECM) to figure out the rate of disequilibrium in the model in the short term because the model achieves equilibrium in the long term.

### **3.5.4 Post Estimation Tests**

Upon estimating the model, multicollinearity, normality and heteroscedasticity tests were performed to ensure estimated results are robust.

#### **3.5.4.1 Multicollinearity test**

This is a test that is applicable to the linear regression model to check whether there are variables which are highly linearly related such that the statistical inferences may end up not being reliable.

#### **3.5.4.2 Normality Test**

Normality of error term with constant variance and zero mean is a vital classical linear regression. This is a condition for OLS to be applicable. Normality test on the residuals was conducted to check if the error term is normally distributed or not.

#### **3.5.4.3 Heteroscedasticity Test**

Heteroscedasticity is said to occur when the variance of the error term varies across observations. Presence of heteroscedasticity affects minimum variance which leads to invalid conclusions during hypothesis testing. Heteroscedasticity was tested by using the Breusch–Pagan test. Its presence would be rectified by use of robust standard error in the testing of hypothesis.

## CHAPTER FOUR DATA ANALYSIS, RESULTS AND DISCUSSION

### 4.1 Introduction

The chapter presents analysis of the data and discussion of the results. It includes the descriptive statistics of variables in the empirical model, results of the estimation and diagnostic tests performed.

### 4.2 Descriptive Statistics

Table 4.1 gives a summary of the attributes of the data. This comprises of the mean, maximum and minimum values, variances and standard deviation, skewness and kurtosis of the variables.

**Table 4.1: Descriptive Statistics**

Variable	Obs	Mean	Std. Dev.	Min	Max	Skewness	Kurtosis
DCRES	56	188.2623	134.3588	20.22	393.4	0.1096	1.3192
GDPPCGR	56	5.4679	1.6752	1.3	11.6	0.2920	5.3175
INF	56	7.9355	4.3818	3.2	18.93	1.2503	3.4446
SIR	56	8.2084	2.8651	2.04	18.3	1.1739	6.9899
LIR	56	9.2002	2.9249	2.14	18.93	0.4833	5.8549
EXRT	56	86.8538	13.9163	63.3	112.77	0.1150	1.6939
HHC	56	217.2477	132.5464	9.54	404.9	-0.0514	1.4232
SG	56	4.6546	2.0813	0.8	11.4	0.6476	4.3621
DDT	56	35.8579	14.6628	20.55	61.2	0.3929	1.4693

The study covered 56 data points drawn from quarter 1 of 2005 – quarter 4 of 2018. In the study period, credit to real estate sector ranged between Ksh 20.22 million to Ksh 393.4 million with a mean value of Ksh 188.26 million and a standard deviation 134.36. It has a positive skewness and has non-normal distribution as evidenced by its kurtosis value.

On the macroeconomic front, the GDP growth rates was found to range between 1.3 percent to 11.6 percent with a mean of 5.47 percent and 1.68 standard deviation. Inflation rate within the study period was found to range between 3.2 percent to 18.93 percent with a mean of 7.94

percent and 4.38 standard deviation. The short term interest rate was found to range between 2.04 percent and 18.3 percent with a mean of 8.21 percent and 2.87 standard deviation. The long term interest rate was found to range between 2.14 percent and 18.93 percent with a mean of 9.20 percent and 2.92 standard deviation. Exchange rate was found to range between 63.3 to 112.77 with a mean of 86.85 and 13.91 standard deviation whereas credit advanced to households ranged between Ksh 9.54 million to Ksh 404.9 million with a mean of Ksh 217.25 million and a standard deviation of 132.55. The real estate sector growth was found to range between 0.8 percent and 11.4 percent with a mean of 4.65 percent and 2.08 standard deviation. Lastly, domestic debt was found to range between Ksh 20.55 million to Ksh 61.20 million with a mean value of Ksh 35.86 million and a standard deviation of 14.66.

Regarding the distribution of the variables, the descriptive statistics results above indicate that all the variables are positively skewed except credit to the households which is skewed to the left of the mean value. In addition, all the variables are not normally distributed based on their kurtosis values except for inflation that signals an almost normal distribution as the kurtosis value is close to 3.0. However, financial data is known to be statistically leptokurtotic thus ruling out the assumption of normal distribution.

### **4.3. Correlation Analysis**

Examination of the relationship between variables was carried out by computing the Pearson correlation coefficients at 5% level of significance. The results for the correlation matrix are presented in Table A1 (Appendix I). A coefficient between 0 and 0.5 signifies a weak relationship between the variables whilst a moderate relationship between variables is denoted by a coefficient between 0.5 and 0.7. However, a correlation coefficient above 0.7 indicates that the relationship between the variables is strong. According to the results, the credit demanded by the real estate is negatively correlated to real estate sector growth and inflation

as depicted by coefficients of (-0.2649) and (-0.3067) respectively. However, it is positively correlated to credit to the household sector (0.3826), as well as short term interest rates (0.2824), real long term interest rates (0.4295), GDP growth rate (0.1155), domestic debt (0.4855) and exchange rate (0.2484). The correlation matrix results does not show any strong correlation between the variables given that none of the correlation coefficients is more than 0.7 which is the qualification for a strong correlation. This removes the possibility of multicollinearity when running the model and therefore all the variables do qualify to be included in the model.

#### 4.4 Pre Estimation Tests

##### 4.4.1 Unit root test

Prior to estimating the empirical model, a unit root test was conducted. The aim of the test was to determine the variables order of integration. Estimation of the model without knowledge of the order of integration of the applicable variables may lead to spurious regression results. The Augmented Dickey – Fuller test was applied in testing for the presence or absence of unit root in each of the series. Test results are presented in Table 4.2.

**Table 4.2: Unit root test results**

	At level				At First difference				Level of Integration
	Test Statistic	1% Critical Value	5% Critical Value	10% Critical Value	Test Statistic	1% Critical Value	5% Critical Value	10% Critical Value	
DCRES	-1.095	-2.618	-1.95	-1.61	-7.396	-2.618	-1.95	-1.61	I(1)
GDPPCGR	-1.487	-2.618	-1.95	-1.61	-12.637	-2.618	-1.95	-1.61	I(1)
INF	-3.256	-2.618	-1.95	-1.61	-	-	-	-	I(0)
SIR	-1.945	-2.618	-1.95	-1.61	-14.099	-2.618	-1.95	-1.61	I(1)
LIR	-1.677	-2.618	-1.95	-1.61	-13.694	-2.618	-1.95	-1.61	I(1)
EXRT	-0.221	-2.618	-1.95	-1.61	-8.368	-2.618	-1.95	-1.61	I(1)
HHC	-0.807	-2.618	-1.95	-1.61	-6.801	-2.618	-1.95	-1.61	I(1)
SG	-2.024	-2.618	-1.95	-1.61	-	-	-	-	I(0)
DDT	-0.698	-2.618	-1.95	-1.61	-8.358	-2.618	-1.95	-1.61	I(1)



H<sub>0</sub>: series contains unit root

H<sub>1</sub>: series does not contain unit root

The null hypothesis is to be rejected if the test statistic is less than the critical value otherwise it should not be rejected. The test results presented in Table 4.2 reveal that rate of inflation and real estate sector growth rate are stationary at level implying that they are integrated at order (0). On the other hand, credit to real estate, GDP growth, real short term interest rate, real long term interest rate, exchange rate, credit to household sector and domestic debt are all integrated of order (1) since they all become stationery after first difference.

#### 4.4.2 Cointegration test

Before performing the cointegration test, it is important to determine the optimal lag length that will be used in running the model. A summary of the optimal lag is provided in Table 4.3.

**Table 4.3: Lag Selection Criterion**

lag	LL	LR	df	p	FPE	AIC	HQIC	SBIC
0	-1391.82				2.0e+12	53.8778	54.0072	54.2155
1	-1071.67	640.3	81	0.000	2.1e+08	44.6797	45.9744	48.0568*
2	-987.816	167.71	81	0.000	2.5e+08	44.5698	47.0298	50.9864
3	-840.697	294.24	81	0.000	4.5e+07	42.0268	45.652	51.4828
4	-632.458	416.48*	81	0.000	2.7e+06*	37.133*	41.9235*	49.6285

\* denotes the lag selected by the criterion

The AIC criterion prefers a lower statistic to a higher one. According to this criterion, the lower the statistic, the better the model and hence 4 lags recommended as the optimal lag length.

To determine whether the variables used in the model move in tandem in the long run, cointegration test was conducted. The confirmation of cointegration would automatically imply the need to run an error correction model to establish the short run effects and the speed of

adjustment to the long run equilibrium. The Johansen cointegration test was performed to test for the cointegration among variables. Table 4.4 presents the results of the test.

**Table 4.4: Johansen test for cointegration**

Maximum rank	parms	LL	eigenvalue	Trace statistic	5 % critical value
0	90	-1160.1882	.	270.5750	192.89
1	107	-1125.2744	0.72558	200.7473	156.00
2	122	-1096.8118	0.65152	143.8221	124.24
3	135	-1074.4827	0.56264	99.1640	94.15
4	146	-1059.2868	0.43039	68.7721	68.52
5	155	-1046.7063	0.37246	43.6111*	47.21
6	162	-1035.6746	0.33541	21.5478	29.68
7	167	-1028.9972	0.21910	8.1929	15.41
8	170	-1025.2072	0.13096	0.6130	3.76
9	171	-1024.9007	0.01129		

H<sub>0</sub>: There is no cointegration

H<sub>1</sub>: There is at least one cointegrating vector

We used the Trace statistic to determine presence of cointegration relationship(s) or the lack thereof. This was compared to the 5% critical value. Where it exceeded the critical value, the null hypothesis was not rejected. From the results, the Trace statistic was lower than then critical value at the 5<sup>th</sup> rank. We therefore concluded that there are 5 cointegrating equations at 5% level of significance implying that there exists a long run relationship between the variables. Presence of cointegrating relationship between the variables justified estimation of the VECM model.

#### 4.5 Estimation results

The results of the model are presented in Table 4.5.

**Table 4.5: VECM Model Results**

Vector Error Correction Model	
D_dcres	
L._ce1	-0.276*** (0.0545)
L._ce2	-0.285 (0.405)
L._ce3	-1.260*** (0.343)
L._ce4	7.875*** (2.256)
LD.DCRES	-0.170 (0.123)
LD.GDPPCGR	1.164 (0.683)
LD.INF	0.710 (0.467)
LD.SIR	-4.084 (2.137)
LD.LIR	4.698* (2.147)
LD.EXRT	-0.727** (0.226)
LD.HHC	-0.157* (0.0797)
LD.SG	2.672*** (0.793)
LD.DDT	-0.745** (0.282)
LD.IRC	9.792 (8.660)
Constant	-0.200 (2.134)

Standard errors in parentheses \*  $p < 0.05$ , \*\*  $p < 0.1$ , \*\*\*  $p < 0.01$

#### **4.6 Interpretation of the results**

The results of the model indicate that there exists a significant long run relationship between the demand for credit by the real estate sector and all the independent variables. This is depicted by the coefficient of the error correction term (-0.276) which is negative and significant at 5% level of significance ( $p=0.000$ ). The coefficient suggests that the rate of adjustment is 28% towards the equilibrium. These findings are in tandem with the findings of Calza (2001) and Chebet (2014).

The growth in per capita GDP was found to have a positive but not significant effect on the credit demanded by the real estate sector. This results are in line with the findings of Egert, Backé and Zumer (2006) who established a positive insignificant relationship between GDP and credit demanded by the private sector of the transition countries. A unit increase in the growth of per capita GDP would result in the increase in credit demanded by the real estate sector by Ksh 1.164 million.

Inflation was found to have a positive effect on the amount of credit demanded by the real estate sector. The effect was however not significant. This implies that general increase in price levels would lead to an increase in the amount of credit demanded by the real estate sector. This findings mirror the results of Egert, Backé and Zumer (2006) whose estimations revealed that there were instances of a negative relationship between inflation and credit to the private sector for the Southeastern European and Baltic countries even though the pattern was not systematic. A negative relationship was however expected.

Real short term interest rate was found to have a negative but not significant effect on the credit demanded by the real estate sector. Increase in interest rate in the short term would result into a decrease in the credit demand by the sector. This concurs with the findings of Calza (2001)

whose findings revealed that loans seemed to be more affected by long-term real interest rates than the effect caused by the real short-term interest rates.

The effect of real long term interest rate was found to be positive. These results concurred with the findings of Chebet (2014) and Guo & Stepanyan (2011) but were however contrary to the findings of Calza (2001). A unit increase in the long term interest rate would result into an increase in the amount of credit demanded by the real estate sector by Ksh 4.7 million.

Increase in the exchange rate was found to negatively impact the credit to real estate. The impact was found to be significant meaning that an increase in exchange rate results into a significant decrease in credit to the real estate sector. This was in line with the results found by Chebet (2014) but inconsistent with the findings of Guo and Stepanyan (2011) who established a positive relationship between the two.

The findings indicate that credit to the household sector has a negative and significant effect on the current credit to real estate sector at 5% level of significance as expected. This implies that the more the credit is channelled to another competing sector, the less the amounts available for the real estate sector.

Growth in the real estate sector on the other hand was found to have a positive and significant effect on credit demanded by the real estate sector as expected. This implies that as the real estate sector grows so does the credit demanded.

Domestic debt was found to exhibit a negative and significant effect on the credit demanded by the real estate sector. Increased government borrowing would lead to lower amount of credit being available for the real estate sector. This is line with the findings of Drazen (1996) who established a negative relationship between domestic debt and private borrowing. The results also concur with the findings of Egert, Backé and Zumer (2006) who found a negative and

statistically significant coefficient for the public sector credit for the emerging market economies and the OECD countries.

Interest rate capping was found to have a positive effect on the credit to real estate. The effect was however not significant. The insignificance of the interest rate capping with regard to credit to real estate could be attributed to the fact that the credit portfolio to the real estate as a proportion of total lending is minimal given that real estate lending is long term lending. As such given that banks rely on the short term deposit they are more likely to devote much of the financial resources towards short term lending as compared to long term lending. These results concur with the argument of Kenya Bankers Association (KBA) whose consumer's survey dated 22 March 2017 showed that 88% of the borrowers in the sampled population failed to change their borrowing behaviour as a result of the rate cap (KBA, 2017).

#### **4.7 Post estimation tests**

##### **4.7.1 Multicollinearity test**

To test whether there are variables in the model that are highly related linearly, the test for multicollinearity using the Variance Inflation Factor (VIF) was performed. Presence of multicollinearity would mean that some of the variables needed to have been excluded otherwise the reliability of the statistical results may be questionable. The rule of thumb is that if VIF is greater than 10, then there is high multicollinearity. From Table 4.6, the conclusion is that there is no presence of high collinearity between the variables.

**Table 4.6: Multicollinearity test**

Variable	VIF	1/VIF
lir	9.83	0.101729
sir	9.71	0.102987
hhc	9.68	0.103341
ddt	6.30	0.158827
exrt	5.28	0.189419
irc	5.00	0.199983
sg	2.15	0.465352
inf	1.81	0.553658
gdppcgr	1.29	0.777249
<b>Mean VIF</b>	<b>5.67</b>	

**4.7.2 Normality test**

Upon estimation of the VECM model, the normality test was conducted using the Shapiro-Wilk test. The results are presented in Table 4.7. From the results, it is evident that the error term is not normally distributed. From the result it is clear that the probabilities of the variables are all less than 5 percent (0.05) significance level implying that the residuals of the models follow a non-normal distribution.

**Table 4.7: Shapiro-Wilk test results**

Shapiro-Wilk W test for normal data					
Variable	Obs	W	V	z	Prob>z
dcres	56	0.85084	7.673	4.375	0.00001
gdppcgr	56	0.94778	2.687	2.122	0.01694
inf	56	0.82819	8.838	4.678	0.00000
sir	56	0.84021	8.220	4.523	0.00000
lir	56	0.87485	6.438	3.998	0.00003
exrt	56	0.93506	3.341	2.590	0.00480
hhc	56	0.88879	5.721	3.744	0.00009
sg	56	0.95031	2.556	2.015	0.02196
ddt	56	0.83002	8.745	4.655	0.00000
irc	56	0.88887	5.717	3.743	0.00009

### 4.7.3 Heteroscedasticity test

In regression, the assumption is that the variance of the error term does not vary across observations. Presence of heteroscedasticity requires use of robust standard errors in testing of the hypothesis in order to avoid invalid conclusions. Table 4.8 shows that the p-value is 0.1264 which is non-significant at 5% level of significance. We therefore conclude that there is no heteroscedasticity in the model.

**Table 4.8: Test for heteroscedasticity**

<b>Breusch-Pagan / Cook-Weisberg test for heteroscedasticity</b>	
Chi2(1)	2.34
Prob > chi2	0.1264



## CHAPTER FIVE

### SUMMARY, CONCLUSION AND RECOMMENDATIONS

#### 5.1 Introduction

This section presents the summary of findings of the study, conclusion and policy recommendations. It also includes the limitations of the study and suggestions for further research.

#### 5.2 Summary

The aim of the study was to establish the determinants of demand for credit by the real estate sector in Kenya by examining the relationship between the amount of credit demanded by Kenya's real estate sector and explanatory variables such as GDP, inflation, short-term interest rate, long-term interest rate, exchange rate, credit to households, sectoral growth, domestic debt and interest rate capping using the VECM model. Descriptive statistics revealed that all the variables were not normally distributed based on their kurtosis values.

Results following the test for correlation did not show any strong correlation between the variables. Test for unit root using the ADF, on the other hand, established that real estate sector growth rate and inflation were stationary at level whereas credit to real estate, GDP growth, real short term interest rate, real long term interest rate, exchange rate, credit to household sector and domestic debt only became stationery after the first difference. Johansen test for cointegration established 5 cointegrating equations meaning that a long run relationship existed between the variables.

Consequently, the VECM model was estimated whose results reveal a positive but insignificant effect of per capita GDP growth rate on the demand for credit by the real estate sector in Kenya. Inflation on the other hand, depicts a positive yet insignificant effect whereas real short-term

interest rate has a negative but insignificant impact. The real long-term interest rate reported a positive but significant effect on the credit demanded by the real estate sector whereas the effect of exchange rate was negative and significant. This was similar to credit to the households which depicted a negative and significant effect. The growth of the sector had a positive and significant effect on the sector's credit demand. Finally, domestic debt had a negative and significant effect whereas interest rate capping depicted a positive yet insignificant effect.

Post estimation results indicated that there was no multicollinearity between the variables. However, normality tests found that residuals of the models followed a non-normal distribution. On the other hand, there was no heteroscedasticity in the model.

### **5.3 Conclusion**

It is notable from the study that macroeconomic factors play an important role in determining the credit demanded by the real estate sector in Kenya. The coefficients supported that there exists a relationship between credit demanded by the real estate sector in Kenya and the determinants used in the study. Efforts to boost growth in per capita GDP would impact positively the credit demanded by the real estate sector. Increasing interest rates in the short term would cause a decrease in the credit demanded whereas the impact in relation to the long term interest rate would be the opposite. High exchange rates and excessive channelling of funds to other competing sectors including the government, on the other hand, would have a negative effect on the credit to real estate sector and therefore should be monitored. Ensuring growth in the sector would automatically boost the credit levels in the sector. Putting a ceiling on the rates of interest rate would enhance credit to real estate. We therefore conclude that sound macroeconomic environment is imperative in supporting the growth in the real estate sector if the desired results are to be achieved in the sector.

#### **5.4 Policy Recommendations**

Based on the findings of the study, the Government should consider formulating policies and creating a conducive macroeconomic environment that will put the country into the growth trajectory. Efforts aimed at improving GDP should be harnessed. Such could include investment in research and development geared towards discovering natural resources, funding human capital development, investment in capital infrastructure, investment in Information Technology and so on. Entrepreneurship should also be encouraged among the citizens and this could be achieved by introducing it into the school curriculum so that children are able to embrace it from a young age.

Policies towards containing the country's inflation should be put in place. Strategies targeted at improving the country's currency competitiveness will go a long way in achieving this. In addition such strategies largely contribute to stabilization of the exchange rate. Also, proper choice of monetary policy regime will impact the exchange rate policy and will ensure stability in the interest rates.

Commercial banks are encouraged to strike a balance between short-term lending e.g. to households and long-term lending development. Such a balance will go a long way in ensuring that all the sectors in the economy thrive together. Proper classification of loans/ credit should also be maintained to capture the correct purpose of the credit subscribed to by a consumer. This will enhance proper and informed decision making in the banking sector.

Finally, the government should work towards containing the level of domestic borrowing from the residents as this leaves little for private sector subscription. The government should focus

on other means of raising revenue such as increasing the tax base among others to avoid crowding out the lending to the private sector.

### **5.5 Limitations of the Study**

The study did not take into account all the factors that affect demand for credit by the real estate sector. It was limited to only the major macroeconomic factors. Consequently, there are other factors that determine credit demand by the real estate sector which were not considered in the study.

### **5.6 Areas of Further Studies**

This study established the determinants of demand for credit by the real estate sector with special consideration for GDP per capita, inflation, short-term interest rate, long-term interest rate, exchange rate, sectoral credit, real estate sector growth, interest rate capping and domestic debt as the explanatory variables. This cannot be said to be exhaustive.

Therefore, the study proposes that further research should be done using additional but relevant variables for comparative analysis and to also augment the findings of this study. This would ascertain the robustness of the findings of this study. Moreover, further studies could be carried out for other sectors that make up the private sector. Such studies will be relevant in informing the government on where policy reforms should be addressed in order for the country to realize its developmental objectives.

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## APPENDIX I

Table A1: Correlation Coefficients

	DCRES	SG	HHC	INF	SIR	LIR	GDPPCGR	DDT	EXRT
DCRES	1.0000								
SG	-0.2649	1.0000							
HHC	0.3826	-0.2226	1.0000						
INF	-0.3067	0.0431	-0.2363	1.0000					
SIR	0.2824	0.0789	0.3099	0.4500	1.0000				
LIR	0.4295	0.0104	0.4498	0.3687	0.9657	1.0000			
GDPPCGR	0.1155	0.1475	0.1120	-0.3384	-0.1823	-0.1836	1.0000		
DDT	0.4855	-0.2449	0.4403	-0.3159	0.1790	0.3356	0.1705	1.0000	
EXRT	0.2484	-0.2205	0.1532	-0.1077	0.4160	0.4237	0.0542	0.2152	1.0000