# The Effect of Macro-Economic Variables on Growth in Real Estate Investment in Kenya

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**Abstract:** *The Real Estate industry has increasingly attracted the attention of investors in the recent past. With such increase, it has been expected that the industry will significantly grow and thus fulfill its role in provision of substantive returns as well as the basic need of housing in Kenya. This has not been the case and thus this study sought to establish the effect of macro-economic variables on growth in real estate investment in Kenya given they are key in the growth of the industry. The study followed a descriptive research design. The study used secondary data on annual real estate investments growth as computed from the Hass Consult. The study obtained the secondary data on the selected macro-economic variables including average annual Exchange Rate (Ksh/USD) (%), average annual growth in Diaspora Remittances (%), average annual growth in Money Supply (M3) (%), average annual Inflation Rate (%), average annual GDP growth (%). The data on macro-economic variables was obtained from Central Bank of Kenya (CBK) and Kenya National Bureau of Statistics (KNBS). The data sets covered the period 2000-2013. The data was summarized or/and analyzed using excel spread sheets and statistical package for social sciences. The findings were summarized in graphs and tables. Regression analysis was conducted in order to establish various inferential statistics; R, R-Square, P-Value and F-Test statistics to determine the relationship, strength of the relationship and the statistical significance of the model. Notably, at least one or more of the selected macro-economic variables and the real estate growth declined over the periods; 2002-2005, 2007-2010, and 2011-2013. These periods were just before, during or/and the years immediate to national elections. It is therefore worthy noting that the politics around and during the electioneering period have an adverse effect on most macro-economic variables, which in turn adversely affects real estate investments growth in the country. Furthermore, the study established a strong positive relationship between the selected macro-economic variables; Exchange Rate fluctuations, Growth in Diaspora Remittances, Growth in Money Supply, Inflations, and GDP Growth since R and R-Square was 0.872 and 0.761 respectively and because their corresponding coefficients were positive. These results were supported by both P-Value and F-test statistics. However, P-Values corresponding to each of the macro-economic variables indicate that the variables were insignificant on their own in influence real estate growth. The study concludes that there is a strong positive relationship between the macro-economic variables and real estate investment growth. Also, the study concludes that growth in; exchange rate, diaspora remittances, money in circulation, inflation rate, and real GDP growth do not individually influence the growth in real estate investment in the country, but the combination effect of the change of the macro-economic variables do influence real estate growth. It is therefore recommended that policy makers and planners plan in advance to be able to Manage Exchange rates and inflation rates. Proper and peaceful political environment should be encouraged at all election periods to cut on the adverse effects of bad political environment to the economy.*
*Key Words: Real Estate, Exchange Rate, Inflation Rate, GDP Growth, Growth in Money supply.*

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## I. Introduction and Background

Real estate investment plays the crucial role of providing employment opportunities, offering shelter to households, enhancing income distribution and poverty alleviation (Masika, 2010). Real estate industry in Kenya continues to fail to fulfil this fundamental role due to a number of unique factors that affect the sector. In the recent past, Kenya has witnessed an upsurge in real estate investment owing to increased quest for Kenyans to own homes coupled by an increased demand for residential homes due to increased rural urban migration, as well as demand for office space as more small and medium enterprises come into being (Nzalu, 2010). Wisniewski (2011) indicates that the processes occurring in real estate are subject to different impulses, and these impulses are different depending on the financial and economic situation of a given country. For example, different macro-economic factors vary over time and they influence economic processes, practices and outputs in an economy. Lynn (2007) states that since macro-economic factors often influence one another, and at times

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very correlated, when one factor changes, ripple effect occurs and the economy is affected much more. To this end, measuring the effect of macro-economic variables is usually a difficult endeavor.

This paper examines the effect of interest rates, GDP/income, inflation, diaspora remittances - which affects the balance of payments and employment, economic growth hence affecting the various markets in the economy including the real estate market (Barkham, 2012). Notably, the fluctuating rates of interest do fluctuate the interest charged by lending institutions on loans – cost of capital for investment. Also, the level of national output/income affects various aspects of the economy including investments. Also, an increase diaspora remittance represents an injection of capital for investment. On the other hand, an employment rate represents a capital addition in the economy which may be spent or invested. This study examines the effect of the selected macro-economic factors on real estate investments in Kenya.

**Real Estate Investments in Kenya**

According to Muchoki (2013) most people in Kenya prefer to invest in real estate. Real estate business in Kenya entails buying a house, and it is one of the safest ways to invest your money in Kenya. This is mostly due to the fact that assets like a land and houses in Kenya have tended to almost always appreciate. Also, real estate business in Kenya is fair well in the market because with growing population in Kenya, the demand for houses is on the rise. A Kenyan with the money to buy a house can prefer to buy a house and make use of the money used to pay rent for investment somewhere else in Kenya.

Factors that Influence Real Estate real estate include demographic factors, rate of interest, inflation rate, performance of the economy among others. Demographics are the data that describes the composition of a population, such as age, race, gender, income, migration patterns and population growth. These statistics are an often overlooked but are significant factors that affect how real estate is priced and what types of properties are in demand. Major shifts in the demographics of a nation can have a large impact on real estate trends for several decades.

According to Wallace (2013) population shifts and demographic changes in the population have an impact on the real estate market in Kenya as an increase in population causes demand, which, further increases prices. In assessing the challenges affecting real estate development, Muchoki (2013) identified that poor planning was one of the challenges. Poor planning is partly contributed by lack of updated demographic reports.

When interest rates decline, the value of a bond goes up because its coupon rate becomes more desirable, and when interest rates increase, the value of bonds decrease. Similarly, when the interest rate decreases in the market, REITs' high yields become more attractive and their value goes up. Real Estate Investment Trust - REIT' is a security that sells like a stock on the major exchanges and invests in real estate directly, either through properties or mortgages. When interest rates increase, the yield on an REIT becomes less attractive and it pushes their value down. Otwoma (2013) identified that property prices displayed a high inverse relationship with interest rates in the period December 2000 to May 2003 and November 2011 to June 2013 when interest rates were high. This inverse relationship reverses in the period June 2003 to October 2011, a period when interest rates were relatively low and stable.

Another key factor that affects the value of real estate is the overall health of the economy. This is generally measured by economic indicators such as the Gross Domestic Product, employment data, manufacturing activity and the prices of goods, amongst others. In a research conducted by Muthee (2012), the results indicate that there is a relationship between the variables (GDP growth, inflation, and unemployment) revealing that a quarterly change in housing prices yields a quarterly change in GDP. The data collected and analyzed indicates that property is a strong asset class which has been under exploited in portfolios.

## II. Research Problem

The growth of real estate investment in any context is highly affected by a myriad of economic factors. The growth in real estate could be measured as the collective total investments (costs of investing in real estate) or the price index (the asking prices). In this sense, then different factors can cause growth. For example, the housing bubble is associable with; excessive desire for home ownership in an economy, buying for speculation rather than shelter, low interest rates, viewing residential real estate as a safe harbor, and bad lending practices. To this extent, variables that influence the above variables such as inflation, GDP, Money supply, including international remittances are bound to affect the growth of real estate and other sectors in the economy.

As of 2012, the National Housing Corporation (NHC), the Vision 2030 estimates that the country requires 200,000 new units of housing per year, but the industry could only avail 35,000 units each year. A report from the Kenya National Bureau of Statistics (KNBS) shows that real estate investment has greatly contributed the growth of Kenya's Gross Domestic Product. Kenya National Bureau of Statistics report (2012) shows that, in 2008, real estate contributed 107, 323, 000 shillings to the country's GDP. However, real estate prices in Kenya have been growing almost every year.

Masika (2010) posits that demand for housing units continues to outstrip the supply. Makena (2012) postulates that level of money supply can influence the level of real estate investments as well as real estate property prices. According to Otwoma (2013) property prices display a high inverse relationship with interest rates especially when interest rates are high. He adds that this inverse relationship reverses when interest rates are relatively low and stable. In his study, Muthee (2012) established a relationship between the variables (GDP growth, inflation, and unemployment) and a quarterly change in housing prices yields.

In his study, Nzalu (2012) concluded that GDP, interest rates and inflation rates do greatly determine the real estate investments in Kenya. Elsewhere, Renigier-Bilozor & Wisniewski (2012) established total consumption expenditure, net income; unemployment and population growths are influential factors to the real estate investment. Also Golob, Bastic & Psuder (2012) affirmed the findings of Renigier-Bilozor & Wisniewski (2012).

It is notable that while different researchers do agree that GDP, interest rates, inflation, unemployment, demographics, amongst others do affect the level of real estate investments, they do not conclude on the direction of the relationship or the strength of the relationship. Furthermore, findings from different authors are not consistent. Therefore this study seeks to determine the effect of macro-economic variables on real estate investments in Kenya.

## III. Objectives of the Study
To determine the effect of macro-economic variables on real estate investment growth in Kenya

**\*Null hypotheses were formulated (in view of each respective specific objective) and tested at a significance level of 0.05.**

## IV. Significance of the Study
The study is of the following practical value: the study provides useful information to policy makers, market players and finance academicians on the extent to which macro-economic factors affect real estate development in the country. The outcome of this study provides insight to policy makers and real estate players as to whether macro-economic factors can be used as a useful tool in ensuring housing affordability in Kenya. The study adds value to theoretical discussion by testing the relationship of macro-economic factors and investment under an environment where demand outweighs supply. The findings of the study are useful resource base to students pursuing Finance and to researchers exploring the area of real estate. The study provides useful data for comparative study purposes in future researches on this topic.

## V. Review of Literature
Relevant key theories were reviewed to support the theoretical anchorage of the study besides conducting an empirical review of related studies.

### 1. Theoretical Review
### 1.1 McKinnon and Shaw Theory
According to McKinnon (1973) and Shaw (1973), increase in demand for investment but not the actual investment can occur, if real interest rates are kept below the market equilibrium. Low interest rates are insufficient to generate savings; it can even reduce savings especially if substitution effects dominate the income effect for households. On the other hand, low rates raise the expected profitability of investment projects by raising the net present value of future earnings from the project. The theory rests on the assumptions that saving is an increasing function of real rate of interest on deposits and real rate of growth in output and that investment is a decreasing function of the real loan rate of interest and an increasing function of the growth rate. The theory posits that the nominal interest rate should be administratively fixed. They advance that emerging economies are fragmented; hence there is a greater likelihood of having investments that are less productive. Capital accumulation is discouraged by the fact that for a high inflation rate, nominal interest rates are set too low and thus real interest rates could be negative. As capital supply of banking sector is limited and banks have only specialized credit activities, people have to finance their investment projects by themselves or have to go to the informal sector where interest rates are often usurious.

### 1.2 Quantity Theory of Money
The concept of the quantity theory of money (QTM) began in the 16th century. As gold and silver inflows from the Americas into Europe were being minted into coins, there was a resulting rise in inflation. This led economist Henry Thornton in 1802 to assume that more money equals more inflation and that an increase in money supply does not necessarily mean an increase in economic output. However, Keynes (1936) challenged the theory in the 1930s, saying that increases in money supply lead to a decrease in the velocity of circulation

and that real income, the flow of money to the factors of production, increased. Therefore, velocity could change in response to changes in money supply. Nevertheless, if this theory was to be considered, inflation and money supply, which are also affected diaspora remittances would be placed into account. Keynes (1936) identify that money supply has a significant impact on inflation rate. Further, inflation has a significant impact on interest rates, which further affects housing prices. For most monetarists, therefore, any anti-inflationary policy will stem from the basic concept that there should be a gradual reduction in the money supply. Monetarists believe that instead of governments continually adjusting economic policies (i.e. government spending and taxes), it is better to let non-inflationary policies (i.e. gradual reduction of money supply) lead an economy to full employment.

**1.3 Keynesian Economic Theory**
        Keynes (1936) is in the view that in the short run, especially during recessions, economic output is strongly influenced by aggregate demand (total spending in the economy). In the Keynesian view, aggregate demand does not necessarily equal the productive capacity of the economy; instead, it is influenced by a host of factors and sometimes behaves erratically, affecting production, employment, and inflation. Keynesian economists often argue that private sector decisions sometimes lead to inefficient macroeconomic outcomes which require active policy responses by the public sector, in particular, monetary policy actions by the central bank and fiscal policy actions by the government, in order to stabilize output over the business cycle. Policies focus on the short-term needs and how economic policies can make instant corrections to a nation's economy. Also, the government is seen as the only force to end financial and economic downturns through monetary or fiscal policies, and providing aggregate demand to increase the level of economic output, facilitated through a stable financial system that can spur continued economic stability. Keynes (1936) later supported an alternative structure that includes direct government control of investment and advanced that financial deepening can occur due to an expansion in government expenditure. Since higher interest rates lower private investment, an increase in government expenditure promotes investments and reduces private investments concurrently.

**2.        Empirical Review**
**2.1 Foreign empirical evidence**
        In a journal titled International Real Estate Review, Apergis (2011) contributed a study on Housing Prices and Macroeconomic Factors: Prospects within the European Monetary Union. The study analyzed the dynamic effects of specific macroeconomic variables (i.e. housing loan rates, inflation and employment) on the price of new houses sold in Greece. An error correction vector autoregressive (ECVAR) model is used to model the impact of the macroeconomic variables on real housing prices. Variance decompositions showed that the housing loan rate is the variable with the highest explanatory power over the variation of real housing prices, followed by inflation and employment.
        Rodenholm & Dominique (2013) studied on Macroeconomic effects on securitized real estate markets which was comparative study of Sweden and Switzerland. The study investigated to what extent macroeconomic factors influence real estate stock prices before and after the outbreak of the financial crisis in 2007. The results show that the macroeconomic effects on real estate stock prices differ among small economies and are inconsistent in a pre-crisis and crisis period. Solely theoretical aspects are not sufficient to describe the varying conditions in the financial markets, which have to be scrutinized in a wider economic context. Those factors that show some regularity in the relation to the real estate markets are all share indices, term structure and real GDP per capita.
        Renigier-Bilozor & Wisniewski (2012) used Italy and Polland to determine the impact of macroeconomic factors on residential property and prices indices in Europe. Quarterly time series data constituted the material for testing and empirical results. The developed models show that the economic and financial situation of European countries affects residential property markets. Residential property markets are connected, despite the fact that they are situated in different parts of Europe. The economic and financial crisis of countries has variable influence on prices of real estate.
        Golob, Bastic & Psunder (2012) using Slovenia as a case study, identified that economic growth, interest rates, construction quality, speed of real estate sales and accessibility of funding sources were significant factors in the real estate market. Although the study was derived from past researches, the researchers also included the expertise of investors, real estate owners, tenancy right holders, real estate users, administrators, managers, tenants, real estate agencies and companies, design and construction companies, as well as other individuals across Slovenia, with varying durations of work experience and varying education levels.
        In assessing the determinants of real estate investment, Klimczak (2010) identifies that familiarity with sources of value as well as factors of which determine the value and impact upon the attractiveness of a capital market segment in question, allows capital owners to make effective and rational investment decisions. Issues concerning economic and physical properties of the estate that constitute its value, are of great importance for prospective investors on the real estate market.

**2.2 Local Empirical Evidence**

In determining the relationship between economic growth and real estate prices in Kenya, Muthee (2012) identified that there is a relationship between the variables (real estate prices and real estate investment) revealing that a quarterly change in housing prices yields a quarterly change in GDP. The data collected and analysed indicates that property is a strong asset class which has been under exploited portfolios. It was also identified that GDP growth, inflation and unemployment show significant correlation with composite property returns.

In the research conducted by Nzalu (2012), it was identified that GDP is the most significant contributor to the growth in real estate. In addition GDP growth, interest rate variation and growth in inflation were found to be statistically significant determinant of real estate growth. The study investigated factors such as GDP Growth, the influence of interest rate, inflation rates and population growth. The study adopted both quantitative and descriptive research design to obtain information especially true for many real estate investors in Kenya.

Makena (2012) sought to investigate the determinants of residential real estate prices in Nairobi. In this study a quantitative approach was followed. The study used secondary data which were largely quantitative and descriptive in nature. The study found that the level of money in supply information can give economists and financial analysts a better understanding of the real estate market and its influence on real estate prices. To the financial analysts, it is important to realize the need to sensitize their clients to do more investment in real estate in municipality areas like Nairobi because there is need for more residential real estates. Further, they need to let financial institutions realize that real estate investment in such metropolitan and municipalities is not exhausted in financing so that they can open up possibilities for their client who would like to venture in the same.

In assessing the determinants of real estate prices in Kenya, Karoki (2013) identified that there are significant negative relationship between residential real estate prices and interest rates, and positive relationships with GDP, and level of money supply. Interest rates have the most significant effect on house prices followed by GDP and level of money supply. Thus the rise in property prices is well explained by macroeconomic variables. Although the study established a positive relationship between residential real estate prices and inflation rates, the relationship was found to be insignificant. The trend also indicates an overall increase in property prices with time hence the real estate market in Kenya is expected to continue to grow. Even without significant changes in the variables, the effect of time is that house prices increase. This also indicates that the real estate market is significantly stable.

# VI. Methodology

Descriptive research design was used to describe the relationship between the selected macro-economic factors and real estate investment. Flick (2009) notes that Descriptive research design is widely accepted in the field of finance and economics since it is proving to be very useful in policy evaluations. According to Groves (2004) descriptive technique gives accurate information of persons, events or situations. For the purpose of this study, the researcher obtained secondary data for all the variables which includes exchange rate, money supply, inflation rate, and real output and diaspora remittances from Central Bank of Kenya (CBK) for the period 2000-2013. The dependent variable real estate investment - Hass Composite Sales Index, is the secondary data that was obtained from Hass Consult Report of between 2000 and 2013. These reports are readily available in the company's website. The data was analyzed using Statistical Package for Social Sciences (SPSS) in order to obtain various statistics, percentages, frequency distribution, means and standard deviation. The unit of analysis was secondary data obtained from CBK, KNBS and reports available on the internet. The variables involved included diaspora remittances, exchange rate, money supply, inflation rate and real output. The study analytical model is depicted by the regression model:

$$Y = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \mu_i$$

Where; Y – Growth of Real estate Investments measured using the percentage change of Hass Composite Annual Average Sales Index

$X_1$ **-** Inflation rate, measured as percentage change in the average annual – the CPI

$X_2$ - Money Supply Growth, measured as percentage change of the average yearly monetary base (M3)

$X_3$ - Real Output (Real GDP) Growth, measured as percentage change in annual Real Output; the real GDP a macroeconomic measure of the value of economic output adjusted for price changes (inflation or deflation)

$X_4$ – Growth in Diaspora Remittances, measured as percentage change average annual amounts as indicated by the
Central Bank of Kenya

$X_5$ – Growth in exchange rate, measured as the percentage change in average annual Kenyan currency exchange to USD

$\beta$ – Beta coefficient of variable *i* that measure the amount of the change in Y associated with a unit change in X.
While $\mu_i$ – is the error term that is assumed to be associated with the Variables

# VII. Analysis

## A. Descriptive Analysis

**Real Estate Prices**

The study sought to establish the real estate growth in Kenya over the study period. The study findings revealed that real estate investments growth as fluctuated each year throughout the period. The study results revealed that real estate investments has fluctuated and has had a highest peak in the years 2002 and 2009 while years; 2001, 2005 and 2012 experienced least growth.

**Inflation Rates**

The study sought to establish the trend of inflation rates in Kenya over the study period. The study results show that the average annual inflation has been fluctuating from one period to another. The inflation rate averaged between 10% during the year 2000. It drops to 5.8% and then to 2% during the periods 2000/2001 and 2001/2002 respectively. Then, the inflation increased to average at 9.8% and to 11.6% during the period 2002/2003 and 2003/2004. The rate dropped again from 10.3% to 4.3% through the period 2004/2005 to 2006/2007 having averaged at 6.0% over the period 2005/2006. Then, the rate shot-up to 16.2% during the period 2007/2008, after which it fell to 4.1% through the period 2009/2010 having averaged at 10.5% during the period 2008/2009. Ones more, the rat hot-up to average at 14.0% during the period 2010/2011 but dropped but dropped to 9.4% and yet again to 4.6% during the periods 2011/2012 and 2012/2013 respectively.

**Growth in Money Supply**

The study sought to establish the trend of the growth of the money supply. The study results established that average annual inflation fluctuated throughout the period. On average, the central bank increased the money supply in several years. The money in circulation rose highly in the year 2007 (increased by 31.8%) while it was reduced greatly, hence the money instead was decreased by 6.5%.

**Real GDP Growth**

The study examined the trend of the growth in real Gross Domestic Product. The study results established that average annual GDP has at least grown each year since the year 2000 to 2013. However, the growth has been inconsistent as the percentage growth changed each year. The three years which witnessed least growths included 2000, 2002 and 2008 with 0.6%, 0.3% and 1.5% respective growths as shown above. Also, the real GDP growth was highest in the year 2007 (7.0%). But, it drops to 1.5% percent within one year in 2008. However, it grew each year to reach 5.8% but has dropped since then to reach 2.1%.

**Growth in Diaspora Remittances**

The study examined the trend of the changes in diaspora remittances over the study period. The study results established that the total annual diaspora remittances grew and declined in different years over the study period. Years such as 2000, 2003, 2006, and 2010 experienced relatively high growths of 24.6%, 24.2%, 40.7%, and 38.8%. Also, years 2002, 2008, and 2013 experienced least growths in remittances to the extent that the growth was negative with values of -21.3%, -0.6% and -27.5%.

**Exchange Rate Fluctuations**

The study examined the change in the average annual exchange rate using the Ksh/USD exchange rate as USD is the world's highly used currency. The study results established that the average annual exchange rate had fluctuated over the study period. Notably, the exchange rate decreased since year 2000 to 2003 from a growth of 3.43% to negative (-3.09%), but grew again by 3.83%, after which it fell by 4.82%, 4.32% and 6.72% in the years 2005, 2006, and 2007 respectively. However, it shot up and grew steadily by 3.63% and 10.98% during the years 2008 and 2009. The growth rate fell again but increased to 11.65% but decreased by 4.60% yet it increased again in the year 2013.

## B. Regression Analysis

Regression analysis was done on the dependent variable growth in real estate investments against 5 predictor variables; average annual inflation, average annual growth in money supply, average annual growth in real GDP, average annual growth in diaspora remittances and average annual exchange rate fluctuations. The regression analysis was undertaken at 5% confident level. The criteria for comparing whether the predictor variables were significant in the model was done by relating the corresponding probability value obtained and $\alpha = 0.05$. If the probability value was less than $\alpha$ then the predictor variable was significant; otherwise it was not. Also, F – table statistic was compared with the one obtained from the regression analysis. If the one from the table was smaller than the computed value from the regression analysis, the variable was significant in predicting/causing a change on the dependent variable. Else, the variable was insignificant in the model.

**Table 1: Regression Model Summary[b]**

| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate | Sig. F Change |
|---|---|---|---|---|---|
| 1 | .872[a] | .761 | .590 | 3.749 | .038 |

a. Predictors: (Constant), Average Annual Exchange Rate fluctuations (Ksh/USD) (%), Average Annual Growth in Diaspora Remittances (%), Average Annual Growth in Money Supply (M3) (%), Average Annual Inflation Rate (%), Average Annual GDP Growth (%).
b. Dependent Variable: Average Annual Growth in Real Estate Investments (%)
Source: Research Findings

In order to explain the percentage of variation in the dependent variable (Average Annual Growth in Real Estate Investments) that is explained by the independent variables, the researcher used coefficient of determination obtained via regression analysis and presented in table 1. Coefficient of determination shows the extent to which changes in the dependent variable can be explained by the change in the independent variables or the percentage of variation in the dependent variable that is explained by all the variations in the three variables (the macro-economic variables – Average Annual Exchange Rate fluctuations (Ksh/USD) (%), Average Annual Growth in Diaspora Remittances (%), Average Annual Growth in Money Supply (M3) (%), Average Annual Inflation Rate (%), Average Annual GDP Growth (%)). The results of the analysis shows that the change in the 5 macro-economic variables above contributed to an equivalent of 76.1% of a change in real estate investments as depicted by the R-Square equal to 0.761. Also, the results revealed that there was a strong relationship between the macro-economic variables and the real estate growth as shown by the coefficient of determination (R) equal to 0.872.

**Table 2: ANOVA table**

ANOVA[a]

| Model | | Sum of Squares | Df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| 1 | Regression | 313.181 | 5 | 62.636 | 4.458 | .038[b] |
| | Residual | 98.363 | 7 | 14.052 | | |
| | Total | 411.544 | 12 | | | |

a. Dependent Variable: Average Annual Growth in Real Estate Investments (%)
b. Predictors (Constant): Average Annual Exchange Rate fluctuations (Ksh/USD) (%), Average Annual Growth in Diaspora Remittances (%) , Average Annual Growth in Money Supply (M3) (%) , Average Annual Inflation Rate (%) , Average Annual GDP Growth (%)

Source: Research Findings

From the ANOVA results, the probability value of 0.038 was obtained implying that the regression model was significant in predicting the relationship between Real Estate Investments growth and the predictor variables as it was less than α=0.05. By use of the F-table, the $F_{12;5;0:05}$ was 4.36 which is less than the F-test statistic = 4.458 determined through analysis and shown in table 2 above, which indicated that the model was statistically significant.

**Table 3. Model of Coefficients**

Table 3: Coefficients[a]

| Model | Unstandardized Coefficients | | Standardized Coefficients | T | Sig. |
|---|---|---|---|---|---|
| | B | Std. Error | Beta | | |
| (Constant) | 13.980 | 4.281 | | 3.266 | .014 |
| Average Annual Inflation Rate ($X_1$) | .188 | .316 | .137 | .596 | .570 |
| Average Annual Growth in Money Supply (M3) ($X_2$) | .472 | .144 | .797 | 3.269 | .059 |
| Average Annual GDP Growth ($X_3$) | 2.901 | .855 | 1.004 | 3.393 | .062 |
| Average Annual Growth in Diaspora Remittances ($X_4$) | .040 | .076 | .140 | .522 | .618 |
| Average Annual Exchange Rate fluctuations (Ksh/USD) ($X_5$) | .192 | .225 | .190 | .852 | .422 |

Source: Research Findings

The regression analysis results indicated that the relationship between real estate investment growth and the predictor variables can be expressed using the following regression equation:
$Y = 13.98 + 0.188X_1 + 0.472X_2 + 2.901X_3 + 0.040X_4 + 0.192X_5 + \mu e$
From the regression model obtained above, holding all the other factors constant, growth in real estate investment would be 13.98. A unit change in each of the predictor variables would cause a change in the real

estate investment growth by an amount corresponding to the coefficient related with each variable as indicated in the model above. Also, there exists a strong positive relationship between each of the predictor variables and real estate investment growth. Further, the corresponding p-values for each of the selected variables; Annual Inflation Rate, Annual Growth in Money Supply (M3), Annual GDP Growth, Annual Growth in Diaspora Remittances, Annual Exchange Rate fluctuations (Ksh/USD) were 0.570, 0.059, 0.062, 0.618, and 0.422 which were larger than 0.05.

## VIII.    Findings and Discussions

The study established that each of the individual study variables fluctuated across the study period. Notably, the study results as depicted by the graphical figure 4.1 shows that the growth in real estate investments declined each year through 2002-2005. Also notable, the growth declined through the period 2009-2010. Also, inflation rates increased through the period 2002-2005 and shot up in the year 2008. Further, the growth in money supply declined slightly through the periods 2002-2003, and greatly through 2007-2008. Moreover, GDP growth declined through the period 2001-2002 and 2007-2008. Also, growth in diaspora remittances declined through the periods 2001-2002, 2007-2003 and 2011-2013. Also notable was that the exchange rate declined just before and shot-up immediately after the periods 2002-2003, 2006-2007, and 2011-2012.

It is worth noting that Kenya held elections during the periods 2002, 2007, and 2013 lying within the study period. It is during these periods that each of all the macro-economic variables experienced an adverse up-turn. Furthermore, real estate growth was the least just before, during, or/and immediately after these periods. The electioneering periods have an adverse effect on most macro-economic variables, which in turn adversely affects real estate investments growth in the country.

The regression analysis results indicated that the relationship between real estate investment growth and the predictor variables can be expressed using the following regression equation: $Y = 13.98 + 0.188X1 + 0.472X2 + 2.901X3 + 0.040X4 + 0.192X5 + \mu e$. Since the coefficients corresponding to various predictor variables were positive, the study established a positive relationship between real estate investment growth and each of the macro-economic variables. This was supported by the positive coefficient of determination and correlation coefficient. Furthermore, the ANOVA results established a p-value of 0.038 which implied that the regression model was statistically significant in predicting the relationship between Real Estate Investments growth and the predictor variables as it was less than $\alpha=0.05$. However, the variables were not statistically significant individually as depicted by corresponding p-values each of the variables which were greater than 0.05.

Furthermore, the study established a strong positive relationship between the selected macro-economic variables Exchange Rate fluctuations, Growth in Diaspora Remittances, Growth in Money Supply, Inflations, and GDP Growth since R and R-Square was 0.872 and 0.761 respectively. Therefore, a change in growth of the selected macro-economic variables contributes 76.1% of the change in the growth of the dependent variable real estate growth.

Moreover, a p-value of 0.038 was obtained (which is less than 0.05) meaning that the multiple linear regression model involving real estate investment growth and the 5 selected macro-economic variables (Exchange Rate fluctuations, Growth in Diaspora Remittances, Growth in Money Supply, Inflations, and GDP Growth) was statistically significant and can be assumed to describe the relationship between the variables. This was supported by the findings of F-test statistics ($F12;5;0:05$ was 4.36 which is less than the F-test statistic = 4.458 determined through analysis). However, each variable (macro-economic) was not statistically significant on its own.

## IX. Conclusions and Recommendations

The analysis results (as shown by positive R, and R-Square) established that there is a strong positive relationship between macro-economic variables and real estate investment growth. Also, the coefficients corresponding to selected macro-economic variables; Exchange Rate fluctuations, Growth in Diaspora Remittances, Growth in Money Supply, Inflations, and GDP Growth were positive apart from the one on growth in GDP meaning that the growth in the selected macro-economic variables positively affects real estate investments.

Therefore, this study concludes that there is a strong positive relationship between the macro-economic variables and real estate investment growth. Also, the study concludes that growth in; exchange rate, diaspora remittances, money in circulation, inflation rate, and real GDP growth do not individually influence the growth in real estate investment in the country, but the combination effect of the change of the macro-economic variables do influence real estate growth.

The study concurred with the findings of Muthee (2012) who established a relationship between the variables (GDP growth, inflation, and unemployment) and a quarterly change in housing prices yields. Also,

Makena (2012) found that the level of money in supply do affect the real estate market and it influences real estate prices. However, the study disagreed with the views of Karoki (2013) who identified that there is a significant negative relationship between residential real estate prices and interest rates, real GDP, and the level of money supply.

The study recommends that the Central Bank of Kenya (CBK) and other regulators should plan in advance and influence the macro-economic variables in the right direction. For instance the economy should have sufficient money supply to ensure that there is enough money to conduct trade in the economy. Further, exchange rate and inflation should be managed to ensure that property prices are stable, because if investors incur more costs they would pass over the costs to property buyers by increasing property prices. The government should also aim to grow the country's real GDP as this would enhance the growth of real estate investments in the economy as established by the study.

Also, the study established that all the selected macro-economic variables worsened just before, during or/and the immediate year following elections. The study recommends that the investment community should plan for the adverse effects of the changes before, during, and immediate years following an election. The situation was worse during the period 2007-2010. Notably, Kenyan held national elections in the year 2007 and was marred by election mal-practices followed by a post-election violence. The study further recommends that the government should ensure that contestants do not engage in bad politicking as this may deteriorate the effect of macro-economic variables and therefore investments in real estate and possibly other sectors. Furthermore, the electoral body should tighten controls of politics and quality of election results.

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