# INFLUENCE OF SELECTED ECONOMIC FACTORS ON VOLATILITY OF HOUSING PRICES IN NAKURU AND KIAMBU COUNTIES, KENYA

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**A Research Project Submitted to the Institute of Postgraduate Studies of Kabarak University in Partial Fulfillment of the Requirements for the Award of the Master of Science in Finance**

**KABARAK UNIVERSITY**

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The research thesis entitled "**Influence of Selected Economic Factors on the Volatility of Housing Prices in Nakuru and Kiambu Counties, Kenya"** and written by **Avikoshe Rebecah** is presented to the Institute of Postgraduate Studies of Kabarak University. We have reviewed the research project and recommend it be accepted in partial fulfillment of the requirement for the award of the degree of Master of Science in Finance.

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## DEDICATION

I wish to devote my effort to my mother Petronila Kisaka for giving me unrestricted assistance, encouragement, support, and inspiration while working on this project.

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## ABSTRACT

Kenya's middle-class population is expanding, which has put more strain on the housing market by driving up demand for houses. Housing unit production is scheduled based on anticipated demand. The increase in population and consumer power fuels demand. The level of pricing affects the capacity to purchase. The study's goal was to evaluate how selected economic factors influenced Nakuru and Kiambu housing price instability. The aim of the research was to determine the impact of housing demand on volatility of housing prices, economic growth on volatility of housing prices, the influence of mortgage rate on volatility of housing prices and influence of demographic characteristics on volatility of housing prices in Nakuru and Kiambu Counties. The ideal competitive theory of the housing market, the search theory and the housing market, and the life-cycle model of household consumption served as the study's pillars. The research design used in the study was descriptive. 600 sales managers from 26 members of the Kenya Property Developers Association who had been in existence for more than 10 years and had developed Nakuru and Kiambu County made up the study's population. Nassiuma's technique and simple random sampling selected 164 sales managers for the study. Semi-structured questionnaires were used to collect primary data. 17 sales managers from Kenya property developer association members were surveyed in Machakos County, Kenya. The instrument was reliable because Cronbach's alpha values for all research variables were between 0.7 and 0.9. Descriptive and inferential statistics were analyzed and presented in tables, percentages, frequencies and central tendencies. The findings of the study indicated that demand of houses had a positive statistically significant effect on housing price volatility ($\beta_1$=0.596, p=0.013), economic growth had positive statically significant influence on housing price volatility ($\beta_{2=}$0.233, p=0.006), mortgage rate had a positive statistically significant effect on housing price volatility ($\beta_3$ = -0.446, p=0.044) and finally, demographic characteristics had a positive statistically significant effect on volatility of housing prices in Nakuru and Kiambu counties ($\beta_4$ = 0.456, p= 0.13). The study recommended that the government should effectively regulate the mortgage market by setting lending standards and limiting the availability of risky loans, which can help to reduce the likelihood of a housing price bubble.



**Keywords**: *Demographics characteristics, Economic Growth, Housing Demand, Mortgage Rates and Price Volatility*

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## ABBREVIATION AND ACRONYMS

| | |
|---|---|
| ARDL | Autoregressive Distributed Lag |
| CBK | Central Bank of Kenya |
| CDR | Child-Age Dependency Ratio |
| CPI | Consumer Price Index |
| FRED | Federal Reserve Economic Database |
| GDP | Gross Domestic Product |
| GMP | Gross Metropolitan Product |
| KNBS | Kenya National Bureau of Statistics |
| KUREC | Kabarak University Research Ethics Committee |
| NACOSTI | National Commission for Science, Technology and Innovations |
| ODR | Old-Age Dependency Ratio |
| SPSS | Statistical Package for Social Sciences |
| VAR | Vector Auto-regression |
| VECM | Vector Error Correction Model |

## CONCEPTUAL AND OPERATION DEFINITION OF TERMS

**Demographics Characteristics** The statistical analysis of human populations (structure and change), the determinants of their dynamics, and the effects of population change are discussed here (Gaye & Jouven, 2020). Demographic in the study meant the gender and age of consumers of housing units and was measured by population growth.

**Economic Growth** It describes the inflation-adjusted increase in the market value of an economy's goods and services. Statisticians measure growth by real GDP growth percent (Stern, 2019). In this study economic growth meant infrastructural development and property taxes and was measured by inflation rates.

**Housing Demand** The impact on a product's price that the link between a product's availability and demand it has (Otwoma, 2017). In this study housing demand meant proximity to basic infrastructure and social amenities and was measured by accessibility of the house and availability of infrastructure

**Mortgage Rates** Mortgage rates refer to the interest rate charged by a lender on a mortgage loan (Makena, 2018). The interest rate on a mortgage loan is a crucial factor that determines the monthly payments, the total cost of the loan, and the affordability of the mortgage. Mortgage rate in the study meant the changes in mortgage rates and how they affected consumption of housing units and was measured by consumers income.

**Price Volatility** This refers to random price drive, quick directional swings and general investment risk. Volatility captures the idea that prices are fluctuating (Fan., Yang., & Yavas, 2019). In this study price volatility meant the fluctuating of price trend of housing units and was measured by other factors.

# CHAPTER ONE

# INTRODUCTION

## 1.1 Background of the Study

Housing as an investment can be considered a social and economic driver for several reasons. Firstly, it is a key factor in creating wealth for individuals and families as property values typically appreciate over time. This creates an opportunity for homeowners to build equity and potentially use it as a basis for monetary security in the future (Bhutta, Dokko, & Shan, 2017). Additionally, the property market has far-reaching effects on the economic system as a whole. The construction and sale of homes creates jobs and drives economic growth. This is particularly true during times of increased housing demand, as more resources are required to meet the needs of buyers.

Furthermore, the availability of affordable housing is an important social issue, as it impacts the quality of life and economic stability of individuals and families. When housing is affordable, it provides stability and allows families to focus on other aspects of their lives, such as education and career development. On the other hand, when housing is unaffordable, it can lead to financial stress, homelessness, and other social problems (Aghion, & Bolton, 2019).

Globally housing is a major factor that affects socioeconomic development of different countries. In China housing as an investment has provided a number of socioeconomic benefits to the country, which are evident in various statistics. These benefits include increased wealth for individuals and families, job creation, and economic growth (Kaul & Zhu, 2021). Firstly, housing has provided a means for individuals and families to build wealth. Regarding the National Bureau of Statistics of China, the normal price of new homes in China rose by 12.4% in 2020, which has allowed homeowners to build

equity and increase their net worth. This has created a situation where individuals and families are able to use their homes as a buffer against economic uncertainty in the future (Stroebel & Vavra, 2019).

Secondly, the housing marketplace has been a significant driver of job creation and development of economy in China. According to the China Real Estate Industry Association, the actual estate commerce contributed to approximately 15% of China's GDP in 2020. This is due to the fact that the construction and sale of homes creates jobs and drives economic growth, as more resources are required to meet the needs of buyers.

In Africa housing is an important factor in economic progress. In Nigeria, the housing industry is one of the largest employers of labor, with an estimated 20 million direct and indirect jobs. The division is also a significant component to the nation's GDP, accounting for approximately 5% of the total. In South Africa housing has a considerable effect on the GDP of the nation, contributing an estimated 7% to the total (Bekhet & Othman, 2018). This growth is driven by increased consumer spending on housing-related expenses such as mortgage payments, home improvement projects, and rental costs.

Economic factors are variables that apply to a broad aspect of the economy rather than a population. Economic factors refer to the various elements that have an impact on a country's economic activities and determine the outcomes of its economy (Guiso., Sapienza, & Zingales, 2016). These factors can be both internal, such as the country's resources and policies, and external, such as global economic trends and events. Common economic factors include gross domestic product, supply and demand, interest rates and population growth. The study focused on four economic factors which were

housing demand, economic growth, mortgage rate and demographic characteristics (Kormendi & Meguire, 2016).

Housing demand refers to the desire or need for housing among potential buyers in a specific market. It is a measure of the aspiring buyers to buy a house or rent a property, and is influenced by a range of factors such as population growth, economic conditions, employment, and interest rates. The higher the demand the lower the supply and thus the increase in prices. By adding additional inputs to the manufacturing process, aggregate supply raises short-term demand. However, in the long track, efficiency and product quality improvements are what determine aggregate supply levels. The government and real estate professionals have been compelled to reconsider how to meet the demand for real estate as a result of rising household numbers, increasing urbanization, a growing middle class, and a rapid increase in population (Otwoma, 2017).

Economic growth refers to the growth in the production of economic products over a period of time (Stern, 2019). It is a measure of the expansion of an economy and is usually measured in terms of the growth rate of GDP, which is the entire marketplace worth of all products and services made within a nation's borders. Economic growth is seen as a key indicator of the economic health and prosperity of a country and is an important goal for many governments around the world (Haller, 2018). Economic growth can occur through an increase in the level of consumer spending, which is a key driver of economic activity. Consumers can buy more properties and services when they have more cash to spend, which in turn stimulates demand and drives economic growth.

Mortgage rates refers to the rate governing the terms on which funds are being currently supplied, interest rate spread are considered to be reliable indicators of economic activity. The common reason is that when interest rate increase consumers are

discouraged from buying houses thereby reducing the uptake. Similar outcomes have been suggested by Makena (2018). Demographics characteristics is the study of human population and the consequences of population change. Most of the developing countries are experiencing increased number of youth and working-class people which if properly utilized can lead to demographic bonus in the short run. The scarcity of low-income housing is a result of increased population density and the real estate market focuses solely on the middle- and high-income market groups (Otwoma, 2017).

### 1.1.1 Volatility of Housing Prices

House price volatility refers to residential real estate value swings over a certain period of time. This can be measured by changes in the average price of houses in a particular region or by changes in the value of individual properties. Housing price volatility can significantly damage the economy, as well as on the financial well-being of individuals and families (Fan., Yang., & Yavas, 2019). There are several factors that contribute to housing price volatility, including changes in the budget, fluctuations in interest rates, changes in housing supply and demand, and changes in consumer confidence (Wang., Zeng., Yao, & Zhang, 2020).

Housing price volatility varies significantly across the world. In industrialized economies, housing prices increased roughly at the same rate as economic activity, but in more recent decades, the growth rate has accelerated (Filatova & Parker, 2018). House price increase varies greatly over time and between nations (from around 1% every year in Germany, Japan, and Switzerland to over 3% in Spain and the UK). The variance averages (7-12)% annually thus housing prices are erratic. Housing price volatility has decreased little over time, partially as a result of the advanced countries' general reduction in the volatility of output and inflation before the crisis, (Curry, 2018).

According to Olowalu, (2019) the primary variables influencing the African housing market are real monthly incomes, constant mortgage rates, joblessness, and house construction. Chinenye (2018) investigated the causal relationships between the price of homes in Nigeria and macroeconomic factors in Nigeria. His findings indicated that housing market was unstable because of factors including the monthly income, mortgage rate, and unemployment rate. The sub-period research also showed that the connections were erratic and changed with time. Karantonis and Ge (2018), on the other hand, concentrated on the housing market in South Africa and showed that actual revenue from households, home completions, speculative investment, and real interest rate affected South African housing prices. According to Dolde and Tirtiroglu (2018), discovered evidence of time-varying volatility in Egyptian housing markets on prices volatility. Crawford and Fratantoni (2017) also presented evidence of persistence time-varying volatility in Moroccan housing markets.

From 2000 to 2015, housing costs in Kenya increased by more than thrice. The typical price for a home with one to three bedrooms increased by a factor of five over this time, from slightly under Ksh 2 million to Ksh 10 million. From roughly 2000: Ksh 10 million 2015: Ksh 31 million, prices for apartments with four to six bedrooms increased (Hassconsult, 2018). Housing is a valuable asset that has contributed significantly to the overall wealth of many households. Housing makes up over 55% of all household assets in Kenya (Abelson, 2019). Kenya is one of the nations in Eastern Africa with a high rate of home ownership. According to Mwangi and Musomi (2018), the real wage income and population growth in Nairobi, Kenya, are the main drivers of real housing prices. While the long-term links between the Consumer Price Index (CPI) and disposable income show positive correlations, the long-term interactions between joblessness, mortgage rate, equity prices, and housing stock negatively correlate with house prices.

Property investors in Kenya are most concerned about the interest rate, which suggests that it is the primary factor influencing home costs.

## 1.2 Statement of the Problem

Most Kenyans cannot afford official home rent, the affordability of adequate housing has remained a distant dream. Around 55% of Kenya's urban population resides in informal settlements (Homeless International, 2020). This has been attributed to the surging prices of housing in Kenya. According to the Homeless international Report (2022) Kenya's real estate market has seen prices rise over the past ten years, prompting questions about whether this upward trend would continue. Kenyan housing costs have soared by nearly 300 percent from the year 2000, particularly in urban areas. Due to the increase, the majority of people cannot afford to own a home, and as a result, more than 60% of the urban population lived in slums without housing, water, power, social services, or security (World Bank, 2022).

Kenya's middle-class population is expanding, which has put more strain on the housing market by driving up demand for houses. Housing unit production is scheduled based on anticipated demand. The increase in population and consumer power are what fuel demand. The level of pricing affects this capacity to purchase. Forecasting demand therefore requires an understanding of the factors that influence housing costs (KNBS, 2022). This emphasizes how crucial it is to have a thorough understanding of what influences real estate pricing. Hence the study wanted to evaluate the effect of selected economic factors on volatility of housing prices in Nakuru and Kiambu Counties.

## 1.3 Objective of the Study

### 1.3.1 General Objective of the Study

The general objective of the study was to assess the influence of selected economic factors on volatility of housing prices in Nakuru and Kiambu counties.

### 1.3.2 Specific Objectives of the Study

i. To establish the influence of housing demand on volatility of housing prices in Nakuru and Kiambu Counties
ii. To determine the influence of economic growth on volatility of housing prices in Nakuru and Kiambu Counties
iii. To evaluate the effect of mortgage rate on volatility of housing prices in Nakuru and Kiambu Counties
iv. To assess the influence of demographic characteristics on volatility of housing prices in Nakuru and Kiambu Counties

## 1.4 Hypothesis of the Study

$H_0 1$: Housing demand has no statistically important inspiration on volatility of housing prices in Nakuru and Kiambu Counties

$H_0 2$: Economic Growth has no statistically important inspiration on volatility of housing prices in Nakuru and Kiambu Counties

$H_0 3$: Mortgage Rate has no statistically important inspiration on volatility of housing prices in Nakuru and Kiambu Counties

$H_0 4$: Demographic characteristics has no statistically important inspiration on volatility of housing of prices in Nakuru and Kiambu Counties

## 1.5 Significance of the Study

The housing ministry will profit from this study in that, it will better comprehend the housing market and, as a result, direct the distribution of desired products to the customers at the precise time. If there are housing bubbles, the ministry would develop intervention strategies to balance the market and prevent or end the bubble. The findings are significant to investors as they would have accurate data and investment decisions would be better supported. Specifically, speculators would be aware of the important considerations while making housing investment decisions.

The findings of the study will also be important to construction companies since it will provide model estimates for future pricing and so determine the viability of any endeavor, greater knowledge would enable them to plan timely and responsibly. The study results will be relevant to other researchers willing to conduct study on price volatility of the housing as it will add knowledge on the empirical review, theoretical review and conceptual reviews.

## 1.6 Scope of the Study

The study was confined on the influence of selected economic factors on volatility of housing prices in Nakuru and Kiambu counties. The independent variables of the study were demand for housing, economic growth, mortgage rate and demographic characteristics. The dependent indicator of the examination was volatility of housing prices. The researcher targeted a population of 600 sales managers from Kenya Property Developers association who had developed both Nakuru and Kiambu Counties with a sample of 164 sales managers. The total respondents were however 124 sales managers. The research was conducted in Nakuru and Kiambu Counties. The research was between October 2022 to June 2023.

# CHAPTER TWO

# LITERATURE REVIEW

## 2.1 Introduction

Theoretical review gives the researcher room to explore different theories that relate to the subject of the study. Under this the study reviewed the perfect competitive theory of housing market, the search theory and housing market, and the life cycle model of housing consumption and how each of them inter link with the economic variables which are; demand, economic growth, interest rates and demographics characteristics to affect the volatility of housing prices.

## 2.2 Theoretical Framework

The study's pillars were the ideal competitive housing market theory, search theory, and the life-cycle of household spending.

### 2.2.1 Perfect Competitive Theory of Housing Market

Perfect Competitive Theory was developed by Kenneth Arrow and Gérard Debreu in 1956. The theory of perfect competition states that a perfectly competitive market is one in which all participants (buyers and sellers) have full and symmetrical information about the prices and qualities of the goods being traded, and there are no barriers to entry or exit for any of the participants. In such a market, demand and supply influence the market price, and each participant acts as a price-taker, meaning that they cannot influence the market price by their individual actions. (Himayatullah, 2013). The concept of perfect rivalry presupposes that there are several tiny market participants, each of which is too small to influence the market price. As a result, each participant makes decisions based solely on the market price, and they have no market power to affect the price.

While the theory of perfect competition, as proposed by Kenneth Arrow and Gérard Debreu, provides a useful benchmark for understanding the behavior of competitive markets, it is subject to criticism on several grounds. One of the main criticisms of the theory of perfect competition is that it is not a realistic representation of most real-world markets. For example, the assumptions of full and symmetrical information and the absence of barriers to entry or exit are often not met in real-world markets ( Arrow, 2000). Another criticism of the theory of perfect competition is that it does not consider the existence of market power. In reality, some firms have the ability to influence market prices, theory of perfect competition does not address this.

The theory also assumes that the relationship between housing supply and demand is what determines home prices. However, in the actual housing market, the assumption that housing record is a capital property that adapts to demand and supply may not be true. Like various other markets, the housing market has flaws, according to Headay (2015). As much as the theory directs how demand and supply are taken into account when deciding housing prices, it lacks information on the precise factors influencing demand, which policymakers must address in order to manage housing prices. The theory helped in explaining the influence of housing demand on volatility of housing prices in Nakuru and Kiambu Counties.

### 2.2.2 Search Theory and the Housing Market

Search Theory was initiated by Rothschild in 1973. The model indicates that housing vacancies and prices are related due to transaction costs during the house hunt. The labor market is compared to the search and matching paradigm. The search theory is used in labor market economics to explain labor market inefficiency. The labor market is not obvious because there are always employees looking for job and employers looking for

workers. Similar to this, the existence of vacant housing at all times, as well as homes with varying costs and locations, as well as a large quantity of purchasers and occupants looking for cover, may indicate that housing charges are not stable. Prices will continue to change in response to vacancies in housing as well as buyer and tenant movements (Wheaton, 1991) .

Similar to the labor market, market forces and shocks have an impact on the housing market, changing the quantity, size, quality, and length of time it takes to sell a home. Buyers will shop for the greatest pricing, square footage, and quality to save short-term costs. In the search theory, housing and household numbers only mismatch when people react badly to shocks. However, the possibility of remaining mismatched in the near term motivates search efforts despite the suppliers' reservation fees being based on estimates of the time it will take to sell and the expense of maintaining the dwelling units. Stahl's (1985) model states that a higher vacancy rate delays home sale. This will eventually lower supplier reservations, search time, and lodging expenses. Until the cost of adding new housing units meets the selling price or expected price, vacancy rises (the price less the anticipated sales time).

The search theory has been subject to criticism on several grounds. First the search model is founded on some simplifying assumptions, such as the homogeneity of workers and firms, the absence of frictions in the search process, and the absence of wage rigidity. These assumptions are often not met in reality, and this limits the applicability of the theory to real-world labor markets. Secondly the search theory focuses on the behavior of workers and firms, but it neglects the role of institutions, such as labor market regulations, in shaping labor market outcomes. Because of this, evaluations are complicated the impact of labor market policies on unemployment and wage determination.

The markets over time stable price are the vacancy rate at which expected housing prices match the cost of building a house. A favorable association between home sales and home prices in the housing market is supported by this model. A change in housing demand will imply that the market falls out of balance, which affects selling and pricing. A rise in interest will make it more difficult for homebuyers to find a suitable home match, and it will spread into the subsequent periods. According to this argument, the reason why housing prices would rise is because the housing supply won't be able to keep up with the rising demand. Since the supply won't adjust in the temporary to meet demand, the hypothesis suggests that housing demand is the only component contributing to the instability of housing prices. However, over time, housing prices adapt along with the modified supply to equal the marginal cost.

### 2.2.3 Life-Cycle Model of Household Consumption

This Model was developed by Modigliani and Ando in 1956. The Life-Cycle Model by Franco Modigliani and Richard Ando is an economic theory that describes the spending and savings patterns of individuals over the course of their lifetime. According to this model, individuals make financial decisions based on their current income, the income they expect to receive in the future, and how many years of life they anticipate to work (Anundsen, 2016). The basic premise of the Life-Cycle Model is that people aim to smooth their consumption over time, meaning that they try to maintain a consistent level of spending despite changes in their income. In order to achieve this, people will save when their income is high and borrow when their income is low (Sanchez, 2016). The model also suggests that individuals will attempt to save for important future expenses, such as retirement, and will adjust their saving behavior accordingly. For example, as people approach retirement age, they are likely to increase their savings in order to ensure that they have enough money to support themselves during their retirement years.

While the Life-Cycle is widely recognized as a seminal contribution to the field of macroeconomics, it is not without its criticisms. First the model assumes that individuals are rational and make financial choices founded solely on their expected income and expected lifespan (Coulson & Kim, 2011). In reality, other factors, such as emotions, behavioral biases, and market conditions, also play a role in financial decision making. Secondly the model assumes that all individuals have access to credit and can borrow and save at will. However, this is not the case in reality, as access to credit and savings can vary greatly across different income groups.

According to the hypothesis, increasing credit availability lowers the opportunity cost of capital, which in turn increases both present and anticipated future economic activity. When this occurs, house prices will increase as a result of an increase in projected returns on housing brought on by a decreased discounting factor. Housing demand will consequently increase as credit becomes more widely available because households are no longer restricted in how much they may borrow. Considering the immobility of the housing market in the short run, due to the time it takes to construct new housing components, higher demand will lead to an increase in housing costs. Therefore, the model anchored the dependent variable of the study which was volatility of housing prices.

## 2.3. Empirical Review

### 2.3.1 Housing Demand on Volatility of Housing Prices

For Kuala Lumpur apartments and condominiums, Asroun, Aliasak, and Bakar (2020) conducted a literature review on the elasticity of housing demand and pricing. The purpose of the article was to review the housing demand variables that had been utilized in previous studies and to suggest ones that would be appropriate for Kuala Lumpur

condominiums and apartments. The analysis highlighted the determinants' coefficient sizes and significant levels to demonstrate their appropriateness. The study found that the cost of housing, the cost of financing it, the cost of construction, and governmental regulations were appropriate and ought to be employed in the new empirical study. The studied recommended the use of a proxy to represent government regulations to make the regression analysis easier. Before the new study could begin, the data gave a clearer knowledge of the influence of each component on housing demand.

Kader, Zayed, Alam and Nitsenko, (2022) conducted a study on an examination of three significant Turkish cities' housing markets to determine the factors influencing supply and demand. The VECM model's error correction variables dominated the mortgage credit volume and constriction cost, demonstrating how the disequilibrium was adjusted in the direction of equilibrium. Demand-side factors had a long-term link in the case of Ankara. Long-term effects on the housing market in Istanbul and Izmir were caused by both housing demand and demand-related factors. The coefficient of C1 calculated from system equations was negative given a substantial p-value. However, the study's major limitations was that it was based on only three major cities in Turkey.

Wagura, (2019) studied Kenyan housing demand determinants. The study examined the variables affecting the demand for homes. The study examined housing stock, rates of interest, inflation, GDP per capita, and commodity prices using regression analysis. The analysis discovered that the cost of housing is the component that has the greatest positive influence on how many homes were provided over time. The number rise when prices moved in the producers' favor. However, this balanced out by an equal demand for the built homes. The study found that rising per capita income did not lead to an increase in housing, therefore the ability to build might reduce the desire to do so.

Akelola (2016) focused on the factors influencing housing demand in Nairobi County. The findings demonstrated that in Nairobi County, the price of land was found to be favorably connected with levels of housing demand, whilst building costs and mortgage interest rates were shown to be adversely correlated with housing demand. One major limitation of this study, was the slow rate at which data could be obtained.

### 2.3.2 Economic Growth on Volatility of Housing Prices

Miller and Sklarz, (2018) focused on housing costs and economic expansion. In order home price security and financial impacts, the authors evaluated the consequences of expected and unpredictable changes in house prices. They also looked at the time structure of the effects and the interactions between them and household borrowing restrictions. These conclusions were drawn from the analysis. First, changes in housing prices had a major impact on the increase of the Gross Metropolitan Product (GMP), with the collateral effect having a roughly three times greater impact than the wealth effect. Second, the collateral effect of predicted change was superior to the impact of novel ones. Third, the total effect was unaffected even though the wealth effect was less and the collateral effect was higher when households were more financially strapped. Last but not least, after changes in housing prices the consequences lasted peaking in the fourth of eighth quarters.

Growth in the economy, real estate values, and financing for Hong Kong were the subject of an empirical study by Chui and Chau in 2019. The study looked at real estate investment, real estate prices, and economic growth all moved in a lead-lag connection. The outcome revealed that there was no connection between real estate investment and gross domestic product. The findings were contrary to earlier studies in economies with comparable structures. which discovered that changes in real estate values could be

utilized to estimate increase in the gross domestic product. Second, because property prices affected GDP, curbing home price appreciation was likely to slow the economy.

Tsoyum, Lin and Hsun, (2019) conducted a study on the situation of Taiwan and the impact of housing costs on consumption and financial growth. The study collected data in Taiwan for empirical analysis to learn how housing prices affect consumption and economic growth. The stock price index, as opposed to interest rates, had a large beneficial impact on consumption, according to the findings. The findings also indicated that growing housing costs had a detrimental impact on consumption, suggesting that these costs cause the crowding-out effect on consumption, which in turn contributes to slow economic growth.

Muthee (2019) examined Kenyan property values and growth in the economy. The results demonstrated that housing prices affected GDP every quarter. The data demonstrated that property was a good asset type that portfolios haven't properly utilized. According to the researchers' findings we can therefore say that Institutional investors should consider investing in property portfolios as they are slightly affected by recession and political unrest, thus real estate prices remain constant.

Njaramba (2017) concentrated on the rise in housing costs in Kenya, and the fluctuating connection between those prices and a handful of macroeconomic variables. The study used ARDL and VAR models with time series data spanning the years 1960 to 2015. Since the behavior of housing prices differed from that of other items' pricing, the choice of the Autoregressive Distributed Lag (ARDL) and Vector Auto-regression (VAR) models was made in order to account for the differences in behavior. The findings were consumer spending, building expenses, and property taxes drove both immediate and long-term home price growth. Housing prices were temporarily elevated by private

capital inflows and household debt. Despite popular opinion, housing supply did not affect home prices. The dynamic link between house prices and selected macroeconomic elements showed that there was a dynamic relationship between the two.

### 2.3.3 Mortgage Rate on Volatility of Housing Prices

Xiaojin (2022) examined mortgage rate changes and there has been a recovery in the housing market. How a mortgage rate shock influences local housing returns is influenced by housing permits, individual income, jobs, and demography. The empirical findings are supported by a partial equilibrium model.

Demewez and Netzell, (2017) examined the impact of interest rates in research on the housing prices in Sweden. The results showed a considerable difference inverse association between housing price index and interest rates (for governmental bonds, mortgage bonds, loan rates, and reposition rates). The regression results demonstrate that for all the specified interest rates, interest rate drops raise housing prices proportionally. Supply and demand, interest rates, income that is disposable, and inflation account for almost 92% of the housing price index fluctuation. The outcome also demonstrates the lag effects of interest rate fluctuations on property prices.

Nkoyo (2017) examined how mortgage rates affect Kenyan residential real estate prices. The survey was descriptive. The results demonstrated that economic growth and the residential property index are negatively correlated, whereas interest rates are not. The results reveal that while the there is a positive and statistically significant correlation between the money supply and the home price index, and price increases has only a positive and minor relationship.

A study on the connection between Kenyan home prices and mortgage credit was done by Muli (2018). According to the study's findings, changes in property prices have a

favorable and significant impact on how mortgage credit has developed through time. This finding implies that bank mortgage lending does not cause the development of housing prices; rather, banks simply adjust mortgage financing to the evolution of housing prices.

Kitavi, (2015) did a study on the impact of mortgage financing on Nairobi County's real estate market development. According to the report, the average number of housing units for the 25 mortgage businesses included in the sample increased over the course of five years, reaching a peak of 3,220 in 2012. Additionally, the standard deviation shows the variation in the annual amount of housing units built.

Kioko, (2020) examined the effects by conducting research of mortgage financing on Kenya's residential real estate market performance. The 42 licensed commercial banks and the lone licensed mortgage housing company were the intended audience. The use of secondary data sources was made. The behavior of the residential real estate market and the macroeconomic phenomenon of mortgage finance were studied using longitudinal data that was gathered across a range of time periods. The results of the investigation indicate that only the ratio of non-performing mortgages is significantly correlated with residential real estate performance. They are strongly associated negatively. Further research revealed that mortgage financing doesn’t significantly affect the presentation of the residential real estate sector and cannot be used to accurately predict that sector's success.

### 2.3.4 Demographic on Volatility of Housing Prices

Haiyan, Zhang, and Yumin (2017) examined demographic trends and housing demand: 31 Chinese provinces, Natural, regional, and social demographics were evaluated. Home consumption models used the Permanent Income Hypothesis and the Life Cycle Theory.

Demographic structures influenced housing consumption. The urbanization rate and ODR increase housing consumption, while the CDR, education level, and family size decrease it. Through deposits, the child-to-dependent ratio increases housing consumption, whereas the old-to-dependent ratio decreases it.

Li and Burcin (2017) focused on the impact of demographics on the housing markets in China and the United States. The National Composite Home Price Index for the United States, which records changes in housing prices, was used in the study to conduct a regression analysis utilizing data from the US Federal Bank of St. Louis FRED. GDP, CPI, supply of housing, actual median earnings, the age range "15-64", joblessness, outstanding mortgage debt, and higher education (Bachelor's degree or higher) are the variables considered. The findings indicated that the "15-64" working age group was statistically significant in the shift in home prices.

Moon, (2017) focused on the effect of demographic shift on South Korea's housing market. The impact of these changes in the population's size and makeup, as well as the mix of households, on housing costs was examined using data by area from 2003 to 2016. Since the patterns of changes in the demographic structure and housing prices in each metropolitan area or province varied, regional analyses as well as a national analysis were carried out. The study's findings indicated that the rate of growth in the population and senior dependency ratio do not affect home prices, but household characteristics like the household growth rate and the percentage of small households (1 or 2 persons) to all households do.

Yuxi, and Yifan, (2022) led an investigation on the demographic changes and the housing market. Specifically, the study focused on changes in urbanization, fertility, immigration from abroad, and life expectancy. Understanding the impact, they play in

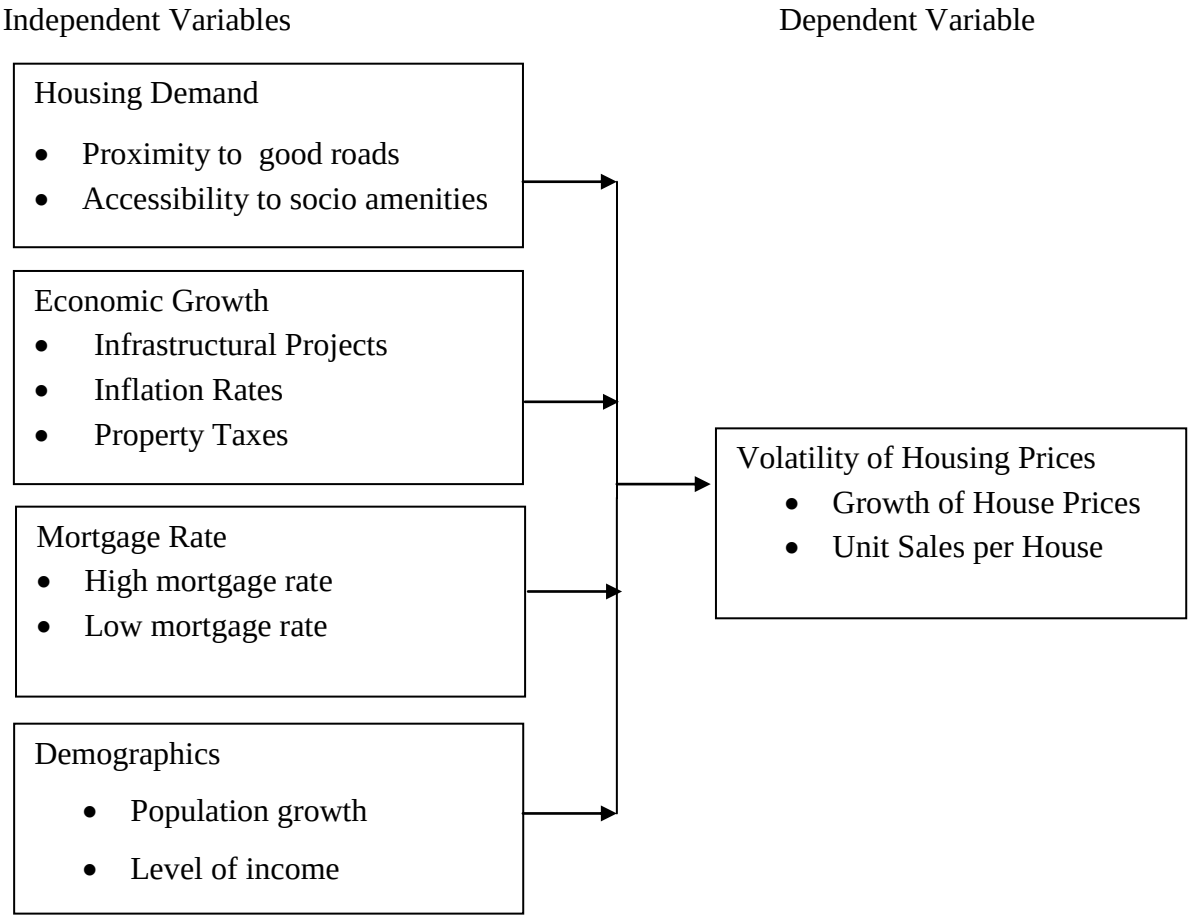
the real estate markets is crucial for forecasting future house values since these changes are enduring and predictable. Using an equilibrium demand and supply model, the study found that these factors may explain 40.54% of the observed increase in property prices between 1970 and 2010. Depending on urbanization and immigration, home prices will rise 4.42% to 18.85% from 2010 to 2050. Census and UN data informed this projection.

### 2.4 Conceptual Framework

The relationship of Figure 1 depicts how we'll be thinking about the variables in our investigation.

**Figure 1**

*Conceptual Framework*




*Source***:** Author (2023)

## 2.5 Summary of the Reviewed Literature and Gaps

The study's pillars were the ideal competitive housing market theory, search theory, and the life-cycle model of household spending. The curves of demand and supply in the perfect competitive theory of the housing market plot the relationship between housing prices (vertical axis) and the supply and demand for dwellings (horizontal axis). Investors and tenants alike are clamoring for new housing options at cheaper prices, while suppliers supply more housing at higher prices.

The search theory and housing market describe how transaction costs throughout the house search process affect housing vacancies and pricing. The labor market is compared to the search and matching paradigm. The search theory is used in labor market economics to explain why labor markets do not clear. The labor market is never completely clear because there are always employers looking for people and job seekers. The idea backs up the claim that housing prices do not, in the short run, reflect marginal costs because it takes time to build a new home and satisfy rising demand. The model does a good job of explaining how expectations are formed, but it fails to account for how an excess supply in response to rising demand could cause home prices to fall below their marginal costs, or, as it is more widely known, cause a bubble to burst. The idea therefore serves as the foundation for the investigation of how economic growth affects the volatility of property prices in Nakuru and Kiambu Counties.

The Life-Cycle Model of Household Consumption was pertinent to the current study because an increase in credit availability lowers the opportunity cost of capital, which in turn increases both current and anticipated upcoming economic activity. When this occurs, house prices will increase as a result of an increase in projected returns on housing brought on by a decreased discounting factor. Housing demand will

consequently increase as credit availability increases because families are no longer restricted in how much they may borrow. Because it takes time to build new housing units, the short-term housing supply is fixed. As a result, rising demand will drive up housing costs. As a result, the model uses the study's dependent variable, the volatility of home prices, as its anchor.

# CHAPTER THREE

# RESEARCH DESIGN AND METHODOLOGY

## 3.1 Introduction

The study's approach and methodologies are described in this chapter. This chapter captured details about planning a study, population of interest, sample strategy, data gathering, and analysis.

## 3.2 Research Design

The research design used for the study was descriptive. According to Dullock (2014), descriptive research design is a technique that involves scientifically watching and summarizing a subject's behavior without making any adjustments. The research design used guided the researcher in gathering enough study data from a larger sample that enabled better analysis of quantitative data. The research's design instructed data from selected respondents and analyzed it in the manner in which they provided it.

## 3.3 Target Population

This research aimed to collect data from 600 sales managers from 26 Kenya property developer association members who had been in existence for more than 10 years and had developed both Nakuru and Kiambu counties. Nakuru and Kiambu counties were chosen because they are second and third contributors to the country’s GDP respectively in Kenya. Nakuru and Kiambu counties were also chosen because it made the scope sufficient for the study allowing effective data collection against the set of time. The two counties were also selected to increase the scope of the study.

**Table 1**

*Target Population*

| Counties | Number of Sales Managers |
|---|---|
| Nakuru | 310 |
| Kiambu | 290 |
| Total | 600 |

*Source:* Survey Data (2023)

### 3.4 Sampling and Sample Size

Sampling is the selection method for the study subjects from the study's target population. An appropriate sample should be representative and sufficient. A reasonable procedure must be used to regulate the sample size (Kothari, 2012). The study adopted Nassiuma's method to determine the study sample size from the target population of 600 sales managers. The managers were from the 26 Kenya property developer association members. Nassiuma's formulas were used to sample of 164 sales managers from Kenya property developer association.

The sample size is given as:

$$n = N(Cv^2)/Cv^2 + (N-1)\,e^2$$

Where:

n = Sample size N=Population C=Covariance Error-mean-squared = e

Nassiuma (2001) recommends a coefficient of variation of 21%–C–30% and a standard error of 2%–e–5% for surveys. Thus, 2% standard error and 30% coefficient variation were used. The mean deviation and coefficient of variance were set higher to reduce sample variability and error.

n=600(0.3)2 /0.32+ (600-1)0.022= 164

Table 2 displays the results with a sample size of 164 managers.

**Table 2**

*Sample Size*

| Counties | Target Population | Sample Size |
|---|---|---|
| Nakuru | 310 (310/600*164) | 92 |
| Kiambu | 290 (290/600*164) | 72 |
| Total | 600 | 164 |

*Source:* Survey Data (2023)

### 3.5 Data Collection Instruments

A survey was used to gather primary data for the study since it allowed for the collection of more accurate data directly from the respondents. This is supported by Kealy and Turner (2013), who found that questionnaires provided far more systematic responses, enabling simple and quick data collecting as well as much simpler statistical data analysis. The survey questions were designed on a Likert scale of five alternatives so that respondents could freely assess the things according to their level of agreement.

### 3.6 Pilot Study

Before moving on with the final study, the piloting of questionnaires is crucial since it assesses their suitability for producing reliable and consistent data. A tenth of the entire population that is homogeneous provides a representative number that can be researched for a pilot study, according to Mugenda & Mugenda (2012). In this regard, 17 sales managers of Kenya property developer association In Machakos County participated in

the pilot study. Machakos county was picked to avoid the spillover effect from Nairobi County. The study excluded piloted surveys.

### 3.6.1 Validity of the Study Instrument

According to Cooper & Schindler (2015), the ability of the research tools to ascertain what they are intended to measure is known as validity. The use of content validity in this study was made possible by its capacity to assess the questionnaire's contents and ensure that they were written in a way that respondents can understand without the assistance of a research assistant. To assess the legitimacy of the questionnaire items, the researcher also looked up the supervisor.

### 3.6.2 Reliability of the Study Instrument

Testing the dependability of the questionnaires is done to see if they will produce reliable results. Ranjit (2015) defines reliability as the ability to consistently produce the same findings when tested, even after multiple testing. An instrument is more reliable when it achieves a correlation coefficient of larger than 0.7, according to Morse (2012), who used the Cronbach's alpha test to assess reliability. An alpha value closer to 1 was sought.

## 3.7 Data Collection Procedure

Using the format of a formal letter, the researcher initially requested approval from Kabarak University before leaving to gather data. After getting approval from the Kabarak University Research Ethics Committee (KUREC). The researcher proceeded to apply for authorization from NACOSTI to gather data from managers of Kenya Property Development Association Nakuru and Kiambu Counties. The name of the researcher and the goal of the study were clearly stated in both the introduction letter from KUREC and

the research permission from NACOSTI. The researcher went ahead after receiving both letters to Kenya Property Development Association Nakuru and Kiambu Counties for introduction. The researcher distributed questionnaires to the study participants, and they were collected two weeks later. Given the high sample size in this study, it was hoped that the time allotted answering surveys would boost response rates. Pickup and drop off is the name of this technique for distributing and collecting questionnaires.

### 3.8 Data Analysis and Presentation

Cooper & Schindler (2015), asserts that data analysis is the process of putting the bulk of the information obtained into order, structuring it, and determining its significance. This study's data collection was primarily quantitative in nature. Investigations used descriptive and inferential statistics. Data was analyzed by SPSS version 25. The findings were both descriptive and inferential. Percentages, frequencies, means, and standard deviations were utilized in descriptive statistics while correlation and regression were used in inferential statistics. Tables displayed the data. Pearson correlation and regression analysis determined the connection between free variables and those they affect. The subsequent model for multiple linear regressions was utilized.

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \varepsilon$$

Where:

Y= is the Volatility of Housing Prices

$\beta_0$ = is the Constant Term

$\beta_1, \beta_2 \beta_3$ and $\beta_4$ are Beta coefficients of variables

$X_1$ is the House Demand

$X_2$ is the Economic Growth

$X_3$ is the Mortgage Rate

$X_4$ is the Demographics

$\varepsilon$ = Error Term

### 3.9 Diagnostic Tests

Initial tests for diagnosis assessed the appropriateness of correlation and multiple linear regression, two types of parametric statistics. Tests for multicollinearity, normality, and linearity were performed first.

#### 3.9.1 Normality Test

Normality test was carried out on the collected data to confirm if it was in a typical distributional form. Statistics using the Shapiro-Wilk and Kolmogorov-Smirnov were utilized in the study to check for normality. Data is considered to be regularly distributed if the significance level (0.05) chosen is lower than the p-value of the normalcy test. If the p-value is less than the threshold for rejection, we can infer that the data did not follow a normal distribution.

#### 3.9.2 Multicollinearity Test

Multicollinearity occurs when predictor variables strongly correlate. Only multiple linear regressions with several predictor variables apply. The correlation matrix and the variance inflation factor (VIF) are two tools that can be used to check for multicollinearity measurements. Multicollinear predictors strongly associate. VIF values require these figures to be below 10.00, although below 5.00 is ideal. This study determined multicollinearity using VIF data.

### 3.10 Ethical Consideration

The researcher first forwarded the document to KUREC for ethical review after which he got consent from the relevant authorities prior the commencement of the study. With the consent from the KUREC the researcher sought the permission from the management of commercial property companies in both Nakuru and Kiambu Counties. With both the informed consent from the university and the management of commercial property companies, the researcher then requested the selected respondents to fill their consent form and questionnaires. Their consent was crucial in making sure that this study got done effectively and that the data gathered in the following phases did not violate the laws and restrictions established when conducting this research.

Respondents could opt out at any time without affecting the program or future participation. All of the respondent's information was guaranteed to be kept private. This helped to improve the respondents' reply degree. The researcher personally stored all the data collected in a secure place and thus it was not accessed by unauthorized persons.

# CHAPTER FOUR

# DATA ANALYSIS, PRESENATION AND DISCUSSION

## 4.1 Introduction

The chapter offers and discusses the respondent's profile investigation findings, followed by descriptive and inferential assessments of the study's goals. The chapter also discusses study conclusions.

## 4.2 Pilot Results

The investigation did a pilot test which was held in Machakos County where 17 questionnaires were issued to sales managers of the selected real estate companies. The results are as shown in Table 3

**Table 3**

*Reliability Results*

| Variable | No. of items | Cronbach alpha | Decision |
|---|---|---|---|
| Demand of Houses | 5 | 0.706 | Reliable |
| Economic Growth | 6 | 0.838 | Reliable |
| Mortgage Rates | 5 | 0.742 | Reliable |
| Demographics | 6 | 0.822 | Reliable |
| Volatility of Housing Prices | 4 | 0.777 | Reliable |
| Overall Reliability | | 0.876 | |

*Source***:** Data Survey (2023)

According to the results, the Cronbach Alpha fell within the advised range of 0.7 and 1 implying that the instruments were reliable. The overall reliability result was 0.876 which implied that the study instrument was reliable

### 4.3 Response Rate

The response rate of the study findings were as shown in Table 4

**Table 4**

*Response Rate*

| Sampled No. of respondents | No. of Questionnaires Returned | Response Rate (%) |
|---|---|---|
| 164 | 124 | 76 |

*Source***:** Survey Data (2023)

The study sought responses from 164 sales managers, and 124 of them completed and returned the questionnaires, yielding a 76% response rate. The study had a significant response appropriate for the research with a 76% response rate. A high response rate, as opposed to a low response rate, is favorable since it significantly minimizes non-response bias, according to Barbie (2014).

#### 4.3.1 Response Rate for Nakuru and Kiambu Counties

The study found a high response rate in Kiambu county as compared to Nakuru County and is in the table 5

**Table 5**

*Response rate in Nakuru and Kiambu Counties*

| County | Frequency | Percentage |
|---|---|---|
| Kiambu | 72 | 58 |
| Nakuru | 52 | 42 |
| Total | 124 | 100 |

*Source***:** Survey Data (2023)

### 4.4 Demographic Information of Consumers

Based on the consumers gender, age, education level and length of employment, study examined the following.

#### 4.4.1 Gender of the consumers of Housing Units

The study subjects' representation of gender was also requested. Table 6 shows results.

**Table 6**

*Gender Representation of Consumers*

| Gender | Frequency | Percentage |
|---|---|---|
| Male | 82 | 66 |
| Female | 42 | 34 |
| Total | 124 | 100 |

*Source***:** Survey Data (2023)

The results showed that 66% of the consumers were men and 34% were women. This demonstrates that the majority of real estate consumers were men.

#### 4.4.2 Age of the Housing consumers

The consumers were requested to provide their age information. The results are displayed in Table 7.

**Table 7**

*Age of Consumers*

| Age of the Respondents | Frequency | Percentage |
|---|---|---|
| 20-30 years | 25 | 20 |
| 31-40 years | 32 | 26 |
| 41-50 years | 47 | 38 |
| Above 50 years | 20 | 16 |
| Total | 124 | 100 |

*Source***:** Survey Data (2023)

20% of consumers were 20–30 years old, 26% were 31–40, 38% were 41–50, and 16% were above 50. This shows that most consumers were between 41–50 years.

### 4.4.3 Consumers Highest Level of Education

The highest degree of schooling for each consumer was requested. The results are displayed in Table 8.

**Table 8**

*Consumers Highest Level of Education*

| Level of Education | Frequency | Percentage |
|---|---|---|
| Professional Certificate | 22 | 18 |
| Post Graduate | 5 | 20 |
| Bachelor’s Degree | 50 | 40 |
| Diploma | 27 | 22 |
| Total | 124 | 100 |

*Source***:** Survey Data (2023)

According to the results, 40% of consumers said they had earned a bachelor's degree, 20% of consumers said they had completed post-graduate coursework, 18% of

consumers said they held a professional certificate, and 22% said they had only completed a diploma program.

### 4.4.4 How long Consumers have been working

The purpose of the survey was to determine how long the Consumers had been employed. Table 9 lists the findings of the analysis.

**Table 9**

*Time Period Consumers of Housing Units Have Been Employed*

| Years | Frequency | Percentage |
|---|---|---|
| Below 1 Year | 15 | 12 |
| 2-5 Years | 69 | 56 |
| 6-10 Years | 35 | 28 |
| Above 10 Years | 5 | 4 |
| Total | 124 | 100 |

*Source***:** Survey Data (2023)

12% said they had been employed by their current company for less than a year, 56% said they had been there for two to five years, 28% had been there for six to ten years, and 4% had been there for more than ten years. This showed that most Consumer had worked for two to five years.

### 4.4.5 Period the Organization has been Running

The purpose of this was to determine how long the organization had been around. Table 10 presents the results.

**Table 10**

*Duration the Organization has been in Operation*

| | Frequency | Percentage |
|---|---|---|
| Below 1 Years | 0 | 0 |
| 2-5 Years | 0 | 0 |
| 6-10 Years | 30 | 24 |
| Above 10 Years | 94 | 76 |
| Total | 124 | 100.0 |

*Source***:** Survey Data (2023)

According to the data, no company had been in business for less than five years; 24% had been in business for between six and ten years; and 76% had been in business for over ten years. This suggested that the bulk of the companies had been in business for longer than ten years.

### 4.5 Descriptive Statistics

Descriptive numbers were provided for the study variables in this section. The section was divided into specific objectives. The finding was given with percentages, averages, and variances.

#### 4.5.1 Demand of House on Volatility of Housing Prices

The study sought to assess the influence of demand of house on volatility of housing prices. Table 11 displays the results.

**Table 11**

*Demand of House on Volatility of Housing Prices*

| Demand of house | SA (%) | A (%) | U (%) | D (%) | SD (%) | Mean | Std Deviation |
|---|---|---|---|---|---|---|---|
| Over the past five years, the demand for homes has gradually increased. | 58 | 24 | 8 | 4 | 6 | 4.177 | 0.912 |
| The demand for houses depends on its proximity to basic infrastructure such as tarmac road, water, sewerage | 40 | 48 | 4 | 8 | 0 | 3.984 | 1.032 |
| The demand of houses close to basic social amenities such as water or school system is usually high which make the prices of houses along these facilities to go high | 50 | 34 | 8 | 4 | 4 | 4.145 | 0.921 |
| High demand of houses result to reduced competition and consequently result to cause by a rise in home prices | 54 | 36 | 2 | 5 | 3 | 4.563 | .608 |
| High demand for a particular type of houses result to an increase in housing prices for that category | 48 | 40 | 3 | 5 | 4 | 4.181 | .513 |

*Source***:** Survey Data (2023)

According to the results, 24% of respondents highly agreed, 58% strongly agreed, 8% agreed, 4% disagreed, and 6% strongly disagreed that the demand for homes has gradually increased over the past five years. Additionally, 48% of respondents agreed, 4% disagreed, and 40% strongly agreed that the demand for dwellings depends on their closeness to essential infrastructure, such as asphalt roads. 34% agreed, 8% neutral, 4% disagreed, and 4% strongly disagreed that there is typically high demand for homes near basic socio-economic amenities like a reliable road system. The exam's findings match

Mendeley (2021), who discovered that proximity to a transportation hub increased both the demand for housing in the area and home rent. Additionally, the accessibility of transportation in the form of a wide range of regular and reasonably priced public transportation promotes travel demand because the cost of commuting will be greatly decreased.

54% strongly agreed that high housing demand reduces competition and raises prices, 36% agreed, 2% were neutral, 5% disagreed, and 3% strongly disagreed. 48% strongly agreed that high demand for a certain style of housing raises its price, 40% agreed, 3% were neutral, 5% disagreed, and 4% strongly disagreed. The findings support Stroebel, & Vavra (2019) who claim that rising housing demand raises prices. When there are more buyers than sellers, competition for available homes can drive up prices. This can occur when there is a strong economy, population growth, or an influx of new residents to an area.

### 4.5.2 Economic Growth on Volatility of Housing Prices

The study examined how economic growth affects home price volatility. Table 12 shows the outcomes.

**Table 12**

*Economic Growth on Volatility of Housing Prices*

| Statements on Economic Growth | SA (%) | A (%) | U (%) | D (%) | SD (%) | Mean | Std |
|---|---|---|---|---|---|---|---|
| Development of infrastructural projects such as roads result to a rise in the prices of houses | 68 | 23 | 2 | 4 | 3 | 4.258 | 0.886 |
| The housing market responds to an increase in industry by driving up home prices. | 69 | 21 | 0 | 5 | 5 | 4.403 | 0.557 |
| High inflation results to home costs are going up because of a rise in the price of construction materials. | 40 | 55 | 0 | 2 | 3 | 4.145 | 0.807 |
| High property taxes can increase the cost of building which lead to lower demand and lower prices for homes. | 49 | 33 | 12 | 3 | 3 | 4.452 | 0.592 |
| High capital gains taxes reduce the amount of profit which discourages investors leading to higher prices. | 69 | 21 | 0 | 5 | 5 | 4.403 | 0.557 |

*Source***:** Survey Data (2023)

68% strongly agreed that development of infrastructural projects such as roads result to an increase in the prices of houses, 23% agreed, 2% were neutral, 4% disagreed while 3% strongly disagreed. Further, 69% strongly agreed that an increase in the number of industries result to an increase in the prices of houses, 21% agreed, 5% were neutral while 5% disagreed. In addition, 40% of the respondents strongly agreed that high inflation resulted to a rise in the price of construction supplies which consequently resulted to an increase in the prices of houses, 55% agreed, 2% disagreed while 3% strongly disagreed. The findings are similar to those of (Muthee 2019) which indicated an increase in house prices with respect to growth in GDP. The study's findings are also

supported by Musarat's (2018) research, which revealed that Inflation can boost or hurt economic growth. This essay discusses how inflation affects the economy and building sector. Most construction projects' economics and budgeting ignore inflation because building materials, labor, and machines are rising annually, resulting in project cost overruns.

49% of respondents strongly agreed that high property taxes could likely increase the cost of building, lowering demand and prices for homes, while 33% agreed, 12% were neutral, 3% disagreed, and 3% strongly disagreed. 69% of respondents strongly agreed that high capital gains taxes limit profit, deter investors, and raised prices, whereas 21% agreed, 5% disagreed, and 5% strongly disagreed. Muhandrat (2017), investors with investments older than a year must settle your tax obligations on long-term gains. If a shareholder has held an investment for less than six months, no long-term capital gains tax is required. A taxpayer's regular income is used to determine their short-term rate. The top earners are the only ones exempt from a higher tax rate than the one on capital gains.

40% strongly agreed that an increase in GDP resulted to higher income thus raising house demand and prices, 55% agreed, 2% disagreed, and 3% strongly disagreed. The results are similar with Majtenyi, (2019) which contended that the government has the obligation to invest more on infrastructure like motorways, bypasses, Standard Gauge Railway, bridges and dams. This, in collaboration with other development partners will over time increase income tax and as a result, numerous areas will be opened up, spurring growth.

### 4.5.3 Mortgage Rates on Volatility of Housing Prices

The investigator wanted to measure the influence of mortgage rates on volatility of housing prices in Nakuru and Kiambu Counties. Table 13 shows results.

**Table 13**

*Mortgage Rates on Volatility of Housing Prices*

| Mortgage Rates | SA | A | U | D | SD | Mean | Std. |
|---|---|---|---|---|---|---|---|
| There has been a gradual increase in mortgage rate for the last five years | 64 | 29 | 2 | 5 | 0 | 4.403 | 0.778 |
| Low mortgage rates result to an rise in demand for homes as more people can afford to buy this result to an increase in the price of houses | 54 | 30 | 8 | 5 | 3 | 4.307 | 0.738 |
| High mortgage rates make the houses less affordable thus reducing the demand for house which lead to a decline in housing prices | 38 | 38 | 4 | 11 | 9 | 4.145 | 0.807 |
| Changes in mortgage rates affect consumer confidence, which can affect demand for homes and consequently the overall prices of houses | 43 | 34 | 7 | 5 | 11 | 4.387 | 0.869 |
| An increase in mortgage rate result to rises in construction costs that raise housing prices | 60 | 32 | 5 | 3 | 0 | 4.48 | .731 |

*Source***:** Survey Data (2023)

64% strongly agreed that it had been rising steadily in mortgage rate for the last five years, 29% agreed, 2% were neutral while 5% disagreed. Further, 54% strongly agreed that a decrease in loan rates resulted to an increase in demand for homes as more people could afford to buy this resulted to an increase in the price of houses, 30% agreed, 8%

were neutral, 5% disagreed while 3% strongly disagreed. Also, 38% strongly agreed that an increase in mortgage rate made the houses less affordable thus reducing the demand for housing which led to decreased housing prices, 38% agreed, 4% were neutral 11% disagreed while 9% strongly disagreed. According to Waddell, (2018) The cost of housing is influenced by mortgage interest rates and can rise with the government's funding rate and other rates on the market.

43% strongly agreed that changes in mortgage rates affected consumer confidence, which could affect demand for homes and consequently the overall prices of houses, 34% agreed, 7% indicated unbiased, 5% disagreed while 11% strongly disagreed. In addition, 60% strongly agreed that increased in mortgage rate resulted to enhance the overall cost of building which resulted to increased housing prices, 32% agreed, 5% were neutral while 3% disagreed. The study concurs with those of Vastmans., & Buyst, (2016) who agreed that mortgages played a crucial role in determining housing prices. Muli,2018 also found that mortgage rates have a positive relationship with house prices. Mortgages allowed people to purchase homes by spreading the cost of the home over a long period of time, usually several decades and as a result housing prices are closely tied to the availability and cost of mortgages.

### 4.5.4 Demographic characteristics on Volatility of Housing Prices

The investigator further pursued to assess the effect of demographics on volatility of housing prices in Nakuru and Kiambu Counties. The findings were as in Table 14.

**Table 14**

*Demographic characteristics on Volatility of Housing Prices*

| Statements on Demographics Characteristics | SA (%) | A (%) | U (%) | D (%) | SD (%) | Mean | Std |
|---|---|---|---|---|---|---|---|
| There has been a gradual growth in population in the county | 49 | 39 | 10 | 2 | 0 | 4.351 | .767 |
| An increase in population can drive up demand for housing and lead to higher home prices | 48 | 39 | 6 | 4 | 3 | 4.345 | .692 |
| An aging population reduce demand for larger homes and a shift towards smaller, more manageable properties, which can impact home prices. | 44 | 38 | 7 | 7 | 4 | 4.273 | .689 |
| Higher incomes can lead to increased demand for more expensive homes, while lower incomes can result in lower demand for housing and lower home prices | 62 | 32 | 3 | 3 | 0 | 4.604 | .670 |
| Whenever there is an influx of people into a particular area, demand for housing can increase and lead to higher home prices. | 48 | 39 | 6 | 4 | 3 | 4.345 | .692 |
| An increase in single-person households, can impact the demand for different types of homes and, in turn, home prices. | 44 | 38 | 7 | 7 | 4 | 4.273 | .689 |

*Source***:** Survey Data (2023)

49% strongly agreed that there had been a gradual growth in population in the county, 39% agreed, 10% were neutral while 2% disagreed. Further, 48% strongly agreed that an increase in population could drive up request for housing and lead to higher housing prices, 39% agreed, 6% were neutral, 4% disagreed while 3% strongly disagreed. In addition, 44% strongly agreed that an aging population lead to decreased in demand for

larger homes and a shift towards smaller, more manageable homes, which could impact home prices, 38% of the respondents agreed, 7% were neutral 7% disagreed while 4% strongly disagreed. The results match those of Girlford (2018), who found that as the population aged quickly, there were fewer people of working age in the workforce and a corresponding decline in housing demand. Because of the resulting housing constraint, it was more challenging for companies to fill positions that were in high demand.

62% strongly agreed that higher incomes could lead to increased demand for more expensive homes, while lower incomes could result in lower demand for housing and lower home prices, 32% agreed, 3% were neutral while 3% disagreed. Additionally, 48% strongly agreed that whenever there was an influx of people into a particular area, demand for housing could increase and lead to higher housing prices, 39% agreed, 6% were neutral 4% disagreed while 3% strongly disagreed. The findings further indicated that 44% strongly agreed that an enhancement in single-person households, could impact the demand for different types of homes and, in turn, home prices, 38% agreed 7% were neutral, 7% disagreed while 4% strongly disagreed.

The conclusions were similar with those of Mwithiga, (2019) who argued that age was a crucial factor affecting the prices of houses. Younger people were more likely to purchase affordable, smaller homes, while older people preferred larger, more expensive homes. Additionally, the presence of older people in an area also increased demand for retirement communities, driving up the prices of homes in those areas. He further indicated that income was another major demographic factor affecting the prices of houses. People with higher incomes were more likely to purchase more expensive homes, while those with lower incomes may be limited to purchasing more affordable homes. In areas with high median incomes, home prices were generally higher.

### 4.5.5 Volatility of Housing Prices

The scholar pursued to find the volatility of housing prices. Table 15 demonstrates the findings.

**Table 15**

*Volatility of Housing Prices*

| Volatility of housing prices | SA (%) | A (%) | U (%) | D (%) | SD (%) | Mean | Std |
|---|---|---|---|---|---|---|---|
| There has been a constant growth in the prices of houses | 52 | 43 | 0 | 3 | 2 | 4.177 | 0.912 |
| There has been a gradual growth of unit of sales of houses | 49 | 41 | 3 | 4 | 3 | 4.563 | 0.608 |
| The prices of houses are highly predictable | 56 | 32 | 3 | 5 | 4 | 4.145 | 0.921 |
| The prices of house are rarely affected by both external and internal factors | 70 | 30 | 0 | 0 | 0 | 4.563 | 0.608 |
| The number of investors venturing into housing business has grown due to gradual rise in the prices of houses | 63 | 32 | 0 | 3 | 2 | 3.984 | 1.032 |

*Source***:** Survey Data (2023)

52% strongly agreed that there had been a constant growth in the prices of houses, 43% agreed, 3% disagreed, 2% strongly disagreed. 49% strongly agreed that house sales had gradually increased, 41% agreed, 3% were indifferent, 4% disagreed, and 3% strongly disagreed. 56% strongly agreed that property prices were very predictable, 32% agreed, and 3% were indifferent. 5% and 4% strongly disagreed.

70% strongly agreed that the prices of house were rarely affected by both external and internal factors while 30% agreed. Due to the progressive rise in house prices, 63% of respondents strongly agreed that more investors were entering the housing market, 32%

agreed, 3% disagreed, and 2% strongly disagreed. The results support Majtenyi's (2019) claim that Kenyan real estate values had increased by more than a factor of two during the past ten years, and in certain cases by a factor of three. The expansion of project financing and mortgage financing had caused the real estate sector in Kenya to grow strongly. The change in the real estate market was expected due to the fixed nature of real estate assets, the limited flexibility in the housing market, and the difficulty to trade.

### 4.6 Diagnostic Tests

The investigation led a diagnostic test to identify problems with the information, such as missing values, multicollinearity, or non-linear relationships.

#### 4.6.1 Test of Multicollinearity

The investigation conducted a multicollinearity test to assess whether there is multicollinearity among independent variables. The findings are presented in the Table 16.

**Table 16**

*Test of Multicollinearity*

| Model | | Collinearity Statistics | |
|---|---|---|---|
| | | Tolerance | VIF |
| 1 | Demand of Houses | .463 | 2.160 |
| | Economic Growth | .778 | 1.285 |
| | Mortgage Rates | .564 | 1.773 |
| | Demographics | .434 | 2.304 |

a. *Predicted Variable: Volatility of Housing Price*

*Source***:** Survey Data (2023)

From the findings, Multicollinearity was absent since the tolerance value exceeded 0.1 and the VIF was less than 10. Table 16 had no multicollinearity because the VIF values were less than 10, but the tolerance factors were greater than 0.1.

### 4.6.2 Test of Normality of Data

Data from a regularly distributed population was tested for normality. Table 17 shows results.

**Table 17**

*Tests of Normality*

| | Kolmogorov-Smirnov[a] | | | Shapiro-Wilk | | |
|---|---|---|---|---|---|---|
| | Statistic | Df | Sig. | Statistic | df | Sig. |
| Demand of Houses | .293 | 124 | .000 | .788 | 124 | .042 |
| Economic Growth | .126 | 124 | .000 | .922 | 124 | .035 |
| Mortgage Rates | .357 | 124 | .000 | .706 | 124 | .017 |
| Demographics characteristics | .677 | 124 | .000 | .866 | 124 | .022 |

a. Significance Correction

*Source*: Survey Data (2023)

From the findings, the sig value of demand of houses was 0.042, the sig value of economic growth was 0.035, the sig value of mortgage rates was 0.017 while the sig value of demographics was 0.022. Since the sig value for all the variables was less than 0.05 and the VIF was not more than 10 therefore data was normally distributed

### 4.7 Regression Analysis

An analysis of regression was performed to determine how a dependent variable affects one or more independent factors.

### 4.7.1 Demand of Houses on Volatility of Housing Prices

The study conducted simple regression on the influence of housing demand on volatility of housing prices in Nakuru and Kiambu counties and findings were revealed in table 18

**Table 18**

*Model Summary on Demand of Houses as Predictor*

| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate |
|---|---|---|---|---|
| 1 | .443[a] | .196 | .183 | .370 |

a. Predictors: (Constant), Demand of Houses
b. Dependent Variable: Volatility of housing prices in Nakuru and Kiambu Counties

The study used R-squared value to measure the percentage influence of the demand of houses on volatility of housing prices in Nakuru and Kiambu Counties. The demand for homes in Nakuru and Kiambu Counties, Kenya, accounts for 19.6% of the fluctuation in housing prices volatility, according to this study's R-squared of 0.197. The results were consistent with those of Kuriakose and Seetharaman (2018), who discovered that housing demand had a strong positive impact on price volatility, suggesting that an increase in demand resulted in higher price volatility for homes.

The researcher performed a variance analysis (ANOVA) assessment to evaluate the statistical implication of the simple regression model between housing demand and volatility of housing prices in Nakuru and Kiambu Counties. The finding are as indicated in Table 19

**Table 19**

*ANOVA for Demand of Houses*

| Model | | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| 1 | Regression | 9.236 | 1 | 9.236 | 29.698 | .000[b] |
| | Residual | 37.886 | 122 | 0.311 | | |
| | Total | 47.122 | 123 | | | |

*a. Predictors: (Constant), Demand of Houses*
*b. Dependent Variable: Volatility of housing prices in Nakuru and Kiambu Counties*

The classical suited the data, as the F-Value of (29.698) was important at (0.000) the influence of demand of houses on volatility of housing prices in Nakuru and Kiambu Counties in Kenya.

The study further conducted regression coefficient analysis to generate a simple regression model on the influence of demand of houses on volatility of housing prices in Nakuru and Kiambu Counties. Table 20 shows results.

**Table 20**
*Effect of Demand of Houses Regression Coefficients*

| | Unstandardized Coefficients | | Standardized Coefficients | | |
|---|---|---|---|---|---|
| Model | B | Std. Error | Beta | **t** | Sig. |
| (Constant) | 2.026 | .420 | | 4.824 | .000 |
| Demand of Houses | .596 | .107 | .548 | 5.570 | .013 |

*Dependent Variable: Volatility of housing prices in Nakuru and Kiambu Counties.*

In Nakuru and Kiambu counties in Kenya, a unit shift in housing demand would cause 0.596 times the volatility of housing prices. t=5.570, p=0.013 which suggested the

classical was statistically significant in explaining the influence of demand of houses on volatility of housing prices in Nakuru and Kiambu Counties. The discoveries agree with a investigation by Xu et al. (2021) which instituted out that there is a bidirectional causality between the two, indicating that changes in housing demand and price volatility can influence each other over time. From the output the simple regression model for the influence of demand of houses on volatility of housing prices in Nakuru and Kiambu Counties was

$Y = 2.026 + 0.596X_1$

### 4.7.2 Economic Growth on Volatility of Housing Prices

The study conducted simple regression on the influence of economic growth on volatility of housing prices in Nakuru and Kiambu counties. The exam led a model summary to determine the proportion of the variance in the volatility of housing prices in Nakuru and Kiambu Counties and the findings are shown in table 21

**Table 21**

*Model Summary of Economic Growth as Predictor*

| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate |
|---|---|---|---|---|
| 1 | .441[a] | .194 | .180 | .3376 |

*a. Predictors: (Constant), Economic Growth*

*b. Dependent Variable: Volatility of housing prices in Nakuru and Kiambu Counties.*

*Source*: Survey Data (2023)

The study measured the percentage impact of economic growth on housing price volatility in Nakuru and Kiambu Counties using R-squared value. This study's R-squared was 0.194, indicating that economic growth explained 19.4% of home price volatility in

Kenya's Nakuru and Kiambu counties. The findings are similar with Lin, Wang, and Wu (2020) who found out economic growth could lead to housing price bubbles, which could result in financial instability.

ANOVA was utilized to investigate the statistical implication of the simple regression model between economic growth and housing price volatility in Nakuru and Kiambu Counties. The finding is indicated in Table 22

**Table 22**

*ANOVA for Effect Economic Growth*

| Model | | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| 1 | Regression | 8.654 | 1 | 8.654 | 29.336 | .000[b] |
| | Residual | 35.954 | 122 | .295 | | |
| | Total | 44.608 | 123 | | | |

*a. Predictors: (Constant), Economic Growth*

*b. Dependent Variable: Volatility of housing prices in Nakuru and Kiambu Counties*

*Source:* Survey Data (2023**)**

According to the results, the F-Value of (29.336) was significant at (0.000), indicating that the model was accurate in forecasting how economic growth will affect the volatility of property prices in Kenya's Nakuru and Kiambu counties.

The study further conducted regression coefficient analysis to generate a simple regression model on the influence of economic growth on volatility of housing prices in Nakuru and Kiambu Counties. The finding is indicated in Table 23.

**Table 23**

*Regression Coefficients for the Influence of Economic Growth on Volatility of Housing Prices*

| | Unstandardized Coefficients | | Standardized Coefficients | | |
|---|---|---|---|---|---|
| Model | B | Std. Error | Beta | t | Sig. |
| (Constant) | 5.664 | 1.629 | | 3.477 | .002 |
| Economic Growth | .233 | .081 | .245 | 2.877 | .006 |

*Dependent Variable: Volatility of housing prices in Nakuru and Kiambu Counties.*

*Source*: Survey Data (2023)

The findings indicated that a single change in economic growth would result to 0.233 times change in volatility of housing prices in Nakuru and Kiambu Counties in Kenya. t=2.877, p=0.05 which implied that the model was statistically significant in explaining the influence of economic growth on volatility of housing prices in Nakuru and Kiambu Counties. The answers matched with Bouri, Gupta, and Tiwari (2018) which instituted that economic growth significantly affected the volatility of housing prices, particularly during economic downturns. From the output the simple regression model for the influence of economic growth on volatility of housing prices in Nakuru and Kiambu Counties was

$Y = 5.664 + 0.233X_2$

### 4.7.3 Mortgage Rates on Volatility of Housing Prices

The study conducted simple regression on the effect of mortgage rates on volatility of housing prices in Nakuru and Kiambu counties and the finding are as shown in Table 24.

**Table 24**

*Model Summary with Mortgage Rates as Predictor*

| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate |
|---|---|---|---|---|
| 1 | .400a | .160 | .073 | 1.47346 |

*a. Predictors: (Constant), Mortgage Rates*

*b. Dependent Variable: Volatility of housing prices in Nakuru and Kiambu Counties*

*Source*: Survey Data (2023)

The investigation used R-squared value to portion the percentage influence of the mortgage rates on volatility of housing prices in Nakuru and Kiambu Counties. Mortgage rates explain 16% of house price volatility in Kenya's Nakuru and Kiambu counties, according to this study's R-squared of 0.160. According to Park, Park, and Cho (2019), mortgage rates significantly affected house prices, with higher rates lowering prices.

The investigation also conducted an ANOVA test to assess the statistical relevance of the simple regression model between mortgage rates and volatility of housing prices in Nakuru and Kiambu Counties. The finding is indicated in Table 25.

**Table 25**

***ANOVA for Mortgage Rates***

| Model | | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| 1 | Regression | 11.994 | 1 | 11.994 | 23.2441 | .000[b] |
| | Residual | 62.961 | 122 | .516 | | |
| | Total | 74.955 | 123 | | | |

*a. Predictors: (Constant), Mortgage Rates*

*b. Dependent Variable: Volatility of housing prices in Nakuru and Kiambu Counties*

*Source*: Survey Data (2023)

The F-Value of (23.2441) was noteworthy at (0.000), proving the model's ability to make accurate predictions Mortgage Rates on Volatility of housing prices in Nakuru and Kiambu Counties in Kenya.

The study further conducted regression coefficient analysis to generate a simple regression model on the influence of mortgage rates on volatility of housing prices in Nakuru and Kiambu Counties. The findings are indicated in Table 26.

**Table 26**

*Regression Coefficients for Effect of Mortgage Rates*

| | Unstandardized Coefficients | | Standardized Coefficients | | |
|---|---|---|---|---|---|
| Model | B | Std. Error | Beta | t | Sig. |
| (Constant) | 3.951 | 1.274 | | 3.102 | .004 |
| Mortgage Rates | .286 | .346 | .421 | 0.827 | .022 |

*Dependent Variable: Volatility of housing prices in Nakuru and Kiambu Counties.*

*Source*: Survey Data (2023)

The findings indicated a single change in mortgage rate could result to 0.286 times change in volatility of housing prices in Nakuru and Kiambu Counties in Kenya. There was statistical significance (t = 0.827, p=0.22) which implied that the model was statistically significant in explaining the influence of mortgage rate on volatility of housing prices in Nakuru and Kiambu Counties. The findings agreed with a study by Alkhathlan and Alsultan (2020) who found out that higher mortgage rates lower housing costs. From the output the simple regression model for the influence of mortgage rate on volatility of housing prices in Nakuru and Kiambu Counties was $Y = 3.951 + 0.286X_{3.}$

### 4.7.4 Demographics characteristics on Volatility of Housing Prices

The study conducted simple regression on the influence of demographics characteristics on volatility of housing prices in Nakuru and Kiambu counties and the findings is shown in Table 27.

**Table 27**

*Model Summary with Demographic characteristics as Predictor*

| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate |
|---|---|---|---|---|
| 1 | .395[a] | 0.156 | .141 | .000 |

*a. Predictors: (Constant), Demographic characteristics*

*b. Dependent Variable: Volatility of housing prices in Nakuru and Kiambu Counties*

*Source*: Survey Data (2023)

The study used R-squared value to measure the percentage influence of the demographic characteristics on volatility of housing prices in Nakuru and Kiambu Counties. The R-squared of 0.156 was obtained. Therefore, demographic characteristics explained 15.6% of housing price volatility in Kenya's Nakuru and Kiambu counties. This is also supported by Baker and Waddell (2018) who discovered that median household income increased median property prices.

The study also showed an examination of discrepancy (ANOVA) test to assess the statistical importance of the simple regression model between demographic characteristics and volatility of housing prices in Nakuru and Kiambu Counties. The finding is as indicated in Table 28

**Table 28**

*ANOVA for Effect of Demographics characteristics*

| Model | | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| 1 | Regression | 5.365 | 1 | 5.365 | 22.542 | .000[b] |
| | Residual | 29.026 | 122 | .238 | | |
| | Total | 34.391 | 123 | | | |

*a. Predictors: (Constant), Demographics characteristics*

*b. Dependent Variable: Volatility of housing prices in Nakuru and Kiambu Counties.*

*Source*: Survey Data (2023)

The model was fit to forecast the effect of demographic characteristics on housing price volatility in Nakuru and Kiambu Counties in Kenya, as the F-Value of (22.542) was significant at (0.000).

The study further conducted regression coefficient analysis to generate a simple regression model on the influence of demographic characteristics on volatility of housing prices in Nakuru and Kiambu Counties. The answers are indicated in Table 29.

**Table 29**

*Regression Coefficients for Effect of Mortgage Rates*

| Model | Unstandardized Coefficients | | Standardized Coefficients | | **Sig.** |
|---|---|---|---|---|---|
| | B | Std. Error | Beta | **t** | |
| (Constant) | 3.564 | .420 | | 8.486 | .000 |
| Mortgage Rates | -.241 | .147 | .421 | -1.640 | .042 |

*Dependent Variable: Volatility of housing prices in Nakuru and Kiambu Counties.*

*Source*: Survey Data (2023)

The findings indicated one change in mortgage rate resulted to 0.241 times change in volatility of housing prices in Nakuru and Kiambu Counties in Kenya. The significance level was greater than 0.05, since the t-value was 1.640 which implied the model was statistically significant in explaining the influence of mortgage rate on volatility of housing prices in Nakuru and Kiambu Counties. From the output the simple regression model for the influence of demographics characteristics on volatility of housing prices in Nakuru and Kiambu Counties was

$Y = 3.564 - 0.241X_4$

### 4.8 Correlation Analysis

The researcher conducted a Pearson's correlation analysis to determine the influence of selected economic factors on volatility of housing prices in Nakuru and Kiambu Counties, Kenya. The findings are indicated in Table 30.

**Table 30**

*Correlation Analysis*

| | | Demand of Houses | Economic Growth | Mortgage Rates | Volatility of housing prices |
|---|---|---|---|---|---|
| Demand of Houses | Pearson Correlation | 1 | | | |
| | Sig. (2-tailed) | | | | |
| | N | 124 | | | |
| Economic Growth | Pearson Correlation | .659** | 1 | | |
| | Sig. (2-tailed) | .002 | | | |
| | N | 124 | 124 | | |
| Mortgage Rates | Pearson Correlation | .109 | .042 | 1 | |
| | Sig. (2-tailed) | .647 | .860 | | |
| | N | 124 | 124 | 124 | |
| Demographic characteristics | Pearson Correlation | .739** | .742** | -.052 | 1 |
| | Sig. (2-tailed) | .000 | .000 | .827 | |
| | N | 124 | 124 | 124 | 124 |
| Volatility of housing prices | Pearson Correlation | .382** | .547** | .394** | .572** |
| | Sig. (2-tailed) | .002 | .026 | .003 | .033 |
| | N | 124 | 124 | 124 | 124 |

*Source*: Survey Data (2023)

The study sought to determine the relationship between demand of house and volatility of housing prices in Nakuru and Kiambu Counties. The results showed a moderate relationship between demand of house and volatility of housing prices in Nakuru and Kiambu Counties ($r=.382$ and $p<0.05$). The findings are in line with those of Dusansky & Koç, (2019) who argue that the type of housing can also affect demand and, in turn, prices. For example, demand for luxury homes may be higher than demand for affordable homes, leading to higher prices for luxury homes.

Additionally, the research examined the relationship between economic growth and volatility of housing prices in Nakuru and Kiambu counties. The findings revealed that there was strong significant positive relationship between economic growth and volatility of housing prices in Nakuru and Kiambu counties ($r=0.547$ and $p<0.05$). The findings are in line with those of Jimmy (2017) who argue that a positive effect on wealth makes property owners feel richer therefore they spend more. On the contrary, when the prices slump, the wealth effect is negative thus the disposable income is reduced.

Additionally, the research aimed to ascertain the relationship between mortgage rates and volatility of housing prices in Nakuru and Kiambu Counties. The result indicated that there was significant positive relationship between mortgage rates and volatility of housing prices in Nakuru and Kiambu Counties ($r=0.394$ and $p<0.05$). The findings are supported by a study by Damen (2017) who argue that when mortgage credit is readily available, more people are able to take out mortgages and purchase homes, leading to increased demand and higher prices. Conversely, when mortgage credit is tight, fewer people are able to take out mortgages, reducing demand for housing and causing prices to decrease. The study also sought to determine the relationship between demographic and volatility of housing prices in Nakuru and Kiambu Counties. The results showed there was a strong positive relationship between demographic characteristics and volatility of housing prices in Nakuru and Kiambu Counties ($r=0.572$ and $p<0.05$).

### 4.9 Overall Regression Analysis

The study led a multiple regression on the influence of economic determinants on volatility of housing prices in Nakuru and Kiambu counties and the findings is shown in Table 31.

**Table 31**

*Overall Model Summary*

| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate |
|---|---|---|---|---|
| 1 | .739[a] | .546 | .476 | .64723 |

*a. Predictors: (Constant), Demand of House, Economic Growth, Mortgage Rates and Demographic characteristics*

*b. Dependent Variable: Volatility of housing prices in Nakuru and Kiambu Counties*

*Source*: Survey Data (2023**)**

According to this study the four selected economic factors explained 54.6% of volatility of housing prices in Nakuru and Kiambu counties and thus 45.4 percent was due to other factors not considered.

ANOVA test was also done to assess the statistical significance of the multiple regression model between selected economic factors and volatility of housing prices in Nakuru and Kiambu Counties. See Table 32.

**Table 32**

*ANOVA*

| Model | | Sum of Squares | Df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| 1 | Regression | 35.713 | 4 | 8.924 | 29.452 | .000[a] |
| | Residual | 26.695 | 88 | 0.303 | | |
| | Total | 65.408 | 92 | | | |

*a. Predictors: (Constant), Demand of House, Economic Growth, Mortgage Rates and Demographics characteristics*

*b. Dependent Variable: Volatility of housing prices in Nakuru and Kiambu Counties*

*Source*: Survey data (2023)

The F statistic was 29.452 which was bigger than the F calculate. In addition, the Sig value was 0.000 which was less than 0.05 therefore the model was fit in forecasting the effect of selected economic factors on volatility of housing prices in Nakuru and Kiambu Counties in Kenya.

### 4.10 Coefficients of Variables

Further the study led a regression coefficient analysis to generate a multiple regression equation on the influence of selected economic factors on volatility of housing prices in Nakuru and Kiambu Counties. Table 33 shows results.

**Table 33**

*Regression Coefficients*

| | Unstandardized Coefficients | | Standardized Coefficients | | |
|---|---|---|---|---|---|
| Model | B | Std. Error | Beta | t | Sig. |
| (Constant) | 2.026 | .420 | | 4.824 | .000 |
| Demand of Houses | .596 | .107 | .548 | 5.570 | .013 |
| Economic Growth | .233 | .081 | .245 | 2.877 | .006 |
| Mortgage Rates | -.446 | .726 | -.229 | -.614 | .044 |
| Demographics Characteristics | .456 | .143 | .432 | 3.189 | .013 |

*Dependent Variable Volatility of housing prices in Nakuru and Kiambu Counties*

*Source*: Survey Data (2023)

The findings indicated that the t-value for demand of houses was 5.570 while the p-value was 0.013 which was less than 0.05 ($p = 0.013$) significant level. Therefore, the null hypothesis ($H_0 1$) stating that House Demand has no statistically significant influence on volatility housing prices in Nakuru and Kiambu Counties was rejected and concluded

that demand of house had statistically significant influence on volatility of housing prices in Nakuru and Kiambu Counties. Findings match with Dusansky & Koç, (2019) who argued that demand was a major factor affecting the prices of houses. The level of demand, the type of housing, and the state of the housing market can all impact prices.

In addition, the findings indicated that the t-value for economic growth was 2.877 while the significance level was lower than 0.05 (p = 0.006). Therefore, the null hypothesis ($H_0$2) stating that Economic Growth has no statistically significant influence on volatility of housing prices in Nakuru and Kiambu Counties was rejected. The study concluded that economic growth had a statistically significant influence on volatility of housing prices in Nakuru and Kiambu counties. The study's findings are consistent with those of Damen (2017) who argue that mortgages play a significant role in determining the prices of houses. The cost and availability of mortgages, as well as the type of mortgage, all influence demand for housing and, in turn, the prices of houses.

Furthermore, the findings indicated that the t-value for mortgage rate was - 0.614 while the p-value was 0.044 which was less than 0.05 (p = 0.044). Therefore, the null hypothesis ($H_0$3) stating that Mortgage Rate has no statistically significant influence on volatility of housing prices in Nakuru and Kiambu Counties was rejected. The researcher concluded that mortgage rates statistically affected housing price volatility. Nkoyo (2017) revealed that whereas inflation and the residential property index have a positive and negligible link, money supply and the index had a positive and significant relationship.

Finally, the findings indicated that the t-value for demographics characteristics was 3.189 while the probability level was lower than 5% (p=0.013). Thus, H04, which stated that Demographics Characteristics has no substantial influence on volatility of housing prices

in Nakuru and Kiambu Counties was rejected and the study concluded that demographic characteristics had a statistically significant influence on volatility of housing prices in Nakuru and Kiambu counties. The study's results confirmed those of Nkoyo, (2017) which found that while there was a positive and significant link between the money supply and the residential property index, there was a positive but negligible association between inflation and the residential property index. The study is also supported by the findings of Haiyan, Zhang, and Yumin (2017) who discovered that demographic structures were significant influences on housing consumption: CDR, education, and family size decrease housing consumption, whereas urbanization rate and ODR increase it; Through deposit, CDR increases housing consumption, while ODR decreases it. In certain ways, the central and western regions are close, but the eastern region is very different.

Each of the research's predictive variables were found to have a positive effect on housing volatility in prices in Nakuru and Kiambu counties. Thus,

$$Y = 2.026 + 0.596X_1 + 0.233X_2 - 0.446X_3 + 0.456X_4$$

# CHAPTER FIVE

# SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

## 5.1 Introduction

This part reviews the study's main findings, conclusions, and discusses implications. It concludes with many study areas and suggestions. This study examined how economic factors affect home price volatility in Nakuru and Kiambu counties.

## 5.2 Summary of the Major Findings

The goal of the investigation was to compile a summary of its key findings. The summary was divided into categories based on specific goals.

### 5.2.1 Housing Demand on Volatility of Housing Prices

From the analysis the study found that housing demand had been rising for five years. The study also found that the demand for houses depended on its proximity to basic infrastructure such as tarmac road. Moreover, the study found that the demand of houses closes to basic socio amenities such as good road network was usually high which made the prices of houses along these facilities to go high. The study further found that high demand of houses resulted to reduced competition and consequently increased. High demand for a particular type of house resulted to a rise in the charges of that category of house. The findings indicated that the p-value was less than a 0.05 chance of that happening, hence the study rejected the first null hypothesis and concluded that housing demand affected housing price volatility in Nakuru and Kiambu Counties.

### 5.2.2 Economic Growth on Volatility of Housing Prices

From the analysis the study revealed that development of infrastructural projects such as roads resulted to housing price inflation. In addition, the study revealed that high inflation resulted to a rise in the price of construction supplies which consequently resulted to an increase in the prices of houses. The study also revealed that high property taxes could increase the cost of building which led to lower demand and lower prices for homes. Moreover, the study revealed that high capital gains taxes reduce the amount of profit which discouraged investors leading to higher prices. In addition, the findings indicated that the Since the p-value was less than 0.05, the study indicated that economic growth significantly affected the volatility of housing prices in Nakuru and Kiambu counties, thereby rejecting the subsequent null hypothesis.

### 5.2.3 Mortgage Rate on Volatility of Housing Prices

From the findings, the study revealed that there had been a gradual increase in mortgage rate for the last five years. The study also revealed that a decrease in mortgage rates resulted to an increase in demand for homes as more people could afford to buy and this resulted to an increase in the price of houses. In addition, the study revealed that an increase in mortgage rate made the houses less affordable thus reducing the demand for house which led to a decrease in housing prices with p values of less than 0.005. The study further revealed that changes in mortgage rates affected consumer confidence, which could affect demand for homes and consequently the overall prices of houses. The research confirmed what many have suspected: that higher mortgage rates led to higher overall building costs, which in turn led to higher housing prices. The study also concluded that mortgage rate significantly affects the volatility of housing prices in Nakuru and Kiambu counties. Therefore it concluded that mortgage rate had a significant

influence on the volatility of housing prices in Nakuru and Kiambu counties and rejected the null hypothesis.

### 5.2.4 Demographic Characteristics on Volatility of Housing Prices

Regarding demographic characteristics, the study revealed that there had been a gradual growth in population in the county. The study also revealed that a rise in populace could drive up demand for housing and led to higher home prices. Moreover, the study revealed that an aging population potential drop led to demand for larger homes and a shift towards smaller, more manageable properties, which could impact home prices. The study further revealed that higher incomes could lead to increased demand for more expensive homes, while lower incomes result in lower demand for housing and lower home prices. The study also revealed that whenever there was an influx of people into a particular area, demand for housing could increase and led to higher home prices. The study further revealed that an increase in single-person households, could impact the house prices and the demand for various housing options. The study found that the p-value less than the 0.05 significant level, therefore it concluded that demographics characteristics had a significant influence on the volatility of housing prices in Nakuru and Kiambu counties and rejected the fourth null hypothesis.

## 5.3 Conclusions

From these abstracts, the study draws the following conclusions:

The study concluded that high demand of houses resulted to reduced competition and consequently caused a rise in the prices of houses. The study further concluded that high demand for a particular type of houses resulted to an increase in the prices of that

category of house. The results concluded that demand of house had significant influence on volatility of housing prices in Nakuru and Kiambu Counties.

Regarding the influence of economic growth, the study concluded that high inflation resulted to increased cost of building materials which consequently caused a rise in the prices of houses. The study also concluded that high property taxes could increase the cost of building which led to lower demand and lower prices for homes. Moreover, the study concluded that high capital gains taxes reduce the amount of profit which discourages investors leading to higher prices. The findings concluded that economic growth has a significant influence on volatility of housing prices in Nakuru and Kiambu counties

From the findings on mortgage rates, the study concluded that an increase in mortgage rate made the houses less affordable thus reducing the demand for house. The study further concluded that changes in mortgage rates affected consumer confidence, which affected demand for homes and consequently the overall prices of houses. The study also concluded that an increase in mortgage rate resulted to growth in the overall cost of construction which result to an increase in the prices of houses. The result concluded that mortgage rate had a significant effect on volatility of housing prices in Nakuru and Kiambu counties

Regarding demographic characteristics, the study concluded that higher incomes could lead to increased demand for more expensive homes, while the opposite was true. The study also concluded that whenever there is an influx of people into a particular area, demand for housing could increase and led to higher home prices. Moreover, the study concluded that an increase in single-person households, could impact the desire for various housing options and, in turn, home prices. The results concluded that

demographic characteristics had a noteworthy effect on volatility of housing prices in Nakuru and Kiambu counties

## 5.4 Recommendations

From the findings the study draws the following recommendations

### 5.4.1 Policy Recommendations

The housing market is complex. Numerous local, regional, national, and international influences as well as other factors influenced housing prices. Fundamental factors like supply and demand, mortgage rates, inflation, and even economic situations are taken into consideration influencing the housing market. The researcher recommended that, to lower the housing prices the government should guarantee affordable housing to the residents and lower the interest rates imposed on the housing. Reduced property taxes could lower housing costs and make homes more affordable.

In addition to having an impact on aggregate demand, the way in which housing prices behave also had an impact on the profitability of commercial banks due to its impact on collateral values. Therefore, central banks who are responsible for preserving value and monetary firmness are particularly interested in comprehending this behavior. The Kenyan central bank should take into account the following measures in this regard:

There needs to be restriction on the high frequency of profitable banks offering expanded admission to price related with the rise in home prices since housing prices affected households' debt levels. In other words, during periods of a housing boom, Commercial banks needed more central bank oversight. The rise in property values corresponded with a time when borrowing against real estate was usually better. The purpose of supervision is to make sure that banks have enough liquid assets and that the risk of non-performing

loans is minimized. The stability of the financial industry is at danger due to the dynamic relationship between home prices and household debt since borrowers' profit from greater loan-to-value ratios brought on by rising housing prices.

The National and the county government, through its tax authority Kenya Revenue Authority, should consider the effect of taxation of mortgages to lower the prices of the houses and encourage investors to invest in real estate. Too much interest is charged on real estates. The results of this study should be used by managers of real estate firms and investors who want to launch real estate firms to determine which elements to take into account when dealing with operational details of their real estate in order to optimize earnings.

### 5.5 Suggestions for Further Research

The scholar proposed that another investigation on the influence of different taxes on the volatility of housing prices since the study concentrated on the selected economic factors influencing the volatility of housing prices. The researcher also recommended that, in order to generalize the findings, a comparative study be carried out in various counties. Finally, the researcher recommends that study be carried out on all property developer member as this study was only limited to 26 Kenya Properties Developers Association members

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## APPENDICES

**Appendix I:** Questionnaire

Dear respondent,

I'm a Kabarak University postgrad student undertaking a study on the "***INFLUENCE OF SELECTED ECONOMIC FACTORS ON VOLATILITY OF HOUSING PRICES BETWEEN NAKURU AND KIAMBU COUNTIE, KENYA"*** I am requesting help with the questionnaires. I promise to keep your information confidential and use it just for this study.

**Section A. Consumer Details**

1. What is the gender of the consumer?

Male [ ]

Female [ ]

2. What is the consumer's age category?

20-30 years [ ]

31-40 years [ ]

41-50 years [ ]

50 years and above [ ]

3. Highest education qualification attained by consumer

Post Graduate [ ]

Under Graduate [ ]

Diploma [ ]

Professional Certificate [ ]

4. How long has the consumer been working ?

Below 1 Year [ ]

2-5 years [ ]

6-10 years [ ]

Above 10 years [ ]

5. How long has this organization been in existence?

Below 1 Year [ ]

2-5 years [ ]

6-10 years [ ]

Above 10 years [ ]

**Section B: Influence of Demand of Houses on Volatility of Housing Prices**

4. Indicate your degree of agreement using a scale from 1 to 5, where 1 means strongly disagree, 2 means disagree, 3 means neutral, 4 means agree, and 5 means strongly agree on the influence of demand of house on volatility of housing prices in Nakuru and Kiambu Counties.

| | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| House demand has been rising for five years. | | | | | |
| The demand for houses depends on their proximity to basic infrastructure such as tarmac road ,schools, water and sewage | | | | | |
| The demand of houses closes to basic socio amenities such as good road network is usually high which make the prices of houses along this facility to go high | | | | | |
| High demand of houses result to reduced competition and consequently result to a growth in the charges of houses | | | | | |
| High demand for a particular type of houses result to an increase in the prices of that category of house | | | | | |

**Section C: Influence of Economic Growth on volatility of housing prices in Nakuru and Kiambu counties**

5. How much do you agree with this statement? Please rate your agreement with this statement on a scale from 1 (strongly disagree) to 5 (strongly agree) on the influence of economic growth on volatility of housing prices in Nakuru and Kiambu Counties

| | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| Development of infrastructural projects such as transport system, school system, water result to a rise in the prices of houses | | | | | |
| An increase in the number of businesses causes a rise in home values | | | | | |
| High inflation results to raise building solid prices which consequently result to growth in house prices | | | | | |
| High property taxes can increase the cost of building which lead to lower demand and lower prices for homes. | | | | | |
| High capital gains taxes reduce the amount of profit which discourages investors leading to higher prices. | | | | | |
| An increase in GDP result to higher income therefore raising property demand as well as prices. | | | | | |

**Section D: Influence of Mortgage Rates on Volatility of Housing Prices**

6. Indicate your degree of agreement using a scale from 1 to 5, where 1 means strongly disagree, 2 means disagree, 3 means neutral, 4 means agree, and 5 means strongly agree on the influence of Mortgage Rates on volatility of housing prices in Nakuru and Kiambu Counties.

| | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| There has been a gradual increase in mortgage rate for the last five years | | | | | |
| Low mortgage rates result to a growth in demand for homes as more people can afford to buy this result to growth in the price of houses | | | | | |
| High mortgage rates make the houses less affordable thus reducing the request for house which lead to a decline in housing prices | | | | | |
| Changes in mortgage rates affect consumer confidence, which can affect demand for homes and consequently the overall prices of houses | | | | | |
| An increase in mortgage rate result to rise in the overall cost of construction which result to a rise in the prices of houses | | | | | |

**Section D: Influence of Demographics on Volatility of Housing Prices**

6. How much do you agree with this statement? Please rate your agreement with this statement on a scale from 1 (strongly disagree) to 5 (strongly agree) on the influence of demographic on volatility of housing prices in Nakuru and Kiambu Counties.

| | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| There has been a gradual growth in population in the county | | | | | |
| Population growth might raise the need for living space and lead to higher home prices | | | | | |
| An aging population potential drop in demand for larger homes and a shift towards smaller, more manageable properties, which can impact home prices. | | | | | |
| Higher incomes can lead to increased demand for more expensive homes, while lower incomes can result in lower demand for housing and lower home prices | | | | | |
| Whenever there is an influx of people into a particular area, demand for housing can increase and lead to higher home prices. | | | | | |
| An increase in single-person households, can impact the demand for different types of homes and, in turn, home prices. | | | | | |

**Section E: Volatility of Housing Prices**

7. Indicate your degree of agreement using a scale from 1 to 5, where 1 means strongly disagree, 2 means disagree, 3 means neutral, 4 means agree, and 5 means strongly agree on the following aspects of volatility of housing prices.

| | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| There has been a constant growth in the prices of houses | | | | | |
| There has been a gradual growth of unit of sales of houses | | | | | |
| The charges of houses are highly predictable | | | | | |
| The charges of house are rarely affected by both external and internal factors | | | | | |
| The number of investors venturing into housing business has grown due to gradual rise in the prices of houses | | | | | |

**Appendix II:** KUREC Clearance

**KABARAK UNIVERSITY RESEARCH ETHICS COMMITTEE**

**Private Bag - 20157**
**KABARAK, KENYA**
**Email: kurec@kabarak.ac.ke**

**Tel: 254-51-343234/5**
**Fax: 254-051-343529**
**www.kabarak.ac.ke**

**OUR REF: KABU01/KUREC/001/09/06/21**

**28th June, 2021**

Rabecca Shivachi,
Kabarak University,

Dear Rabecca,

**SUBJECT: ETHICS REVIEW DECISION**

Kabarak University Research Ethics Committee (KUREC) received application for a protocol titled "COMPARATIVE ANALYSIS OF THE INFLUENCE OF ECONOMIC DETERMINANTS ON VOLATILITY OF HOUSING PRICES BETWEEN NAKURU AND KIAMBU COUNTY" on 13th May, 2021. The protocol was reviewed and discussed during a virtual meeting held on 7th June, 2021 at 1000 Hours. The committee considered the application in accordance with the Kabarak University procedures on review of research protocols for ethical clearance and decided as follows:

1. **PROPOSED STUDY SITE**

   NAKURU and KIAMBU COUNTY

2. **KUREC DECISION**

   **Approved** for data collection for a minimum period of ONE year from 28th June, 2021

This approval is subject to the following conditions:

i. The researcher shall obtain a RESEARCH PERMIT from NACOSTI before commencement of data collection & submit a copy to the Kabarak University Institute of Postgraduate Studies (IPGS);
ii. The researcher shall immediately notify KUREC in case of any adjustments to the protocol;
iii. The researcher shall within 7 days of occurrence notify KUREC of any adverse events associated with the conduct of this study;
iv. The researcher shall apply for extension of the study period should the initial 1 year expire before completion of data collection;
v. The researcher shall submit study progress reports to KUREC after every 6 months and a full report at completion of the study/project

Thank you.

Sincerely,

KABARAK UNIVERSITY
INSTITUTIONAL RESEARCH ETHICS COMMITTEE
28 JUN 2021
APPROVED
P.O. PRIVATE BAG - 20157, KABARAK

**Prof. Jackson Kitetu PhD.**
KUREC-Chairman

Cc Vice Chancellor
DVC-Academic & Research
Registrar-Academic & Research
Director-Research Innovation & Outreach
Institute of Post Graduate Studies

**Appendix III:** NACOSTI Research Permit

REPUBLIC OF KENYA

NATIONAL COMMISSION FOR SCIENCE,TECHNOLOGY & INNOVATION

Ref No: **363856**

Date of Issue: **30/July/2021**

**RESEARCH LICENSE**

**This is to Certify that Miss.. Rabecca Avikoshe Shivachi of Kabarak University, has been licensed to conduct research in Kiambu, Nakuru on the topic: COMPARATIVE ANALYSIS OF THE INFLUENCE OF ECONOMIC DETERMINANTS ON VOLATILITY OF HOUSING PRICES BETWEEN NAKURU AND KIAMBU COUNTIES for the period ending : 30/July/2022.**

License No: **NACOSTI/P/21/12110**

**363856**

Applicant Identification Number

Director General
NATIONAL COMMISSION FOR SCIENCE,TECHNOLOGY & INNOVATION

Verification QR Code

NOTE: This is a computer generated License. To verify the authenticity of this document, Scan the QR Code using QR scanner application.

**Appendix IV:** List of Publication

**International Journal of Economics, Commerce and Management**
United Kingdom ISSN 2348 0386 Vol. 11, Issue 11, Nov 2023

*https://ijecm.co.uk/*

# THE INFLUENCE OF HOUSE DEMAND ON VOLATILITY OF HOUSING PRICES IN NAKURU AND KIAMBU COUNTIES, KENYA

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School of Business and Economics, Kabarak University, Kenya

**Paul Muoki Nzioki**
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**Abstract**

The housing market in Nakuru and Kiambu counties has experienced fluctuations in property prices over recent years, creating uncertainty for homeowners, prospective buyers, and real estate investors therefore the study sought to assess the influence of house demand on volatility of housing prices in Nakuru and Kiambu counties. The study was anchored on perfect competitive theory. The study adopted a descriptive research design. The population of this study was 600 managers from 26 Kenya property developer association members who have developed properties in both Nakuru and Kiambu counties, Kenya. The study adopted a simple random sampling and Nassiuma's formula to determine a sample size of 164 managers. The research data collected primary data using questionnaires. Piloting was done in Nairobi City County where 17 questionnaires were administered to managers of Kenya property developer association. The reliability was determined using Cronbach's alpha test whereby the alpha value of all the study variables were in the range of 0.7 to 0.9 implying that the instrument was reliable. Both descriptive and inferential statistics was adopted. Descriptive statistics was employed in the study using percentages, frequencies, measures of central tendencies and measures of dispersion. Inferential statistics comprised correlation and regression analysis. The

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**Appendix V:** Conference Participation

**Appendix VI:** Kenya Property Development Association Members Under Study

| No. | Company Name | KPDA Category of Membership |
|---|---|---|
| 1 | Acorn Management Services Ltd | Corporate |
| 2 | Amazon Projects Ltd | Corporate |
| 3 | AMS Properties Ltd | Corporate |
| 4 | Bahati Ridge Development Ltd | Corporate |
| 5 | Blueline Properties Ltd | Corporate |
| 6 | BuildX Studio | Corporate |
| 7 | Canaan Developers | Platinum |
| 8 | Chigwell Holdings Ltd | Corporate |
| 9 | Coral Property International Ltd | Corporate |
| 10 | Daykio Plantations Ltd | Corporate |
| 11 | Dunhill Consulting Ltd | Corporate |
| 12 | Fairdeal Development & Infrastructure Ltd | Corporate |
| 13 | Fedha (Management) Ltd | Corporate |
| 14 | Golden Compass Ltd | Corporate |
| 15 | Hass Consult Ltd | Corporate |
| 16 | Kings Developers Ltd | Corporate |
| 17 | Koibatek Ltd | Corporate |
| 18 | MML Turner & Townsend | Corporate |
| 19 | Natureville Homes | Corporate |
| 20 | Optiven Ltd | Corporate |
| 21 | PDM (Kenya) Ltd | Corporate |
| 22 | Pioneer Holdings (Africa) Ltd | Corporate |
| 23 | Superior Homes Kenya Ltd | Corporate |
| 24 | Tatu City Ltd | Corporate |
| 25 | Tilisi Developments Ltd | Corporate |
| 26 | Unity Homes Ltd | Corporate |

**Appendix V:** Informed Consent

KABARAK UNIVERSITY RESEARCH ETHICS COMMITTEE

ADULT INFORMED CONSENT FORM (TEMPLATE)

*(The form is written in English language but can be translated to Kiswahili or any other appropriate language)*

**Study Title INFLUENCE OF SELECTED ECONOMIC FACTORS ON VOLATILITY OF HOUSING PRICES IN NAKURU AND KIAMBU COUNTIES, KENYA**

PI . Avikoshe Rebecah

Affiliated Institution Kabarak University

Co-investigator(s)1. Dr. Nehemiah kiplagat 2. Prof. Paul Muoki Nzioki Affiliated Institution(s) 1. Kabarak University 2. Murang'a University

---

**INTRODUCTION**

You are invited to participate in this research study being undertaken by the above listed investigators. This form will help you gather information about the study so that you can voluntarily decide whether you want to participate or not. You are encouraged to ask any question regarding the research process as well as any benefit or risk that you may accrue by participating. After you have adequately been informed about the study, you will be requested to either agree or decline to participate. Upon agreeing to participate in the study, you will be further requested to affirm that by appending your signature/thumbprint on this form. Accepting or declining to participate in this study does not in any way waive the following rights which you're entitled to:

a. Voluntary participation in the study
b. Withdrawing from the study at any time without the obligation of having to give an explanation and;
c. Access to services which you're entitled to

A copy of this form will be provided to you for your own records, should I continue YES/NO_____

This study has been reviewed and approved by Kabarak University Research Ethics Committee (KUREC)

**What is the Purpose of the Study?**

The main reason(s) for conducting this study is to answer the following questions:

i. To establish the influence of housing demand on volatility of housing prices in Nakuru and Kiambu Counties
ii. To determine the influence of economic growth on volatility of housing prices in Nakuru and Kiambu Counties
iii. To evaluate the effect of mortgage rate on volatility of housing prices in Nakuru and Kiambu Counties
iv. To assess the influence of demographic characteristics on volatility of housing prices in Nakuru and Kiambu Counties

**Who can Take Part** in the Study? *Outline the inclusion and exclusion criteria*

The study targeted a population of 600 sales managers from Kenya Property Developers association who had developed both Nakuru and Kiambu Counties in a minimum period of 10 years with a target population of 600 and a sample of 164 sales managers. Those who had developed in both Nakuru and Kiambu county and had not developed for more than 10 years were excluded in the study.

*Specify the sample size*

The study participants will be the 164 sales managers from the 26 Kenya properties developers in Nakuru and Kiambu Counties

**In Case You Agree to Participate in the Study, What Will Happen?**

This is what is going to happen once you have agreed to participate in the study:

- *First, include a statement about the time commitments of the research for the participant including both the duration of the research and follow-up, if relevant.*

This research will have you commit your time to answer questions from the research assistant and researcher from a prepared questionnaire. Follow up questions to clarify a point may also be required. All your responses will be treated with utmost good faith and will not be divulged to any third party. The research will take a period of two weeks

.....
.....
.....

- *Second, a qualified and well-trained interviewer will ask you questions in a private place where you will feel comfortable. In case there is any question you feel uncomfortable responding to, you will not be coerced to respond. The questions will be on the following areas: (list the areas below)*

  i. Housing Demand
  ii. Economic Growth
  iii. Mortgage Rate O
  iv. Demographic Characteristics

.....

.....

- *Third, after the interview, the following procedures will be done {detailed information on any procedures to be undertaken by the investigator(s)}*

After the collection of your responses to the interview questions, the data gotten will be analyzed using scientific methods called SPSS version 25, using descriptive and inferential statistics. These data will then be presented in pie charts, graphs and summative conclusions and a copy of the findings and summaries sent to you.

.....
.....

- *Last, you are requested to provide your contact details (phone number or any other reliable form of contact). This will help reach you in case new information regarding the study emerges. Other reason(s) for requesting your contact details is (are)*

In case of follow up clarifications, we will need your full-time contacts.

- *The contact details you will provide shall remain confidential to the lead researcher (PI).*

**What Potential Risks are Associated with Participation in this Study?**

Any research involving human subjects has the potential of imposing a number of risks/harms or discomfort including psychological, physical, emotional, environmental, cultural etc.

{*The risks depend upon the nature and type of study and the interventions. State and explain the risk to the participant. Explain to the participant how this risk will be mitigated*}

*Participation in this study doesn't pose any kind of risk or harm*

.....

.....

**Privacy & Confidentiality**

Privacy is the right of an individual to have some control over how his or her personal information/data is collected, used, and/or disclosed. Confidentiality is the duty to ensure information (data) is kept secret only to the extent possible/reasonable. {*Explain to the participants how privacy and confidentiality will be upheld. Explain to the participant any extra precautions, you will take to ensure safety and anonymity. How well data will be handled and after how long will the data be discarded and how the data will be discarded*}

The respondent's information will be kept private by employing numbers method to keep their identities confidential. Their records will be kept secure using password protected files, encryption when sending the information over the internet and use of lockable cabinets and drawers for bound paper work

*In case you aren't comfortable answering any of the questions during the interview because of feeling embarrassed or uncomfortable, it will be within your rights to decline. Otherwise, every measure has been taken to ensure that the interview is conducted in a private area with minimal to no interference so that you feel comfortable.*

*In case of clinical procedures:* You may experience some discomfort/pain after {*State the procedure*}

**No clinical procedure involved**_____. This may even cause some {*state the effects of the procedure*}

If at all you suffer any injury, illness or complication(s) by participating in this study, kindly contact us immediately using the contact details provided at the bottom of this form. you will be attended to by the study clinician and if there is need for further assessment or treatment you will be referred accordingly

**What Benefits are you Going to Accrue by Participating in the Study**

{*Benefits may be divided into benefits to the individual, benefits to the community in which the individual resides, and benefits to society as a whole as a result of finding an answer to the research question. Mention those that will be actual benefits not entitlements*}

{*Highlight the significance of the study*}

First housing ministry will profit from this study in that, it will better comprehend the housing market and, as a result, direct the distribution of desired products to the customers at the precise time.

Secondly the findings are significant to investors as they would have accurate data and investment decisions would be better supported. Specifically, speculators would be aware of the important considerations while making housing investment decisions

Lastly the study results will relevant to other researchers willing to conduct study on price volatility of the housing as it will add knowledge on the empirical review, theoretical review and conceptual reviews.

**What Will it Cost You to Participate in the Study?**

{*Will the participant incur any cost in order to participate in the study? Explain it clearly to the participant*}

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Participation will be cost free. All the attendant costs including stationery and internet fees will be catered for by the researcher. The respondent will only be required to avail himself at his venue of choice.

**Will Any Expenditure that You Incur by Participating in the Study be Refunded? Or will you be Paid for Participating in the Study?** {*Explain clearly to the participant whether or not they will be reimbursed*}

In the unlikely circumstance that the respondent will be made to incur some expenditure (including meals, and travel), this will be reimbursed by the researcher at prevailing market rates

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**In Case I Have any Further Questions/ Concerns in Future Whom Should I Contact?**

In the event that you need further clarification or questions regarding your continued participation in the study feel free to contact the PI {*Mobile Number 0712428834, Email – rabeccashivachi@gmail.com Physical Address: Nakuru -Town East Kenyatta Avenue, P.O Box 73304, Nairobi*}. In case of concerns regarding your rights and/or obligations as a research participant do not hesitate to contact the secretary, KUREC on {*KUREC contact*}

**What Alternative Options are Available to Me?**

*The decision on whether to participate or not is absolutely voluntary. You will be free to withdraw from the study at any point during the study without providing any explanation.*

**How Will the Findings of this Study be Communicated or Shared?**

{*Provide a detailed plan of how feedback of the study findings will be given*}

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At the debriefing stage, after the research questionnaire has been administered, the researcher will provide a contact information that the participants may use to request for findings from the research. Alternatively, the researcher will provide a link to a website once the study is completed.

**Statement of Consent**

I have comprehensively read the consent form or/the information has been comprehensively read to me by the researcher. I have understood what the study is about and all the questions and concerns that I had have been responded to in a clear and concise. The study benefits and foreseeable risks have been explained to me. I totally understand that my decision to participate in this study is voluntary and I have the right to withdraw at any point during the study.

**I freely consent to participate in this study**

Signing this form does not in any way imply that I have given up the rights am entitled to as a participant

I agree to participate in this research YES_____

I agree to provide my contact details for follow-up YES_____

Participant's Name

Participant's Signature/Thumb print_____

Date _____

**----------END----------**