

**THE RELATIONSHIP BETWEEN INFLATION RATES AND REAL
ESTATE PRICES IN KENYA. CASE OF NAIROBI COUNTY**

BY

SYLVIA KANGOGO C.

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DECLARATION

I declare that this research project is my original work and has not been presented for a degree in any other university.

Signed _____

Date _____

Sylvia Kangogo C.

D61/66842/2011

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

Signed _____

Date _____

Dr. Josiah O. Aduda

Chairman Department of Finance and Accounting.

School of business

University of Nairobi

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DEDICATION

I dedicate this project to my parents, siblings, my husband Isaac and children Alvin and Mitchelle.

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ABSTRACT

Real estate industry has been one of the most resilient, vibrant and profitable in the world today. The growth has mainly been driven by urbanization, a strong economy and stable legal environment, significant credit expansion and increased spending on infrastructure by the government. Fluctuation in property prices have been experienced in many countries, this is attributed to the financial instability result from the house price boom and bust. According to the Kenya National Bureau of statistics, in Kenya the real estate has been a driver of growth in the past five years. Real estate markets are continuously adjusting to equilibrium where price range is adjusted according to variation in supply influenced by changes national and regional economies. Inflation has pushed up the cost of doing business contributing to the cutting down to the number of properties.

This project objective is to investigate the relationship between property price and the inflation rates. The causal research design was used in this study and secondary data which was analyzed using SPSS package. From the findings it was observed that there is no clear defined relationship between the property prices and inflation rates. From the analysis of variance (ANOVA) statistic the study shows that the processed data has the significant level. This indicates that the data is ideal for making conclusion and it also shows that the data sampled represent the population. We can observe that the regression sum of squares is very huge implying that much of the variability is actually accounted for in this regression model.

The $p\text{-value}=0.000<0.05$ (significance level) indicating that the model is appropriate and significant. It can also be observed that property prices has been on a continuous increase over the years but gradually while inflation rate rose sharply to its peak (double digit) highest of 19.72% in the last quarter of 2012. It has been fluctuating to extreme variations. The findings of this study shows that there is no clear relationship between the property price and the inflation rate

ABBREVIATIONS

DCF -	Discounted Cash Flow
EMH -	Efficient Market Hypothesis
GGM -	Gordon Growth Model
TVM -	Time Value of Money
KSH-	Kenya Shilling
KNBS -	Kenya Bureau of Statistics
NVP -	Net Present Value
SPSS-	Statistical package for social sciences

CHAPTER ONE

1.0 INTRODUCTION

1.1 Background of the Study

Inflation is described as the general rise in prices of goods and services and its felt by all parties in the economy. It's the reduction of buyers' purchasing power and hence sellers have to increase their prices in order to make profit, an increase in expected rate of inflation causes an immediate increase in the value of real asset (Syagga, 1994). This study wants to find out how the fluctuation in property price relates with the inflation.

Real estate sector is one of the most resilient, vibrant and profitable in the world today. In Kenya it has been anything but robust. The growth has mainly been driven by urbanization, a strong economic and growing middle-class, stable legal environment, significant credit expansion and increased spending on infrastructure by the government (Ojjo, 2011).

The real estate boom survived the 2008 post election violence and global economic downturns that crippled other sectors such as tourism and agriculture in the country. The market faced difficulties in 2011 due to weakening of the shilling against major currencies, double digit inflation, and interest rates hike is taking its toll on real estate industry. Developers and buyers are struggling to meet financing cost occasioned by high interest rates triggered by aggressive tightening of monetary policy to counter the weakening of the shilling (Waweru, 2011).

Real estate is the property consisting of land and buildings on it, along with its natural resources such as crops, mineral water immovable property of this nature, an interest

vested in this, an item of real property, building or housing in general. It can also be defined as the business of real estate, the profession of buying and selling or renting land, building or housing. With the development of private property ownership, real estate has become a major area of business. Commonly referred to as commercial real estate. Purchasing real estate is a significant investment and each parcel of land has unique characteristics so the real estate industry has evolved into several distinct fields. Specialists are often called to value the real estate and facilitate transaction.

Real estate valuation is estimating the value of real property. It's important in real estate financing, listing real estate for sale, investment analysis property insurance and taxation of real estate to know the worth of the property. Determining the asking or purchase price of a property is the useful application of real estate valuation, value is not necessarily equal to price. Price is the amount paid for a property, Johnson et al (2000). The basic concepts of valuation are value, cost and price. According to Richmond (1994) market value is the most probable price that the property will bring in a competitive and open market. Market price is the price at which the property actually sells it may not always represent the market value that is if the property was sold in private sale without being exposed to the open market, the property will sale below its market value. Value is the present worth of future benefits arising from the ownership of real property the benefits are realized over a long period of time therefore estimating a property's value must be taken into considerations economic and social trends as well as governmental control or regulations and environmental conditions, this may influence this element of value i.e. demand, utility, scarcity and transferability.

Fluctuation in the property prices have been experience in many countries, this is attributed to the financial instability resulting from the house price boom and bust. According to Kenya National Bureau of statistic, in Kenya the real estate sector has been a driver of growth in the past five years. Inflation has pushed up the cost of doing business contributing to the cutting down of the number of properties. Investors in real estate who are looking for safe haven for their money in turbulent times in the equity markets have underestimated risk, property price fluctuations have been witnessed in many countries over the past decades which have been associated with financial instability. The resent financial crisis has led to the accelerated housing defaults in the U.S and other countries (Burnside et al, 2011).

1.1.1 Inflation

Inflation is the rise in the general level of price of goods and services in an economy over a period of time. It's referred to the broad price index representing the overall price level for goods and services in the economy. Inflation reflects a reduction in the purchasing power per unit of money. Brown and Matysiak (2000). Inflation affects the property value in that low inflation means low or no property values. It's related to capital growth, the real benefit from the capital growth is maintaining a hedge against inflation and over and above it by increasing purchasing power of capital ahead of the rate of inflation, (Fama and Gibbons 1982).

According to Brown and Matysiak (2000), inflation arises from some initiating influences on demand and supply side that can be seen to contribute to the development of an inflationary economy. That is if the demand for the property exceeds supply then the asking price will be bid up. In real estate inflation has the effect of increasing the monetary value of the future earnings which will in turn be reflected in capital values.

Price inflation has immense effect in TVM, this act as principal component of the real rates of interest which forms the basis of all TVM calculation. According to KNBS inflation has contributed to the slowing down of real estate market construction cost have rise to 40%, currency. KSH has depreciated by 28% and inflation went up to 16.67%. The cost of borrowing has also gone up and financial companies adjust their base lending rates to reflect the weakening shilling. The rising lending rates will have a negative effect on real estate sector by making mortgage unattractive for both existing and potential clients.

The impact of inflation on the value of assets is considered one of the primary financial concerns of long-term investors such as pension funds and life insurance companies since the mid 1970s. Combating inflation has been the overriding goal of the Federal Reserve's monetary policy. The increase in the rate of inflation is still a dominant consideration for long-term investors (Hartzell et al, 1978).

According to Rajesh Goyal an economic analyst inflation has been classified in two as follows: first demand-pull inflation in this type of inflation prices increase results from an excess of demand over supply for the economy as a whole demand inflation occurs when supply cannot expand any more to meet demand; that is, when critical production factors

are being fully utilized, also called Demand inflation. The second is cost-push inflation. This type of inflation occurs when general price levels rise owing to rising input costs. In general, there are three factors that could contribute to Cost-Push inflation: rising wages increases in corporate taxes, and imported inflation. Imported raw or partly-finished goods may become expensive due to rise in international costs or as a result of depreciation of local currency.

1.1.2 Types of Inflation

1.1.2.1 Creeping Inflation

This is also known as mild inflation or moderate inflation. This type of inflation occurs when the price level persistently rises over a period of time at a mild rate. When the rate of inflation is less than 10 per cent annually, or it is a single digit inflation rate, it is considered to be a moderate inflation.

1.1.2.2 Galloping Inflation

If mild inflation is not checked and if it is uncontrollable, it may assume the character of galloping inflation. Inflation in the double or triple digit range of 20, 100 or 200 percent a year is called galloping inflation. Many Latin American countries such as Argentina, Brazil had inflation rates of 50 to 700 percent per year in the 1970s and 1980s.

1.1.2.3 Hyperinflation

It is a stage of very high rate of inflation. While economies seem to survive under galloping inflation, a third and deadly strain takes hold when the cancer of hyperinflation strikes. Nothing good can be said about a market economy in which prices are rising a

million or even a trillion percent per year. Hyperinflation occurs when the prices go out of control and the monetary authorities are unable to impose any check on it. Germany had witnessed hyperinflation in 1920's.

1.1.2.4 Stagflation

It is an economic situation in which inflation and economic stagnation or recession occur simultaneously and remain unchecked for a period of time. Stagflation was witnessed by developed countries in 1970s, when world oil prices rose dramatically.

1.1.3 Property Prices

Theoretically prices are assumed to develop within neo-classical economic structures in which the core concept is demand and supply, market forces and equilibrium prices. Price assert that the market reflects interaction between two opposing consideration. Demand consideration based on utility and supply consideration based on marginal cost on the other side. An equilibrium price is supposed to be at once equal to marginal utility from the buyer's side and marginal cost from the sellers' side (Sharpe, 1999)

Property prices have been the main focal point in the economic and social debate in the developed countries. In Kenya it has been one of the most striking issues in the economy. There are many factors affecting house price, this are mortgage, inflation etc. price is assumed to developed within a neo-classical economic structure in which the core concepts are supply and demand, market forces and equilibrium prices (Syagga, 1994)

Real estate markets are characterized by predictable cycle boom and bust. During the cycle of booms the prices in the market sky rocket and almost inevitably, this season in

followed by busts (very low price). Prices in most areas are influenced by demand and supply forces, are also limited by various factors such as the income of potential buyers, the cost and the ability to construct new property to increase supply and demand. Access of finance, ability to make payments and the cost of borrowing money has led to spiraling cost of housing and escalating property prices.

Hass property has been tracking property prices in the upper and middle section of the Kenya property market and has seen the average price in this sector rise. Property value in the country have increased by 3.36 times since 2000 as the average value of property rose from 7.1 millions in the year 2000 to 24.1 millions in 2012 according to their annual housing report, (Hassconsult 2012). This rapid growth in real estate prices makes it necessary for Kenyans to open up for mortgage credit. Property cost rise due to the rate of construction of new property increase because investors, developers and speculators are constantly monitoring the investment equation. They are also looking at the land costs, when values are rising strongly then prospective profit are significantly enhanced, when there is surplus of property in the market, values tend to level off and with inflation real value will fall, Fred & Brett (1997). Mocoloo as cited in Muli (2011) examining the building cost in Kenya which he found out that the high building cost had an impact on the house prices has developers' tries to maintain their profit taking opportunities. Therefore for Kenyans to afford the highly priced property they need more financing from the mortgage lenders.

1.1.4 Real Estate Market

Real estate markets are a combination of a regional and National economic and therefore influenced by changes in these economies. Chin (2002) suggested that real estate markets are continuously adjusting to equilibrium where price range is adjusted according to variation in supply influenced by changes national and regional economies. This combined imperfect characteristics of real estate's markets ensures that risk is always present, its further heighten by the large capital cost of real estate and need to use debt funding for acquisition significantly increasing the exposure to risk.

Real estate markets are divided into categories based on the difference among the property types and their appeal to different markets participants. All real estate markets are influenced by the attitudes, motivation and interactions of buyers and sellers of real property which in turn are subject to many social, economic, governmental and environmental influences, these markets are: residential, commercial and industrial, (Pearson et al 1995).

Real estate's markets are inefficient and due to imperfections such as lack of product standardization and the time required to produce new product, this makes it difficult to predict market behavior accurately. Inefficiency in the market enable valuers to always identify undervalued properties, (Brown and Matysiak 2000).

According to Dasso and Ring (1989) real estate market is sensitive to local changes in demographic, economic, political and social forces. The supply of real estate suitable for a specific use is slow to adjust to market demand; shift in demand may occur while new real estate units are being constructed hence an oversupply rather than market equilibrium may result.

1.2 Statement of the Problem

There has been great appreciation of property price and volatility across the property markets in Kenya since 2006. For vast areas of U.S. home prices are close to inflation adjusted trend line. This has been the case since the housing bubble peaked and burst in 2007. The price nationwide is trending with longer-term, inflation trend line. Real estate is local and portrays a manic behavior in a niche market, that's investors overbidding for investment and overestimating the profit. Demand for commercial and residential properties in Nairobi raised the monetary value of the property. Increase demand for construction of office in Westland in Nairobi has led to rise of property price to unsustainable levels. Morris (2007)

According to Shiller (2005) U.S. housing price index showed that, prices more or less paced with inflation, with at best a very slight bias. Certainly there were periods where prices rose notably faster or slower than inflation. Also there have been real estate booms in the recent past from Hong Kong, Russia, New Zealand, South Africa and other various parts of the world. The oldest housing data in the world also confirms this trend. In a study of house prices in Amsterdam back to the 1620s, Piet Eichholtz of Maastricht

University found that while prices were volatile in the short term, they tended to track inflation over time. The value of real estate properties is escalating in Kenya; this is affecting house demand and supply. According to the NHC the estimate current urban housing demand are 150,000 units per year for the urban areas and 300,000 units per year for the rural. The current production of new housing in urban areas is only 20,000-30,000 units annually, giving a shortfall of over 120,000 units per annum,(Syrya 2010).This huge deficit escalates prices. Developers and sellers push up asking price, in townhouse asking price rose by 1.2% in the stand alone house 3.4% and apartment price recorded a sharpest rice of 3.6%. Hassconsult (2012) A study by Muli (2010) on mortgage lenders shows that increase in property prices has led to increased borrowing as cash is on the high valuations. It shows that increased mortgage lending has led to high property prices with increased spending capability from mortgage financing.

1.3 Objective of the Study

The objective of the study is to establish the relationship between inflation and real estate prices in Kenya.

1.4 Significance of the Study

The study will be of significance to the following group of people:

1.4.1 Investors

The study will be of a great importance to investors, it gives an understanding of the impact of inflation on the value of assets and considering that value of an asset is one of the primary financial concerns for long-term investors. The findings will give them

knowledge on how to diversify commercial real estate portfolio which will provide complete protection from expected inflation. It also tell investors how much of a return (%) their investment need to make for them to maintain their standard of living, when to hold and when to invest.

1.4.2 Scholars and Researchers

The research will be important for the scholars and researchers in that it contribute additional knowledge in the field of study. It also provides further research suggestions.

1.4.3 Financial institutions

The study will be of importance to the financial institutions and banks in the pricing of mortgages and other financing services/ products sold to the real estate players. Inflation affects the interest rates of mortgage this affects the cost of financing all this affects the property price. Therefore when determining the mortgage lending value the sale ability of the property is to be taken as the basis within the scope of a prudent valuation taking in to consideration the long-term and the permanent features of the property. The study will also help the lenders improve their rates and policies on how to finance real estate property depending on their value.

1.4.4 The Government

The study will be important to the government in reviewing avenues which are used to stabilize inflation. Will also help the regulators to understand the effects of property price fluctuations to the economy and come up with policies to regulate the real estate markets hedging the economy against the ever rising prices.

1.4.5 Agents and Brokers

The study would also benefit real estate agents and brokers. They would get information on purchase patterns, intern would be able to advice their clients to make informed choices.

CHAPTER TWO

2.0 LITERATURE REVIEW

2.1 Introduction

This chapter will discuss the literature required to answer the objectives of the study, review theories and to summaries the researches done by other researches in the same field of study. The specific areas are theories, and review of empirical studies done in this research field, this will enhance further understanding on the research area.

2.2 Review of Theories

2.2.1 Prospect Theory

The prospect theory was developed by Kahneman and Tversky (1979) its states that, human beings value gain and losses differently and will base decision on perceived gains rather than perceived losses. In their study they found out that human beings give more weight to outcomes that are more certain as compared to outcomes that are merely probable, also noted that people do not adapt easily to losses. Kahneman, and Tversky (1979). Tversky (1990) noted that people exhibit risk averse behavior when faced with higher chances of loss. Therefore property investor will make their decision based on possible gains anticipated in their investment. They avoid selling properties that have decreased in value and readily sell that have increased in value. Lebaron (1999). Kahneman, and Tversky(1991) find out that prospect theory is characterized by three essential features which are important to the investors. First gains and losses are examined relative to the reference point. Second the value function is steeper losses than for the equivalently sized gains. Third the marginal value of gains or losses diminishes

with the size of the gain or loses, thus investors under prospect theory behave to maximize gains. Genesove and Meyer's (2001) examining sale in Boston housing market they find that lose aversion explain the behavior of real estate sellers in their asking prices, those faced with the prospective lose set a higher asking price as a result less sale frequency. According to Kahneman and Tversky (1979) the weight determine by a function of true probabilities which give zero weight to extremely low probabilities and a weight of one to extremely high probabilities. However events that are very improbable are given too much weight, they behave as if they exaggerate the probability. Whereas events that are very probable are given too little weight, they behave as if they underestimate probability. This explains the overpricing the properties were investors are choosing to cash on the escalated prices in anticipation of a higher rise in the future.

2.2.2 Efficient Market Hypothesis (EMH)

A market is efficient when it adjust rapidly to new information, Fama et al, (1969). EMH emphasis that price in the market reflect already known information and the fundamentals of the respective part of the economy. Information in the EMH is defined as anything that may affect prices that are unknowable in the present and thus appear randomly in the future, Fama (1970) in the EMH price expectations are formed by the rational expectations as the current and past market price, as a result no one can earn profits if the estimates are unbiased. Investors assume that current price are right and usually use their purchase price as a reference point Kahmena and Riepe (1980) they expect the earning to be in line with historical trends leading to possible under-reaction to trend chance.

Investors tend to be optimistic in times of good market performance and pessimistic when the market dips.

Real estate markets are influenced by the attitudes, motivation and interaction of buyers, lenders, borrowers and sellers of real property, where they affects each other's decisions regarding property investment. the markets are not efficient and due to imperfections such as lack of product standardization and the time required to produce a new supply it is difficult to predict their behavior accurately, Richmond (1994).

Psychological factors rather than fundamental have been argued to impact property prices dynamic. Shiller & Case (1989) gives evidence from their study that either boom in the market are as a result of investors in reaction to past price or past market boom. They further noted that investors in real estate markets do not know fundamentals but rather interpret events in terms of hearsay and causal observations, they also confirm that there is evidence of price rigidity in falling markets than in rising markets. EMH allows that when faced with new information some investors may overreact and some may under react. All that is required by EMH is that investors reactions be random and follow a normal distribution pattern so that the net effect on market prices cannot be exploited to make an abnormal profit, especially when considering transaction costs. Mmalya (2005).

2.2.3 Rational Expectation Theory

The theory was developed by Muth (1961). Its state that current expectations in the economy are the equivalent to what the future state of economy will be. In expectation theory people in the economy make choices based on their rational outlook, available

information and past experienced. The way in which developers form their expectations of development values, cost and hence profitability influenced their decisions to develop, Henneberry & Rowley (2000). Investors believe that the price of the property will be higher in the future it will hold the property until the price rises.

According to Muth (1961) the average expectation are more accurate indicators of expected value than adaptive models such as cobweb model. According to rational expectancy theory the optimal forecast about the future are made using all available information. As a result rational expectancy theory changes real estate asset price over time should be unpredictable and thus follow a random walk, (Malpezzi & wachter 2005). Adapting an option pricing approach, Grenadier (1995) explains developers expectations using assumptions of rationality, he argue that although the risk of overbuilding is higher when construction time are longer, developers will continue to develop in the knowledge of this risk because the benefits of good outcomes believed to outweigh the costs of poor outcome.

2.2.4 Dynamic Gordon Growth Model Theory

The dynamic Gordon growth model states that the real interest does determine the intrinsic value of the assets in a free market. The standard Gordon growth model states that $\text{Assets Price} = \text{Dividend} / (\text{Interest rate} - \text{Dividend growth rate})$.for the housing market the model would be interpreted as $\text{House price} = \text{Rent} / (\text{Interest Rate} - \text{Rental growth rate})$ Gordon (1962). The dynamic Gordon growth model has been applied to study valuation in the commercial real estates and to examine the linkages of money illusion

and property price inflation in national-rent ratio. This model provides direct evidence on the nature of fluctuations rent-price ratio, Plazzi et al (2006)

2.2.5 The Gordon Growth Model Theory

The Gordon growth model theory suggests that real estate can be considered a perfect hedge against inflation. Real estate is a long-lived asset with income that can adjust to inflation. Real estate asset pricing is given by the Net Present Value (NPV) of the future rent cash flow stream, which is assumed to grow indefinitely at a constant rate (g) and is discounted by the appropriate nominal rate (r). therefore real estate price = NPV (future Rent Income) = $\frac{\text{Next Period Rent}}{r-g}$. inflation will affect the discounted rate r and the rent growth rate g in an equal measure.

The expected earnings growth model, based on DCF model and the GGM are used in pricing real estate assets. GGM model explains that the earnings are expected to grow at a constant rate during the holding period. The model further assumes that the asset has income with current value and the income is expected to grow at a constant rate. Another assumption is that the discount rate of money remains constant and is equal to the cost of capital for the asset. Gordon (1959) for the investors the cost of capital for the assets equals to the returns they expects from the assets.

2.2.6 Monetarism Theory of Inflation

Friedmand and Schwartz (1963) holds that only money matters and this led to the development of the monetary theory and as such monetary policy which is a more potent instrument than financial policy in an economic stabilization. According to monetarism

the money supply is the dominant though not exclusive determinant of both the level of output and prices in the short-run, and of the level of price in the long-run. The long-run level of output is not influenced by the money supply.

Inflation is always and everywhere and it's a monetary phenomenon that arises from a more rapid expansion in the quantity of money than in total output. The money that exists will determine the amount of money people spend. In any market the price of the property is determined by the supply and demand, therefore the prices of items will go up only when the supply is lower than the demand and vice versa. According to Chin (2002) real estate markets are continuously adjusted to equilibrium where price range is adjusted according to supply. Therefore the rise of property prices in Kenya is attributed to the high demand and low supply.

2.3 Empirical Evidence

According to the study done by Debelle (2004) investigating the importance of inflation. The findings indicate that inflation is the driver of housing prices. Across the countries on average, inflation accounts for more than half of the total variations in house price in the short-run. The strong influence of inflation is even important when considers that house price are measured in real terms. The above findings are due to the functions of residential estates as consumption good and investment vehicle. As such its often used as the main hedge against the risk that inflation might erode their wealth.

Mwangi (2010) in the study to investigate the relationship between inflation and land prices in Kenya: case of Nairobi and its environs. In her study she concluded that there were no clear defined relationships between inflation and land prices.

Cho (2005) discussed the relationship between inflation interest rates, inflation rate and housing price with emphasis on Chonsei (up- front lump-sum deposit from the tenant to the owner for the use of the property with no additional requirement for periodic rent payment) price in Korea. The relative price for sale of chonsei in depends on the ratio of inflation to real interest rate, even when the monetary authority maintain a pre-announced target level of inflation rate, the relative price of chonsei rises even if the real interest rate declines. This finding explains the recent hike of house prices despite the stabilizing chonsei prices. Inflation and interest rates explain the direction of the long-term of the housing price ratio, they are not sufficient enough to explain the magnitude of the change in this ratio. The findings also indicate that the target inflation rate should be lowered in an economy where real interest permanently declines.

Piazzessi and Schneider (2012) in their study of inflation and the price of real asset they consider the effects of inflation on the price- dividend ratio of real asset in the 1970 using an overlapping generation model to quantify the extent to which changes in expected inflation uncertainty and lower returns predicted by high expected inflation contribute to high house prices. They found out that these changes in inflation expectations make housing more attractive, because of capital gains, taxes and mortgage deductibility.

Wurtzebach (1991) in the study to examine the relationship between the performance of commercial real estate and inflation they examine real estate performance and during

both high and low inflation periods. Their results shows that real estate provides an effective inflation hedge in mixed asset context, the portfolio must consist of the properties in balanced market.

Omboi (2011) in the study on the impact of inflation on the cost of mortgage financing, his findings shows that higher inflation would have a negative impact on house prices. When financing decisions are more sensitive to the nominal yield curve than to real rates one would expect housing demand real property demand to respond to changes in inflation. High inflation affects the repayment of the mortgage principal and increases the real value repayment in the early part of the repayment period of the loan; this raised the demand for housing.

Muli (2011) in the study of the relationship between property prices and mortgage lending in Kenya shows found out that, the relationship between the evolution of mortgage lending and house price is well established. The findings also show that changes in house prices are positively and significantly related to the long-term evolution of mortgage credit. This suggests that the evolution of house prices is not triggered by bank mortgage lending and that banks just accommodate mortgage financing to the evolution of house prices.

According to Gonefrey and Whelan study on the relationship between demand in house price and various measures of housing supply. The results shows that months' supply of new homes places greater downward pressure on house prices than the months' supply of existing homes. The study results also show a strong relationship between changes in

house prices and month supply for new homes. Supply conditions in the markets for existing homes, the vacancy rate, and time on the market and other fundamental variables like mortgage rates and GDP growth are found to have little impact on house prices. The results further indicates that low mortgage rates may stimulate new homes sales, hence reducing month's supply and raising house prices.

2.4 Conclusion of Literature Review

Property price is the issue of the economy in the world today, both in the developed and the undeveloped countries. The review of the theories shows that investors value gains hence they will price their properties according to the anticipated returns. Also the real estate market partly determines the asking price for the investment in the market. The economic characteristics of real estate are the immobility, large economic units, durability and scarcity this contributes to the rising prices of properties in the market (Pearson et al, 1995) Various empirical studies, which examine the property price and other factors such as inflation, mortgage and demand and supply shows that these factors have influence on the property prices. Also property price affected by inflation, mortgage and the cost of construction which is rising due to the import duty levied on building materials.

CHAPTER THREE

3.0 RESEARCH METHODOLOGY

3.1 Introduction

This chapter outlines how the study was conducted, to show the relationship between inflation and the property prices. the study describe and justify the method that was used to answer the research question. This includes the research design, population sample, data collection and data analysis.

3.2 Research Design

The causal study design was used in this study. Causal research aimed to investigate whether there is a relationship between variables that is relationship between inflation and the property prices in Kenya for a period of five years in real estate sector. This method looks at the relationship between and among the variables, Mugenda and Mugenda (2003). Causal research aims to suggest causal linkages between variables by observing existing phenomena and then searching back through available data to try and identify plausible cause relationship. It was concern in determining cause and effect relationship, Zickmund (2003)This method was successfully used by Muli (2011) in the study to investigate the relationship between house price and mortgage credit in Kenya.

3.3 Population

Population is the element or units that meets the selection criteria for a group to be studied and from which a representative sample is taken for detailed examination

(Zickmund 2003) .The target population of interest in this study was 2,000 houses sold in each area selected in Nairobi County.

3.4 Sample and sampling Technique

Sample is small groups whose characteristics are accurately reflect those of the larger population from which it is drawn ,King'oria (2004). In this research the sample was 2000 houses sold, for the period of five years from 2008 to 2012.This period is selected due to the rapid growth of property prices, and also due to the instability of the Kenya shilling which was attributed to the inflation, Hass Consult (2012). Judgmental sampling method was used to come up with a representative sample; this method was successfully used by Mwangi (2010). According to Zickmund (2003) judgmental sampling is the selection of items on the basis of the judgment or opinion of one or more persons. It enables one to select cases that will best answer the research question.

3.5 Data collection

Secondary data was used in this research. Property prices was collected from the ministry Lands, Housing and Urban development, while inflation rates data was collected from the Kenya National Bureau of statistic.

3.6 Data analysis.

Data collected was analyzed using statistical package for the social sciences (SPSS) .This was used to assess the relationship between inflation and the property prices. To investigate this relationship in the study regression equation was formulated which seeks to answer the research question. Simple linear regression model was used to determine the nature of the relationship.

The least square method was used to find the estimated regression equation of best fit. Further analysis was conducted on the data where the coefficient of the determination was calculated to check the how well the equation fits the data used,(King' oriah 2004).Finally correlation coefficient which shows the strength of the linear association between the inflation and property prices. The T-test will be used to test the significance. The regression equation to be use is derived from the straight line as:

$$y=a +bx_i + e_i$$

Where y = property price

X_i = the inflation rate

a= the y intercept (constant)

b is the gradient of the line fitted to the data.

e_i , the error term, represents the difference between the score predicted by the line for the subject i, and the score that subject is actually obtained.

CHAPTER FOUR

4.0 DATA ANALYSIS AND PRESENTATION OF THE FINDINGS.

4.1 Introduction

This chapter presents the research findings and conclusions of the causal study. The study is centered on the relationship between inflation and property prices in Kenya. The study was conducted on the data for Q1 to Q4 for the years 2008 to 2012. The price of the property was analyzed in two set. This will give more accurate findings. Data from Kileleswa, Lavington and Kilimani is analyzed and presented as section one while section two represent Embakasi, Buruburu, Kasarani and South B & C.

4.2 Data presentation

Table 4.1: Property price and inflation rates for Kileleswa, Lavington and Kilimani.

	2008		2009		2010	
	Property price	Inflation rates	Property price	Inflation rates	Property price	Inflation rates
JAN	6,683,333.33	7.93	10,030,000.00	13.33	13,050,000.00	7.52
FEB	9,280,000.00	11.04	11,010,000.00	14.62	13,693,333.33	5.18
MAR	27,600,000.00	12.53	11,770,000.00	14.44	14,300,000.00	3.97
APR	9,363,333.33	16.83	10,700,000.00	12.10	14,165,000.00	3.66
MAY	8,070,000.00	18.70	12,050,000.00	9.88	14,916,666.67	3.88
JUN	8,625,500.00	16.79	12,630,000.00	9.86	15,200,000.00	3.49
JUL	9,890,666.67	15.33	11,433,333.33	10.33	15,000,000.00	3.57
AUG	10,200,000.00	15.98	12,000,000.00	9.76	15,230,000.00	3.22
SEP	6,686,666.67	16.32	10,790,000.00	9.19	14,676,666.67	3.21
OCT	11,600,000.00	16.70	10,450,000.00	8.80	15,050,000.00	3.18
NOV	11,016,666.67	17.56	12,580,000.00	7.14	10,666,666.67	3.84
DEC	11,703,333.33	15.48	11,200,000.00	8.02	15,350,000.00	4.51

	2011		2012	
		inflation		Inflation
		rates		rates
JAN	14,230,000.00	5.42	18,752,000.00	18.31
FEB	14,640,000.00	6.54	19,336,000.00	16.70
MAR	14,410,000.00	9.19	19,520,000.00	15.61
APR	15,633,333.33	12.05	20,102,333.33	13.06
MAY	14,983,333.33	12.95	20,706,666.67	12.22
JUN	16,363,333.33	14.48	20,356,666.67	10.05
JUL	17,910,000.00	15.53	21,250,000.00	7.74
AUG	18,316,666.67	16.67	21,500,000.00	6.09
SEP	18,075,000.00	17.32	21,136,666.67	5.32
OCT	17,640,000.00	18.91	22,130,000.00	4.14
NOV	16,811,500.00	19.72	22,313,333.33	3.25
DEC	18,458,666.67	18.93	22,526,666.67	3.20

Table 4.2: for Property price and inflation rates for Embakasi, Kasarani, Buruburu and South B & C

	2008					
JAN	4,020,000.00	7.93	4,900,000.00	13.33	6,525,000.00	7.52
FEB	3,850,000.00	11.04	4,090,000.00	14.62	6,750,000.00	5.18
MAR	4,500,000.00	12.53	5,616,666.67	14.44	6,723,333.33	3.97
APR	4,406,666.76	16.83	5,325,000.00	12.1	6,483,333.33	3.66
MAY	3,950,000.00	18.7	5,975,000.00	9.88	6,440,000.00	3.88
JUN	3,965,555.56	16.79	6,200,000.00	9.86	6,900,000.00	3.49
JUL	4,766,666.67	15.33	5,726,666.00	10.33	7,050,000.00	3.57
AUG	4,096,000.00	15.98	5,225,000.00	9.76	7,190,000.00	3.22
SEP	6,160,000.00	16.32	5,700,000.00	9.19	7,220,000.00	3.21
OCT	4,750,000.00	16.7	5,833,333.33	8.8	7,050,000.00	3.18
NOV	5,175,000.00	17.56	5,700,000.00	7.14	7,346,666.67	3.84
DEC	5,500,000.00	15.48	6,125,000.00	8.02	7,375,000.00	4.51

		2012		
7,500,000.00	5.42	9,400,000.00	18.31	
7,800,000.00	6.54	9,760,000.00	16.7	
7,883,333.00	9.19	9,875,000.00	15.61	
8,080,000.00	12.05	9,790,000.00	13.03	
8,450,000.00	12.95	10,186,666.67	12.22	
8,480,000.00	14.48	10,416,666.67	10.05	
8,723,333.33	15.53	10,916,666.67	7.74	
8,833,333.33	16.67	11,200,000.00	609	
8,925,000.00	17.32	12,300,000.00	5.32	
9,023,333.33	18.91	11,950,000.00	4.14	
9,266,666.67	19.72	12,550,000.00	3.25	
6,925,000.00	18.93	12,966,666.67	3.2	

Tables 4.1 & 4.2 shows the property prices o the houses sold for the period of five years. The data collected is for the apartments, flats and maisonettes, this will provide a comparable findings. The property price is obtained by getting the average of the houses sold in the area. This are the average prices of the houses sold or the asking price obtained as:

The Property price = total sales /no of houses sold.

Table 4.3 Quarterly property prices and inflation rates for Kileleswa, Lavington and Kilimani.

	Period	Property Prices	Period	Property Prices (%)	Inflation
	2008 1st Quarter	14,521,111.11	2008 Q1	4.918162958	10.5
	2008 2nd Quarter	8,686,277.78	2008 Q2	2.941960108	17.44
	2008 3rd Quarter	8,926,111.11	2008 Q3	3.023189389	15.87667
	2008 4th Quarter	11,440,000.00	2008 Q4	3.874619773	16.58
	2009 1st Quarter	10,936,666.67	2009 Q1	3.704145535	14.13
	2009 2nd Quarter	11,793,333.33	2009 Q2	3.99429043	10.61333
	2009 3rd Quarter	11,407,777.78	2009 Q3	3.863706411	9.76
	2009 4th Quarter	11,410,000.00	2009 Q4	3.864459057	7.986667
	2010 1st Quarter	13,681,111.11	2010 Q1	4.633662904	5.556667
	2010 2nd Quarter	14,760,555.56	2010 Q2	4.999260526	3.676667
	2010 3rd Quarter	14,968,888.89	2010 Q3	5.069821055	3.333333
	2010 4th Quarter	13,688,888.89	2010 Q4	4.636297164	3.843333
	2011 1st Quarter	14,426,666.67	2011 Q1	4.886175518	7.05
	2011 2nd Quarter	15,660,000.00	2011 Q2	5.30389385	13.16
	2011 3rd Quarter	18,100,555.56	2011 Q3	6.130486928	16.50667
	2011 4th Quarter	17,636,722.22	2011 Q4	5.973390966	19.18667
	2012 1st Quarter	19,202,666.67	2012 Q1	6.503761535	16.87333
	2012 2nd Quarter	20,388,555.56	2012 Q2	6.905410882	11.77667
	2012 3rd Quarter	21,295,555.56	2012 Q3	7.212603202	6.383333
	2012 4th Quarter	22,323,333.33	2012 Q4	7.560701812	3.53
		295254777.8			

Table 4.4 Quarterly property price and inflation rates for Embakasi, Buruburu, Kasarani and South B & C. Quarterly data.

Period	Property Prices	Period	Property Prices(%)	Inflation
2008 1st Quarter	4,123,333.33	2008 Q1	2.83	10.50
2008 2nd Quarter	3,965,555.56	2008 Q2	2.72	17.44
2008 3rd Quarter	5,007,555.56	2008 Q3	3.43	15.88
2008 4th Quarter	5,141,666.67	2008 Q4	3.52	16.58
2009 1st Quarter	4,868,888.89	2009 Q1	3.34	14.13
2009 2nd Quarter	5,833,333.33	2009 Q2	4.00	10.61
2009 3rd Quarter	5,408,888.89	2009 Q3	3.71	9.76
2009 4th Quarter	5,886,111.11	2009 Q4	4.03	7.99
2010 1st Quarter	6,666,111.11	2010 Q1	4.57	5.56
2010 2nd Quarter	6,607,777.78	2010 Q2	4.53	3.68
2010 3rd Quarter	7,153,333.33	2010 Q3	4.90	3.33
2010 4th Quarter	7,257,222.22	2010 Q4	4.97	3.84
2011 1st Quarter	7,727,777.78	2011 Q1	5.30	7.05
2011 2nd Quarter	8,336,666.67	2011 Q2	5.71	13.16
2011 3rd Quarter	8,827,222.22	2011 Q3	6.05	16.51
2011 4th Quarter	9,305,000.00	2011 Q4	6.38	19.19
2012 1st Quarter	9,678,333.33	2012 Q1	6.63	16.87
2012 2nd Quarter	10,131,111.11	2012 Q2	6.94	11.78
2012 3rd Quarter	11,472,222.22	2012 Q3	7.86	6.38
2012 4th Quarter	12,488,888.89	2012 Q4	8.56	3.53
	145,887,000.00			

4.3 Summary and interpretation of the findings

Relative change in the property price averages in each specific area was then calculated and compared with the relative change in inflation. Property prices were first converted in to percentage and analyzed in a line graph. Inflation also of the same period analyzed in a line graph. This will give accurate findings.

Figure 4.1: property prices and inflation movement from 2008 to 2012.

The figure below represent the data analysis for Kileleswa, Lavington and Kilimani area.

Figure 4.1: Data Analysis for Kileleswa, Lavington and Kilimani

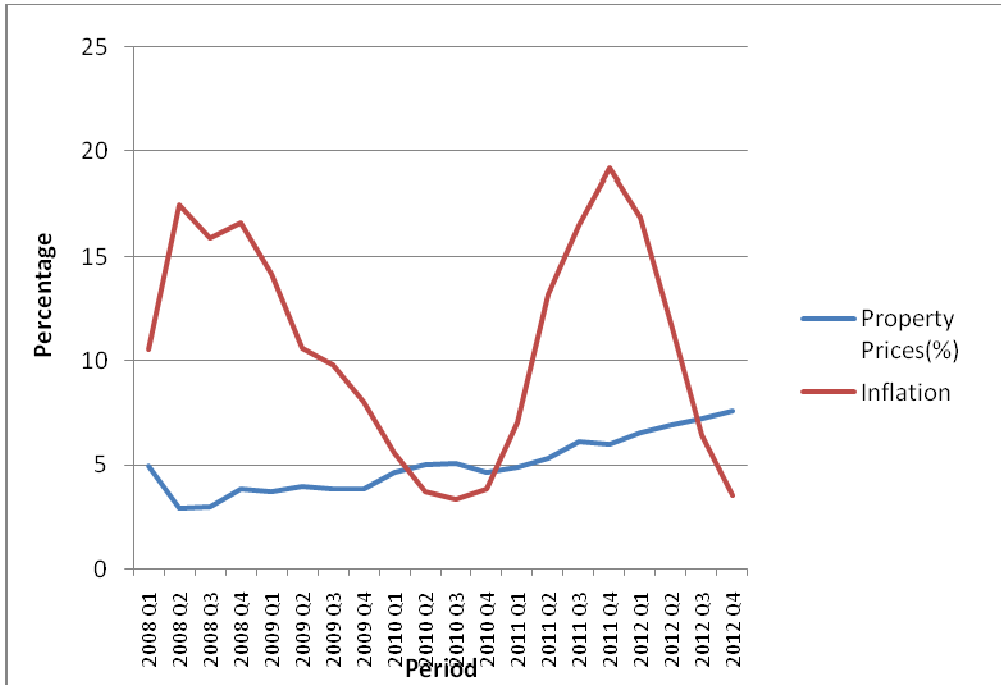
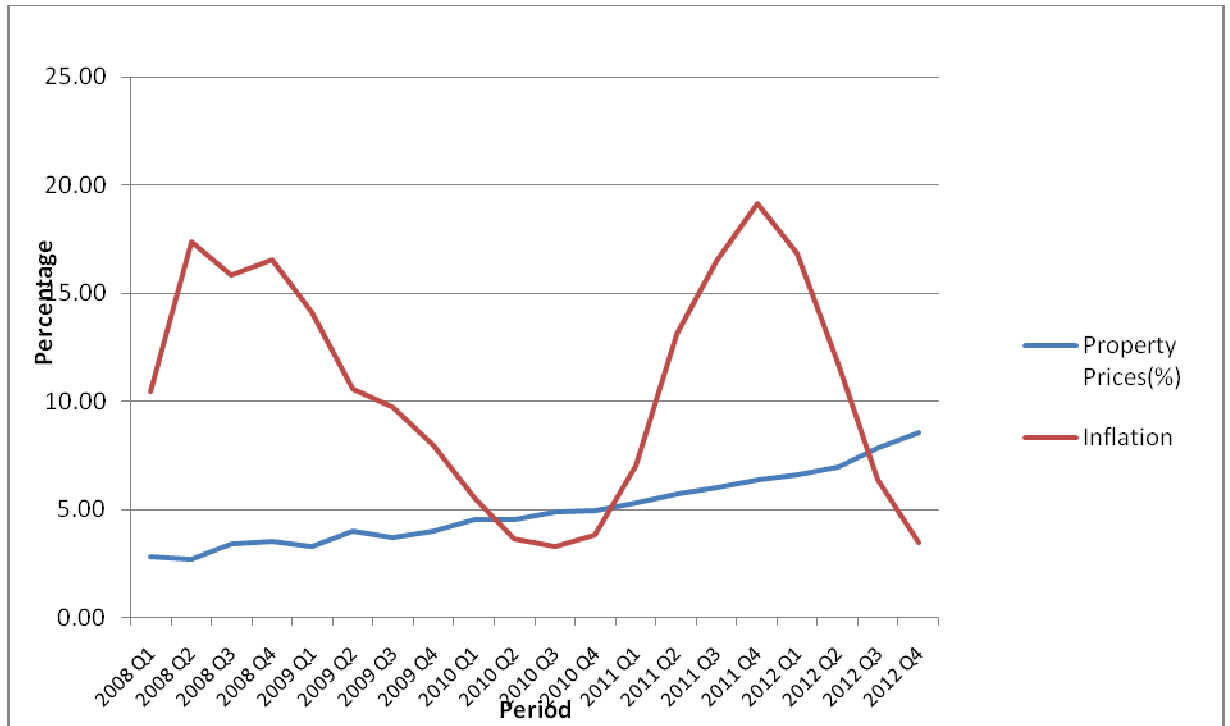


Figure 4.2: property prices and inflation rates movements from 2008 to 2012 For Embakasi, Kasarani, Buruburu, Mombasa road, South B and C.

Figure 4.2 Property prices and inflation movement



From the graph above we can observe that the property prices have been on a continuous increase over the years. Between Q1 to Q3 of 2008 there was a slight drop and stagnation while the inflation rose gradually reaching its highest level. In Q4 2008 to Q1 of 2010, the property prices were still increasing gradually where as inflation rates declines in the same quarters reaching its dip in between the second and the third quarters of 2010.

The charts also indicate that there was a gradual increase in property prices in Q1 2011 all through to the last quarter of 2012. (Q4). While inflation rates rose it peak of 19% in the fourth quarter of 2011 before taking a sharp dip to 3.2% in the last quarter of 2012

this display a negative correlation. These extreme variations which were observed could have been due to the fiscal and monetary policies by the government through Central Bank o Kenya in an effort to meet their macroeconomic goal of price stability.

This research objective is to find out if there is any relationship between property prices and inflation from the findings it can be observed that there is no clear defined relationship between the property prices and inflation rates.

From the analysis of variance (ANOVA) statistic the study shows that the processed data has the significant level. This indicates that the data is ideal for making conclusion and it also shows that the data sampled represent the population. We can observe that the regression sum of squares is very huge implying that much of the variability is actually accounted for in this regression model. The $p\text{-value}=0.000<0.05$ (significance level) indicating that the model is appropriate and significant.

4.4 Summary of the study

The objectives of the study was to find out whether property prices change are related to change in inflation. Its observed that property prices has been on a continuous increase over the years but gradually while inflation rate rose sharply to its peak (double digit)highest of 19.72% in the last quarter of 2012. It has been fluctuating to extreme variations. The findings of this study shows that there is no clear relationship between the property price and the inflation rate in contrary Muli (2011) in his study of the relationship between property prices and the mortgage lending in Kenya, his findings

indicate that the relationship between evolution of mortgage lending and the house price is well established.

Omboi (2011) in the study of impacts of inflation on the cost of mortgage financing, his findings shows that higher inflation would have a negative impact on housing prices. High inflation rates affect the repayment of the mortgage principle and increase the real value repayment this raise the demand for property. Piazzessi and Schneider (2012) in their study of inflation and property of real asset found out that these changes in inflation expectations make housing more attractive, because of the capital gains, taxes and mortgage deductibility.

CHAPTER FIVE

5.0 SUMMARY, CONCLUSION AND RECOMENTATIONS

5.1 Summary

Real estate is one of the most vibrant and profitable in the world today. The growth has been driven by urbanization, a strong economy and significant credit expansion. This project sought to investigate the relationship between property prices and inflation rates. Property prices fluctuations has been associated with the housing boom and bust and the financial instability which has been experienced by many countries in the world. The study also explains the types of inflation and its effects in the real estate market. The study review theories and the empirical evidence of various researchers, these enhance an insight understanding of the research problem.

This study used secondary data on property prices which was collected from the ministry of Land, Housing and Urban Development, Hassconsult and Value zones limited. Inflation rate data was collected from the Kenya National Bureau of statistics. All this was analyzed by regression analysis to determine whether there is a relationship between property prices and inflation rates. Judgmental sampling was used to get the sample and the target population was the apartments and mansionetts which are more common in the selected area.

The study concluded that a property price has been on continuous increase over the years but at a gradual phase. While the inflation rates increased sharply and dropping sharply. This shows that there is no clear defined relationship between inflation rates and property prices.

5.2 Conclusion

The aim of the study was to investigate the relationship between property price and inflation rates. It is observed that property price have been continuously increasing gradually while inflation rates has been fluctuating, it stabilized in the last quarter of 2012 due to the government fiscal and monetary policies through central bank in an effort to meet microeconomic goal of price stability.

The movement of property prices was not consistent with inflation rates. Inflation rates change movement were sometimes very high while the property price low and gradually increasing this draws a conclusion of this causal study that there were no clear defined relationship between property price and inflation rates. There are several factors influencing property prices this is why the results were not clear.

5.3 Policy recommendations.

Property is an attractive investment asset that investors should include in their portfolio. According to this study property prices were not affected by the inflation hence the Government should set policies to encourage people to invest in real asset like property so as to edge inflation when it is high.

Property price has been increasing over the years hence the Government should set up policies towards ensuring that every Kenyan has real asset which he/ she can afford. This can be achieved by setting up policies that can control property pricing.

The purchase and ownership of property depend largely on the availability and cost of mortgage. Mortgage rates should be controlled by the Government through CBK. Central Bank of Kenya should consider exploring more prescriptive rules which would set some minimum standards for mortgage loans in terms of both loan to value and payment to income. Lastly the Government should set standards which ensure full disclosure of information pertaining rates, terms and conditions, fees and charges on properties in Kenya. This would stabilize the real estate market.

5.4 Limitations of the study.

Lack of local studies on the relationship between property price and inflation rates. The study relied on the international studies. The Kenyan government should encourage more studies in the real estate market, since its one of the fastest growing market. This was a causal study and the findings may not be representative of the country. The focus was Nairobi county and due to lack of data from previous years period to 2008, the study was only carried out for five years this is a restrictive short period. More time would have been more reliable in making generalization.

Real estate market is influenced by factors such as import duty, land price, proximity to the major highway population and the exchange rates. This makes every investor comes up with his or her own price. Also the price may have been bargained downwards from the asking price i.e. the government are discounted and this will not reflect the market.

Inconsistency in data collection was another limiting factor in this study. The average data obtained from the available months was therefore used to make reference for the whole quarter. Data collection was not consistent for some months and therefore not reflecting the market trends.

5.5 Suggestions for further studies.

From the research findings of these studies, the real estate market is vast and very few researches has been done especially in Kenya. This study targeted the apartments and the mansionet only further research should be done on town houses and all types to compare the trends in the industry.

A research on other factors that influence property prices should also be conducted. This should include the level of development in the area, proximity to the tarmac road, which are the main highways in Kenya. The same such research should also be carried out in the major towns in Kenya such as Kisumu, Mombasa, Kericho ,Nakuru and Eldoret. This will have a larger sample and the findings will reflect the real estate market clearly.

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APPENDICES

APPENDIX 1

PROPERTY PRICE AND INFLATION RATE FOR KILELESWA, LAVINGTON AND KILIMANI

YEAR	MONTH	DATA PRICES IN KSHS.			Average	INFLATION RATES
2008	JAN	6,500,000.00	7,000,000.00	6,550,000.00	6,683,333.33	7.93
2008	FEB	8,000,000.00		10,560,000.00	9,280,000.00	11.04
2008	MAR	8,200,000.00	65,850,000.00	8,750,000.00	27,600,000.00	12.53
	2008 Q1			-	<u>14,521,111.11</u>	<u>10.50</u>
2008	APR	6,570,000.00	9,000,000.00	12,520,000.00	9,363,333.33	16.83
2008	MAY		8,500,000.00	7,640,000.00	8,070,000.00	18.70
2008	JUN	9,251,000.00	8,000,000.00		8,625,500.00	16.79
	2008 Q2			-	<u>8,686,277.78</u>	<u>17.44</u>
2008	JUL	8,600,000.00	10,275,000.00	10,800,000.00	9,891,666.67	15.33
2008	AUG	11,900,000.00	8,500,000.00		10,200,000.00	15.98
2008	SEPT	8,280,000.00	10,500,000.00	1,280,000.00	6,686,666.67	16.32
	2008 Q3			-	<u>8,926,111.11</u>	<u>15.88</u>
2008	OCT	9,700,000.00	13,500,000.00		11,600,000.00	16.70
2008	NOV	10,100,000.00	11,000,000.00	11,950,000.00	11,016,666.67	17.56
2008	DEC	9,900,000.00	13,210,000.00	12,000,000.00	11,703,333.33	15.48
	2008 Q4			-	<u>11,440,000.00</u>	<u>16.58</u>
YEA R	MONTH					
2009	JAN	8,720,000.00	11,340,000.00		10,030,000.00	13.33
2009	FEB	12,000,000.00	7,930,000.00	13,100,000.00	11,010,000.00	14.62
2009	MAR	9,740,000.00	13,800,000.00		11,770,000.00	14.44
	2009 Q1			-	<u>10,936,666.67</u>	<u>14.13</u>
2009	APR	10,700,000.00			10,700,000.00	12.10
2009	MAY	11,200,000.00	12,900,000.00		12,050,000.00	9.88
2009	JUN	11,700,000.00	12,980,000.00	13,210,000.00	12,630,000.00	9.86

	2009 Q2			-	<u>11,793,333.33</u>	<u>10.61</u>
2009	JUL	10,950,000.00	13,100,000.00	10,250,000.00	11,433,333.33	10.33
2009	AUG	12,000,000.00			12,000,000.00	9.76
2009	SEP	10,280,000.00	11,300,000.00		10,790,000.00	9.19
	2009 Q3			-	<u>11,407,777.78</u>	<u>9.76</u>
2009	OCT	9,950,000.00	10,950,000.00		10,450,000.00	8.80
2009	NOV	12,000,000.00	12,340,000.00	13,400,000.00	12,580,000.00	7.14
2009	DEC	11,200,000.00			11,200,000.00	8.02
	2009 Q4			-	<u>11,410,000.00</u>	<u>7.99</u>
YEA R	MONTH					
2010	JAN	12,890,000.00	13,210,000.00		13,050,000.00	7.52
2010	FEB	13,780,000.00	13,000,000.00	14,300,000.00	13,693,333.33	5.18
2010	MAR	14,500,000.00	13,500,000.00	14,900,000.00	14,300,000.00	3.97
	2010 Q1			-	<u>13,681,111.11</u>	<u>5.56</u>
2010	APR	13,950,000.00	14,380,000.00		14,165,000.00	3.66
2010	MAY	14,000,000.00	15,100,000.00	15,650,000.00	14,916,666.67	3.88
2010	JUN	15,000,000.00	15,400,000.00		15,200,000.00	3.49
	2010 Q2			-	<u>14,760,555.56</u>	<u>3.68</u>
2010	JUL	15,000,000.00			15,000,000.00	3.57
2010	AUG	14,560,000.00	15,900,000.00		15,230,000.00	3.22
2010	SEP	15,380,000.00	13,950,000.00	14,700,000.00	14,676,666.67	3.21
	2010 Q3			-	<u>14,968,888.89</u>	<u>3.33</u>
2010	OCT	14,800,000.00	15,300,000.00		15,050,000.00	3.18
2010	NOV	15,000,000.00	15,400,000.00	1,600,000.00	10,666,666.67	3.84
2010	DEC	16,120,000.00	14,580,000.00		15,350,000.00	4.51
	2010 Q4			-	<u>13,688,888.89</u>	<u>3.84</u>
YEA R	MONTH					
2011	JAN		14,560,000.00	13,900,000.00	14,230,000.00	5.42
2011	FEB	13,500,000.00	15,780,000.00		14,640,000.00	6.54
2011	MAR		12,000,000.00	16,820,000.00	14,410,000.00	9.19
	2011 Q1			-	<u>14,426,666.67</u>	<u>7.05</u>
2011	APR	15,700,000.00	16,200,000.00	15,000,000.00	15,633,333.33	12.05

2011	MAY	14,950,000.00	14,000,000.00	16,000,000.00	14,983,333.33	12.95
2011	JUN	15,000,000.00	17,200,000.00	16,890,000.00	16,363,333.33	14.48
	2011 Q2			-	<u>15,660,000.00</u>	<u>13.16</u>
2011	JULY	17,820,000.00	18,000,000.00		17,910,000.00	15.53
2011	AUG	18,340,000.00	17,890,000.00	18,720,000.00	18,316,666.67	16.67
2011	SEP	17,650,000.00	18,500,000.00		18,075,000.00	17.32
	2011 Q3			-	<u>18,100,555.56</u>	<u>16.51</u>
2011	OCT	16,900,000.00	17,560,000.00	18,460,000.00	17,640,000.00	18.91
2011	NOV	15,970,000.00	17,653,000.00		16,811,500.00	19.72
2011	DEC	18,130,000.00	18,752,000.00	18,494,000.00	18,458,666.67	18.93
	2011 Q4			-	<u>17,636,722.22</u>	<u>19.19</u>
YEA R	MONTH					
2012	JAN	18,752,000.00			18,752,000.00	18.31
2012	FEB	19,200,000.00	19,472,000.00		19,336,000.00	16.70
2012	MAR	19,467,000.00	20,120,000.00	18,973,000.00	19,520,000.00	15.61
	2012 Q 1			-	<u>19,202,666.67</u>	<u>16.87</u>
2012	APR	19,865,000.00	20,542,000.00	19,900,000.00	20,102,333.33	13.06
2012	MAY	20,100,000.00	20,820,000.00	21,200,000.00	20,706,666.67	12.22
2012	JUN	19,950,000.00	21,340,000.00	19,780,000.00	20,356,666.67	10.05
	2012 Q2			-	<u>20,388,555.56</u>	<u>11.78</u>
2012	JUL	20,700,000.00	21,800,000.00		21,250,000.00	7.74
2012	AUG	21,500,000.00			21,500,000.00	6.09
2012	SEP	21,940,000.00	21,670,000.00	19,800,000.00	21,136,666.67	5.32
	2012 Q3				<u>21,295,555.56</u>	<u>6.38</u>
2012	OCT	22,300,000.00	21,900,000.00	22,190,000.00	22,130,000.00	4.14
2012	NOV	22,560,000.00	21,960,000.00	22,420,000.00	22,313,333.33	3.25
2012	DEC	22,180,000.00	22,400,000.00	23,000,000.00	22,526,666.67	3.20
	2012 Q4			-	<u>22,323,333.33</u>	<u>3.53</u>

APPENDIX II

QUARTERLY PRICES AND INFLATION RATES FOR KILELESWA, LAVINGTON AND KILIMANI

Period	Property Prices	Period	Property Prices (%)	Inflation
2008 1st Quarter	4,123,333.33	2008 Q1	2.83	10.50
2008 2nd Quarter	3,965,555.56	2008 Q2	2.72	17.44
2008 3rd Quarter	5,007,555.56	2008 Q3	3.43	15.88
2008 4th Quarter	5,141,666.67	2008 Q4	3.52	16.58
2009 1st Quarter	4,868,888.89	2009 Q1	3.34	14.13
2009 2nd Quarter	5,833,333.33	2009 Q2	4.00	10.61
2009 3rd Quarter	5,408,888.89	2009 Q3	3.71	9.76
2009 4th Quarter	5,886,111.11	2009 Q4	4.03	7.99
2010 1st Quarter	6,666,111.11	2010 Q1	4.57	5.56
2010 2nd Quarter	6,607,777.78	2010 Q2	4.53	3.68
2010 3rd Quarter	7,153,333.33	2010 Q3	4.90	3.33
2010 4th Quarter	7,257,222.22	2010 Q4	4.97	3.84
2011 1st Quarter	7,727,777.78	2011 Q1	5.30	7.05
2011 2nd Quarter	8,336,666.67	2011 Q2	5.71	13.16
2011 3rd Quarter	8,827,222.22	2011 Q3	6.05	16.51
2011 4th Quarter	9,305,000.00	2011 Q4	6.38	19.19
2012 1st Quarter	9,678,333.33	2012 Q1	6.63	16.87
2012 2nd Quarter	10,131,111.11	2012 Q2	6.94	11.78
2012 3rd Quarter	11,472,222.22	2012 Q3	7.86	6.38
2012 4th Quarter	12,488,888.89	2012 Q4	8.56	3.53
	145,887,000.00			

APPENDIX III

PROPERTY PRICES AND INFLATION RATES FOR EMBAKASI, KASARANI, BURUBURU, AND MOMBASA ROAD SOUTH B & C

YEAR	MONTH				Property price	Inflation rates
2008	JAN	3,520,000.00	4,520,000.00		4,020,000.00	7.93
2008	FEB	4,200,000.00	3,500,000.00		3,850,000.00	11.04
2008	MAR	4,500,000.00			4,500,000.00	12.53
	1st Quarter				4,123,333.33	10.50
2008	APR	4,950,000.00	3,980,000.00	4,290,000.00	4,406,666.67	16.83
2008	MAY	3,900,000.00	4,000,000.00		3,950,000.00	18.70
2008	JUN	3,540,000.00			3,540,000.00	16.79
	2nd Quarter				3,965,555.56	17.44
2008	JUL	4,800,000.00	5,000,000.00	4,500,000.00	4,766,666.67	15.33
2008	AUG	4,952,000.00	3,240,000.00		4,096,000.00	15.98
2008	SEP	3,700,000.00	4,100,000.00	4,520,000.00	6,160,000.00	16.32
	3rd Quarter				5,007,555.56	15.88
2008	OCT	5,000,000.00	4,500,000.00		4,750,000.00	16.70
2008	NOV	5,400,000.00	4,950,000.00		5,175,000.00	17.56
2008	DEC	5,500,000.00			5,500,000.00	15.48
	4th Quarter				5,141,666.67	16.58
2009	JAN	4,900,000.00			4,900,000.00	13.33
2009	FEB	3,970,000.00	4,500,000.00	3,800,000.00	4,090,000.00	14.62
2009	MAR	5,400,000.00	5,850,000.00	5,600,000.00	5,616,666.67	14.44
	1st Quarter				4,868,888.89	14.13
2009	APR	4,900,000.00	5,750,000.00		5,325,000.00	12.10
2009	MAY	5,950,000.00	6,000,000.00		5,975,000.00	9.88
2009	JUN	6,200,000.00			6,200,000.00	9.86
	2nd Quarter				5,833,333.33	10.61
2009	JUL	5,950,000.00	5,250,000.00	5,980,000.00	5,726,666.67	10.33
2009	AUG	5,500,000.00	4,950,000.00		5,225,000.00	9.76
2009	SEP	4,900,000.00	5,650,000.00		5,275,000.00	9.19
	3rd Quarter				5,408,888.89	9.76
2009	OCT	5,750,000.00	6,250,000.00	5,500,000.00	5,833,333.33	8.80
2009	NOV	5,950,000.00	6,150,000.00	5,000,000.00	5,700,000.00	7.14
2009	DEC	6,300,000.00	5,950,000.00		6,125,000.00	8.02

	4th Quarter				<u>5,886,111.11</u>	<u>7.99</u>
YEAR						
2010	JAN	6,500,000.00	6,550,000.00		6,525,000.00	7.52
2010	FEB	6,750,000.00			6,750,000.00	5.18
2010	MAR	6,650,000.00	6,800,000.00	6,720,000.00	6,723,333.33	3.97
	1st Quarter				<u>6,666,111.11</u>	<u>5.56</u>
2010	APR	6,900,000.00	5,950,000.00	6,600,000.00	6,483,333.33	3.66
2010	MAY	6,450,000.00	6,430,000.00		6,440,000.00	3.88
2010	JUN	7,000,000.00	6,950,000.00	6,750,000.00	6,900,000.00	3.49
	2nd Quarter				<u>6,607,777.78</u>	<u>3.68</u>
2010	JUL	7,200,000.00	6,850,000.00	7,100,000.00	7,050,000.00	3.57
2010	AUG	7,400,000.00	6,980,000.00		7,190,000.00	3.22
2010	SEP	7,000,000.00	7,160,000.00	7,500,000.00	7,220,000.00	3.21
	3rd Quarter				<u>7,153,333.33</u>	<u>3.33</u>
2010	OCT	6,900,000.00	7,200,000.00		7,050,000.00	3.18
2010	NOV	7,140,000.00	7,550,000.00	7,350,000.00	7,346,666.67	3.84
2010	DEC	7,450,000.00	7,300,000.00		7,375,000.00	4.51
	4th Quarter				<u>7,257,222.22</u>	<u>3.84</u>
YEAR						
2011	JAN	7,500,000.00			7,500,000.00	5.42
2011	FEB	7,800,000.00	7,600,000.00	8,000,000.00	7,800,000.00	6.54
2011	MAR	8,000,000.00	7,950,000.00	7,700,000.00	7,883,333.33	9.19
	2011 Q1				<u>7,727,777.78</u>	<u>7.05</u>
2011	APRIL	8,200,000.00	7,960,000.00		8,080,000.00	12.05
2011	MAY	8,100,000.00	8,600,000.00	8,650,000.00	8,450,000.00	12.95
2011	JUN	8,400,000.00	8,560,000.00		8,480,000.00	14.48
	2011 Q2				<u>8,336,666.67</u>	<u>13.16</u>
2011	JUL	8,800,000.00	8,750,000.00	8,620,000.00	8,723,333.33	15.53
2011	AUG	8,300,000.00	8,950,000.00	9,250,000.00	8,833,333.33	16.67
2011	SEP	9,000,000.00	8,850,000.00		8,925,000.00	17.32
	2011 Q3				<u>8,827,222.22</u>	<u>16.51</u>
2011	OCT	9,150,000.00	8,920,000.00	9,000,000.00	9,023,333.33	18.91
2011	NOV	9,300,000.00	9,400,000.00	9,100,000.00	9,266,666.67	19.72
2011	DEC	9,500,000.00	9,750,000.00		9,625,000.00	18.93
	2011 Q4				<u>9,305,000.00</u>	<u>19.19</u>
YEAR						
2012	JAN	9,000,000.00	9,650,000.00	9,550,000.00	9,400,000.00	18.31
2012	FEB	9,720,000.00	9,800,000.00		9,760,000.00	16.70

2012	MAR	9,750,000.00	10,000,000.00		9,875,000.00	15.61
	2012 Q1				<u>9,678,333.33</u>	<u>16.87</u>
2012	APR	9,850,000.00	9,620,000.00	9,900,000.00	9,790,000.00	13.06
2012	MAY	9,740,000.00	11,000,000.00	9,820,000.00	10,186,666.67	12.22
2012	JUN	10,500,000.00	10,250,000.00	10,500,000.00	10,416,666.67	10.05
	2012 Q2				<u>10,131,111.11</u>	<u>11.78</u>
2012	JUL	11,000,000.00	10,800,000.00	10,950,000.00	10,916,666.67	7.74
2012	AUG	10,900,000.00	11,500,000.00		11,200,000.00	6.09
2012	SEP	12,000,000.00	12,500,000.00	12,400,000.00	12,300,000.00	5.32
	2012 Q3				<u>11,472,222.22</u>	<u>6.38</u>
2012	OCT	11,200,000.00	11,850,000.00	12,800,000.00	11,950,000.00	4.14
2012	NOV	11,950,000.00	13,000,000.00	12,700,000.00	12,550,000.00	3.25
2012	DEC	12,950,000.00	12,950,000.00	13,000,000.00	12,966,666.67	3.20
	2012 Q4				<u>12,488,888.89</u>	<u>3.53</u>

APPENDIX IV

QUARTERLY PRICES AND INFLATION RATES EMBAKASI, KASARANI, BURUBURU AND MOMBASA ROAD (SOUTH B & C)

Period	Property Prices	Period	Property Prices (%)	Inflation
2008 1st Quarter	4,123,333.33	2008 Q1	2.83	10.50
2008 2nd Quarter	3,965,555.56	2008 Q2	2.72	17.44
2008 3rd Quarter	5,007,555.56	2008 Q3	3.43	15.88
2008 4th Quarter	5,141,666.67	2008 Q4	3.52	16.58
2009 1st Quarter	4,868,888.89	2009 Q1	3.34	14.13
2009 2nd Quarter	5,833,333.33	2009 Q2	4.00	10.61
2009 3rd Quarter	5,408,888.89	2009 Q3	3.71	9.76
2009 4th Quarter	5,886,111.11	2009 Q4	4.03	7.99
2010 1st Quarter	6,666,111.11	2010 Q1	4.57	5.56
2010 2nd Quarter	6,607,777.78	2010 Q2	4.53	3.68
2010 3rd Quarter	7,153,333.33	2010 Q3	4.90	3.33
2010 4th Quarter	7,257,222.22	2010 Q4	4.97	3.84
2011 1st Quarter	7,727,777.78	2011 Q1	5.30	7.05
2011 2nd Quarter	8,336,666.67	2011 Q2	5.71	13.16
2011 3rd Quarter	8,827,222.22	2011 Q3	6.05	16.51
2011 4th Quarter	9,305,000.00	2011 Q4	6.38	19.19
2012 1st Quarter	9,678,333.33	2012 Q1	6.63	16.87
2012 2nd Quarter	10,131,111.11	2012 Q2	6.94	11.78
2012 3rd Quarter	11,472,222.22	2012 Q3	7.86	6.38
2012 4th Quarter	12,488,888.89	2012 Q4	8.56	3.53
	145,887,000.00			

APPENDIX V

REGRESSION OUTPUT FOR KILELESWA, LAVINGTON AND KILIMANI

Year 2008

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.883 ^a	.780	.670	1563568.09735

a. Predictors: (Constant), Inflation

ANOVA^a

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	17311183140614.030	1	17311183140614.030	7.081	.117 ^b
	Residual	4889490390132.417	2	2444745195066.209		
	Total	22200673530746.445	3			

a. Dependent Variable: Property Price

b. Predictors: (Constant), Inflation

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	22473868.434	4421578.669		5.083	.037
	Inflation	-766962.422	288222.254	-.883	-2.661	.117

a. Dependent Variable: Property Price

The year 2009

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.612 ^a	.374	.062	339666.02248

a. Predictors: (Constant), Inflation

ANOVA^a

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	138121573313.68	1	138121573313.68	1.197	.388 ^b
		5	5			
	Residual	230746013660.38	2	115373006830.19		
		9	4			
	Total	368867586974.07	3			
		4				

a. Dependent Variable: Propert Price

b. Predictors: (Constant), Inflation

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	12269832.974	824592.850		14.880	.004
	Inflation	-83114.947	75962.716	-.612	-1.094	.388

a. Dependent Variable: Property Price

The year 2010

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.711 ^a	.505	.257	591500.96723

a. Predictors: (Constant), Inflation

ANOVA^a

Model	Sum of Squares	df	Mean Square	F	Sig.	
1	Regression	713729374815.56 8	1	713729374815.56 8	2.040	.289 ^b
	Residual	699746788468.69 3	2	349873394234.34 6		
	Total	1413476163284.2 60	3			

a. Dependent Variable: Property Price

b. Predictors: (Constant), Inflation

Coefficients^a

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	
	B	Std. Error	Beta			
1	(Constant)	16291170.862	1442358.292		11.295	.008
	Inflation	-491483.181	344110.032	-.711	-1.428	.289

a. Dependent Variable: Property Price

The year 2011

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.928 ^a	.860	.791	785723.43920

a. Predictors: (Constant), Inflation

ANOVA^a

Model	Sum of Squares	df	Mean Square	F	Sig.
1	7615755068376.0	1	7615755068376.0	12.336	.072 ^b
	98		98		
	1234722645829.9	2	617361322914.98		
	77		9		
	8850477714206.0	3			
	74				

a. Dependent Variable: Property Price

b. Predictors: (Constant), Inflation

Coefficients^a

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	
	B	Std. Error	Beta			
1	(Constant)	12201736.362	1273374.738		9.582	.011
	Inflation	304400.435	86667.944	.928	3.512	.072

a. Dependent Variable: Property Price

The year 2012

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.992 ^a	.984	.976	204344.56464

a. Predictors: (Constant), Inflation

ANOVA^a

Model	Sum of Squares	df	Mean Square	F	Sig.
1	5203341080789.8	1	5203341080789.8	124.611	.008 ^b
	78		78		
	83513402194.802	2	41756701097.401		
	5286854482984.6	3			
	80				

a. Dependent Variable: Property Price

b. Predictors: (Constant), Inflation

Coefficients^a

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	
	B	Std. Error	Beta			
1	(Constant)	22950479.259	217862.304		105.344	.000
	Inflation	-222797.284	19958.681	-.992	-11.163	.008

a. Dependent Variable: Property Price

APPENDIX VI

Regression output for Embakasi, Buruburu, kasarani and Mombasa road

South B & C

Year 2008

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.324 ^a	.105	-.343	696192.66225

a. Predictors: (Constant), Inflation

ANOVA^a

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	113314724354.710	1	113314724354.710	.234	.676 ^b
	Residual	969368445947.537	2	484684222973.768		
	Total	1082683170302.247	3			

a. Dependent Variable: Property Price

b. Predictors: (Constant), Inflation

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	3622598.387	1968747.399		1.840	.207
	Inflation	62051.728	128333.533	.324	.484	.676

a. Dependent Variable: Property Price

Year 2009

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.864 ^a	.747	.621	290420.74540

a. Predictors: (Constant), Inflation

ANOVA^a

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	498105022173.45	1	498105022173.45	5.906	.136 ^b
		5	5			
	Residual	168688418715.74	2	84344209357.871		
		1				
	Total	666793440889.19	3			
		6				

a. Dependent Variable: Propert Price

b. Predictors: (Constant), Inflation

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	7175929.160	705042.172		10.178	.010
	Inflation	-157837.007	64949.530	-.864	-2.430	.136

a. Dependent Variable: Propert Price

Year 2010

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.509 ^a	.260	-.111	349595.48738

a. Predictors: (Constant), Inflation

ANOVA^a

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	85666607300.072	1	85666607300.072	.701	.491 ^b
	Residual	244434009597.08	2	122217004798.54		
	Total	330100616897.16	3			

a. Dependent Variable: Property Price

b. Predictors: (Constant), Inflation

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	7619659.103	852478.657		8.938	.012
	Inflation	-170273.733	203379.742	-.509	-.837	.491

a. Dependent Variable: Property Price

Year 2011

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.990 ^a	.981	.972	113834.92176

a. Predictors: (Constant), Inflation

ANOVA^a

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1342518097090.452	1	1342518097090.452	103.602	.010 ^b
	Residual	25916778822.449	2	12958389411.224		
	Total	1368434875912.900	3			

a. Dependent Variable: Property Price

b. Predictors: (Constant), Inflation

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	6762981.114	184485.414		36.659	.001
	Inflation	127805.299	12556.376	.990	10.179	.010

a. Dependent Variable: Property Price

Year 2012

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.970 ^a	.941	.912	380500.15774

a. Predictors: (Constant), Inflation

ANOVA^a

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	4638832705008.5	1	4638832705008.5	32.040	.030 ^b
		10		10		
	Residual	289560740078.19	2	144780370039.09	5	
	Total	4928393445086.6	3			
		99				

a. Dependent Variable: Property Price

b. Predictors: (Constant), Inflation

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	12970730.993	405670.889		31.974	.001
	Inflation	-210364.813	37164.097	-.970	-5.660	.030

a. Dependent Variable: Property Price