

**CAUSAL RELATIONSHIP BETWEEN MONETARY POLICY AND HOUSE  
PRICES: A COMPARATIVE ANALYSIS OF KENYA AND SOUTH AFRICA**

**BY**

**MASAI WILFRED CHEROKONY**

**A THESIS SUBMITTED TO THE SCHOOL OF BUSINESS AND  
ECONOMICS, DEPARTMENT OF FINANCE AND ACCOUNTING IN  
PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE AWARD  
OF MASTERS DEGREE IN BUSINESS ADMINISTRATION**

**MOI UNIVERSITY**

**AUGUST, 2019**

## DECLARATION

### Declaration by Candidate

This research thesis is my original work and has not been presented for the award of degree in any other university. No part of this project may be produced without permission of the author and or Moi University.

Sign: \_\_\_\_\_ Date: \_\_\_\_\_

MASAI WILFRED CHEROKONY

### Declaration by the Supervisors

This project has been submitted with our approval as University supervisors.

Sign: \_\_\_\_\_ Date: \_\_\_\_\_

DR. SIMIYU ALLAN

DEPARTMENT OF FINANCE AND ACCOUNTING

SCHOOL OF BUSINESS AND ECONOMICS

MOI UNIVERSITY

Sign: \_\_\_\_\_ Date: \_\_\_\_\_

DR. CHEBOI JOSPHAT

DEPARTMENT OF FINANCE AND ACCOUNTING

SCHOOL OF BUSINESS AND ECONOMICS

MOI UNIVERSITY

## **DEDICATION**

This thesis is dedicated to my lovely parents Mr. Masai Matui and Mrs. Jane Rahab for their great contribution through unceasing prayers, moral and financial support.

## **ACKNOWLEDGEMENT**

I acknowledge the many people who assisted and supported me through the period in which I was undertaking this project. First and foremost I would like to thank the almighty God for enabling me to reach this far. Also I would like to acknowledge my supervisors Dr. Allan Simiyu and Dr. Cheboi Josphat for the continuous guidance, support and critics which really opened my eyes to the research world. I also acknowledge my colleagues for the continued support and advice. Finally I thank Moi University for the opportunity it has endowed me to access its resources.

## ABSTRACT

The financial crisis which hit United States (US) in 2007 brought interaction between housing prices and household borrowing in the limelight of economic policy debate, attracting attention of the policy makers in economic stability. Given close interaction between housing prices and monetary policy, this study aimed at coming up with solution on housing deficits by the utilizing the relationship between the two variables. The problem of housing deficit is in terms of both quantity of housing, especially in urban areas where the quantity of available housing unit is grossly inadequate and the quality of housing particularly in the rural areas. The purpose of the study was to study causal relationship between housing prices and monetary policy in Kenya and South Africa. South Africa was used as comparison because South Africa financial institution have well established structures which can be used to transmit monetary policy into the economy as compared to Kenya which have structural problems in the financial market, including inadequate financial infrastructure and weak legal framework (Cheng, 2006). The main variables tested under this study were housing prices, lending rates and domestic credit to private sector based on the data collected from Hassconsultant ltd, IMF-IFS, and ABSA bank for a period spanning between 2001 and 2016. The study employed the use of vector Auto regression (VAR) model due to its robustness in forecasting. The collected data was first subjected to unit root test at levels using Augmented Dickey Fuller, and was found to be non-stationary and therefore had to be transformed to remove non stationarity so as to avoid spurious regression and misinterpretation of data. Vector auto regression was used to establish the nature and direction of relationship between the variables. It was established that house prices have statistical significance and positive effect on lending rates while lending rates have statistical significance and a positive effect on house prices. House prices have statistical significance and positive effect on domestic credit to private sector while domestic credit to private sector have no statistical significance on the housing prices. The study findings on comparison between Kenya and South Africa indicate that results of Kenya or South Africa cannot be used to predict or determine the movement of house prices in either countries. the results show that monetary policy have causal relationship with house prices and therefore based on this, it is recommended that policy makers pay close attention to house prices while designing policies on economic stability. Specifically, on relationship between lending rates and house prices, policy makers should reduce the lending rates so as to reduce house prices. While on domestic credit and house prices policy makers should avail more credit so as to allow individuals to purchase more decent house. Policy makers should utilize country specific data in designing policies because countries have different characteristics which may not be generalized.

## TABLE OF CONTENTS

DECLARATION .....	ii
DEDICATION .....	iii
ACKNOWLEDGEMENT .....	iv
ABSTRACT.....	v
TABLE OF CONTENTS.....	vi
LIST OF TABLES .....	ix
LIST OF FIGURES .....	x
DEFINITION OF TERMS .....	xi
LIST OF ABBREVIATIONS .....	xii
<b>CHAPTER ONE .....</b>	<b>1</b>
<b>INTRODUCTION.....</b>	<b>1</b>
1.0 Overview .....	1
1.1 Background of the Study .....	1
1.2 Statement of the Problem.....	8
1.3 General Objectives of the Study .....	9
1.3.1 Specific Objectives.....	9
1.4 Research Hypothesis .....	9
1.5 Significance of the Study .....	10
1.6 Scope of the Study .....	11
<b>CHAPTER TWO .....</b>	<b>12</b>
<b>LITERATURE REVIEW .....</b>	<b>12</b>
2.0 Introduction.....	12
2.1 Concept of House prices .....	12
2.2 Concept of Monetary policy .....	13
2.2.1 Central bank of Kenya.....	15
2.3 Concept of Interest Rate.....	17
2.4 Concept of Credit Channel (Domestic Credit).....	19
2.5 Relationship between interest rates and housing prices.....	20
2.6 Relationship between Domestic Credit and Housing Prices.....	22
2.7 Theoretical Review .....	24
2.7.1 Life cycle model of household consumption and saving .....	25
2.7.2 BGG MODEL (Bernanke, Gertler and Gilchrist, 1999).....	27

2.8 Conceptual Framework.....	28
<b>CHAPTER THREE .....</b>	<b>29</b>
<b>RESEARCH METHODOLOGY .....</b>	<b>29</b>
3.0 Introduction.....	29
3.1. Research Design.....	29
3.2. Area of study.....	29
3.3. Target Population.....	31
3.4 Sampling Design.....	32
3.5 Data Collection .....	33
3.5.1 Document analysis Guide.....	34
3.6 Measurement of Variables .....	35
3.6.1 House prices .....	35
3.6.2 Domestic credit and real interest rates .....	36
3.7 Data Analysis .....	36
<b>CHAPTER FOUR.....</b>	<b>40</b>
<b>DATA PRESENTATION, ANALYSIS AND INTERPRETATION .....</b>	<b>40</b>
4.0 Introduction.....	40
4.1 Descriptive statistics .....	40
4.1.1 Descriptive statistics: House Prices .....	40
4.1.2 Descriptive Statistics: Lending Rates.....	42
4.1.3 Descriptive Statistic: Domestic Credit to Private Sector .....	45
4.2 Test for Stationarity .....	47
4.3 Correlation analysis .....	49
4.4 Results on analysis of nature and direction of causal relationships.....	50
<b>CHAPTER FIVE .....</b>	<b>53</b>
<b>SUMMARY, CONCLUSION AND RECOMMENDATION.....</b>	<b>53</b>
5.0 Introduction.....	53
5.1 Summary of the Findings.....	53
5.1.1 Nature and direction of causal relationship between interest rates and house prices .....	53
5.1.2 Difference in the causal relationship between interest rates and house prices in Kenya and South Africa .....	54

5.1.3 Nature and direction of causal relationship between domestic credit to private sector and house prices .....	55
5.1.4 Difference in the causal relationship between domestic credit to private sector and house prices in Kenya and South Africa .....	56
5.2 Conclusion .....	56
5.3 Theoretical Implication of the Study .....	57
5.4 Managerial Implications and Recommendation of the Study.....	57
5.5 Limitations and Suggestions for Future Study.....	58
REFERENCES .....	60
APPENDIX.....	68
Appendix I: Document Analysis Guide .....	68



**LIST OF TABLES**

Table 4.1: Descriptive statistics: House Prices .....	40
Table 4.2: Descriptive Statistics: Lending Rates .....	42
Table 4.3: Descriptive Statistic: Domestic Credit to Private Sector .....	45
Table 4.4: Test on Stationarity .....	48
Table 4.5: Unit Root Test for Differenced Series .....	48
Table 4.6: Correlation Analysis .....	49
Table 4.5: Summary of Hypothesis Tests Results .....	52

**LIST OF FIGURES**

Figure 1.1: Conceptual Framework .....	28
Figure 4.1: Descriptive Statistics on House Prices .....	41
Figure 4.2: Descriptive Statistics on Lending Rates .....	44
Figure 4.3: Descriptive Statistics on Domestic Credit.....	46

## DEFINITION OF TERMS

**House prices-** The house price data is the weighted average for the middle segment for all sizes smoothed and seasonally adjusted to exclude distortions.

**Monetary policy-** it is a deliberate effort by the monetary authorities (the Central Bank) to control the money supply and credit conditions for the purpose of achieving certain broad economic objectives (Wrightsonan, 1976).

**Interest rates-** the amount received in relation to an amount loaned, generally expressed as a ratio of dollars received per hundred dollars lent (Radha, 2011).

**Domestic credit-** refers to lending or credit that a country or territory central bank makes available to borrowers within the same territory. This can involve commercial banks and even the government itself.

**LIST OF ABBREVIATIONS**

ADF:	Augmented Dickey Fuller
AfDB:	African Development Bank
BGG:	Bernanke Gertler and Gilchrist
BIS:	Bank of international Settlement
CAHF:	Centre for Affordable Housing Finance
CBK:	Central Bank of Kenya
C2PSZA:	Credit to Private sector for South Africa.
DSGE:	Dynamic Stochastic General Equilibrium
HPKE:	House prices for Kenya
HPZA:	House prices for South Africa
LRKE:	Lending rates for Kenya
LRZA:	Lending rates for South Africa.
SBIC:	Schwarz Bayes information Criterion
INT:	Interest rates
HP:	House prices.
IRs:	Impulse Response
IMF-IFS:	International Monetary Finance-International Financial Statistics.
NSE:	Nairobi Stock Exchange
JSE:	Johannesburg Stock Exchange
VAR:	Vector Auto Regression
UK:	United Kingdom
MPAC:	Monetary Policy Advisory Committee
GDP:	Gross Domestic Credit Product.
US:	United States

## **CHAPTER ONE**

### **INTRODUCTION**

#### **1.0 Overview**

This chapter contains the background to the study, statement of the problem, objectives of the study, research questions, and significance of the study and scope of the study.

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

According to surveys done by United Nations (UN), it is evident that sub-Saharan Africa is experiencing accelerated urban expansion. Which has further increased the demand for houses in African continent, this has led to growth of slums in most African urban cities. UN Habitat estimates that 200 million people in sub-Saharan Africa live in slums (Un-habitat, 2010). This therefore urges the need for more decent houses in the continent. Most African governments, for instance, Nigeria and Kenya, have put in place housing reform programmes to upgrade slums. Despite these efforts, housing continues to be a mirage to ordinary people since slum upgrade only solves the growth of slums not housing deficit in the country. It is clear that the only solution to solve housing problem is through credit lending which will in turn encourage individuals to build decent houses (Lindsey, Thompson, Cohen, & Williamson, 2012). Governments therefore should strive to provide affordable housing finance which seems to be impediment to house delivery in the country through provision of domestic credit.

Housing finance play an important role in shaping a country's wider housing system and services, the stability and effectiveness of the financial system, promoting social stability and economic development (Stein & Vance, 2008). It has also been found

that correctly structured finance systems can deliver improved housing for larger population segments, which has caused housing finance to rise to the top of urban policy and research agendas (Datta & Jones, 2012). Credit market as a capital market plays a significant role in house delivery through provision of mortgages to individuals who cannot afford to buy houses using their own money. However it has been a challenge to individuals in sub-Saharan Africa to go for such credit since it is costly option for them. Mortgage loans account for less than one percent of commercial banks' total assets and housing and construction only 3.1 percent of the rebased Gross Domestic Product (GDP). This compared to the United States (US), where the total housing sector contribution to GDP is in the order of about 18 percent. The World Bank estimates that if only the top three percent of Africa's population were to access mortgages, the continent's mortgage debt to GDP ratio could rise to 18 percent (12 percent, excluding South Africa). This activity could contribute as much as US\$300 billion to GDP (Maimbo, Faye, & Triki, 2011). Statistics from Centre for Affordable Housing Finance (CAHF's) indicate that mortgage to Gross Domestic Credit in developed countries is higher as compared to those of developing countries (CAHF, 2014).

Empirical literature has shown that credit lending has a significant impact on house prices, for example (Mian & Sufi, 2009) and (Dell'Ariccia, Igan, & Laeven, 2009) show that house prices in the US increased two-fold in nominal terms between the beginning of 2000 and the end of 2006. Over the same period mortgage rates fell by approximately 25% (from 8.2% to 6.1% for conventional 30-year fixed rate mortgages) and were accompanied by a reduction in credit standards, including the growth of new mortgage products such as subprime mortgages that made credit more widely available. It has also been proposed that easy access to credit and the reduced

cost of credit were the central factors fuelling the boom in housing prices as well as the subsequent reversal in house price growth when credit dried up (Mayer, 2011), (Adelino, Schoar, & Severino, 2012). Other scholars argue that there's causality relation between credit availability and house price growth. On the one hand, easier access to credit might reduce borrower financing constraints and increase total demand housing, which in turn lead to higher prices. On the other hand, however, credit conditions might be responding to expectations of stronger housing demand and, as a consequence, higher house prices. In this latter scenario, cheaper credit is not the driver house price increases but a by-product of increased demand for housing, since housing as a collateral becomes more valuable (Favara & Imbs, 2015)

This relationship between credit lending and house prices is of importance to monetary policy makers since deviations of both house prices and bank credits from their fundamental values serve as a useful piece of information to policy makers in designing appropriate stabilization policies (Goodhart & Hofmann, 2008). It has also been argued that a monetary-policy strategy that attaches some weight to the monitoring of monetary variables, rather than following a pure inflation-targeting approach, may help to avoid adverse long run consequences of building up financial imbalances by automatically inducing a leaning against-the-wind monetary policy mitigating excessive asset-price bubbles.

Research have shown that monetary policy has an impact on house delivery. For example (Williams, 2011), argue that monetary policy actions have sizable and significant effects on house prices in advanced economies; an increase in interest rates tends to lower (inflation adjusted) house prices. (Ungerer, 2015), also found out that both the housing sales rate and loan-to-value ratios increase after expansionary

monetary policy. Best on our knowledge on the law of demand an increase in price affect the quantity demanded and therefore an increase in house price will affect its demand and hence house delivery. There are two main channels of which monetary policy can be transmitted into the economy that is; credit channel and interest rate channel.

According to the Keynesian interest rate channel, a policy induced increase in the short term nominal interest rate leads first to an increase in longer term nominal interest rate (as cited by (Villar Burke, 2015)). Interest rate channel stresses that monetary policy can influence aggregate policy through interest rate changes. In this case, the effect of changes in short-term nominal interest rate is transmitted to the medium and long term interest rate through the mechanism of balancing demand and supply in the money market. Any changes interest rates will affect the cost of capital and in turn will affect investment and consumption spending as component of aggregate demand (Mishkin, 1995). (Hume & Sentance, 2009), argue that expansionary monetary policy is responsible for the low level of interest rates and the subsequent house price boom. Others scholars content that the low degree of financial development in emerging economies leads to capital inflows to developed countries, depressing long term interest rates and stimulating an increase in the demand for housing (Warnock & Warnock, 2009), (Bernanke, 2010).

On the other hand credit markets also play an important role in the transmission of monetary policy shocks and act as a channel for further propagation of monetary policy. Moreover, one of these factors that enables the existence of these channels of credit as additional mechanisms of monetary policy is related to the asymmetric information involved in financial transitions which, in turn, leads to problems of



adverse selection and moral hazard and making access difficult to borrowers to the credit market during tight-money periods, (Jiménez, Ongena, Peydró, & Saurina, 2014). These therefore limits house delivery to those who do not have enough funds. It has also been studied that housing market-credit market causal interactions has important implications. To the extent that the housing and credit markets reinforce each other, their behaviour should contain information for future financial distress and aggregate downturns. With the benefits of hindsight, some have claimed that the build-up of bank credits and house prices in the leading years to the 1997/ 1998 Asian crisis is a key contributing factor to the severity of the crisis (MULI, 2013); (Basten & Koch, 2015), also found that a 1% higher house price increases the requested mortgage amount by 0.52%. The non-causal partial correlation between house prices and mortgage demand however amounts to 0.78% due to reverse causality from mortgage amounts to house prices.

Any courses of action taken by the monetary policy authorities can have a serious side effect to the economy especially to house prices. Evidence suggest that banks shift the mortgage supply curve by making a larger share of applicants an offer or by offering more attractive mortgage rates. The resulting easier access to mortgages allows more potential home buyers to enter the market for owner-occupied property, and allows each of them to afford a more expensive house, thereby bidding up house prices (Fostel & Geanakoplos, 2014). This is also evident with the 2007 global economic downturn which was said to have been instigated by sub-prime lending in the United States (US). The crisis was triggered by series of events as from 1990s, at this time there was sharp increase in the subprime mortgages fuelled by low interest rates, lax lending standards, and low default rates and increased house appreciation. This as a

result encouraged banks to invest heavily in the real estate market, which eventually led to the creation of a speculative real estate bubble.

The collapse of the real estate bubble exerted enormous pressure on the banks that were highly exposed to the real estate market. In particular, many banking institutions suffered from severe liquidity shortages due to sharp increase in their nonperforming real estate loans. In fact, falling house prices undermined the value of real estate collaterals, which motivated many subprime mortgage borrowers to default on their loan repayments. Higher default rates, in turn, led to credit contraction and tightening of the lending standards in banks. As a consequence, the housing demand substantially dropped, while the house supply was increasing due to the raising number of real estate foreclosures. The imbalances between supply and demand further reduced house prices and exacerbated deteriorating credit market conditions, which severely affected the economy and led to high default rates across all loan categories (Tajik, Aliakbari, Ghalia, & Kaffash, 2015).

The 2007 financial crisis taught us that house prices are highly intertwined with several economic factors hence cannot be left to fall freely. (Goodhart & Hofmann, 2008), assessed the links between money credit, house prices and economic activity in 17 industrialized countries over three decades and one of the results they found out is that there is significant multidirectional link between house price, monetary variable and the macro economy. From a theoretical point of view, the interlinkages between monetary variables, house prices, and the macro economy are multi-faceted. For example optimal portfolio adjustment mechanisms, suggest a two-way link between house prices and money ((Barnett, Bhadury, & Ghosh, 2015), (Greiber & Setzer, 2007). Also according to the life-cycle model of household consumption, a permanent

increase in housing wealth leads to an increase in household spending and borrowing when homeowners try to smooth consumption over the life cycle. Besides this wealth effect, there is also a collateral effect of house prices emanating from the fact that houses are commonly used as collateral for loans because they are immobile and can, therefore, not easily be put out of a creditor's reach. As a consequence, higher house prices not only induce homeowners to spend and borrow more, but also enable them to do so by enhancing their borrowing capacity (Aoki, Proudman, & Vlieghe, 2004), (Muellbauer, 2008)

Given these evidences on the relationship between house prices and monetary policy, it is therefore important to investigate whether any of these monetary channels are available to policy makers to increase house production in order to reduce housing deficit. Since African continent is on the developing stage, housing markets are still tiny and one may wonder whether they will have a significant interaction or influence to economic fundamentals. Interest rates have also not been so unstable and one would doubt whether they are important drivers on house prices. Hence this study will establish the nature and direction of influence between interest rates and credit by commercial banks and house prices for both Kenya and South Africa. South Africa was used so as to provide a comparison because of higher openness of the economy, low wholesale prices relative to consumer prices, high real exchange rate, low real mortgage payments, low real interest rates, low output gap, as well as low indirect tax rate which is associated with adequate financial structure and strong legal framework (Cheng, 2006).

## **1.2 Statement of the Problem**

Despite the noble policy objectives and past efforts of the government, the current housing situation remains serious. The problem is in terms of both quantity of housing, especially in urban areas where the quantity of available housing unit is grossly inadequate and the quality of housing particularly in the rural areas. According to recent research by the African Development Bank (AfDB), Africa's middle class reached 34.3% of the population in 2010, up from 26.2% in 1980 (AfDB, 2011). In Kenya, it encompasses 44.9% of the population, this phenomenon has been accompanied by rapid urbanisation and strong growth in consumption expenditure and demand for certain types of goods and services. This therefore calls for general need for increase in housing production to accommodate the ever increasing population.

Since credit to housing sector, whether to buyers or developers has been proved to increase production, it is always easier to advise policy makers to allow more credit to housing players but the concern is that more credit will increase house prices which will affect economic stability. Given established empirical evidence of Hoffman (2004), Goodhart and Hofmann (2008), (McQuinn & O'Reilly, 2008), (Oikarinen, 2009), (Gimeno & Martinez-Carrascal, 2010) the increase in house prices can spur bank lending activities either by stimulating credit supply or credit demand.

The dilemma in Kenya is that there is no evidence that would suggest this to be true. So this study aims at investigating the causality relationship between the monetary policy and house prices in Kenya and South Africa. South Africa was used as comparative since while some African countries have problems in maintaining both political and economic stability, South Africa has capitalized on its stability and

economic infrastructure to attract private equity capital. South Africa private equity industry holds R86.6 under management as Dec 31 2017 compared to Dec 2006 at R59 billion. South Africa credit industry is highly dualistic, on the one hand, then exists a plethora of financial and credit products aimed at the middle income groups. At the opposite end, as much as 50% of low income individuals remain unbanked, the micro lending sector therefore, in most cases, become the primary source of accesses to credit for this category borrowers.

### **1.3 General Objectives of the Study**

To determine whether there is causality relationship between house prices and monetary policies in Kenya and South Africa.

#### **1.3.1 Specific Objectives**

- i. To establish nature and direction of causal relationship between interest rates and house prices
- ii. To compare causal relationship between interest rates and housing prices in Kenya and South Africa
- iii. To examine nature and direction of causal relationship between domestic credit and housing prices
- iv. To compare causal relationship between domestic credit and housing prices in Kenya and South Africa

### **1.4 Research Hypothesis**

**H<sub>01a</sub>**: There is no significant causal relationship in the nature and direction between interest rates and house prices

**H<sub>01b</sub>:** There is no significant difference in the causal relationship between interest rates and house prices in Kenya and South Africa

**H<sub>02a</sub>:** There is no significant causal relationship in the nature and direction between domestic credit and housing prices.

**H<sub>02b</sub>:** There is no significant difference in the causal relationship between domestic credit and housing prices in Kenya and South Africa

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

This study provides additional information to home owners, property investors, mortgage lenders, policy makers and other property market stakeholders on macroeconomic variables that influence housing prices and the impact of these variables on housing prices. This aids home owners and property investors in decisions on when to enter the property market and whether housing values are supported by fundamentals. The study also provides insight to stakeholders on prediction of the impact of shocks on macroeconomic variables on future housing prices and also aids policy makers in policy formulation and monitoring of the housing market.

Accordingly, deviations of both house prices and bank credits from their fundamental values should serve as a useful piece of information to policy makers in designing appropriate stabilization policies (Goodhart & Hofmann, 2008).

Knowledge of the housing cycles and their relations to the credit market is crucial for investors and construction firms. For instance, if the credit market is a priori causal to the housing market, an excessive expansion of credits should serve as a forewarning

signal that a collapse in the housing value could ensue and hence should be factored in their investment and construction decisions.

Some commentators have recently argued that a monetary-policy strategy that attaches some weight to the monitoring of monetary variables, rather than following a pure inflation targeting approach, may help to avoid adverse long run consequences of building up financial imbalances by automatically inducing a leaning against-the-wind monetary policy mitigating excessive asset-price bubbles. This study therefore helps the policy makers to come up with appropriate policy at an earlier stage rather than reactive one.

The study sought to serve as a contributing foundation in guiding students who wish to further their research in this topic as they will use the work as a baseline study and subsequently work on them for better results. The study is important to forex dealers, securities markets dealers, the government and the public as a whole, to understand the degree of responsiveness of foreign exchange, financial securities and the economy at large to interest rate changes

### **1.6 Scope of the Study**

The study utilised quarterly data between the first quarter of 2001 and the fourth quarter of 2016. The focus was to establish the causality relationship between house prices and monetary policy. The study used quarterly data on lending rate, and the domestic credit, house prices, gross domestic product, exchange rate, consumer price index, treasury bills rate for the two countries; Kenya and South Africa.

## **CHAPTER TWO**

### **LITERATURE REVIEW**

#### **2.0 Introduction**

This chapter presents past studies on the area of house prices and the monetary policy. This chapter is segmented into three parts. The first part presents the concepts (house prices, monetary policy, real interest rate and domestic credit), the second part presents the relationship between the variables (real interest rate and house prices, domestic credit and the house prices), and the subsequent section presents the theoretical review and finally the conceptual framework of the study.

#### **2.1 Concept of House prices**

Price can be defined both from money perspective and without reference to money. From money perspective it can be defined as the amount of money a given commodity will exchange for, it expresses therefore the value of commodity with respect to money (Johnson, 1905). It can also be defined as the signified amount of money which it will command; in other words, its value in terms of the accepted medium of exchange (Taussig, 1911). Without reference to money perspective it can be defined as quantity of goods given or received in exchange for another good (Fetter, 1912).

The literature of (Dees, Holly, Pesaran, & Smith, 2007) state that changes in housing prices have major implications for output and credit market. Also, house prices fluctuate due to job market conditions and relocation costs (Keen & Konrad, 2014). It follows that the housing market may stimulate the economy or may trigger economic recession as vindicated by the recent global financial turmoil, which had its roots in the subprime crisis in the United States. However, from the differences in average



house price inflation across the regions, it is not clear whether regions experiencing high increases in house prices grow faster than those experiencing slow increases in house prices. In effect, house prices may simply keep pace with inflation such that house prices in the relatively poorer regions may not be below the cross-regional average as expected. Understanding how economic growth is related to house prices is therefore of considerable value.

According to (Gupta & Sun, 2016), housing accounts for 29.40% of household assets and 21.68% of total wealth in South Africa. The permanent income hypothesis asserts that house price inflation increases the expected lifetime wealth of homeowners and hence impacts their desired consumption. This is known as the wealth effect. The collateral effect, on the other hand, postulates that fluctuations in house prices relax homeowners' financial constraints, which may in turn affect their actual consumption. While the wealth effect is immediate, the collateral effect assumes households are financially constrained. Consequently, distinguishing between the wealth effect and the collateral effect of house prices may contribute to understanding which policy measures will be effective in raising growth. For instance, easing borrowing constraints to stimulate the economy may not be efficient if the recession is due to the wealth effect; meaning that "households voluntarily reduce consumption because they feel poorer" (Miller, Peng, & Sklarz, 2011).

## **2.2 Concept of Monetary policy**

Monetary policy is the amalgam of measures designed to regulate the value, supply and cost of money in an economy, to stimulate productive economic activity in the country. The objectives of monetary policy in most economies include price stability,

maintenance of external balance, reduction of unemployment, growth in output, and sustainable development (Fasanya, Onakoya, & Agboluaje, 2013).

As from independence to 1990, the government of Kenya pursued a controlling monetary policy strategy where market interest rates were fixed by the monetary authority. Central Bank of Kenya mainly pursued low interest rate policy with a view of boosting investment in the country. During this era, monetary policy transmission was to a large extent determined by policy and regulations set by the monetary authority (Kinyua, 2001); (Ngugi, 2001). Controlling monetary policy strategy was counterproductive and ineffective to the extent that statutory controls translated to high cost of borrowing, inaccessibility of financial services by majority of Kenyans and interference with market operations (Ngugi, 2001); (Misati, Njoroge, Kamau, & Ouma, 2010). In this regard, monetary policy transmission was ineffective as financial market was dominated by a few commercial banks and security market growth stagnated.

From 1991, the Kenya government focused on implementation of structural reforms meant to drive the economy towards equitable and sustainable growth. Comprehensive economic reform introduced in 1990's led to fundamental changes in the institutional and operational framework of monetary policy in Kenya (Kinyua, 2001). Interest rates were liberalized in July 1991 and CBK became an autonomous institution mandated to formulate and implement monetary policy (Ngugi, 2001).

Under the framework introduced in the economic reforms of 1990's, CBK estimates demand for money in line with inflation and output targets and sets the money supply path to conform to its primary objectives (Ngugi, 2001). Given economic conditions and monetary policy targets, Central Bank through the monetary policy committee

effect monetary policy decisions by manipulating Central Bank Rate and the reserve requirements which are in turn transmitted to short-term interest rates.

In Kenya, the most applicable short term interest rates targeted by Central bank are Treasury bill rate, repo rate and interbank rate (Misati et al., 2010). Decontrolling of interest rates led to changes in monetary policy transmission framework in Kenya. The use of market-based or indirect monetary policy strategy aims at managing liquidity through manipulation of Commercial banks credit creation ability.

Central Bank influence commercial bank credit through its influence on short term interest rates and reserve requirements. This gives monetary authority ability to stimulate investment, prices, and output growth in line with set objectives (Central Bank of Kenya, 2011).

### **2.2.1 Central bank of Kenya**

Having been established in 1966 under Central Bank Act (Cap 481), The Central Bank Of Kenya has been entrusted with the responsibility of formulating and implementing monetary policy directed at achieving and maintaining stability in the general level of prices, to foster the liquidity, solvency and proper functioning of a stable market based financial system and to maintain a sound market based financial system. Measured against fiscal policy, monetary policy is said to be quicker at resolving economic shocks. (Kahn & Farrell, 2002) observes that monetary policy objectives are concerned with the management of multiple monetary targets among them price stability, promotion of growth, achieving full employment, smoothing the business cycle, preventing financial crises, stabilizing long-term interest rates and the real exchange rate.

Under Central bank, monetary policy committee has been established, which is responsible for formulating monetary policy. The committee was formed vide Gazette Notice 3771 on 30th April 2008 replacing the hitherto Monetary Policy Advisory Committee (MPAC). The membership of MPAC is composed of the Governor ,who is the chairman of the committee, the deputy Governor ,who is the deputy chairman ,two members appointed by the Governor from the bank ,one being a person with executive responsibility within the bank for monetary policy analysis(Director Research department) and the other person is a person with responsibility within the bank for monetary policy operations (External payment and reserve management );for external members who have knowledge ,experience and expert in matters relating to finance, banking, fiscal and monetary policy who are appointed by the minister for finance, The permanent secretary of the ministry of finance is a non -voting member of the committee or his designated alternate as representing the Treasury. Each external member of the committee serves for a term of 3 years which is renewable once (CBK Act, 2005).

Main tools that CBK uses to implement monetary policy include the following: open market operation and reserve requirement others include rediscount facilities and lender of the last resort facility which have not been recently used as the key tools for implementing monetary policy (Cheng, 2006). All these policies plays a critical role in influencing economic growth. In literature the role of monetary policy in influencing economic performance dates back to (Friedman & Schwartz, 1963) where it is shown that monetary policy actions are followed by movements in real output which is confirmed by recent empirical evidence that the effect of monetary policy on output may delay for up to two years (Bernanke & Blinder, 1992); (Christiano, Eichenbaum, & Evans, 1994).

However little research has been done on how these policies are transmitted in Kenya, it has been an area of abundant economic research in many countries. A prominent recent trend in this field has been the empirical analysis of how a monetary policy shock, usually defined as a temporary and exogenous rise in a short-term interest rate, affects output, prices, exchange rates, as well as other key economic variables. Typically, this strand of research has been conducted in the context of a vector auto regression (VAR) framework pioneered by (Sims, 1980). Notable examples using VAR to identify transmission of monetary policy for advanced economies include (Christiano, Eichenbaum, & Evans, 1999) for the United States, (Kim & Roubini, 2000) for G-7 economies, as well as (Peersman & Smets, 2005) for the euro area.

Theoretically monetary policy are transmitted into economy using various channels namely: asset price channel, interest rate channel, exchange rate channel, credit channel, and expectations channel (Meltzer, 1995) and (Mishkin, 1995) For the purpose of the study we are mainly dealing with credit channel and interest rate channel which have been studied to be having causality relationship with house prices in other country.

### **2.3 Concept of Interest Rate**

Interest rate has been defined as the percent premium paid on money at one date in terms of money to be in hand one year later. While Money is which can be traded as present and future; hence rate of interest is also known as cost of money or the price and the market in which it is traded is known as money market (Hou, Xue, & Zhang, 2014). Keynes define rate of interest rates as the reward of parting with liquidity for a specified period of time. According to (Ouma, 2014) interest rate is the “rent” paid to borrow money, the lender receives a compensation for foregoing other uses of the

funds including personal consumption. The original amount lent is called the principal and the percentage of the principal is paid or is payable over a period of time is the interest rate.

(Upadhyaya, 2011) also define interest rate as the amount received in relation to an amount loaned, generally expressed as a ratio of dollars received per hundred dollars lent. However, a distinction should be made between specific interest rates and interest rates in general (Moyo, Nandwa, Council, Oduor, & Simpasa, 2014). Specific interest rates on a particular financial instrument for example, a mortgage or bank certificate of deposit reflect the time for which the money is on loan, the risk that the money may not be repaid, and current supply and demand in the marketplace for funds available for lending (Siddiqui, Malik, & Shah, 2012). Interest rate always changes as a result of inflation and Central Banks rates, it varies from bank to bank depending on asset, staff cost, market power among other factors (Aboagye, Akoena, Antwi Asare, & Gockel, 2008).

Real interest rate plays a significant role in monetary transmission. Studies looking at Africa suggest that, in this part of the world, the interest rate channel is generally weak, and that the credit channel and exchange rate channels are more important although not always very strong. In particular, (Buigut, 2009) found the interest rate channel to be of relatively little importance in the transmission of monetary policy to output and prices in the East African region. (Al-Mashat, 2008) found similar results for Egypt. (Chhibber & Shafik, 1990) found that the credit channel was via money creation the main transmission channel in Ghana. (Harvey & Cushing, 2014) analysed the impact of monetary growth and exchange rate developments in ten African countries and found that though both factors were important in the inflationary

process in most of the countries examined, neither money nor exchange rate developments had a dominant role. For South Africa, a number of empirical studies have identified the interest rate channel as the dominant channel (Aron, Farrell, Muellbauer, & Sinclair, 2014) likely reflecting the more advanced nature of the financial sector compared to other African economies.

#### **2.4 Concept of Credit Channel (Domestic Credit)**

Previous researches on credit channel have indicated that credit channel play a role in monetary transmission. (Junior, Denardin, & Neto), in their research, while doing a comparison between Brazil and United states found out that financial regulatory and institutional framework determine the sensitivity of credit to monetary innovations and different economies react to monetary policy shocks. (Iacoviello & Minetti, 2003) also argue that the relevance of the credit channel depends on the structural features of the housing finance system, in particular efficiency and institutional organization. Their results support the existence of a broad credit channel and, in some contexts, of a bank lending channel. More importantly, the findings show across countries a clear-cut relationship between presence of a credit (bank-lending) channel, efficiency of housing finance and type of institutions active in mortgage provision.

The basic notion underlying this channel is that monetary policy can have price and output effects through credit rationing that arises from information asymmetries between financial institutions and the firms and consumers to which they lend (Levine, Loayza, & Beck, 2002). This occurs because monetary policy affects the extent of adverse selection and moral hazard that constrain the provision of credit in the economy. It is argued that monetary expansion reduces adverse selection and moral hazard problems by increasing firm's net worth, reducing perceived loan risks,

improving firms' cash flow, and decreasing the burden of nominal debt contracts (Levine et al., 2002).

The credit channel has two sub-channels—the bank lending and the balance sheet channels. The bank lending sub-channel works by influencing banks' ability to make loans following changes in the monetary base (Kishan & Opiela, 2000; Sichei, 2005). Here, a policy induced expansion of the monetary base increases the amount of reserves (deposits) available to banks, which they can use to advance loans. An expanded monetary base is thus likely to increase lending for investment and consumption purposes, leading to a rise in investment and consumption spending. The increase in domestic demand raises aggregate demand and, if aggregate demand exceeds aggregate supply, also inflationary pressures in the economy.

The balance sheet sub-channel is premised on the prediction that the external finance premium that a borrower faces depends on the borrower's net worth. In this regard, monetary policy can have direct and indirect effects on borrowers' balance sheets. A direct effect arises when an increase in interest rates works to raise the payments a borrower must make to service debts, while an indirect effect arises when interest rates reduce the capitalized value of the borrower's assets (Ireland, 2010). As a result, an increase in interest rates arising from tight monetary policy depresses spending through the traditional interest rate channel, but also raises the borrowers' cost of capital through the balance sheet channel. This reduces investment, consumption, employment, and output, and puts downward pressure on prices.

## **2.5 Relationship between interest rates and housing prices**

(Woodford, 2011) and (Michis, 2015) have showed that interest rates are influenced mainly by the money supply (for example the liquidity effect). Then, a change in the



interest rate or in the liquidity can affect real estate prices through different channels. The first channel is the credit channel (Mishkin, 2007). Lower interest rates make it cheaper to obtain a mortgage, and thus, there is an increase in the housing demand and an increase in housing prices. The second channel is the so called asset inflation channel (Belke, Orth, & Setzer, 2008). In this case, lower interest rates imply higher asset prices, including housing prices.

A lot of research have been done on the relationship between real interest rate and house prices world. Among the research done is the work of (Hofmann, 2004) he considers long run relationship between real bank credit, real interest rate, real GDP and real property prices in 16 industrialized countries using quarterly data from 1980 to 1998. He is able to pin down the presence of a long run credit equation for each individual country once the real property prices are incorporated in the analysis. He notes that the real property prices enter positively in the long run credit equations for all countries. Moreover, based on a dynamic analysis, innovations in real property prices solicit positive and persistent responses by bank lending. (Goodhart & Hofmann, 2008) examine patterns of causality between house prices, money, credit and the macro economy using a panel vector auto regression of 17 industrialized countries and quarterly data covering 1970Q1 to 2006Q4. They find multi-dimensional causal links among these variables. For the house prices bank credit pair, their causal patterns are bidirectional. In addition, the roles of money and credit shocks are found to be stronger during periods of booming house prices

The relationship between interest rates and house prices under what can possibly be described as 'normal conditions' has been extensively debated in the literature. (Levin & Pryce, 2009) argued that UK house prices increases over the period 1996-2007

were driven by real interest rates and (Ho & Wong, 2008) demonstrated that in Hong Kong house prices were driven by the local equivalent of the UK central bank base rate. (Fitzpatrick & McQuinn, 2007) also identified a long-run mutually reinforcing relationship between house prices and mortgage credit.

It should also be noted that other research suggests that the relationship between interest rates and house prices might not be so clear cut. For example, (Gilchrist & Leahy, 2002) argued that monetary-policy-related interest rate movements have little direct effect on asset prices. This is however, perhaps only a minority view. (Giuliodori, 2005) examined the relationship between interest rate shocks and house prices across Europe between 1979 and 1998. It was found that the impulse response to a 100 basis point shock varied considerably between countries. The UK however, was found to have a relatively large maximum response of about two percentage points after a lag of around 10 periods. (Tsatsaronis & Zhu, 2004) examined data from 1970 to 2002 and found similar results using a variance decomposition methodology; the UK was found to be in a group of countries where a one percentage point fall in absolute short term interest rates would increase house price inflation by about 2.6 percentage points.

## **2.6 Relationship between Domestic Credit and Housing Prices**

There has been extensive studies on the relationship between bank lending and house prices and this continues to attract the attention monetary policy makers. Among others, (Hofmann, 2003) (Davis & Zhu, 2011; Gimeno & Martinez-Carrascal, 2010) argue that there is a significant bilateral dynamic interplay between bank lending and house prices. The works of (Gorton & Ordoñez, 2014); (Inoguchi, 2011) claims that the build-up of bank credits and house prices in the leading years to the 1997/1998

Asian crisis is a key contributing factor to the severity of the crisis. (Aoki et al., 2004) and (Iacoviello, 2004) show that house prices may affect the availability of bank lending by the wealth effect. (Gerlach & Peng, 2005) find a one-way causality from house prices to bank lending. These studies suggest that house prices influence bank lending rather than the other way around.

On the other hand, the contrary of unilateral causality can also be assumed. Bank lending may affect house prices with increased credit availability, possibly expanding the demand for a contemporaneously fixed supply of housing stock. (Segoviano Basurto & Goodhart, 2009) and (Minsky, 2015), for example, have developed models that exhibit the role of credit in asset valuations, particularly when it increases available liquidity. The literature of (McQuinn & O'Reilly, 2008) also posit that house prices tend to depend on how much individuals can borrow from financial institutions, the latter in turns depends on real income and interest rate. They provide supportive evidence based on Irish quarterly data from 1980Q1 to 2005Q4 for a long run positive relation between house prices and the amount individuals can borrow and the significant adjustment of house prices to restore the long run equilibrium relation.

Interaction between global imbalances and the dynamics of house prices and the household debt has also been analysed using Dynamic Stochastic General Equilibrium (DSGE) models. Current account deficits have been linked to house prices in New-Keynesian open economy model in which the US borrows from a representative international saver. It is found out that a looser monetary policy combined with lower collateral requirements can explain about 60% of the increase in real house prices and about 25% of the current account deficits since 2000s (Ferrero, 2013). (Justiniano, Primiceri, & Tambalotti, 2014) argue that the dynamics of foreign capital flows

account for between one fourth and one third of the recent cycle in the US prices and household debt.

Although in Africa little has been done in regards to the relationship between the domestic credit and the house prices. The literature however indicates that there is the relationship between domestic credit and the house prices. For example (Mwenje, 2015) study investigates key macroeconomic variables that influence housing prices in South Africa. She also analyses the Impact of shocks to macro-economic variables in the short run as well as the nature of the relationship between house prices and the macroeconomic variables in the long run. Her study shows that real house prices and exchange rate household/debt disposable income, household net wealth/disposable income, new mortgage loans and prime interest have long run equilibrium relationship. The macroeconomic variables have positive impact on house prices in the long run. In other studies done in South African market, it has been found that housing prices have an impact on economic activity (for instance (Aye, Balcilar, Bosch, & Gupta, 2014) and (B. D. Simo-Kengne, Balcilar, Gupta, Reid, & Aye, 2013)

Given the development and liberalisation of financial sector Kenya, individuals have been able to access domestic credit to finance them to acquire houses. Its however not clear if there is causality relationship between the domestic credit and house prices in Kenya. The study therefore seeks to ascertain if there is causality relationship between the variables in Kenya.

## **2.7 Theoretical Review**

From a theoretical point of view, the interlinkages between monetary variables, house prices, and the macro economy are multi-faceted. Optimal portfolio adjustment mechanisms, which are at the heart of the traditional monetarist view of the

transmission process, suggest a two way link between house prices and money. An expansion of money changes the stock, and the marginal utility of liquid assets relative to the stock, and the marginal utility of other assets. Agents attempt to restore equilibrium by means of adjustments in spending and asset portfolios that re-equate for all assets as well as for consumption the ratios of marginal utilities to relative prices. This implies that an increase in money triggers increases in a broad range of asset prices and decreases in a broad range of interest rates and yields. In this sense, monetarists characterize the development of money as reflecting changes in the whole spectrum of interest rates and asset prices which are relevant for spending and investment decisions (Meltzer, 1995). By the same token, a change in house prices alters the value of the stock of housing assets, triggering a portfolio rebalancing which will also involve an adjustment in the demand for monetary assets (Greiber & Setzer, 2007).

### **2.7.1 Life cycle model of household consumption and saving**

According to the life-cycle model of household consumption, a permanent increase in housing wealth leads to an increase in household spending and borrowing when homeowners try to smooth consumption over the life cycle. Besides this wealth effect, there is also a collateral effect of house prices emanating from the fact that houses are commonly used as collateral for loans because they are immobile and can, therefore, not easily be put out of a creditor's reach. As a consequence, higher house prices not only induce homeowners to spend and borrow more, but also enable them to do so by enhancing their borrowing capacity. Also it might be argued that those who have already completed their life-cycle purchases gain from asset-price increases, while those who have yet to save up for retirement lose. Moreover, a large proportion of the

'losers' from a relative housing price increase are those yet to be born, and those too young to be earning for themselves. They can hardly save more, or lower their current consumption, whereas the old homeowners (the net gainers) can, and will, raise their consumption. There is, therefore, an asymmetry between gainers and losers, which works in favour of a positive wealth or collateral effect of house prices on consumption.

While the housing wealth and housing collateral effects on consumption are the most important or most explored channels of the transmission of house-price fluctuations to the real economy, the transmission via private investment also plays a role. The most direct effect of house-price fluctuations on economic activity is via residential investment. An increase in house prices raises the value of housing relative to construction costs, i.e. the Tobin  $q$  for residential investment. New housing construction becomes profitable when house prices rise above construction costs. Residential investment is therefore a positive function of house prices. Furthermore, the value of collateralizable property and land also affects the ability of firms to borrow and finance business investment, giving rise to a positive link between house prices and business investment.

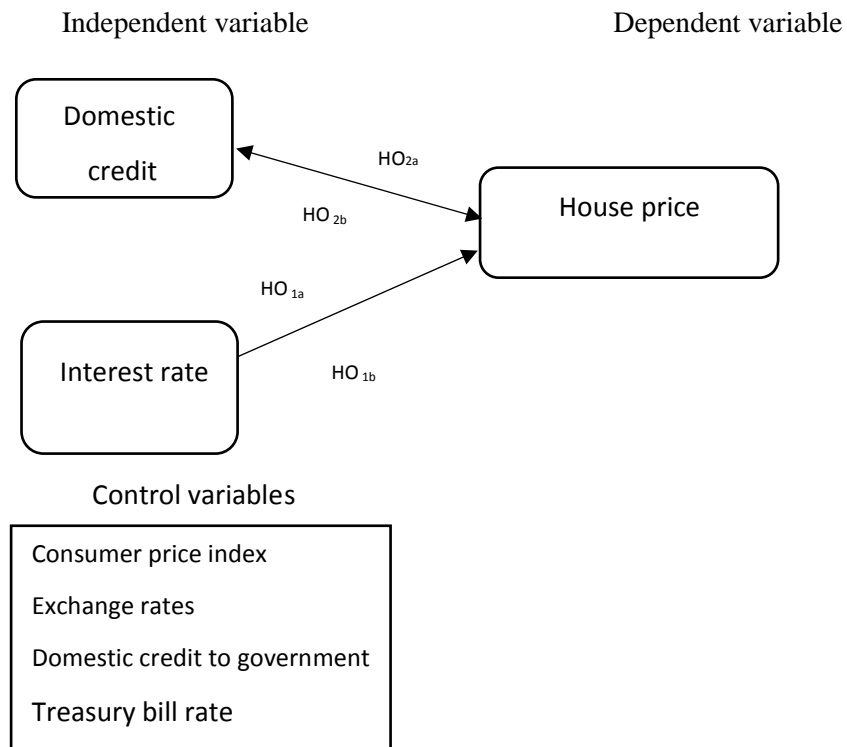
These wealth and collateral effects of house prices on consumption and investment imply adjustments in credit demand and credit supply, thereby potentially giving rise to a causal link from house prices to credit aggregates. House prices influence credit demand via wealth effects on consumption and Tobin's  $q$  effects on investment, while the collateral effects also have an impact on credit supply. Additional credit supply effects may arise via the effect of house prices on the balance sheets of banks. Such an effect may result directly via banks' property wealth, and indirectly via the effect

on the value of loans secured by real estate. An exogenous change in credit supply, e.g. driven by financial liberalization, may in turn also have repercussions on house prices. The price of property can be seen as an asset price, which is determined by the discounted future stream of property returns. An increase in credit supply lowers lending interest rates and stimulates current and future expected economic activity. As a result, property prices may rise because of higher expected returns on property and a lower discount factor. An increase in the availability of credit may also increase the demand for housing if households are borrowing-constrained. With supply temporarily fixed because of the time it takes to construct new housing units, this increase in demand will be reflected in higher property prices.

### **2.7.2 BGG MODEL (Bernanke, Gertler and Gilchrist, 1999)**

The model describes how this credit market channel may form part of the monetary transmission mechanism. The model focuses on the macroeconomic effects of imperfections in credit markets. Such imperfections generate premia on the external cost of raising funds, which in turn affect borrowing decisions. Within this framework, endogenous developments in credit markets—such as variations in net worth or collateral—work to amplify and propagate shocks to the macro economy. A positive shock to economic activity causes a rise in housing demand, which leads to a rise in house prices and so an increase in homeowners' net worth. This decreases the external finance premium, which leads to a further rise in housing demand and also spills over into consumption demand.

## 2.8 Conceptual Framework



**Figure 1.1: Conceptual Framework**

Source: Researcher 2018



## **CHAPTER THREE**

### **RESEARCH METHODOLOGY**

#### **3.0 Introduction**

Research methodology is a way to systematically solve the research problem. It indicates the various steps that are generally adopted by a researcher in studying his research problem along with the logic behind them (Kothari, 2004). The aim of the chapter is therefore to provide arguments for the approaches that the researcher will adopt in gathering and in the treatment of the data in order to answer the research questions and objectives. In this regard, this chapter discusses the following aspects: the research design, area of study, target population, data collection and the instruments used for data gathering, measurement of variables, data analysis methods and ethical consideration.

#### **3.1. Research Design**

Design involves planning, organization, collection and analysis of data to provide information and also solutions to the existing problem of the study. An explanatory research design will be employed in this research. According to (Cooper & Schindler, 2003), an explanatory study uses theories or hypotheses to account for the forces that caused a certain phenomenon to occur. (Orodho, 2003) also adds that an explanatory study analyses the cause effect relationship between two or more variables. This study investigates the causality relationship between monetary policy and house prices.

#### **3.2. Area of Study**

The study focused on the causality relationship between house prices and monetary policy in Kenya and South Africa. Kenya is an economic powerhouse for east Africa

and it is the key entry point to East Africa region with a population of over 40 million (Waruiru, Kim, & Kimanga, 2014) and it is continually growing. South Africa on the other hand has a population close to 53 million (Puoane et al., 2002) and it is situated southern tip of the African continent.

South Africa financial institution have well established structures which can be used to transmit monetary policy into the economy as compared to Kenya which have structural problems in the financial market, including inadequate financial infrastructure and weak legal framework (Cheng, 2006). For instance the Johannesburg is the Africa's premier exchange and the most sophisticated exchange comparable to exchange markets in developed countries. The market have evolved from traditional floor based equities trading market to modern security exchange providing fully electronic trading, clearing and settlement in securities, financial and agricultural derivatives and other associated instruments and has extensive surveillance capabilities. Johannesburg stock exchange (JSE) is the 17th largest exchange in the world by capitalisation, which is at more than R6- trillion with about 400 listed companies and 907 securities (JSE, November 2012). While some African countries have problems in maintain both political and economic stability, South African has capitalized on its stability and economic infrastructure to attract private equity capital (Allen, Otchere, & Senbet, 2011).

Survey analysed that analysed South African equity market from 2006 to 2007 reveals booming economy. South Africa economy holds R86.6 billion under management as at Dec 31 2017 compared to Dec 31 2006 at R59 billion. South African credit granting industry is highly dualistic on the one hand, there exists a plethora of financial and credit products aimed at the middle income groups. At the opposite end,

as much as 50% of low income individuals remain unbanked. The micro-lending sector therefore, in most cases, become the primary source of access to credit for this category of borrowers.

On contrary Kenya's Nairobi stock Exchange market is underdeveloped with little number of listed companies which as at year 2009 stood at 55 companies with market capitalization of 36% of gross domestic product. The value of stocks traded during the year was 1.6% of the GDP compared to that of South Africa which was at 119.76% of the GDP. NSE on the other hand is not fully automated as some of the operation such as clearing and settlement is still manual.

### **3.3. Target Population**

The unit of observation for this study was housing sector, and the countries will be Kenya and South Africa. While the unit of analysis for the study will be at country level.

Housing industry encompasses the many facets of property, including development, appraisal, marketing, leasing, and management of commercial, industrial, residential and agricultural properties. The industry can fluctuate depending on the national and local economies, although it remains somewhat consistent due to the fact that people always need homes and business always need office space (Vault real estate). This study will majorly focus on residential housing sector in order to determine the relationship with monetary policy.

Kenya housing market though still young compared with South Africa, is as old as the articulation of housing policy in 1965/66 sessional paper No. 5, which had a long term goal of ensuring that every house hold had access to a decent home. After more than 30 years, this policy thrust remains unchanged, although implementation has reflected

prevailing realities and resources (Makinde, 2014). Currently in Kenya, one third of the houses were inherited and only 1.5% of the house owners acquired it through credit (UGWUANYI & NO, 2012). In Nairobi, over 70% of the houses are permanent while only 54% of the houses in Mombasa are permanent. Traditional houses are more common in North Eastern (55%) but much less so on the coast and large cities. The real estate market in Kenya is characterized by information asymmetry with very little information centrally available (Johnson & Nino-Zarazua, 2011).

South Africa housing market began during the nineteenth and twentieth centuries, where home ownership in South Africa was financed mainly through building societies. The push effects of the Agricultural Revolution and the pull effects of the Industrial Revolution encouraged a mass migration of the British population to the cities and towns. This resulted in a chronic housing shortage, which the middle class traders and craftsmen were determined to overcome through the establishment of “friendly societies” (BIS paper No 21). Urban housing in south Africa consist of 60.4% of total housing (formal housing being 35.5%, informal 10%, traditional 0.6% and other 14.3%) while rural housing consist of 39.6% of total housing (formal 21.8%, informal 2.4, traditional 10.3% and others being 5.1%) (BIS Paper No.21). The study will majorly base on the urban housing for South Africa which its data already exist. Since most of the data collected by both countries are from urban regions country wide, the study will use such data as a representative of respective countries.

### **3.4 Sampling Design**

Purposive sampling design for this study was employed. This sample design is described as a random selection of sampling units within the segment of population

with the most information on the characteristic of interest (Creswell & Clark, 2007). Purposive sampling design is usually used when a limited number of individuals possess the trait of interest. It is also used if the researcher knows a reliable professional authority that he/she thinks is capable of assembling representative sample. The study therefore depended on the level of accuracy of the authorities collecting the data.

Data for this study was collected as from 2001 to 2016 since this is the periods during which the two countries underwent significant economic policy changes. Over the last two decades, South Africa witnessed a rapid appreciation in home values which has been shown to have affected the real economy, through consumption, at both aggregate and provincial levels (Das, Gupta, & Kanda, 2011; Gupta & Hartley, 2013). Further, Gupta and Hartley point out that house price in South Africa, is a leading indicator for output and inflation, and hence, can provide important information as to where the real economy is heading. Kenya on the other hand have had significant monetary changes during this study period like for example interest rate capping.

### **3.5 Data Collection**

Data for the study was derived from various sources for both the countries. For instance the Kenyan data on house prices was derived from Hassconsultant, largest real estate firm with wealth of experience from 1992. The company constructs data using data sets for 50 property types across Kenya, which have been weighted in an index basket. It excludes properties with development potential, being houses with land of half an acre or more where zoning allows further development. The properties included, cover those handled by Hassconsultant itself one of the city's largest estate agencies, at closing sale price and the offer prices from 13 other estate agencies, the

data is then cleansed to exclude all typical properties such as properties with development. This data have been utilized by other institutions such as World Bank 2011, African development bank (AfDB), CAHF.

The house prices for South Africa were obtained from Barclays Africa Group Limited, formerly known as Amalgamated Banks of South Africa (ABSA). The data is captured directly by property valuers into the mainframe mortgage loan database. This is done using a mobile device called Q10TECH. To ensure that data are as clean as possible, certain filters are applied to rid the data of outliers which could be caused by the incorrect capturing of values (Luüs, 2005). The data from this database have been utilized by various researchers such as (Allen et al., 2011; B. Simo-Kengne, Bittencourt, & Gupta, 2012).

Other data on other variables such as lending rates, exchange rates, credit to government sector, treasury bills rates were derived from IMF-IFS for both the countries. IMF international financial statistics is a compilation of financial data collected from various sources, covering over 200 countries worldwide which is published monthly by IMF. IMFIFS derives its data from its member countries central banks of which Kenya and South Africa are members. The data used for this study was based on the averages of three months to arrive on quarterly series.

### **3.5.1 Document analysis Guide**

Document analysis is a systematic procedure for reviewing or evaluating documents both printed and electronic (computer--based and Internet--transmitted) material. Like other analytical methods in qualitative research, document analysis requires that data be examined and interpreted in order to elicit meaning, gain understanding, and develop empirical knowledge (Strauss & Corbin, 1998). The instrument is

advantageous to this study because it is efficient method, many documents are in public domain, it is cost effective, lack of obtrusiveness and reactivity, exactness and coverage (Yin, 1994). Major limitations of document analysis are; insufficient details, low retrievability and biased selectivity (Yin, 1994).

The study will overcome the limitation by identifying pertinent information and to separate it from that which is not pertinent. In order to ensure retrievability the study will have back up for the data immediately after its collection.

### **3.6 Measurement of Variables**

#### **3.6.1 House prices**

House prices are often conceptualized in varied ways in most studies on house prices and monetary policy. Pan and Wang (2013) consider percentage change in the house price index and house price deviation from the fundamental level. Others such as Shi, Jou, and Tripe (2014), Vansteenkiste and Hiebert (2011) and Mendicino and Punzi (2014), among others use the real house prices but others, for instance, McQuinn and O'Reilly (2008) and Beltratti and Morana (2010) simply use nominal house prices.

Data on house prices for Kenya was obtained from Hassconsultant limited, other researchers who have utilized data from the same company are; (Arvanitis, 2013; Muthaura, 2012) and was measured by the use of house price index (Vargas-Silva, 2008), base year being 2001. For South Africa house price index was obtained from Barclays bank Africa group (Sá, Towbin, & Wieladek, 2011).(Williams, 2015). House price indices are based on the total purchases of homes, which is arrived at by dividing the current market price by the price of the property the base year multiplied by 100.

### **3.6.2 Domestic credit and real interest rates**

Data on domestic credit was obtained from International Monetary Fund – International Financial Statistics (IMF-IFS) data. It can also be obtained from South African Reserve Bank and Central Bank of Kenya. Interest rate was measured by use of lending rates (Iacoviello & Minetti, 2008). Domestic credit was measured by domestic credit to private sector as it has been used by various researchers.

Other variables that were used in the study are: domestic credit to government, inflation, gross domestic product, lending rates. All the above variables were obtained from international financial statistics.

### **3.7 Data Analysis**

Traditionally, various econometric techniques are used to estimate effectiveness of channels of transmission of policy and other financial and economic changes. Specific to this study, analysis of the causal relationship between interest rate, credit and housing prices is tantamount to an estimation of the effectiveness of interest rate channel and that of credit channel in transmitting monetary policy changes. A common and generally applauded approach is to use the Vector Autoregressive (VAR) model. In order to do VAR, all variables need to be stationary (Koops, 2006) therefore this means that unit root tests will be carried out. (Dickey & Fuller, 1979) and (Phillips & Perron, 1988) tests are used to test for stationarity. The two tests are used to resolve their inherent limitations.

The European Central Bank (2011) puts it rather clear. Accordingly, there is an extensive use of Vector Autoregressions (VARs) to study the macroeconomic effects of an unexpected change in policy-controlled factors because VARs allow one to additionally estimate impulse responses (IR) of the main variables to a monetary



policy shock and further compared IRs from one country to another. In this study, VARs and IRs will show how a temporary change in interest rate and credit tend to be followed by a change in house price and how long such change in house price will take before reaching its peak before it slowly returns to a baseline, or otherwise. If house prices are unresponsive to interest rate or credit change, then the specific monetary policy instrument (interest rate or credit) would be said to be ineffective.

VARs were developed from the behavioural equations or a system of equations known as ‘simultaneous equation models’ (SEMs)(Asteriou & Hall, 2011). In a VAR, a system of equations, where all variables are presumed to be endogenous, is estimated. In this type of test, different dependent variables are regressed against their lags. This modern time-series modelling technique allow one to find out which variable’s effect comes first and the nature of that effect. These are generally called ‘causality tests’. Basically, variable X causes variable Y if the past values of variable X can help explain variable Y because time does not run backwards (Granger, 1969; Koops, 2006).

Specifically, we specify our basic models as:

$$HP_t = b_{10} + b_{11j} \sum_{j=1}^p HP_{t-j} + b_{12j} \sum_{j=0}^p INT_{t-j} + b_{13j} \sum_{j=0}^p CREDIT_{t-j} + e_{1t} \quad (1)$$

$$INT_t = b_{20} + b_{21j} \sum_{j=1}^p HP_{t-j} + b_{2j} \sum_{j=0}^p INT_{t-j} + b_{2j} \sum_{j=0}^p CREDIT_{t-j} + e_{2t} \quad (2)$$

$$CREDIT_t = b_{30} + b_{31j} \sum_{j=1}^p HP_{t-j} + b_{32j} \sum_{j=0}^p INT_{t-j} + b_{3j} \sum_{j=0}^p CREDIT_{t-j} + e_{3t} \quad (3)$$

In this system of equations, *HP* denotes house prices, *INT* stands for interest rate, *CREDIT* stands for credit advances and connotes the error terms. Using matrix notation, equation (1) to (3) can be written as:

$$Y_t = \beta_0 + \beta_1(A)Y'_{t-1} + \beta_2X_t + \varepsilon_t \quad (4)$$

Where,  $\beta_0$  is a vector of constants,  $A$  is a lag operator,  $Y_t$  is a vector of endogenous variables defined as:

$$Y_t = \{HP, INT, CREDIT\} \quad (5)$$

While  $\beta_1$  and  $\beta_2$  represent coefficient matrices,  $\varepsilon_t$  is a vector of errors whereas  $X_t$  denotes a set of exogenous/control variables which will be used to control for change inflation, economic conditions, financial markets among others. In particular, our control variables from theory and review of empirical literature will be inflation, exchange rate, household/debt disposable income, household net wealth/disposable income.

From Model (4), important causal relationships are estimated by analysing and establishing whether estimates of  $\beta_1$  are statistically important or otherwise. However, to be able to compare the persistence of these causal links between Kenya and South Africa, we introduce a dummy variable that segregates data and between the two countries. We define this variable as:

$$Z = \begin{cases} 1, & i = Kenya \\ 0, & i = South Africa \end{cases} \quad (6)$$

Where  $i$  denotes the country. This being the case, equation (1-3) can then be rewritten as:

$$HP_{it} = b_{10} + b_{11j} \sum_{pj=1} HP_{it-j} + b_{12j} \sum_{pj=0} INT_{it-j} + b_{13j} \sum_{pj=0} CREDIT_{it-j} + b_{14j} \sum_{jg=1} X_{it} + b_{15}Z + e_{1it} \dots \dots \dots \quad (7)$$

$$INT_{it} = b_{20} + b_{21j} \sum_{pj=1} HP_{it-j} + b_{22j} \sum_{pj=0} INT_{it-j} + b_{23j} \sum_{pj=0} CREDIT_{it-j} + b_{24j} \sum_{jg=1} X_{it} + b_{25}Z + e_{2it} \dots \dots \dots \quad (8)$$

$$CREDIT_{it} = b_{30} + b_{31j} \sum_{p=1} HP_{it-j} + b_{32j} \sum_{p=0} INT_{it-j} + b_{33j} \sum_{p=0} CREDIT_{it-j} + b_{34j} \sum_{g=1} X_{it} + b_{35}Z + e_{3it} \dots\dots\dots(9)$$

Here  $i$  stands for the country,  $g$  represents the number of control variables and  $Z$  is a dummy variable that takes the value of 1 when  $i$  is Kenya and otherwise takes zero (0) for South Africa. Once again, models (7-9) can be denoted in matrix form as:

$$Y_t = \beta_0 + \beta_1(A)Y_{t-1} + \beta_2X_t + \beta_3Z + \varepsilon_t \quad (10)$$

This way, estimation of coefficients forming vector  $\beta_3$  reveals statistical differences in the causal relationships between the two countries. In model (7) to (9), it is clear that lag length shall be chosen for the three endogenous variables. Selection of optimal lag length will be done using the Schwarz (SBIC) information criteria. SBIC has been chosen because it selects a parsimonious model which has fewer parameters.

## CHAPTER FOUR

### DATA PRESENTATION, ANALYSIS AND INTERPRETATION

#### 4.0 Introduction

The purpose of this study was to examine the causality relationship between house prices and monetary policy instruments of credit and interest rates; both in Kenya and South Africa. This chapter contains descriptive statistics, unit root test, cointegration test, correlation and results of the VAR model analysis.

#### 4.1 Descriptive statistics

##### 4.1.1 Descriptive statistics: House Prices

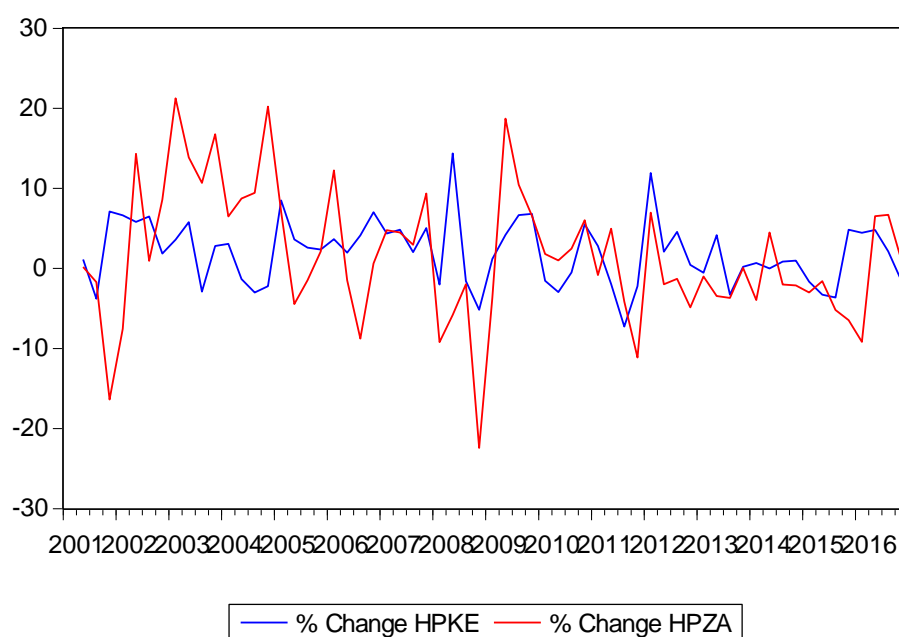
**Table 4.1: Descriptive statistics: House Prices**

	KENYA \$	SOUTH AFRICA \$
Mean	207373.2	83363.17
Median	223824.7	91695.58
Std. Dev.	69873.35	25605.67
Skewness	-0.226427	-0.930475
Kurtosis	1.561542	2.756959
Jarque-Bera	6.064632	9.392537
Probability	0.048204	0.009129
Sum	13271882	5335243.
Sum Sq. Dev.	3.08E+11	4.13E+10
Observations	64	64

When analyzing time series data, it is of importance to know whether the variables are normally distributed and are stationary, failure to which will lead to spurious results (nonsensical) results. During the test for normality, the researcher's main concern was the Jarque-Bera (JB) probability as our main focus was measures of variability and

dispersion. Therefore, the researcher used J-B probability to draw inferences from it. Also provided in the table were the central tendency measures of mean, mode and median. House price in both countries shows a significant range and dispersion around their mean values. For instance the house prices for Kenya had a mean of \$207373 and median of \$223824.7 while South Africa had a mean of \$83363.17 and a median of \$91695.58.

The J-B descriptive statistics test is a joint hypothesis test that comprise of skewness and kurtosis whereby, for a normal distribution, the value of skewness must be 0 and the value of kurtosis must be 3 ( $S=0$  and  $K=3$ ). A null hypothesis of normal distribution against an alternative hypothesis of non normal distribution is used when using the J-B test.  $H_0: J-B=0$  (normally distributed),  $H_1: J-B \neq 0$  (not normally distributed). for instance in table 4.1 the results indicate test for house price for Kenya to be 0.048204 while that of South Africa is 0.009129. This results indicate that data for house price for both countries are normal.



**Figure 4.1: Descriptive Statistics on House Prices**

Figure 4.1 above shows 15 years average house price changes from year 2001 to year 2016 for Kenya (HPKE) and South Africa (HPZA). Up until to 2007 the house prices for Kenya fluctuated between percentage change of -3% and about 8%, after this percentage change increased sharply to about 15% and sharply decreased to the lowest of -3% percentage change and then afterwards returned to normalcy of change between -3% and 15%. The South African house prices had the highest fluctuation ranging between -22% and 22% percentage change, the highest decline of house prices being between 2008 and 2009. Though Kenya had a decline in the same year but not as large as South African case, while Kenya was at -3% percentage change, South Africa was at -22%. Do this for endogenous variables

#### 4.1.2 Descriptive Statistics: Lending Rates

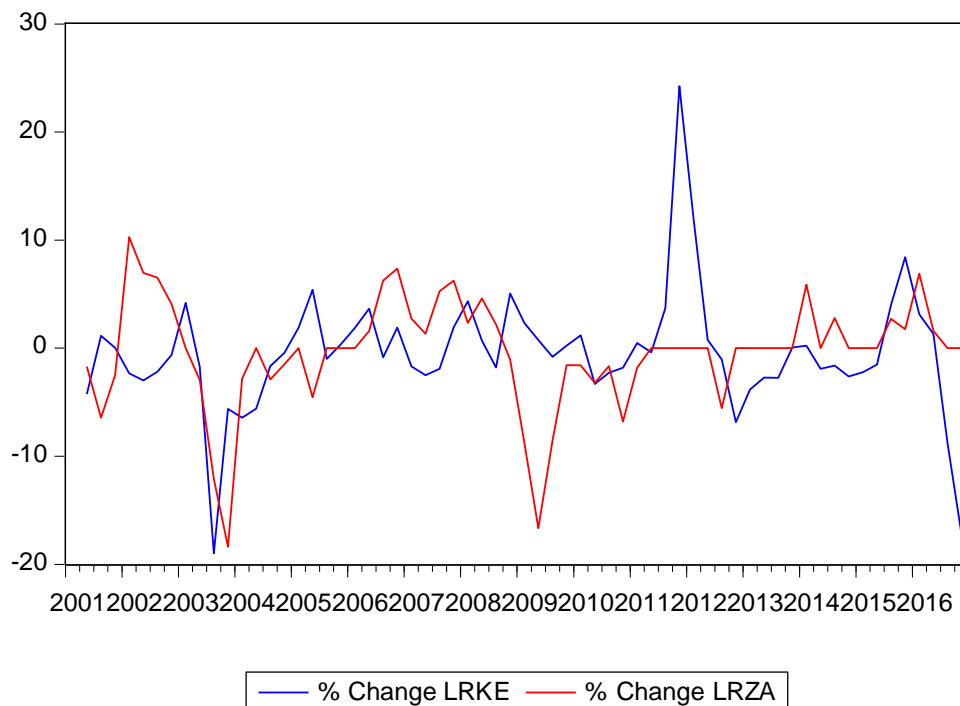
**Table 4.2: Descriptive Statistics: Lending Rates**

	LRKE	LRZA
Mean	15.71997	11.41536
Median	14.91668	10.50000
Maximum	20.21102	17.00000
Minimum	12.20333	8.500000
Std. Dev.	2.395086	2.487867
Skewness	0.395130	0.720371
Kurtosis	1.838509	2.338568
Jarque-Bera	5.262856	6.701941
Probability	0.071976	0.055050
Sum	1006.078	730.5833
Sum Sq. Dev.	361.3955	389.9374
Observations	64	64

Lending rates in both countries shows a significant range and dispersion around their mean values. For instance in Kenya the lending rates fluctuated between maximum of 20.2 and a minimum of 12.2 which is also typified by standard deviation of 2.4 and a mean of 15.7. The median was also 14.9 which is very close to the mean indicating that lending rates is normally distributed. The coefficient of skewness of 0.39513 indicated that data is normal while kurtosis coefficient of 1.838509 indicated that lending rate is not normally distributed since it is more than 1. Jarque-Bera also indicated that data is normal when tested at 5% significance level.

South Africa on the other side, lending rates fluctuated between maximum of 17 and minimum of 8.5 typified with the standard deviation of 2.49 and a mean of 11.4. The midpoint for South Africa was 10.5 which is close to a mean of 11.4 this implies that the data is normally distributed. Jarque-Bera is also confirming the normality of the data because it is less than 3, therefore it is symmetrical or normally distributed.

The two countries compared, the Kenyan market has a high lending rates with a high mean of 15.7 compared to South Africa which charges an interest rate of 11.4. The maximum that is charged by the Kenyan financial institution is within the study period is 20.2 with the lowest of 12.2. South Africa on the other hand charges a maximum of 17 and minimum of 8.5.



**Figure 4.2: Descriptive Statistics on Lending Rates**

Percentage change for lending rates seem to be similar for both countries for example during 2002 quarter 4 the lending rates declined sharply by about -20% and rose again sharply for about 19% in 2003. Afterwards the percentage change on lending rates fluctuated between 5% and 6% up to 2008 where South African lending rates started declining to the lowest of 20% and came up back to normal. Between 2011 and 2012 the lending rates for Kenyan market rose sharply by about 25% and also came back to its normalcy of percentage change between -5% and 6%. The lending rates for Kenya declined sharply between 2015 and 2016 to the lowest of percentage change of -20%.



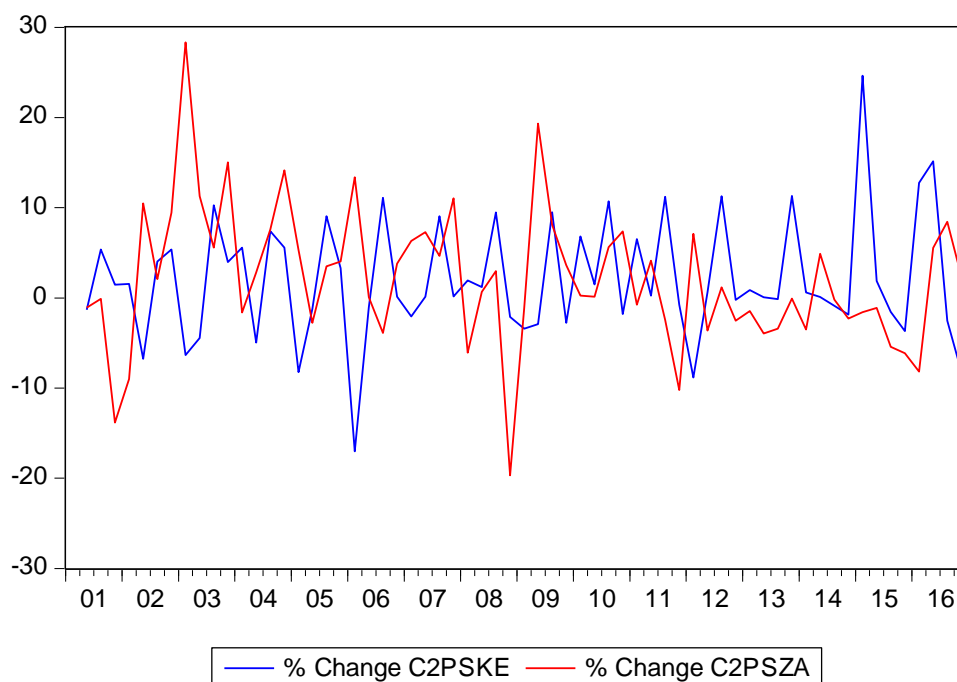
### 4.1.3 Descriptive Statistic: Domestic Credit to Private Sector

**Table 4.3: Descriptive Statistic: Domestic Credit to Private Sector**

	C2PSZA(in US Dollars)	C2PSKE (in US Dollars)
Mean	203216.7	102840.3
Median	228453.6	86900.30
Maximum	310831.9	214940.4
Minimum	58117.17	61422.75
Std. Dev.	73363.46	39911.36
Skewness	-0.629408	-0.425629
Kurtosis	2.199520	2.402770
Jarque-Bera	2.934366	2.14771
Probability	0.051448	0.051036
Sum	13005868	6581781.
Observations	64	64

Domestic credit for both countries shows a significant range and dispersion between mean and median. For instance in Kenya the mean and median had a difference of \$15940 meaning there was high fluctuation in domestic credit to private sector between the first quarter of year 2001 and fourth quarter of year 2016. Domestic credit for Kenya ranged between maximum of \$214940 and the lowest of \$61422.75 best on the averages for the period. South Africa data on domestic credit to private sector had a significant range between mean and median, with maximum of \$310831.9 and minimum of \$58117. The mean and median had a difference of \$25236.9 indicating that there is significant fluctuation in the domestic credit to private sector.

On normality test, skewness for both countries indicated that domestic credit to private sector data were normal with values of -0.629408 for South Africa and -0.425629 which is close to zero. However using kurtosis the data on credit to private sector indicate that data is not normal since it is not in the range of -1.0 and +1.0. Jarque-Bera also indicate that the data is normal when tested at 5% significance level.



**Figure 4.3: Descriptive Statistics on Domestic Credit**

Domestic credit to private sector for Kenya fluctuate with the lowest of -18% and the highest of 27% in year 2006 first quarter and year 2015 first quarter respectively. Other periods fluctuated between minimum of -10% change and maximum of 10% change. During the period between 2008 and 2009 there was no significant change in domestic credit to private sector as compared to that of south Africa which fluctuated by about -20% change signifying that the sub-prime mortgage crisis that hit USA in that period did not affect domestic to private sector in Kenya while it had an impact on the South African side.

Domestic credit to private sector for South Africa fluctuated between the lowest of -20% percentage change and the highest of 29% percentage change. The period with the highest negative percentage change was period between 2008 and 2009 which is coincidentally a period with which subprime mortgage crisis occurred in USA shaking the other economies in the world. South African domestic credit to private sector increased with highest percentage between year 2002 and year 2003. Other

periods such as between 2003 and 2008 averaged between 12% percentage change and about -2%, period between 2011 and 2014, percentage change was very dismal as it oscillated around 0% percentage change.

#### **4.2 Test for Stationarity**

Time series data is said to be stationary if their means and variance vary systematically over time. However if the means and variance is time invariant then it means that time series data is non stationary. Since non stationary data, as general rule are unpredictable and cannot be modelled, the data will have to be transformed into stationary data so as to avoid spurious regression and misinterpretation (Adam, Rosnawintang, Nusantara, & Muthalib, 2017; Greene, 2015; Wang, 2008). There are various methods that are used to test for stationarity however the most commonly used are; augmented dickey fuller method and Philip Perron.

As an essential step for running Vector Auto regression model, Augmented Dickey-Fuller (ADF) (1979, 1981) test was applied. It is based on the simple logic that non-stationary process has infinite memory as it does not show decay in a shock that takes place in the process. Unit root test was done to check for stationarity of the variables. Decision rule is based on the null hypothesis that the variable has a unit root or non-stationary against alternative hypothesis that the variable has no unit root (stationary). Test for individual variable stationarity helps to establish whether the variables are stationary or non-stationary. To ascertain this, the study utilized the Augmented Dickey Fuller Test. Decision is reached by comparing the ADF test statistic with critical values at 1% level, 5% level and 10 % level.

**Table 4.4: Test on Stationarity**

	intercept			Intercept and trend					
	T-stat	Critical level			t-stat	Critical level			
	t-stat	1%	5%	10%	t-stat	1%	5%	10%	
HPKE	-0.866856	-3.538362	-2.90842	-2.591799	-2.114948	-4.11044	-3.482763	-3.169372	
HPZA	-2.081488	-3.540198	-2.909206	-2.592215	-1.009826	-4.11044	-3.482763	-3.169372	
C2PSKE	-0.213904	-3.538362	-2.90842	-2.591799	-1.58919	-4.11044	-3.482763	-3.169372	
C2PSZA	-1.752996	-3.538362	-2.90842	-2.591799	-0.729108	-4.11044	-3.482763	-3.169372	
LRKE	-2.653227	-3.540198	-2.909206	-2.592215	-2.614024	-4.113017	-3.48397	-3.170071	
LRZA	-2.507284	-3.540198	-2.909206	-2.592215	-3.46777	-4.113017	-3.48397	-3.170071	

Results in table 4.20 indicate that the series; house price for Kenya (HPIKE), domestic credit to private sector for Kenya (CRPSKE), domestic credit to private sector for south Africa (CRPSZA), house price for south Africa (HPIZA) and lending rates for south Africa (LRZA) are non-stationary and therefore we cannot run regression for the series since it will yield spurious regression results. Series for lending rates for Kenya tend to be stationary at intercept at 10% significance level. The variables will need to be transformed by either differencing it, or using the percentage change. For the case of this study, percentage change was used to transform the series into the stationary so that regression can be done.

**Table 4.5: Unit Root Test for Differenced Series**

	intercept				Intercept and trend			
	T-stat	Critical level			T-stat	Critical level		
	T-stat	1%	5%	10%	T-stat	1%	5%	10%
HPKE	-6.893236	-3.540198	-2.909206	-2.592215	-7.143294	-4.113017	-3.48397	-3.170071
HPZA	-5.091693	-3.540198	-2.909206	-2.592215	-5.435039	-4.113017	-3.48397	-3.170071
C2PSKE	-7.588561	-3.540198	-2.909206	-2.592215	-7.664698	-4.113017	-3.48397	-3.170071
C2PSZA	-5.831684	-3.540198	-2.909206	-2.592215	-5.561021	-4.115684	-3.485218	-3.170793
LRKE	-3.867825	-3.540198	-2.909206	-2.592215	-3.734286	-4.113017	-3.48397	-3.170071
LRZA	-3.848254	-3.540198	-2.909206	-2.592215	-3.831746	-4.113017	-3.48397	-3.170071

### 4.3 Correlation analysis

Two variables are said to be correlated if they move together. Correlation matrix is based on the correlation coefficient ranging between -1 and +1. Whereas correlation coefficient of 1 shows a perfect negative linear relationship between variables, +1 shows a perfect positive linear relationship, and 0 means there is no linear relationship between variables. Multicollinearity is said to occur if the correlation coefficient between two variables is above 0.7 (Gujarati, 2009).

**Table 4.6: Correlation Analysis**

	HPKE	HPZA	LRKE	LRZA	C2PSKE	C2PSZA
HPKE	1					
HPZA	0.178133	1				
LRKE	0.166019	-0.27717	1			
LRZA	0.161171	-0.68053	0.183205	1		
C2PSKE	0.771860	-0.07946	0.003421	0.156278	1	
C2PSZA	0.235887	0.53982	-0.20435	-0.28336	-0.08274	1

The table 4.3 above shows the correlation between house prices, lending rates, and domestic credit to private sector. Each variable is perfectly correlated to itself as indicated by the coefficient 1. For Kenyan data, house prices have positive correlation with lending rates and domestic credit to private sector as indicated by the coefficients 0.166019 and 0.771860 respectively. The coefficients indicate that house price for Kenya have weak correlation with lending rates and strong correlation with domestic credit to private sector.

For the case of South African market, house price have a negative correlation with lending rates with coefficient of -0.68053 and positive correlation of 0.539820 with domestic credit to private sector.

Kenya and South Africa compared, while Kenya is having positive correlation between house prices and lending rates, South African house prices have negative correlation with lending rates. For the case of relationship between house prices and domestic credit to private sector, both countries have positive correlation of coefficients 0.771860 and 0.539820 respectively.

#### 4.4 Results on analysis of nature and direction of causal relationships

	HP	C2PS	LR
HP(-1)	0.130701 [ 2.46178]	0.227 275 [ 2.79418]	-0.468235 [-4.34563]
HP(-2)	-0.010199 [-0.18534]	-0.060687 [-0.71985]	-0.046201 [-0.41370]
HP(-3)	-0.143362 [-2.67227]	-0.077731 [-0.94574]	-0.111892 [-1.02769]
C2PS(-1)	-0.009694 [-1.47900]	-0.004398 [-0.43799]	-0.013671 [-1.02773]
C2PS(-2)	-0.005106 [-0.78323]	0.004195 [ 0.42009]	-0.004958 [-0.37476]
C2PS(-3)	-0.004034 [-0.60338]	-0.003208 [-0.31321]	-0.008169 [-0.60211]
LR(-1)	0.067243 [ 1.28650]	-0.002421 [-0.03023]	0.485477 [ 4.57666]
LR(-2)	-0.109224 [-1.87618]	-0.242332 [-2.71705]	0.056670 [ 0.47965]
LR(-3)	0.138986 [ 2.98595]	0.004037 [ 0.05662]	0.034265 [ 0.36273]
C	0.035343 [ 6.13741]	0.001425 [ 0.16155]	-0.006086 [-0.52075]
Z	-0.000406 [-0.10693]	0.000171 [ 0.02940]	-0.002106 [-0.27294]
CPI	-0.075923 [-1.05599]	-0.035919 [-0.32610]	0.451863 [ 3.09681]
EXCH	-1.061376 [-9.87378]	0.257608 [ 1.56425]	0.280563 [ 1.28606]
GDP	-0.006836 [-0.94012]	1.103300 [ 99.0392]	0.000458 [ 0.03100]
TB	-0.009442 [-1.32138]	-0.005117 [-0.46746]	0.034953 [ 2.41022]
R-squared	0.772350	0.990265	0.498552
Adj. R-squared	0.739197	0.988847	0.425526
Sum sq. resids	0.044250	0.103861	0.182256
F-statistic	23.29654	698.4615	6.827019

The study results indicate that there is causal relationship between house prices and monetary policy when the results are tested at 5% significance level. First lending rates have significant effect on house prices when lagged 3 times with t-values of 2.98595 and at the same time house prices have a significant effect on lending rates with t-values of -4.34563.

The result also indicate that house prices have a significant effect on credit to private sector with t value of 2.79418 but credit to private sector have no effect on house prices therefore there is no causality between the two variables.

In terms of comparity between the two countries using the z results on the table above we find that there is no relationship between Kenya and South Africa therefore the results are country specific. We therefore fail to reject the second and fourth hypothesis because there t-values were below the table values of t-distribution table. This means that the data for Kenya cannot be used to predict for another country.

Other results indicate that exchange rate have significant effect on the house prices while treasury bill rate, consumer price index, credit to government sector and gross domestic product were found not to have a significant effect on house prices.

Using the R square results of this study we can see how much of variation of the dependent variables can be explained by the independent variable. For instance house prices on house prices itself, 77.22% percent of variation in house prices can be explained by the house prices itself. On effect of credit to private sector on house prices, 99% of variation on house prices can be explained by the credit to private sector and on effect of lending rates on house prices, 49.85% of variation in house prices can be explained by the lending rates.

**Table 4.5: Summary of Hypothesis Tests Results**

<b>Hypothesis</b>		<b>Nature of relationship</b>	<b>Results</b>
<b>H<sub>01a</sub></b>	There is no significant causal relationship in the nature and direction between interest rates and house prices	<b>Dual</b>	<b>Reject</b>
<b>H<sub>01b</sub></b>	There is no significant difference in the causal relationship between interest rates and house prices in Kenya and South Africa.	<b>No relationship</b>	<b>Fail to reject</b>
<b>H<sub>02a</sub></b>	There is no significant causal relationship in the nature and direction between domestic credit and housing prices	<b>unidirectional</b>	<b>reject</b>
<b>H<sub>02b</sub></b>	There is no significant difference in the causal relationship between domestic credit and housing prices in Kenya and South Africa	<b>No relationship</b>	<b>Fail to reject</b>



## CHAPTER FIVE

### SUMMARY, CONCLUSION AND RECOMMENDATION

#### 5.0 Introduction

This chapter covers discussion of the findings of the study, conclusions and recommendations. The framework of discussion is guided by the objectives of the research that is to determine the causal relationship between monetary policy and house prices.

#### 5.1 Summary of the Findings

The study focused on the causal relationship between monetary policy (lending rates and domestic credit to private sector) and house prices.

##### 5.1.1 Nature and direction of causal relationship between interest rates and house prices

The study had proposed the research hypothesis stating that there is no significant causal relationship in the nature and direction between interest rates and house prices. The findings from the study shows coefficient of 0.138986,  $t = 2.98595$ . This results imply that lending rate has significant effect on house prices with the lag of 3.

These results are in tandem with previous research of (Mwenje, 2015), whose research finding show that lending rates have significant effect on house prices. The study investigated the macroeconomic determinates of house prices in South Africa using quarterly data from 1978 (3rd quarter) to 2014 (1st quarter). Their evidences indicate that lending rates have an impact on house prices.

The results are also in agreement with that of (Shi et al., 2014), in which they study if interest rates can really control house prices and the effectiveness of and implication

of macroprudential policy in New Zealand for period between 1999-2009. Their results suggest that interest rate are significantly positively related to house prices.

On the effect of house prices on lending rates the results were as follows coefficient was 0.468235, std deviation 0.10775  $t = -4.34563$ . This signifies that house prices have an effect on the lending rates.

From the findings of the study we find that there is multidirectional causality between lending rates and house prices. In particular, lending rates found to have a significant effect on future house prices and, at the same time, house prices are found to have a highly significant effect on lending rates. This results are in agreement with that of good hart and Hoffman in which they studied house prices, money credit and the macro economy, their study was carried 17 industrialized countries spanning the period 1970-2006 (Goodhart & Hofmann, 2008).

### **5.1.2 Difference in the causal relationship between interest rates and house prices in Kenya and South Africa**

The second objective of the study was to determine if there exists difference in the causal relationship between interest rates and house prices in Kenya and South Africa. The results indicated that there is no significant difference in the causal relationship between interest rates and house prices and therefore we fail to reject the hypothesis. This outcome is supported by the study done by (Calza, Monacelli, & Stracca, 2013), in which they study the structure of housing finance and the monetary policy transmission mechanism in several industrialized countries. They show that there is significant heterogeneity in the institutional characteristics of national mortgage markets across the main industrialized countries, and especially within the European Union (EU).

### **5.1.3 Nature and direction of causal relationship between domestic credit to private sector and house prices**

The third hypothesis of the study was about the nature and direction of causal relationship between domestic credit to private sector and house prices. The results of the study indicated that domestic credit to private sector have no significant effect on house prices when both lagged and when not lagged.

The study findings on effect of house prices on domestic credit to private sector shows that house prices have an effect on credit to private sector (Coeff = -0.468235 std=0.10775 t=4.34563). This study findings are consistent with that of Hong Kong monetary policy authority 2002, in which they study bank lending and property prices in Hong Kong. Their estimates suggest that the existence of stable long run relationship between lending, property prices and gross domestic product and that the direction of influence goes from property prices to bank credit rather than the other way round.

The study is also in agreement with the study done by (Anundsen & Jansen, 2011), in which they study self-reinforcing effects between housing prices and credit. Their study established two way interaction in the long run, so that higher house prices lead to credit expansion, which in turn puts an upward pressure on housing prices, interest rates influence housing prices indirectly through the credit channel.

The study agrees with that of (Gerlach & Peng, 2005) in which they find a one-way causality from house prices to bank lending. These studies suggest that house prices influence bank lending rather than the other way around.

#### **5.1.4 Difference in the causal relationship between domestic credit to private sector and house prices in Kenya and South Africa**

The fourth hypothesis was to determine whether there is relationship between domestic credit to private sector and house prices in Kenya and South Africa. The study findings indicate that results of Kenya or South Africa cannot be used to predict or determine the movement of house prices in either countries. This means therefore that the outcome is country specific. This is also supported by the study done by Aiyar & Chandra (2012) in which they study domestic credit supply response to international bank deleveraging, they find that contraction in European Bank foreign claims was associated with a substantial reduction in domestic credits supply in a broad sample of countries, however the credit supply response in Asia was only about half the size of the response in non-Asian countries possibly due to more robust policy response and healthier local bank balance sheet.

#### **5.2 Conclusion**

It has become evident that sub-Saharan Africa is experiencing accelerated urban expansion calling for more housing units in the urban centres so as to accommodate the ever increasing demand for housing (UN-Habitat, 2010). Despite government effort to upgrade the informal settlement, housing have remained a mirage both in quantity and quality. This study addressed the gap by examining the causal relationship between house prices and monetary policy in Kenya in comparison with South Africa. The study findings indeed confirm that there is causal relationship between the house prices and monetary policy.

The study finds out that there is causal relationship between house prices and lending rates that is house prices have significant effect on lending rates and at the same time

lending rates have a significant effect on the house prices. An increase in housing prices increases the lending rates while an increase in lending rates increases the house prices. While on the other domestic credit was found to be statistically insignificant on house prices and housing prices was found out to be statistically insignificant on domestic credit to private sector. Signifying that house prices are the main drivers on the amount of loan and individual will take.

Policy makers should take into consideration housing prices while designing monetary policies for stabilizing the economy this will in turn help the home owners, property investors, mortgage lenders, and other property market stakeholders in reducing the housing deficit in the country.

### **5.3 Theoretical Implication of the Study**

The study provides new knowledge that there is causal relationship between house prices and lending rates in Kenya. The study also confirms that the domestic credit is statistically significant on house prices not the other way round. The results of the study add some new knowledge to the literature on lending rates, domestic credit to private sector and house prices and their causal relationship which influence economic stability in developing countries.

### **5.4 Managerial Implications and Recommendation of the Study**

First, house prices is an important tool in playing a significant role in the economic stability of the economy. An increase in house prices will increase lending rates while increase in lending rates will lead to a decrease in housing prices. This signifies that house prices have a positive effect on lending rates while lending rates have negative effect on house prices. Policy makers on economic stability should also pay close attention to house prices while designing policies on economic stability. For instance

if the government wants to increase the number of housing units in the country, it should pay close attention to lending rates since it is economically significant on the housing prices. Following the law of demand, other things held constant, a decrease in house prices will lead to an increase in the number of houses demanded and hence a reduction in the housing deficit.

On domestic credit to the private sector and house prices, the study is able to conclude that house prices are statistically and economically significant on the size of domestic credit to the private sector. This means therefore that the larger the house prices, the larger the size of domestic credit. The government and other financial institutions should take into consideration house prices in determining the amount of credit to allocate to the private sector so as to reduce the housing deficit in the country.

### **5.5 Limitations and Suggestions for Future Study**

Data on major variables deemed necessary for the study such as house prices, domestic credit to the private sector and interest rates were not readily available. In addition, the period on which the study was premised is relatively short to provide a good data set for sound conclusions to be drawn from the study.

The study was only carried out in two countries and therefore the conclusion of the study cannot be generalized for the whole continent of Africa; this is due to the heterogeneity of countries.

The study was carried out using two variables: lending interest rates and credit to the private sector as determinants of house prices. However, in real life there are many factors which might influence or affect house prices apart from the above two variables. The researcher felt that other variables should be included such as accessibility to social amenities, location of the house, size of the house, disposable

income of the individual and infrastructure. Further research could extend these findings by considering the study period and also increasing the number of variables.

## REFERENCES

- Aboagye, A. Q., Akoena, S., Antwi-Asare, T., & Gockel, A. (2008). Explaining interest rate spreads in Ghana. *African Development Review*, 20(3), 378-399.
- Adam, P., Rosnawintang, R., Nusantara, A. W., & Muthalib, A. A. (2017). A Model of The Dynamic of The Relationship Between Exchange Rate and Indonesia's Export. *International Journal of Economics and Financial Issues*, 7(1).
- Adelino, M., Schoar, A., & Severino, F. (2012). Credit supply and house prices: evidence from mortgage market segmentation: National Bureau of Economic Research. AfDB, O. (2011). UNECA and UNDP (2011). *African Economic Outlook 2011*.
- Al-Mashat, R. A. (2008). *Monetary policy in Egypt: a retrospective and preparedness for inflation targeting*: Egyptian Center for Economic Studies.
- Allen, F., Otchere, I., & Senbet, L. W. (2011). African financial systems: A review. *Review of Development Finance*, 1(2), 79-113.
- Anundsen, A. K., & Jansen, E. S. (2011). Self-reinforcing effects between housing prices and credit. Evidence from Norway.
- Aoki, K., Proudman, J., & Vlieghe, G. (2004). House prices, consumption, and monetary policy: a financial accelerator approach. *Journal of financial intermediation*, 13(4), 414-435.
- Aron, J., Farrell, G., Muellbauer, J., & Sinclair, P. (2014). Exchange rate pass-through to import prices, and monetary policy in South Africa. *Journal of Development Studies*, 50(1), 144-164.
- Arvanitis, Y. (2013). African housing dynamics: lessons from the kenyan market. *Africa Economic Brief*, 4(3), 1-12.
- Asteriou, D., & Hall, S. G. (2011). ARIMA models and the Box-Jenkins methodology. *Applied Econometrics*, 2(2), 265-286.
- Aye, G. C., Balcilar, M., Bosch, A., & Gupta, R. (2014). Housing and the business cycle in South Africa. *Journal of Policy Modeling*, 36(3), 471-491.
- Barnett, W., Bhadury, S. S., & Ghosh, T. (2015). A SVAR approach to evaluation of monetary policy in India: Indira Gandhi Institute of Development Research, Mumbai, India.
- Basten, C., & Koch, C. (2015). The causal effect of house prices on mortgage demand and mortgage supply: Evidence from Switzerland. *Journal of Housing Economics*, 30, 1-22.
- Belke, A. H., Orth, W., & Setzer, R. (2008). Global liquidity and house prices: a VAR analysis for OECD countries.
- Beltratti, A., & Morana, C. (2010). International house prices and macroeconomic fluctuations. *Journal of Banking & Finance*, 34(3), 533-545. doi: <http://dx.doi.org/10.1016/j.jbankfin.2009.08.020>



- Bernanke, B. S. (2010). Monetary policy and the housing bubble: a speech at the Annual Meeting of the American Economic Association, Atlanta, Georgia, January 3, 2010.
- Bernanke, B. S., & Blinder, A. S. (1992). The federal funds rate and the channels of monetary transmission. *The American Economic Review*, 901-921.
- Buigut, S. (2009). *Monetary policy transmission mechanism: implications for the proposed East African community (EAC) monetary union*. Paper presented at the CSAE Conference.
- Calza, A., Monacelli, T., & Stracca, L. (2013). Housing finance and monetary policy. *Journal of the European Economic Association*, 11(suppl\_1), 101-122.
- Cheng, M. K. C. (2006). *A VAR Analysis of Kenya's Monetary Policy Transmission Mechanism: How Does the Central Bank's REPO Rate Affect the Economy?* : International Monetary Fund.
- Chhibber, A., & Shafik, N. (1990). Exchange reform, parallel markets, and inflation in Africa. *World Bank PPR Working Paper Series*, 427.
- Christiano, L. J., Eichenbaum, M., & Evans, C. (1994). The effects of monetary policy shocks: some evidence from the flow of funds: National Bureau of Economic Research.
- Christiano, L. J., Eichenbaum, M., & Evans, C. L. (1999). Monetary policy shocks: What have we learned and to what end? *Handbook of macroeconomics*, 1, 65-148.
- Cooper, D., & Schindler, P. (2003). Research methods. *Boston, MA: Irwin*.
- Creswell, J. W., & Clark, V. L. P. (2007). *Designing and conducting mixed methods research*.
- Das, S., Gupta, R., & Kanda, P. (2011). International articles: Bubbles in south African house prices and their impact on consumption. *Journal of Real Estate Literature*, 19(1), 69-91.
- Datta, K., & Jones, G. (2012). *Housing and finance in developing countries*: Routledge.
- Davis, E. P., & Zhu, H. (2011). Bank lending and commercial property cycles: some cross-country evidence. *Journal of international Money and Finance*, 30(1), 1-21.
- Dees, S., Holly, S., Pesaran, M. H., & Smith, L. V. (2007). Long run macroeconomic relations in the global economy.
- Dell'Ariccia, G., Igan, D., & Laeven, L. (2009). Credit booms and lending standards: Evidence from the subprime mortgage market.
- Dickey, D. A., & Fuller, W. A. (1979). Distribution of the estimators for autoregressive time series with a unit root. *Journal of the American statistical association*, 74(366a), 427-431.

- Fasanya, I. O., Onakoya, A. B., & Agboluaje, M. A. (2013). Does monetary policy influence economic growth in Nigeria? *Asian Economic and Financial Review*, 3(5), 635.
- Favara, G., & Imbs, J. (2015). Credit supply and the price of housing. *The American Economic Review*, 105(3), 958-992.
- Ferrero, A. (2013). House price booms, current account deficits, and low interest rates,(541).
- Fitzpatrick, T., & McQuinn, K. (2007). House prices and mortgage credit: Empirical evidence for Ireland. *the manchester school*, 75(1), 82-103.
- Fostel, A., & Geanakoplos, J. (2014). Leverage, Securitization and Shadow Banking: Theory and Policy.
- Friedman, M., & Schwartz, A. (1963). A monetary history of the United States: Princeton: Princeton University Press.
- Gerlach, S., & Peng, W. (2005). Bank lending and property prices in Hong Kong. *Journal of Banking & Finance*, 29(2), 461-481.
- Gilchrist, S., & Leahy, J. V. (2002). Monetary policy and asset prices. *Journal of Monetary Economics*, 49(1), 75-97.
- Gimeno, R., & Martinez-Carrascal, C. (2010). The relationship between house prices and house purchase loans: The Spanish case. *Journal of Banking & Finance*, 34(8), 1849-1855.
- Giuliodori, M. (2005). The role of house prices in the monetary transmission mechanism across European countries. *Scottish journal of political economy*, 52(4), 519-543.
- Goodhart, C., & Hofmann, B. (2008). House prices, money, credit, and the macroeconomy. *Oxford Review of Economic Policy*, 24(1), 180-205.
- Gorton, G., & Ordoñez, G. (2014). Collateral crises. *The American Economic Review*, 104(2), 343-378.
- Granger, C. W. J. (1969). Investigating Causal Relations by Econometric Models and Cross-spectral Methods. *Econometrica*, 37(3), 424-438.
- Greene, W. H. (2015). Solutions Manual Econometric Analysis.
- Greiber, C., & Setzer, R. (2007). Money and Housing: Evidence for the Euro Area and the US.
- Gujarati, D. N. (2009). *Basic econometrics*: Tata McGraw-Hill Education.
- Gupta, R., & Hartley, F. (2013). The role of asset prices in forecasting inflation and output in South Africa. *Journal of Emerging Market Finance*, 12(3), 239-291.
- Gupta, R., & Sun, X. (2016). Housing Market Spillovers in South Africa: Evidence from an Estimated Small Open Economy DSGE Model.
- Harvey, S. K., & Cushing, M. J. (2014). Separating Monetary and Structural Causes of Inflation. *Journal of Finance and Economics*, 2, 16-30.

- Ho, L. S., & Wong, G. (2008). Nexus between housing and the macro economy: the Hong Kong case. *Pacific Economic Review*, 13(2), 223-239.
- Hofmann, B. (2003). Bank lending and property prices: Some international evidence.
- Hofmann, B. (2004). The determinants of bank credit in industrialized countries: do property prices matter? *International finance*, 7(2), 203-234.
- Hou, K., Xue, C., & Zhang, L. (2014). Digesting anomalies: An investment approach. *Review of Financial Studies*, hhu068.
- Hume, M., & Sentance, A. (2009). The global credit boom: Challenges for macroeconomics and policy. *Journal of international Money and Finance*, 28(8), 1426-1461.
- Iacoviello, M. (2004). Consumption, house prices, and collateral constraints: a structural econometric analysis. *Journal of Housing Economics*, 13(4), 304-320.
- Iacoviello, M., & Minetti, R. (2003). Financial liberalization and the sensitivity of house prices to monetary policy: theory and evidence. *the manchester school*, 71(1), 20-34.
- Iacoviello, M., & Minetti, R. (2008). The credit channel of monetary policy: Evidence from the housing market. *Journal of Macroeconomics*, 30(1), 69-96.
- Inoguchi, M. (2011). Influence of real estate prices on domestic bank loans in Southeast Asia. *Asian Pacific Economic Literature*, 25(2), 151-164.
- Ireland, P. N. (2010). Monetary transmission mechanism *Monetary Economics* (pp. 216-223): Springer.
- Jiménez, G., Ongena, S., Peydró, J. L., & Saurina, J. (2014). Hazardous Times for Monetary Policy: What Do Twenty-Three Million Bank Loans Say About the Effects of Monetary Policy on Credit Risk Taking? *Econometrica*, 82(2), 463-505.
- Johnson, S., & Nino-Zarazua, M. (2011). Financial access and exclusion in Kenya and Uganda. *The Journal of Development Studies*, 47(3), 475-496.
- Junior, P. H. D., Denardin, A. A., & Neto, G. B. The Credit Channel in Monetary Policy: Empirical Comparison between Brazil and United States.
- Justiniano, A., Primiceri, G. E., & Tambalotti, A. (2014). The effects of the saving and banking glut on the US economy. *Journal of International Economics*, 92, S52-S67.
- Kahn, B., & Farrell, G. (2002). *South African real interest rates in comparative perspective: theory and evidence*: South African Reserve Bank.
- Keen, M., & Konrad, K. A. (2014). The theory of international tax competition and coordination.
- Kim, S., & Roubini, N. (2000). Exchange rate anomalies in the industrial countries: A solution with a structural VAR approach. *Journal of Monetary Economics*, 45(3), 561-586.

- Kinyua, J. (2001). Monetary Policy in Kenya: Evolution and current framework. *Central Bank of Kenya Papers*.
- Kishan, R. P., & Opiela, T. P. (2000). Bank size, bank capital, and the bank lending channel. *Journal of Money, Credit and Banking*, 121-141.
- Koops, G. (2006). *Analysis of Financial Data*. West Sussex: John Wiley & Sons Ltd.
- Kothari, C. R. (2004). *Research methodology: Methods and techniques*: New Age International.
- Levin, E. J., & Pryce, G. B. (2009). What determines the price elasticity of house supply? Real interest rate effects and cyclical asymmetries. *Housing Studies*, 24(6), 713-736.
- Levine, R., Loayza, N., & Beck, T. (2002). Financial intermediation and growth: causality and causes. *Central Banking, Analysis, and Economic Policies Book Series*, 3, 031-084.
- Lindsey, D., Thompson, D. E., Cohen, A., & Williamson, O. (2012). Why Responsible Mortgage Lending Is a Fair Housing Issue: National Consumer Law Center (Feb. 2012), [http://www.nclc.org/images/pdf/credit\\_discrimination/fair-housing-brief.pdf](http://www.nclc.org/images/pdf/credit_discrimination/fair-housing-brief.pdf).
- Luüs, C. (2005). The Absa residential property market database for South Africa-key data trends and implications. *BIS Paper*, 21, 149-170.
- Maimbo, S. M., Faye, I., & Triki, T. (2011). *Financing Africa: Through the Crisis and Beyond*: World Bank Publications.
- Makinde, O. O. (2014). Housing delivery system, need and demand. *Environment, development and sustainability*, 16(1), 49-69.
- Mayer, C. (2011). Housing bubbles: A survey. *Annu. Rev. Econ.*, 3(1), 559-577.
- McQuinn, K., & O'Reilly, G. (2008). Assessing the role of income and interest rates in determining house prices. *Economic Modelling*, 25(3), 377-390.
- Meltzer, A. H. (1995). Monetary, credit and (other) transmission processes: a monetarist perspective. *The Journal of Economic Perspectives*, 9(4), 49-72.
- Mendicino, C., & Punzi, M. T. (2014). House prices, capital inflows and macroprudential policy. *Journal of Banking & Finance*(0). doi: <http://dx.doi.org/10.1016/j.jbankfin.2014.06.007>
- Mian, A., & Sufi, A. (2009). The consequences of mortgage credit expansion: Evidence from the US mortgage default crisis. *The Quarterly Journal of Economics*, 124(4), 1449-1496.
- Michis, A. A. (2015). Multiscale analysis of the liquidity effect in the UK economy. *Computational Economics*, 45(4), 615-633.
- Miller, N., Peng, L., & Sklarz, M. (2011). House prices and economic growth. *The Journal of Real Estate Finance and Economics*, 42(4), 522-541.
- Minsky, H. P. (2015). *Can" it" happen again?: essays on instability and finance*: Routledge.

- Misati, R. N., Njoroge, L., Kamau, A., & Ouma, S. (2010). Financial innovation and monetary policy transmission in Kenya. *International Research Journal of Finance and Economics*, 50, 123136.
- Mishkin, F. S. (1995). " Symposium on the Monetary Transmission Mechanism. *The Journal of Economic Perspectives*, 9(4), 3-10.
- Mishkin, F. S. (2007). Housing and the monetary transmission mechanism: National Bureau of Economic Research.
- Moyo, J., Nandwa, B., Council, D. E., Oduor, J., & Simpasa, A. (2014). Financial sector reforms, competition and banking system stability in Sub-Saharan Africa. *New Perspectives*.
- Muellbauer, J. (2008). Housing, credit and consumer expenditure.
- MULI, N. F. (2013). *An Assessment of the Factors Affecting the Growth in Real Estate Investment in Kenya*. University of Nairobi.
- Muthaura, A. (2012). The relationship between interest rates and real Estate investment in Kenya. *Unpublished MBA Thesis, University of Nairobi*.
- Mwenje, G. (2015). *Macroeconomic determinates of housing prices in South Africa*.
- Ngugi, R. W. (2001). An empirical analysis of interest rate spread in Kenya.
- Oikarinen, E. (2009). Interaction between housing prices and household borrowing: The Finnish case. *Journal of Banking & Finance*, 33(4), 747-756.
- Orodho, A. (2003). Essentials of Educational and Social Science Research methods: Qualitative and Quantitative Approaches: Nairobi: Acts Press.
- Ouma, O. J. (2014). *Effects of real interest rate on the financial deepening in Kenya*. University of Nairobi.
- Pan, H., & Wang, C. (2013). House prices, bank instability, and economic growth: Evidence from the threshold model. *Journal of Banking & Finance*, 37(5), 1720-1732.
- Peersman, G., & Smets, F. (2005). The industry effects of monetary policy in the euro area. *The Economic Journal*, 115(503), 319-342.
- Phillips, P. C., & Perron, P. (1988). Testing for a unit root in time series regression. *Biometrika*, 335346.
- Puoane, T., Steyn, K., Bradshaw, D., Laubscher, R., Fourie, J., Lambert, V., & Mbananga, N. (2002). Obesity in South Africa: the South African demographic and health survey. *Obesity*, 10(10), 1038-1048.
- Sá, F., Towbin, P., & Wieladek, T. (2011). Low interest rates and housing booms: the role of capital inflows, monetary policy and financial innovation.
- Segoviano Basurto, M., & Goodhart, C. (2009). Banking stability measures.
- Shi, S., Jou, J.-B., & Tripe, D. (2014). Can interest rates really control house prices? Effectiveness and implications for macroprudential policy. *Journal of Banking & Finance*, 47, 15-28.

- Sichei, M. M. (2005). *Bank lending channel in South Africa: bank-level dynamic panel data analysis*.
- Siddiqui, S., Malik, S., & Shah, S. (2012). Impact of Interest Rate Volatility on Non-Performing Loans in Pakistan. *International Research Journal of Finance and Economics*, 84, 66.
- Simo-Kengne, B., Bittencourt, M., & Gupta, R. (2012). House prices and economic growth in South Africa: Evidence from provincial-level data. *Journal of Real Estate Literature*, 20(1), 97-117.
- Simo-Kengne, B. D., Balcilar, M., Gupta, R., Reid, M., & Aye, G. C. (2013). Is the relationship between monetary policy and house prices asymmetric across bull and bear markets in South Africa? Evidence from a Markov-Switching Vector Autoregressive model. *Economic Modelling*, 32, 161-171.
- Sims, C. A. (1980). Macroeconomics and reality. *Econometrica: Journal of the Econometric Society*, 1-48.
- Stein, A., & Vance, I. (2008). The role of housing finance in addressing the needs of the urban poor: lessons from Central America. *Environment and Urbanization*, 20(1), 13-30.
- Strauss, A., & Corbin, J. (1998). *Basic of qualitative research: Techniques and procedures for developing Grounded Theory*. 1998: Thousand Oaks, CA: Sage.
- Tajik, M., Aliakbari, S., Ghahia, T., & Kaffash, S. (2015). House prices and credit risk: Evidence from the United States. *Economic Modelling*, 51, 123-135.
- Tsatsaronis, K., & Zhu, H. (2004). *What drives housing price dynamics: cross-country evidence*.
- Ugwuanyi, H. C., & No, R. (2012). *Access to and impact of credit on households welfare in Nigeria*.
- Un-habitat. (2010). *State of the world's cities 2010/2011: bridging the urban divide*: Earthscan.
- Ungerer, C. (2015). *Monetary policy, hot housing markets and leverage*.
- Upadhyaya, R. (2011). *Analyzing the sources and impact of segmentation in the banking sector: a case study of Kenya*. SOAS, University of London.
- Vansteenkiste, I., & Hiebert, P. (2011). Do house price developments spillover across euro area countries? Evidence from a global VAR. *Journal of Housing Economics*, 20(4), 299-314. doi: <http://dx.doi.org/10.1016/j.jhe.2011.08.003>
- Vargas-Silva, C. (2008). Monetary policy and the US housing market: A VAR analysis imposing sign restrictions. *Journal of Macroeconomics*, 30(3), 977-990.
- Villar Burke, J. (2015). Impact of loan contract characteristics on monetary transmission and consumer rent. *Browser Download This Paper*.
- Wang, P. (2008). *Financial econometrics*: Routledge.

- Warnock, F. E., & Warnock, V. C. (2009). International capital flows and US interest rates. *Journal of international Money and Finance*, 28(6), 903-919.
- Waruiru, W., Kim, A. A., & Kimanga, D. O. (2014). The Kenya AIDS indicator survey 2012: rationale, methods, description of participants, and response rates. *Journal of acquired immune deficiency syndromes (1999)*, 66(Suppl 1), S3.
- Williams, J. C. (2011). Monetary policy and housing booms. *International Journal of Central Banking*, 7(1), 345-354.
- Woodford, M. (2011). *Interest and prices: foundations of a theory of monetary policy*: Princeton University press.
- Yin, R. K. (1994). *Case study research: Design and methods*. 2d ed. *Applied Social Methods Research Series*: Thousand Oaks (California): Sage Publications, Inc.









	Q2	2 - 16Q2	0								
	Q3	2 - 16Q3	0								
	Q4	2 - 16Q4	0								