THE EFFECT OF REAL ESTATE DEVELOPMENT ON ECONOMIC GROWTH IN KENYA

BY

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DECLARATION

I, hereby declare that this research project is my original work and has not been presented for a degree at any other university known to me.

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This research project has been submitted for examination with my approval as the university supervisor

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ABBREVIATIONS

ADF - Augmented Dickey-Fuller

ARDL - Autoregressive Distributed Lag Model

CMA - Capital Market Authority

CPI - Quarterly Consumer Price Index

FDI - Foreign Direct Investment

GoK Government of Kenya

GDP - Gross Domestic Product

IEA - Institute of Economic Affairs

IPAR - Institute of Policy Analysis and Research

IR - Quarterly rates of interest

NSE - Nairobi Securities Exchange

OECD - Organization for Economic Co-operation and Development

Pi - Quarterly Real Estate Property Index

R&D - Research and Development

RPGT - Interest rate real property gains tax

SML - Security Market Line

UAE - United Arab Emirates

USA United State of America

ABSTRACT

Real estate development helps in creating employment, providing shelter to families, promoting distribution of income in an economy and lessening poverty. The effect of property market developments on growth of an economy has attracted interest for the longest time. This may be due to the role housing plays in a Country in providing one of the basic need to a Country's population: the shelter. The objective of the study was therefore to determine the effect of real estate development on economic growth in Kenya. The study employed descriptive statistics to investigate the relationship between real estate development, inflation, interest rates and money supply to economic growth. The study reviewed the investment, Neo classical growth and endogenous growth theories. The study used secondary data. Inflation, interest rate and money supply data was extracted from Central Bank publications while GDP data was sourced from Kenya Bureau of statistics website. The data used was for the period 2007 to 2016. The collected data was analyzed using pooled regression analysis. The study found a positive correlation between all independent variables and economic growth. The study also found that there was a significant relationship between real estate development, Inflation rate, Money supply and economic growth while relationship between interest rate and economic growth was insignificant. The study concluded that over 91% of variations on the dependent variables could be explained by the studied variables. The study recommended greater control of Money supply, inflation rate and development in real estate as the three variables significantly affects economic growth in Kenya.

CHAPTER ONE: INTRODUCTION

1.1 Background of the Study

Real estate development helps in creating employment, providing shelter to families, promoting distribution of income in an economy and lessening poverty. Real estate property is property made up of a mix of land, buildings, and natural resources sitting on the land, flora and fauna (Muli, 2013). Real estate development involves purchase, management, ownership, rental land or sale of real estate for profit (Abraham, 2009). Real estate investments relative to other form of investments is illiquid, demanding in terms of capital (although capital can be secured through mortgage) and highly dependent on cash flow. If the variables influencing the investment growth are not well mastered and controlled by an investor, investment in real estate is significantly risky (Geoffrey, 2011).

Theoretically, the investment theory endeavors to explain investment shift by investors. The theory states that individuals are for utility maximization, always switching from one investment to another primarily due to risk difference even though returns may be the same (Markowitz, 1958). Where real estate offers better returns given its moderate risk, then investor will prefer switching their investment to this sector hence contributing to its growth. Solow-Swan theory on the other hand posits that an output of an economy is directly proportional to the existing knowledge. The models ignore the impact of natural resources including land in determining output of an economy and views production as a function of Labour, Capital and knowledge. New growth theory was an improvement of neoclassical growth theory where unlike in neoclassical theory, progress in technology was considered part of the production function. The endogenous theories primarily seek to explain source of technological driven productivity growth.

The Kenyan real estate property market comprises of all property classes from houses occupied by a single family to those inhabited by many families, commercial land, Agricultural land, office space, go-dawns and warehouses, shopping complexes and retail shops (Masika, 2010). However, Kenya's real estate sector continues to lag in fulfilling these fundamental roles due to various factors affecting the sector including the pursuit by most Kenyans to own houses, increased migration to urban areas, increased remittances from Kenyans living in diaspora among others. Consequently, prices of properties in urban setup have skyrocketed. Government investment in heavy infrastructure such as the construction of Thika Road and Mombasa road has led to fast development of properties in the served areas due to improved demand price. It's therefore important to examine factors that support investment growth to inform policies that would sustain future growth of the sector (Muli, 2013).

1.1.1 Real Estate Development

Real estate property comprises of land and all else that is permanently affixed to it. Real estate can also be defined as part of individual's estate comprising of realty, where estate refers to total individual worth (Brueggeman & Fisher, 2008). Solnik and Mcleavy (2009) describe real estate as a form of intangible asset one can touch, see and feel, as opposed to financial instruments claims. Real estate falls under four broad categories; Residential, Agriculture, Commercial and Development Real estate (Michigan State Tax Commission, 2013).

Real estate industry, like any other industry, undergoes continuous evolution. Rural urban migration has been noted to be key demand driver of both residential and commercial properties in Kenya and world over (Kimani et al., 2016). Consequently, demand and supply mismatch occurs. The sitution is aggrevated by inefficiency on the supply side as a result of challenges ranging from lack of financing mechanism and loan capital, unfavourable interest rates, low earning levels by the general population, cost of building materials and issues of land acquisition in Kenya.

Real estate development can be measured through a number of approaches. One of the approach is to use securities exchange stock price indices. Indices are commonly used as benchmark when measuring shares and fixed interest stock performance (Barkham, 2012). They are applied in the property market but in a limited scope as compared to stock markets primarily due to unavailability of data. Owing to the subjectiveness of many approaches used in valuing properties, Ideally property index should be derived from a large sample free of influence from any one institutional investor where income, capital performance and total performance are segmented and considered separately for each property category.

Alternatively, the market value can be used to measure performance of property in the market. The value placed on a property is a major determinant of its performance. The value may be either market value or fundamental value. The fundamental value being the property value attached to a property by the owner and which does not in many instance relate to the market, Thalmann (2006). The market value is the value market places on the property.

Normally, property indices are produced by industry players such as investment firms with significant market share or government valuing agencies. In real estate sector, indices are

produced by real estate investment firms e.g. HassConsult Real Estate Ltd. Specifically, the Hass composite Sales Index is a measure of asking property sales price, based on a Mixed Adjusted Methodology.

1.1.2 Economic Growth

Economic growth can be defined as the increase in the total output of an economy and can be measured using gross domestic product (GDP) with a finality aim of enhancing standard and quality of life among the populace. This happens when the output per capita outgrows population, Case, Fair and Oster (2012). Haller (2012) defines economic growth as process of growing the sizes of countries' economies, the macro-economic indicators particularly GDP per capita, systematically and that results to a positive effect on the social-economic sector. Thus, economic growth is the expanding of a country's economy.

Growth in a given economy can be measured using GDP, which estimates market throughput by summing values of final goods and services created and exchanged for money within a given time period, Costanzaet al.,(2009). Subsequently, the rate at which economy grows is defined as the percentage change in the produced quantity of goods and services from one year to the next (Keithly, 2013).

1.1.3 Real Estate development and Economic Growth

The effect of property market developments on growth of an economy has attracted interest for the longest time. This may be due to the role housing plays in a Country in providing one of the basic need to its population; shelter. While this is an important sector to a country's growth plan, particularly in addressing the ever increasing urban population

resulting from among other factors rural-urban migration, its contribution, or lack of it, to economic growth remain unclear.

The change in real estate prices as a result of wealth effect may affect an economy. A hypothesis by Friedman on permanent income suggest that people are likely to change their desired consumption if prices of houses affect their target lifetime wealth (Norman, 2011). Investment theory endeavors to explain investment shift by investors. Where real estate offers better returns given its moderate risk, then investor will prefer switching their investment to this sector hence contributing to its growth (Markowitz, 1958). Solow-Swan theory on the other hand posits that an output of an economy is directly proportional to the existing knowledge. The models ignore the impact of natural resources including land in determining output of an economy. New growth theory was an improvement of neoclassical growth theory where unlike in neoclassical theory, progress in technology was considered part of the production function. Hence, progress in technology contributes to the overall output of an economy.

Various studies suggest that there exists a direct relationship between real estate and economic growth. Ho and Wong (2008) in Hong Kong while assessing the effect of prices of house on private local demand found that booms in housing market significantly augmented domestic demand. Studies by Ludwig and Slok (2004) and Case et al., (2005) reported existent of relationship between price of properties and the consumption in the USA and several other OECD economies. Leung (2001) investigated consumption and investment channels in Hong Kong and found that the two channels significantly responded positively to prices of property.

Conversely, a study by Peng, Tam and Yiu (2008) in China found effect of wealth on consumption as negative and to be of statistical insignificance. Delong (1992) and Long and Summers (1991) suggested that investment in buildings has insignificant relationship to GDP growth when using purchasing power parity adjusted data. Green (1997) and Podenza (1988) view is that residential real estate investment just like interest rates and prices of stock is a good predictor of GDP. Delong (1992) and Long and Summers (1991) suggested that structural investment has no relationship worth noting with GDP growth when using purchasing power parity adjusted data.

1.1.4 Economic Growth in Kenya

According to IEA and IPAR (2000), economy in Kenya has been very erratic with the lowest, about negative 0.8 % recorded in 1992. Few years after the independence, Kenya enjoyed a robust economic growth compared to other SSA countries. During the period 1975 and 1984, annual average GDP growth was about 4.7% which increased to 5.9% between the years 1985 to 1989. However, in the year 1991 the GDP dipped to about 1.4% and later in 1992 to about negative 0.8% (Masika, 2010). There was a considerable GDP improvement between 1993 and 1995. During this period, the GDP growth rate improved from about negative 0.8 % in `1992 to 0.4 % in 1993, and further increasing to about 2.6 and 4.4% in 1994 and 1995 respectively. However, this high continuously improving growth did not last since the GDP growth dropped to 2.1%, 1.6 % and 1.3% in the year 1997, 1998 and 1999. By the year 2000 a negative growth rate of - 0.2 % was recorded. Since the year 2000 Kenyan economy has not bleached sub-zero line. During this period, the highest GDP (7.0%) was registered in over two decades. This growth was recorded in the year 2007. Due to the unfortunate political events that faced the country in early 2008

following a contested general election, the economy slumped to 1.5% in that year. Ten years later, Kenya is yet to recover the pre 2007 GDP growth momentum, having recorded 5.8% growth as the highest since 2007. For the period between 2007 and 2016 the GDP growth rate has fluctuated between 4.4% and 5.6 % and averaging 4.16% annually. This year, GDP is estimated to grow at 5.5 % (Kenya National Bureau of Statistics, 2017). However, low growth rate is possible given unfavorable political atmosphere experienced in the year.

1.2 Research Problem

The impact of property market development on economic activities continue to attract notable attention in the past few years. The interest is partially motivated by the observed stable asset prices in most industrialized economies such as USA, which is attributed by many to have contributed to the healthy economic performance in those countries before sub-prime crisis of mortgage. Discussion about the linkage existing between property market and economy remain relevant even as crisis unfold for the basic reason that they offer critical experiences to economies of developing countries (Hui, 2009). In the past few centuries, living standards in many industrialized nations have attained highs unimaginable before. Whereas it is hard to compare, there is strong evidence suggesting that the current mean real income in the USA and western Europe have grown with between ten and thirty times of the levels registered a century back and 50 and 300 times than that of 2 centuries ago (Romer, 1994).

Real estate is among the four top contributors to the Kenyan economy. Other sectors with stellar performance include storage, transport and ICT. In the year 2016, the sector contributed 7.4% growth to GDP (Kenya National Bureau of Statistics, 2017). The growth

in the sector is attributed to; high growth in population and urbanization which increases demand; increase development of infrastructure and government incentives in form of favorable policies. However, the situation in Africa countries such as Kenya is critical. World Bank Group (2017) notes, in Kenya there is estimated cumulative deficit in housing of over two million house units, and close to 61% households in urban living in slums. The shortage is attributed to annual supply of 50,000 against annual demand of 244,000 housing units. The huge demand against the supply, the affordability of housing has been pushed beyond reach to majority of Kenyans (Arvanitis, 2013). This has resulted to many Kenyans unnecessarily living in slum dwellings.

Recent literatures examining effects of property market on economic performance includes that of Ho and Wong (2008) in Hong Kong, which evaluated effect of prices of house on private local demand. The study found that booms in housing market have a significant inverse effect on local demand. Some studies modeled property market shocks transmission channels. For example, the studies by Ludwig and Slok (2004) and Case, Quigley and Shiller (2005) resulted into conclusion that property prices and consumption in the USA and several OECD economies have a significant relationship. However, studies conducted in some countries in Asia which included Singapore failed to confirm the linkage. Leung (2001) as well as Peng et al., (2008) investigated investment channels and consumption channels in Hong Kong and China respectively. Their findings in Hong Kong suggested that the two channels were positively significantly responsive to prices of property.

Thus, lack of agreeing results from the studies carried out in other economies, Ludwig and Slok (2004) and Case, Quigley and Shiller (2005) vs Leung (2001) and Peng et al., (2008),

and lack of a study in Kenya in this specific area suggests that relationship observed on property and economic performance is yet to be concluded and furthermore may not be generalized across countries and regions given varying structures of institutions.

Despite the weight given in most economies, debate on contribution of property market to economic development has been occasioned with little or no attention in Kenya. Considering property markets and the real economy are seemingly intertwined there is still very little appreciation of the importance the former has in influencing the latter. Secondly, most government pursues policies that promote growth of property market with expectation of triggering ripple effect in other sectors of the economy. Thus, we lack empirical evidence to ascertain or refute the claims, policy-makers have no way of knowing whether promoting property market translates to the intended economic impact. Thus the question, what is the effect of real estate development on the economic growth in Kenya?

1.3 Research Objective

To determine effect of real estate development to economic growth in Kenya

1.4 Value of the Study

The study finding will help the following sectors of the society

Real estate investors will benefit from the study findings since they can use the study findings to formulate investment decisions that aligns to the prevailing business environment hence maximize their returns.

Policy makers including Kenya government and National Housing Corporation will benefit from the findings of this study as they will be better positioned to device effective policies

capable of addressing challenges affordability and availability of housing in Kenya and stimulation of economic growth.

Academicians and researchers on the other had will benefit from the findings of this study as future scholars may use the findings as the basis for further research. As such, the study will contribute to the already available knowledge in real estate development and economic growth.

CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

This chapter reviews published and unpublished studies including journals, papers books and other accredited works related to the topic under consideration. This chapter reviews the theoretical literature, empirical literature, determinants of economic growth and finally summarize the literature reviewed.

2.2 Theoretical Review

2.2.1 Investment theory

Investment theory is credited to Markowitz (1958) and states that individuals are for utility maximization, always switching one investment for another that has the similar expected returns but lesser risk or one that has the similar risk but higher expected return, or one, with expected return and less risk are high (Kazimoto, 2013). Bofar et al., McClure (2010) defined financial risk as deviation of returns of an asset from what is historically known in a particular period of time. In investment theory, however, Markowitz expands the meaning from risk pertaining to a single asset to risk of a group consisting of many assets referred to as portfolio (Royal Swedish Academy of Sciences, 1990).

Mangram (2013) observes that foundation of contemporary portfolio theory was formed by theoretical contributions of Harry Markowitz in the fields of corporate finance and financial economics. Markowitz work was contained in an essay on portfolio selection published in 1952 in the Journal of Finance and in detail in his book: Portfolio Selection: Efficient Diversification, published in 1959. Contemporary portfolio theory is a framework of investment for selecting and constructing investment portfolio with an intention to

maximize the overall returns and to minimize investment risk. Investment theory surfer one problem in that it focuses on complex mathematical models and formulas, which backs the concept's theoretic assumptions.

2.2.2 Neoclassical Growth Theory: The Solow-Swan Model (1956)

Solow and Swan (1956) laid the foundation of neoclassical growth model which has since been influential in analysis of economic growth. Other contributors to neoclassical growth theory includes Ramsey (1928), Koopmans (1965) and Cass (1965). Whereas there were contributors to the neoclassical before Solows such as Harrod (1939) and Domar (1947), its Solow's model that 'punctuates most analysis touching on growth. Romer (2001) observes that models deviating significantly from Solow's are well understood by comparing them with Solow model.

Solow-Swan model focus on four parameters capital (K), output(Y), labour(L) and "Knowledge" also referred to as "effectiveness of labour" (A). The Solow-Swan model defines technical progress as that which enhances labour efficiency such that at a given time the economy produces output through a combination of varying proportions of capital, labour, and knowledge.

According to the model, the quantity of output obtained from given quantities of capital and labor is directly proportional to existing knowledge (A) as at that time. The model makes two assumptions; the function of production has a fixed return to scale. i.e. unit increase in quantities of capital and effective labor results to a unit increase of the amount produced; the second being that safe for capital all other inputs; labour and knowledge are relatively insignificant, specifically the model ignores other natural resources including

land which means that where natural resources are vital, unit increase in capital could derive less than a unit of output.

The model concludes therefore, that both significant over-the-time growth in output per person and the vast geographical difference in output-per-person cannot be accounted for by buildup of physical capital. According to the model, other probable causes of real income difference are exogenous. Hence, in the long-term, growth of output-per-worker is only dependent on technological advancement while short-term growth is influenced either by technological advancement or capital buildup.

2.2.3 New (Endogenous) Growth Theory

Neoclassical growth model was used as the benchmark model of economic growth for many years. However, starting 1980s newer and more sophisticated growth model were introduced by a group of growth theorists who included Paul Romer (1986), Robert Lucas (1988) and Sergio Rebelo (1991). In these models, unlike neoclassical, progress in technology is not expected to be exogenous. Subsequently, new growth theories are generally referred to as "Endogenous growth models." Given that one of their main task is to explain source of technological driven productivity growth. In these models, buildup of knowledge is a key driver of productivity growth.

Many research studies on economics application of growth, beginning mid-1980s, endeavored to comprehend and explain the variance in the growth output rates and per capita growth of income across the globe. The research was motivated by three key factors:

The concern of economic performance which increasingly faced poorer world regions and the considerable differences between regions. Easily available standardized data (e.g.

Summers and Heston) data which could allow improvement of reliability of empirical work. Some ground breaking studies (e.g. Baumol, 1986), failed to find per capital incomes' convergence of the world, contradicting neoclassical growth principle.

The last factor is credited to have motivated the expansion of the new growth model through relaxation of the assumptions considered in the neoclassical theory, particularly, the assumption on diminishing return to capital. The new model also was in an attempt to answer many questions that had been avoided by the neoclassical theory. Such questions included: who are the producers of technical progress and what are the motivating factors? How is it transferred? What is the repayment and what are the source this payment? All which were avoided by assuming technical progress is exogenously given. Considering Solow's inference that a significant portion of growth output is owed to technical progress, we can safely state that a critical reason on output growth remain unexplained.

Justification that exogenous progress in technology produced outside the sphere of private, profit-optimizing firms, is not mysterious was given by Valdes (1999). According to Valdes, technological progress could be delivered by state where the government forms R&D firms to manufacture technology firms and pay them using funds collected from the public in form of tax and subsequently make technological output from these firms accessible to all. Technical production may not however be attributed to R&D in whole since significant portion of technical progress is attributable to private, profit optimizing firms which incur the cost in production of technology and sell it to other firms at a profit.

2.3 Determinants of Economic Growth

2.3.1 Real Estate Development

Real estate is defined as land and everything that is permanently affixed to it. Real estate can also be defined as part of individual's estate comprising of realty, where estate refers to total individual worth (Brueggeman &Fisher,2008). Solnik and Mcleavy (2009) describe real estate as a form of intangible asset one can touch, see and feel, as opposed to financial instruments claims. Real estate falls under four broad categories; Residential, Agriculture, Commercial and Development Real estate (Michigan State Tax Commission,2013).

Real estate investment is considered to contribute to economic growth in many countries. In the year 2016, the real estate is said to have contributed over 7 % to the GDP (Economic survey, 2016). However, various research conducted in different economies fail to agree on the significance of real estate development to GDP.

2.3.2 Inflation

Inflation is the general surge in prices of goods and/or services. Inflation lead to a currency of a country becoming weak and hence the government spends more to provide goods and services. As a result, the countries revenue base may increase and more taxes collected, but its economic development is negatively affected. The purchasing power of the country's currency is highly affected by inflation (Kneller et al., 1999).

Erkin et al. (1988) found evidence that inflation is negatively related to growth of economy. They claimed that inflation results to more public expenditures for lesser goods. They also found out that when inflation is high, the level of investment is low as many people spend money to purchase only basic commodities especially food. However, they found out that

inflation usually remains stable for a long period of time unless affected by other macroeconomic situations affecting a particular country.

Barro (1991) findings showed a significant negative effect of inflation on the growth of an economy. He found a non-linear connection between inflation and economic growth. His concluding policy message stated that 1 % reduction of inflation could result to a raise of between 0.5 and 2.5% in economic output.

2.3.3 Interest rates

An interest rate refers to a premium paid by a borrower to use money borrowed from a lender, Brealey et al., (2001). Kwak (2000) defines interest as the price borrower pays to forego future consumption Interest rate depicts the cost of finance in a market. More specifically, interest rate is the annual price charged by a moneylender to a money consumer to obtain a credit. Interest is usually expressed as a percentage of the overall amount advanced (Fisher, 1930). Interest can be said to be the price difference between an asset's present vs future claim.

The change in interest rate has previously been observed to have significant impact on households' savings and consumption behavior, firm's capital accumulation decisions and on local and foreign traders' portfolio allocation in money and exchange rate markets. The above changes were observed to affect demand supply equilibrium in an economy which occurs immediately or lag with up to 2 years. The changes also affect the expectations and strategies of economic agents about their own future and perception relating to welfare, redistribution of income and about anticipations of the economy (Keynes, 1936). The cost of doing business, livelihood and investment is proportional to real interest rate. Low

interest rates stimulate the economy since home loans and car loans are affordable to a wider base.

2.3.4 Money Supply

The impact of money supply to an economy has been studied widely. Some examples include: Friedman and Meiselman (1963), Shapiro and Watson (1988), Blanchard and Quah (1989), Chari et al. (1991), Clarida and Gali (1994), Ansari (1996), and Reynolds (2000). Chowdhury, et al. (1986), Chowdhury (1988), Cardia (1991), Chari and Kehoe (2004), and Feldstein (2002) have examined the impact of fiscal and monetary policies on various aggregates.

However, theoretical and empirical studies have failed to determine the power of monetary policy to effect economic growth. Findings by some researchers suggest that monetary policy has significant impact on economic growth (Ajayi, 1974; Elliot, 1975; Batten and Hafer, 1983), while others claim that fiscal stimulations is vital to growth of economy (Chowdhury et al., 1986; Olaloye and Ikhide, 1995). Conversely, Cardia (1991) found that both fiscal and monetary policies plays have a limited impact on investment, consumption, and output.

2.4 Empirical Review

Ong (2013) sought to investigate relationship between macroeconomic variables (population, inflation, costs of construction, gross domestic product (GDP), interest rate, RPGT and the housing price in Malaysia. The study used exploratory method using data of between 2001 to 2010from Ministry of Finance's Valuation and Property Services Department in Malaysia. The study found that population, GDP and RPGT are key

elements of housing prices. Nonetheless, housing prices did not have causal relationship with GDP, population or RPGT. The finding of the paper generally suggests prevalence of volatility of housing prices in the Malaysian residential property market that risk collapse of the market.

Ma(2010) work studied the contribution of real estate in China's economic recovery in the year 2009 and elements of house prices in the current robust real estate market. Empirical analysis found a significant positive influence of housing investment to GDP growth. Prices of houses in China were observed to have defied economic fundamentals and looked to rely more on house prices for the preceding year and the associated level of change. The paper further observed that deviation of prices of house from the economic fundamentals suggested a housing market probable collapse. The primary force driving increase in house prices was noted to be the expectations of progressive positive change in house prices. The reluctance of the two level of governments (central and local) to allow drop of house prices, the entrenchment of the long time held belief that land is a scarce resource especially in urban areas, past price trends in house prices, inadequate money supply regulatory policy and difficulties experienced in manufacturing all contributed to continuous rise in house prices.

Hui (2009) in Malaysia, using Autoregressive Distributed Lag (ARDL) model investigated the effects of real estate development to real economy using secondary data consisting of GDP and property price fluctuation. His findings suggested that, GDP and domestic demand have no effect on property price fluctuations in the long-term. This was observed to be the case considering that improved gross investments resulting from property booms is accompanied by decline in private consumption which offsets the changes in

investments. However, in the short-term the stability of demand and GDP to property price fluctuations were observed as being less predictable. It can be argued that property booms can support real economy booms given that property prices can be observed exert short-term pro-cyclical effects to both investments and consumption. The finding implied that stimulating activities in property market does not guarantee sustainable growth of the real economy. Even so, approach of stimulating activities in the property market can be used as a policy tool to manage macro economy in the short-term.

Venlauskiene and Snieska (2009) examined real estate market and slowdown interaction in countries with transition economy case of Republic of Lithuania. The study used secondary data on mortgage credit and GDP obtained during the period 2000-2008 and concluded that slowdown buildup of real estate market and growth slowdown in construction sector results to recession in real estate market and general slowdown of the economy.

Abdelgalil(2007) descriptive study to establish the impact of real estate performance to financial sector in Dubai. The study used secondary data obtained from Dubai Financial Market (UAE Central Bank) as well as Federal Ministry of Economy and Planning among other government agencies covering the periods 1985 to 2004. The study found irrefutable relationship between the variables under study. Also, the study found share price of real estate companies to relate significantly to that of banks.

Long and Summers (1991) using data from the United Nations Comparison Project and the Penn World Table investigated the relationship between equipment investment and economic growth. The study found a strong association between investments in machinery and equipment and growth of the economy: they found that, during the period 1960-1985,

each additional percentage of GDP invested in equipment lead to yearly one third percentage increase in GDP growth. This association was much stronger compared to any other form of investment. There are suggestions that the association is causal, and that increased investment in equipment leads to accelerated growth of economy. Moreover, social return of investment on equipment in an efficient market economy is in the rate of thirty percent annually.

The study by Kimani and Memba (2016), using Vector Auto Regression method examined the effect of interest rate, inflation rate, and interest rate and GDP fluctuations on real estate growth in Kenya. The study used correlation research design using secondary data obtained from Kenya's central bank and Hass consultant quarterly property index. The study found that an increase in exchange rate increased the prospects of investment in real estate in Kenya. Secondly, interest rate had a negative effect on real estate growth. Thirdly, GDP had a positive influence on real estate growth rate and finally, inflation rate has a positive influence on real estate growth rate.

Mella(2016) study sought to establish effects of real estate investments to the performance of pension fund in Kenya. The research design entailed a descriptive survey of the pension fund regulated by Retirement Benefits Authority (RBA). The study census of all the pension funds that had made real estate investments as the study population, totaling to forty-eight as at December 2015. A multi-regression model was used was used to analyze the data. The study found that real estate investment positively and strongly affects return on investment for the pension funds Also, the finding showed offshore investments strongly and positively affected performance of the pension funds. Further, fixed income and government securities were found to strongly and positively affect performance of the

pension funds while Equities negatively influenced performance of the pension funds; and, Cash and fixed deposits negatively affected return on investment.

A descriptive study by Loyford and Moronge (2014) evaluated effect of economic elements on performance of real estate market in Kenya. Economic factors examined in the study included inflation, interest rate, demand for housing and transaction cost. Stratified sampling method was used in selecting sample from each segment and then sample population of 44 respondents was randomly picked. This was considered to fairly represent real estate market. Primary data was compiled by use of semi-structured questionnaires issued to respondents comprising sampled real estate agent's employees. The study found that inflation, interest rate, transactions cost and demand for housing significantly influence real estate industry performance.

Study by Wachira (2013) examined the relationship between returns on capital market and growth of economy in Kenya. The study adopted descriptive and regression method to analyze secondary data comprising of Nairobi Securities Exchange 20 share index and Gross domestic product for the period 1982-2012. The study finding indicated that there was weak negative correlation between GDP growth and Changes in SMI. The reason being that NSE20 share index was represented by a few companies in the whole economy and GDP is measured in terms of sales not profit. Changes in Foreign Direct Investment (FDI) and population also indicated a weak positive correlation to GDP growth. The study recommended that both the government and Capital Market Authority (CMA) encourages more companies to be part of the securities market to reinforce importance of the NSE20 share index to the economy.

Using Multivariate regression model, Karuana (2012) investigated association of economic growth and housing prices in Kenya. Study population included all standalone houses, town houses and apartments constituting the Hass Property Index. The population constituted the sample and data used covered the periods between 2005 and 2010. The study findings revealed that prices of real estate had a strong positive correlation on GDP i.e. a unit increase in housing prices results to a unit increase in GDP.

Study by Kigige (2011) covering Meru Municipality in Kenya had three objectives; first, to determine the relationship between investors' income in real estate and real estate prices, secondly, evaluate relationship between real estate property location and related price and lastly, establish effects of real estate demand on property prices. The study used descriptive research to compile information on the prevailing state of affairs. Structurally formatted questionnaires were employed in collecting information required by the study. The population under study consisted of 15,844 total number of registered real estate investors in 5 (five) selected areas in Meru municipality. A sample size of three ninety (390) real estate owners was selected by stratifying population and picking respondents randomly. The data collected was analyzed using statistical packages to obtain the regression model and other descriptive statistics. Findings showed nearly 70%of price variations was attributed to incomes while demand was associated with about 20 percent of the changes in real estate prices. Subsequently, location and Realtors were found not to be significant.

2.5 Conceptual Framework

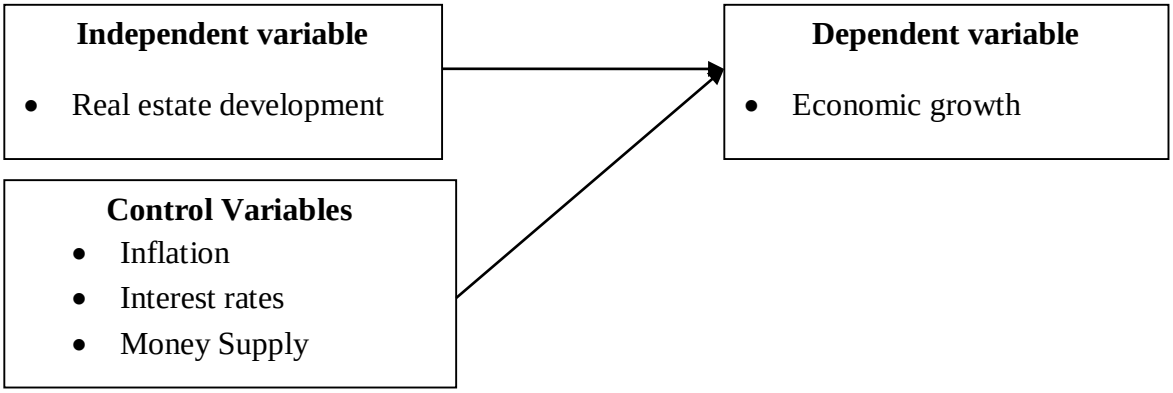

Figure 2. 1 Conceptual Framework

2.6 Summary of the Literature Review

Most of the literature reviewed has investigated impact of economic growth on real estate development. Most of these studies' findings indicate that economic growth has significant impact on real estate development. However, few studies such as Hui (2009) finds GDP growth to have no effect on the property prices. Only a few studies have been done to examine the effect of real estate development to economic growth and most of which were conducted in developed countries e.g. Ma (2010) study in China whose findings showed significant positive influence housing investment has on GDP growth. It will therefore be interesting to test the effect real estate development has on economic growth in a developing country such as Kenya.

CHAPTER THREE: RESEARCH METHODOLOGY

3.1 Introduction

This section contains the research design, the population of the study, data collection as well as data analysis methods, which entails the analytical model and test of significance.

3.2 Research Design

According to Zikmund et al. (2011), a research design is a blueprint specifying the approaches and procedures for gathering and analyzing information required to facilitate the study. This research adopted a descriptive research design. A descriptive research aims at providing an accurate and useable representation of the variables relates to or are relevant to the research question. A descriptive research seeks to provide accurate description of findings made on a phenomenon. It is concerned with the present, and attempts to determine the status of the phenomenon under investigation.

3.3 Population of the study

A population refers to all people or items with the characteristics that a researcher intends to study. The study population comprised of all commercial and residential real estate developments in Kenya. The study considered the commercial and residential real estate developments, which are normally used by the Hassconsult to generate the Kenyan Property Index.

3.4 Data Collection

This research employed secondary data. The data covered a period of 10 years from 2007 to 2016. Secondary data of estate investments was obtained from Hassconsult which provides the real estate property index in Kenya. The index is the only publicly available

index in the country and is available on monthly and quarterly basis. Data on economic growth, interest rates, money supply and inflation was sourced from the Central bank of Kenya annual reports and publications.

3.5 Diagnostic Tests

The study assessed multicollinearity using the variance inflation factors while autocorrelation was assessed using the Durbin Watson statistics. Additionally, the study tested for normality using the skewness and kurtosis

3.6 Data Analysis

Data analysis entails the process of examining the collected data and making deductions and inferences. Data was analyzed using descriptive and inferential statistics using STATA. Descriptive statistics such as percentages, the mean and standard deviation was used while various inferential statistics were used to make inferences on the population.

3.6.1 Analytical Models

The objective of this study was to investigate the effect of real estate development to economic growth in Kenya. According to Chen and Zhu (2008), real estate investment can stimulate economic growth, and economic growth in return improves real estate investment. This means that the two may have a bilateral causal relationship. To examine the relationship between real estate development and economic most studies including Jackman, M. (2010), Chen, J., & Zhu, A. (2008), Zhang, J., Wang, J. & Zhu, A. (2012) and Hong, L. (2014) used the granger causality test.

3.6.1.1 Granger Causality Test

The Granger causality test, Granger (1969) was used to analyze the causal relationship. The main purpose of causality test is to test the causality between two variables, X and Y, and judge whether there is causality between them. The Granger causality test was applied to test the causal relationship between real estate development and economic growth.

3.6.1.2 Augmented Dickey-Fuller (ADF) test

The Granger causality tests require the use of stationary variables; hence the Augmented Dickey-Fuller test was used. The ADF unit root test is normally carried out to test the stability of time series variables.

3.6.1.3 Regression Analysis

Pooled regression analysis was employed to test the relationship between the research variables and to determine which factor has most significant impact on economic growth. The regression equation was developed as follows

$$GDP = \beta_{\circ} + \beta_1 ln(Pi) + \beta_2 ln(CPI) + \beta_3 ln(IR) + \beta_4 ln(M3) + \varepsilon$$

Where GDP = Quarterly Real Gross Domestic Product growth rate

Pi =Quarterly real estate property index

CPI =Quarterly Consumer Price index

IR = Quarterly rates of interest

$M3$ = Quarterly amount of broad money supply

$\beta_{\circ}$ = Intercept (constant)

β_1, β_2 , β_3 and β_4 = Coefficient betas

ε = Regression error

3.6.2 Tests of Significance

To establish the significance of the regression model, the F test statistics and ANOVA were used. On the other hand, to test the significance of the regression coefficients the t-test statistic was used. The significance tests were carried at 95% confidence level.

CHAPTER FOUR: DATA ANALYSIS, RESULTS AND INTERPRETATION

4.1 Introduction

This section outlines the analysis and presentation of the study findings. It contains descriptive statistics, the graphical representation of the variables and the correlations as well as presentation of findings of the Augmented Dickey Fuller Test, ganger causality test, regression analysis and the findings interpretation.

4.2 Descriptive Statistics

Descriptive statistics comprise of minimum and maximum values, the arithmetic mean, the standard deviation and the finding's graphical analysis.

4.2.1 Summary Descriptive Statistics

Table 4. 1 Summary Descriptive Statistics

	GDP	PI	CPI	IR	M3
Mean	824287.6	304.4583	125.4706	15.78775	1513157
Median	812199.4	310.185	130.0851	15.33	1507538
Standard Deviation	134419.6	74.89119	29.03479	2.068132	691402
C.V.	0.163074	0.245982	0.231407	0.130996	0.456927
Kurtosis	-0.83411	-0.74054	-1.21035	-0.27742	-0.90479
Skewness	0.477128	-0.1229	0.007125	0.738205	0.341207
Minimum	633710	175.3	78.45777	12.87	557650
Maximum	1094567	436.8587	175.18	20.34	2761800
Count	40	40	40	40	40

Source: Research Findings

The results on table 4.1 show that economic growth, measured using GDP, had a mean of 824, 287.6 with 633,710 and 1,094,567 as minimum and maximum respectively. The

results also show that the mean of the property index (PI) is 304.4583 with the minimum and maximum PI being 175.3 and 436.8587 respectively. In addition, the result show that the mean of the inflation rate (CPI) is 125.4706 with minimum CPI of 78.45777 and maximum CPI of 175.18. Also from the results, the interest rate (IR) mean is 15.78775 with maximum and minimum IR of 20.34 and 12.87 respectively. Further, the result show that the mean of the money supply (M3) was 1513157 and minimum and maximum M3 of 557,650 and 2,761,800 in that order.

The kurtosis and skewness values are within the range of -2 and +2. The values are considered to be within the acceptable range of -2 and 2 George & Mallery (2010) for the datasets to considered symmetrical hence an indication that the data is normally distributed

4.3 Graphical Trends

This section presents the graphical analysis of the variables in the study and comprises of graphs for GDP, Property Index, CPI, IR and Money supply.

4.3.1 GDP Trend

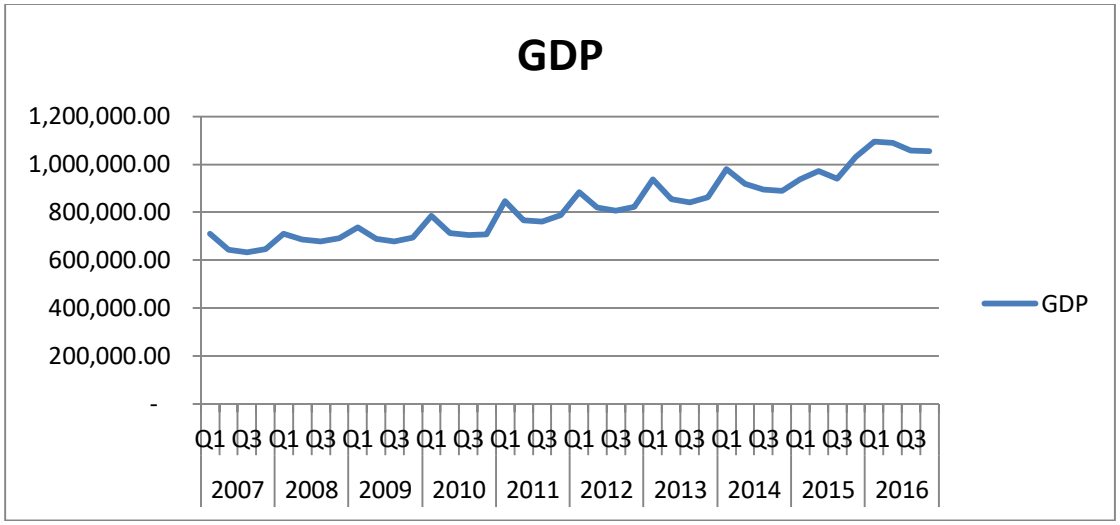

Figure 4. 1 GDP trend

Source: Research Findings

The results on figure 4.1 shows that GDP has improved over the years (2007 to 2016). During the period of study cumulative growth of over 47% was recorded. The fluctuations of GDP over the years of study was observed. However, the results show a positive GDP growth during the years covered by the study.

4.3.2 Property Index Trend

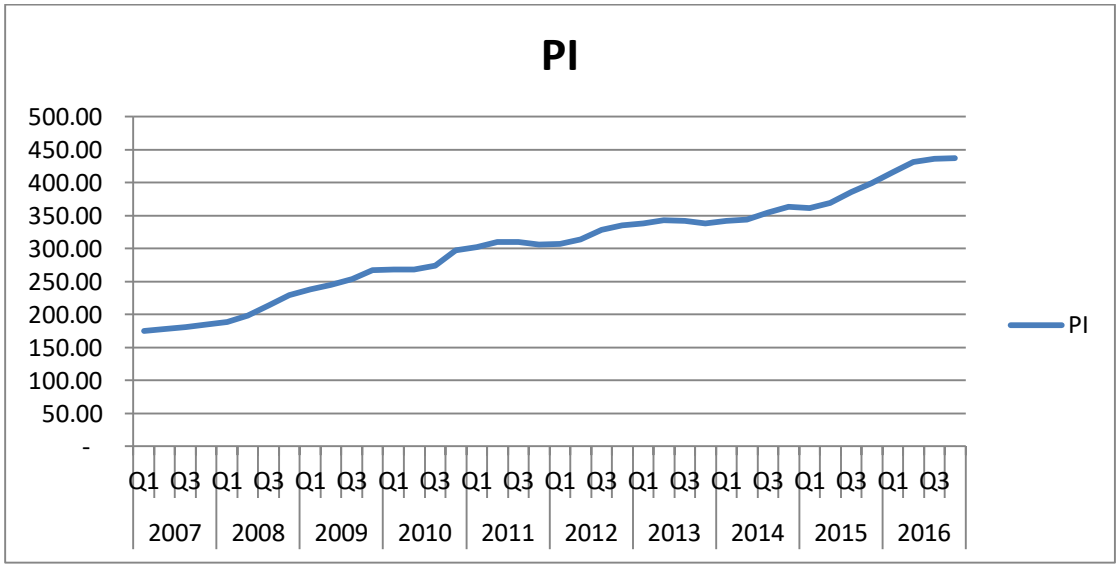

Figure 4. 2 Property Index trend

Results on figure 4.2 shows a trend of a consistent increasing house prices over the period of study. In the beginning of the study period, property index stood at around 170. This improved to around 440 by Quarter 4 of 2016 which equate to an estimated growth of over 200%. The consistent increase of Property index can be attributed to increasing demand, improvement of the economy among other factors.

4.3.3 CPI Trend

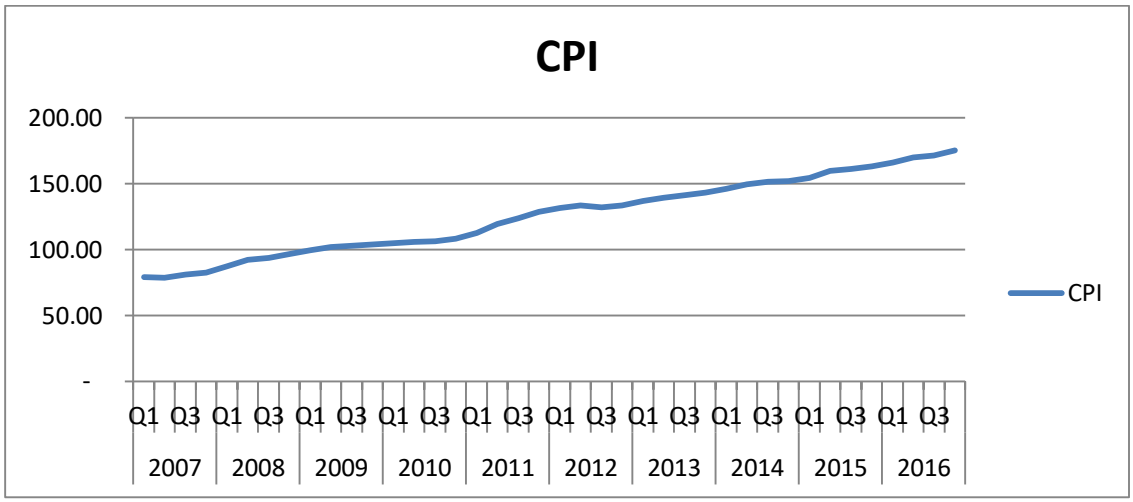

Figure 4. 3 CPI trend

The figure 4.3 above show a trend of increasing inflation over the period of study. Over the period of study, the index increased by over 200%, moving from around the figure of 75 to 175. It is also evident that the growth slowed down in Q3 of 2010 and also in Q4 of 2012.

4.3.4 Interest Rate Trend

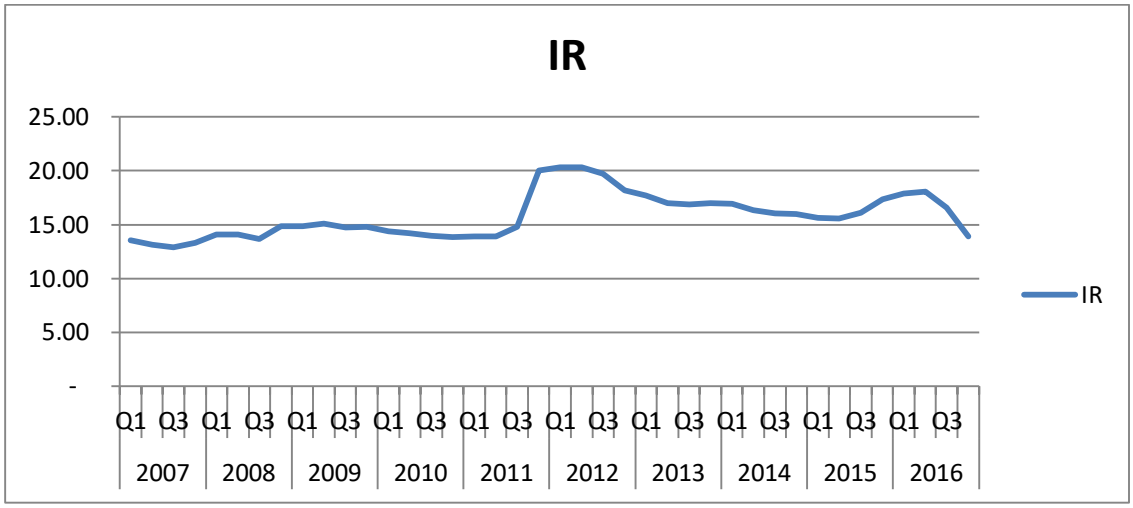

Figure 4. 4 IR trend

The figure 4.4 shows that over the period of study interest rate averaged 15%. However, a sharp rate increase 15% to 20% is visible in Q3 of 2011. The new rate maintains until end of 2012 before assuming a downward trend in Q3 of 2012 and then stabilizing at around 15% inQ3 of 2015. Q 4 of 2015 records a momentarily rate increase to around 18% and subsequently a slum to under 15% in third quarter of 2016.

4.3.5 M3 Trend

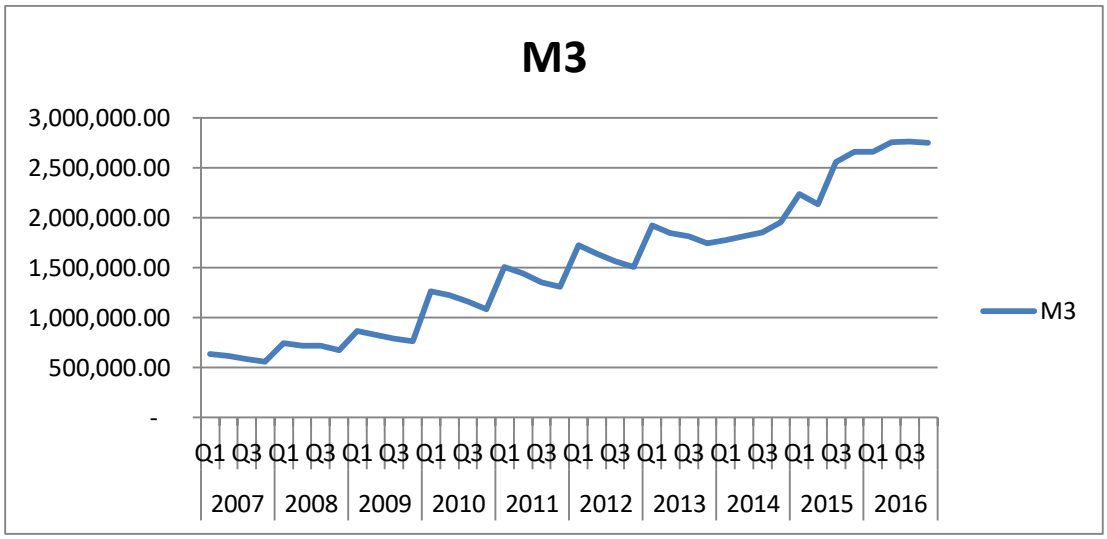

Figure 4. 5 M3 trend

The figure 4.5 shows that money supply has been increasing over the period of study year in out although in a fluctuating manner. Over the period, the money supply increased from a figure slightly above 500,000 to a figure of around 2,750,000.

4.4 Inferential Statistics

This section contains the correlations, the Augmented Dickey Fuller Test, ganger causality test and regression analysis.

4.4.1 Correlation Analysis

Correlation analysis was done to establish the nature and the nature of the relationship between the variable of the research. Table 4.2 shows the obtained correlation analysis results.

Table 4. 2 Correlation Matrix

	GDP	PI	CPI	IR	M3
GDP	1.0000				
PI	0.600234**	1.0000			
CPI	0.633833**	0.579762**	1.0000		
IR	0.58247**	0.610031**	0.446975**	1.0000	
M3	0.547657**	0.665531**	0.571228**	0.606763**	1.0000

**. Correlation is significant at the 0.025 level (2-tailed)

Source: Research findings

The results on table 4.2, show a positive correlation between all independent variables and economic growth. Real estate development has a Pearson correlation coefficient of 0.600234, which indicate a linear association with economic growth.

Similarly, control variables have a near stable linear relationship with economic growth: Inflation (0.633833) Interest rate (0.58247) and Money supply (0.547657)

4.4.2 Augmented Dickey Fuller Test

The ADF unit root test is normally carried out to test the stability of time series variables. The results are shown by table 4.3

Table 4. 3 Augmented Dickey Fuller Test

Null hypothesis: the time series has a unit root		
Augmented Dickey-Fuller test statistic	Real estate development	Economic growth
t-statistic	-5.96349	15.333
Prob.*	0.003011	0.0000

*MacKinnon (1996) one-sided p-values

Source: Research findings

The table 4.3 findings show P-values of Real estate development and economic growth being 0.003011 and <0.0000 respectively. The two P-values are less than the 0.05 significance value hence the null hypothesis that the time series has unit root

4.4.3 Granger Causality

The Granger causality test was applied to test the causal relationship between real estate development and economic growth. Table 4.4 indicates the results

Table 4. 4 Granger Causality Test

Null hypothesis	F-statistic	Prob.	Casual inference
Real estate development does not granger cause economic growth	19.288	0.0001	Causality
Economic growth does not granger cause Real estate development	12.877	0.0010	Causality

Source: Research findings

The results on table 4.4 shows that there is a causal relationship between real estate development and economic growth and vice versa given that P-values are below 0.05 (0.0001<0.05 and 0.001<0.05).

4.4.4 Regression Analysis

Regression analysis was used to establish relationship existing between the variables (independent, control and dependent variables). The table 4.5 shows the regression results;

Table 4. 5 Regression Analysis

Model 1: Pooled OLS, using 40 observations

Dependent variable: GDP

Robust (HAC) standard errors

	Coefficient	*Std. Error*	*z*	*p-value*
Const	4.18972	0.144094	29.08	0.0001
PI	−0.422029	0.160709	−2.626	0.0086
CPI	0.528992	0.163211	3.241	0.0012
IR	−0.0513298	0.0476527	−1.077	0.2814
M3	0.280650	0.0236829	11.85	0.0001

Mean dependent var	5.910586	S.D. dependent var	0.069574
Sum squared residue	0.015320	S.E. of regression	0.020922
R-squared	0.918849	Adjusted R-squared	0.909574
F(4, 35)	99.45840	P-value(F)	1.31e-18
Log-likelihood	100.5919	Akaike criterion	−191.1838

Schwarz criterion	−182.7394	Hannan-Quinn	−188.1306
Rho	0.307400	Durbin-Watson	1.605805

Source: research findings

The following regression equation was established given the data in table 4.5 above;

$$Y = 4.18972 - 0.422029PI + 0.528992CPI + 0.280650M3$$

The study found that the R squared value was 0.9188, which indicates that 91.88% of the variation in the dependent variable is accounted for by the independent variables. Thus, 8.12% is accounted for by other factors not considered by the study and the error term. The F statistics value of 99.45840shows that the regression equation is significant and a good predictor of the relationship between the study variables. The Durbin Watson value of 1.605805 indicates that there is no autocorrelation since the value is within the range of 1.25 and 2.5 respectively.

The results on table 4.5 shows a significant negative relationship between GDP and real estate development. The relationship between economic growth (GDP) and Inflation rate (CPI) is significantly positive whereas the relationship between economic growth and interest rate (IR) is insignificantly negative. On the other hand, the result indicates that there is a significant positive relationship between economic growth and money supply (M3).

4.3.4.1 Test for Multicollinearity

Table 4. 6 Test for Multicollinearity

	Tolerance	VIF
PI	.360	2.778
CPI	.275	3.636
IR	.564	1.773
M3	.511	1.957

Dependent variable: GDP

Source: Research Findings

The variance inflation factors of all variables in table 4.6 indicates are within the acceptable range of less than 10 hence the conclusion that there is no multicollinearity between the dependent and independent variables.

4.4 Interpretation of the Findings

In this study, real estate development and economic growth had a significant negative relationship. Hence, there exist a significant relationship between real estate development and economic growth in Kenya. These findings are similar to the findings by Ma (2010) in China where Housing investment was found to be significantly related to GDP. Karuana (2012) also found a strong positive correlation between real estate and GDP. However, Hui (2009) found that stimulating activities in property market does not guarantee sustainable GDP growth.

The study also found effect of interest rate to GDP in Kenya to be negatively insignificant. Hence there is an insignificant relationship between Interest rate and GDP in Kenya. The

findings of the study were similar to the study by Chepkemoi (2014) whose findings showed a linear relationship between interest rate and economic growth.

Further, inflation rate as measured by Consumer Price Index (CPI) was observed to have a positive significant effect on GDP. Hence there is a direct relationship between inflation rate and GDP in Kenya. The study findings are similar to that of Wambui (2013) which found Inflation to positively and significantly influence economic growth as measured by GDP.

Lastly, the effect of money supply to economic growth was found to be significantly positive (p-value being less than 0.001). This results therefore shows a direct relationship between money supply and economic growth in Kenya. The study findings are similar to those reported by Chepkemoi (2014) study, which found a significant long-run relationship between money supply and economic growth in Kenya.

Results of Granger causality test revealed a causal relationship between real estate development and economic growth. This means economic development is affected by the real estate development and economic growth can be said to have an effect to development of real estate.

CHAPTER FIVE: SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

This chapter summarizes the research findings; provides conclusions of the study and recommendations, present the limitations of the study and suggests areas requiring further research.

5.2 Summary

The main objective of this study was to determine the effect of real estate development to economic growth in Kenya. The independent variable for study was real estate development, which was measured using property index published by Hassconsult while the dependent variable was economic growth measured using GDP growth rate. Interest rate, money supply and inflation rates formed the control variables. To investigate the relationship between real estate development and economic growth, the study reviewed the investment, Neo classical growth and endogenous growth theories.

The descriptive statistics established that economic growth, measured using GDP, had a mean of 824, 287.6 with 633,710 and 1,094,567 as minimum and maximum respectively. The results also show that the mean of the property index (PI) is 304.4583 with the minimum and maximum PI being 175.3 and 436.8587 respectively. In addition, the result show that the mean of the inflation rate (CPI) is 125.4706 with minimum CPI of 78.45777 and maximum CPI of 175.18. Also from the results, the interest rate (IR) mean is 15.78775 with maximum and minimum IR of 20.34 and 12.87 respectively. Further, the result show that the mean of the money supply (M3) was 1513157 and minimum and maximum M3 of 557,650 and 2,761,800 in that order. The kurtosis and skewness values were found to be

within the range of -2 and +2. These values were considered to be within the acceptable range of -2 and 2 George and Mallery (2010) for the datasets to considered symmetrical hence an indication that the data is normally distributed.

The inferential statistical analysis revealed a positive correlation between all independent variables and economic growth. Real estate development has a Pearson correlation coefficient of 0.600234 which indicate a linear association with economic growth. Similarly, control variables had a near stable linear relationship with economic growth: Inflation (0.633833) Interest rate (0.58247) and Money supply (0.547657). The causality test found causal relationship between real estate development and economic growth and vice versa given p-values were below 0.05 (0.0001<0.05 and 0.001<0.05).

Further, regression analysis results found that the R squared value was 0.9188, which indicated that 91.88% of the variations in the dependent variable was accounted for by the independent variables. Thus, 8.12% was accounted for by other factors not considered by the study and the error term. The F statistics value of 99.45840 showed that the regression equation was significant and a good predictor of the relationship between the study variables. Autocorrelation between variables was ruled out given that Durbin Watson value was estimated to 1.605805 which fall within the range of 1.25 and 2.5 respectively.

5.3 Conclusions

The study findings established a significant relationship between real estate development and economic growth in Kenya. This leads to conclusion that real estate development has an effect in the growth of the economy. The minor effect of the real estate development to

the economic growth was noted to be negative which means that if the economy is performing poorly the real estate sector will also perform poorly and vice versa.

It was also revealed from the findings that the relationship between GDP and inflation was significant. This points to a direct relationship between the variables and hence the conclusion that a positive change in inflation results to positive change in economic growth.

The findings further revealed an insignificant relationship between Interest rate and economic growth. This means that changes in interest rate have inconsequential effect on the growth of the economy. The conclusion from the findings therefore is no relationship between Interest rate and economic growth in Kenya.

Lastly, the findings revealed a significant relationship between Money supply and economic growth. The relationship was observed to be positive. This means for a change in money supply in Kenya, a notable change in economic growth is recorded in the same direction. The conclusion therefore is that there exists a direct relationship between money supply and economic growth in Kenya.

5.4 Recommendations

The study concluded that real estate development has a significant effect on the economic growth. Given the conclusion, the study recommend that GoK should invest in real estate to improve economic growth in Kenya. Reengineering policies surrounding development and management of real estate in Kenya to attract investment from private sector can be one of the many ways the GoK can use to fast track development of the sector.

The conclusion that inflation has a direct effect on the economic growth lead to recommendation to the government to effectively put in place policies (fiscal and monetary) that would allow effective and efficient management of inflation in the country as this would guarantee sustainable growth of the economy.

The study observed an insignificant relationship between Interest rate and economic growth in Kenya. Whereas interest rate is one of the key indicator controlled by the CBK through its Monetary Policy Committee (MPC), the study recommends that the Kenya's Central Bank should prioritize investment in controlling other variables such as inflation and money supply whose effect on economic growth are higher.

The conclusion of the study that there exists a significant positive relationship between Money supply and economic growth points to the need for proper management of money in circulation by the GoK, as this has a potential of determining the course taken by the economy. The study recommends therefore that the Central Bank should continue monitoring money in circulation and ensure the right threshold that optimizes economic growth is maintained.

5.5 Limitations of the Study

The objective of the study was to establish the relationship existing between real estate development and economic growth in Kenya. The study delved on the property index published by Hassconsult between the period 2007 and 2016 as a proxy to real estate development. Whereas Hassconsult notes that the index provides a national outlook, it is worth noting collecting data of all real estate transactions made in the country is near impossible and hence the property index scope may not reveal the exact real estate

development trend. Future studies therefore may employ other proxies to measure real estate development such as GoK budget allocation to housing, growth of mortgage market in Kenya etc.

Given the short period available to conduct the research meant the researcher lacked benefit associated with longer time period. Details of variables salient to the study may have been inadvertently overlooked or not discussed in detail.

5.6 Suggestion for Further Research

Measurement of real estate development in the study was only possible using Hassconsult Property Index. The study suggest that future studies use of other proxies to real estate growth such as GoK budgetary allocation to the housing sector, land transfer records from the Ministry of land etc.

The researcher recommends study of determinants of real estate development. There is need to interrogate this subject using both qualitative as well as quantitative data. This would help Kenya in better understanding the sector which would assist in aiding GoK investments geared towards improving the sector.

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APPENDICES

APPENDIX 1 House price index data (PI: DEC: 2005 = 100)

Year	Quarter	Property Index(PI) Q1:2005 = 100
2007	Q1	103.82
	Q2	104.23
	Q3	106.38
	Q4	111.76
2008	Q1	116.06
	Q2	118.10
	Q3	123.80
	Q4	129.11
2009	Q1	132.16
	Q2	130.29
	Q3	127.51
	Q4	128.04
2010	Q1	128.44
	Q2	130.24
	Q3	130.74
	Q4	133.34
2011	Q1	137.24
	Q2	141.64
	Q3	140.64
	Q4	139.64
2012	Q1	140.34
	Q2	141.64
	Q3	142.94
	Q4	148.04
2013	Q1	149.74
	Q2	150.24
	Q3	152.54
	Q4	151.04
2014	Q1	150.04
	Q2	151.94
	Q3	152.54
	Q4	155.64

Year	Quarter	Property Index(PI) Q1:2005 = 100
2015	Q1	158.04
	Q2	157.64
	Q3	159.84
	Q4	164.04
2016	Q1	167.64
	Q2	171.84
	Q3	175.44
	Q4	176.64

Source: Hass Consult Ltd

APPENDIX 2 Data for GDP per Quarter in million Kes

Year	Quarter	GDP
2007	Q1	709,240.00
	Q2	643,248.00
	Q3	633,710.00
	Q4	647,553.00
2008	Q1	710,887.00
	Q2	687,316.00
	Q3	677,124.00
	Q4	691,916.00
2009	Q1	737,906.34
	Q2	688,912.00
	Q3	678,697.00
	Q4	693,523.00
2010	Q1	786,481.00
	Q2	713,363.99
	Q3	705,260.19
	Q4	707,158.87
2011	Q1	845,860.78
	Q2	767,418.00
	Q3	761,159.00
	Q4	789,245.00
2012	Q1	880,802.00
	Q2	853,430.00
	Q3	847,709.00
	Q4	862,398.00
2013	Q1	934,377.00
	Q2	917,617.00
	Q3	902,369.00
	Q4	892,495.00
2014	Q1	982,831.00
	Q2	972,665.00
	Q3	944,042.00
	Q4	942,493.00
2015	Q1	1,039,409.00
	Q2	1,026,857.00
	Q3	1,001,186.00
	Q4	994,079.00

Year	Quarter	GDP
2016	Q1	1,094,619.00
	Q2	1,091,052.00
	Q3	1,058,371.00
	Q4	1,055,045.00

Source: Kenya Bureau of statistics

APPENDIX 3 Data for average interest rate % (IR) per Quarter

Year	Quarter	Average Interest rate
2007	Q1	8.00
	Q2	8.50
	Q3	8.75
	Q4	8.75
2008	Q1	8.75
	Q2	9.00
	Q3	9.00
	Q4	8.75
2009	Q1	8.38
	Q2	8.00
	Q3	7.75
	Q4	7.00
2010	Q1	7.00
	Q2	6.75
	Q3	6.38
	Q4	6.00
2011	Q1	5.88
	Q2	6.25
	Q3	6.63
	Q4	15.17
2012	Q1	18.00
	Q2	18.00
	Q3	14.75
	Q4	11.00
2013	Q1	9.50
	Q2	8.50
	Q3	8.50
	Q4	8.50
2014	Q1	8.50
	Q2	8.50
	Q3	8.50
	Q4	8.50
2015	Q1	11.50
	Q2	11.50
	Q3	9.00
	Q4	11.50

Year	Quarter	Average Interest rate
2016	Q1	**11.50**
	Q2	11.50
	Q3	10.00
	Q4	10.00

Source: Central Bank of Kenya

APPENDIX 4 Data for average nominal inflation rate % (CPI) per Quarter

Year	Quarter	CPI
2007	Q1	78.90
	Q2	78.46
	Q3	80.90
	Q4	82.68
2008	Q1	87.18
	Q2	92.14
	Q3	93.75
	Q4	96.38
2009	Q1	99.50
	Q2	101.91
	Q3	102.90
	Q4	104.07
2010	Q1	105.01
	Q2	105.65
	Q3	106.32
	Q4	108.07
2011	Q1	112.41
	Q2	119.56
	Q3	123.88
	Q4	128.81
2012	Q1	131.36
	Q2	133.63
	Q3	131.78
	Q4	133.35
2013	Q1	136.72
	Q2	139.46
	Q3	140.99
	Q4	143.25
2014	Q1	145.99
	Q2	149.27
	Q3	151.62
	Q4	152.09
2015	Q1	154.48
	Q2	159.71
	Q3	160.93
	Q4	163.27

Year	Quarter	CPI
2016	Q1	165.45
	Q2	168.27
	Q3	171.12
	Q4	173.89

Source: Central Bank of Kenya

APPENDIX 5 Data for Broad money supply (M3) in Million Kes.

Year	Quarter	Money supply (M3)
2007	Q1	624,288.69
	Q2	649,189.32
	Q3	564,605.74
	Q4	591,195.90
2008	Q1	726,331.39
	Q2	757,128.71
	Q3	690,580.46
	Q4	723,174.43
2009	Q1	836,937.19
	Q2	883,107.75
	Q3	770,784.32
	Q4	800,321.15
2010	Q1	1,055,491.29
	Q2	1,091,455.40
	Q3	938,002.60
	Q4	1,000,392.41
2011	Q1	1,211,263.46
	Q2	1,243,904.59
	Q3	1,129,631.56
	Q4	1,164,448.79
2012	Q1	1,386,144.40
	Q2	1,456,090.13
	Q3	1,255,046.50
	Q4	1,314,226.51
2013	Q1	1,582,248.76
	Q2	1,649,167.12
	Q3	1,468,297.84
	Q4	1,541,419.93
2014	Q1	1,876,820.34
	Q2	1,949,985.60
	Q3	1,730,680.13
	Q4	1,815,431.03

Year	Quarter	Money supply (M3)
2015	Q1	2,145,558.62
	Q2	2,193,983.91
	Q3	2,022,103.78
	Q4	2,108,592.59
2016	Q1	2,145,558.00
	Q2	2,202,200.50
	Q3	2,231,846.00
	Q4	2,305,862.00

Source: Central Bank of Kenya