EFFECTS OF INFRASTRUCTURE DEVELOPMENT, HUMAN CAPITAL DEVELOPMENT, AND FOREIGN DIRECT INVESTMENT ON HOUSING IN KENYA

By

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DECLARATION

This research paper is my original work and has not been presented for a degree award in any other university.

Signed  Date 14th November 2022

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This research paper has been submitted to the Department of Economics and Development Studies, the University of Nairobi with my approval as university supervisor.

Signature  …… Date. 15/11/2022……

DEDICATION

I would like to dedicate this research paper to my parents, as your son, I cannot ask for better parents than you. I would also like to dedicate this research paper to my wife a good companion in the entire research.

ACKNOWLEDGMENT

First, I would like to thank you LORD. You LORD "gives wisdom; from Your mouth come knowledge and understanding" (Proverbs 2: 6). It is through Your wisdom that I have gained knowledge. Continue being the source of my knowledge!

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ABBREVIATIONS AND ACRONYMS

ADF	Augmented Dickey-Fuller
ARDL	Autoregressive Distributed Lag
CBK	Central Bank of Kenya
COMESA	Common Market for Eastern and Southern Africa
EAC	East African Community
EU	European Union
FDI	Foreign Direct Investment
HCD	Human Capital Development
HDI	Human Development Index
IMF	International Monetary Fund
KIPPRA	Kenya Institute for Public Policy Research and Analysis
KMRC	Kenya Mortgage Refinancing Company
KNBS	Kenya National Bureau of Statistics
KRA	Kenya Revenue Authority
NHDF	National Housing Development Fund
NHDF	National Social Security Fund
UN	United Nations
UNCTAD	United Nations Conference on Trade and Development
VECM	Vector Error Correction Model

ABSTRACT

To establish a vibrant real estate sector and facilitate the construction of affordable, modern, and efficient housing units to all Kenyans, the government should establish measures and policies that impact investors positively. Primary, this is achievable through partnership with local and foreign investors to reduce the housing cost. The initial medium-term idea (MTI, 2009-2012) of vision 2030 in Kenya was to grant 250,000 housing items per year to all income levels by the year 2012. However, the goal was not achieved since only 50,000 out of 250,000 housing units were constructed. In Kenya, housing shortages will be more profound as a result of increased population growth rates and urbanization which is not accompanied by improvements in the housing sector. Affordable housing is one of Kenya's Big 4 agendas aimed at transforming the economy of the country into a middle-income one. Therefore, the focus of this study is to suggest policies to Kenyan government and investors to solve problems of absence of sufficient housing units through evaluation of Infrastructural Development (ID), Human Capital Development (HCD), and Foreign Direct Investment (FDI) in relation to Housing in Kenya. The research will use quarterly non-stationary data for the period 2009-2020 to approximate a simple regression of housing growth rates and the chosen macroeconomic factors. This study will employ both causal and analytical design using auxiliary data from the CBK, KNBS, KIPPRA, KRA, and other Government records. Test of the unit root will be undertaken to determine stationarity of the data used using critical Dickey-Fuller where ($P<0.05$), Cointegration test is also performed to identify any existence of a relationship between the predictor variables and the predicted variable, in the long run, using Engle-Granger test($P<0.05$). Multicollinearity is performed using variance inflation factor ($VIF<10$) to identify any correlation between the predictor variables. A test of Heteroscedasticity is done to establish whether the residual term is equally distributed using the Breusch-Pagan-Godfrey test and the Durbin Watson test for serial correlation coefficient ($p<2.5$). Using documentary research, the time series data will be collected and analyzed using STATA. The findings are expected to inform the government on the initiatives, measure, and policy options to adopt in order to reduce the housing deficit in Kenya.

CHAPTER ONE
INTRODUCTION

1.1 Background

Housing is defined as the contriving and allotted utilization of buildings or houses collectively, with the intention of sheltering individuals (Ajanlekoko, 2015). Similarly (Amis & Kumar, 2010) housing refers to Buildings or structures that meet certain federal regulations for people as well as their families to dwell in (Amis & Kumar, 2010). Housing conditions differ according to geographical location, age, and families in various individuals (Fox, 2014). Various governments have several housing authorities which are sometimes referred to as housing ministries or departments (World Bank, 2015).

Some international policies that remedy the housing problems include, introducing cost-efficient regulations which enable the household to increase their borrowing (Fox, 2014), direct subsidies on the home acquisition (Nubi, 2013), and introducing a deductible tax on the mortgage interest rate. Most of the European Union countries experienced an increase in average housing costs among poor families between 2007 and 2017. Greece experienced a 90% rise in housing costs while Denmark and Bulgaria experienced 75% and 50% respectively (UNCTAD, 2017). 42% of people living below the poverty line in EU nations in 2017 were burdened by the high housing costs. The ratio increased to 63% in the Netherlands, 84%, and 91% in Denmark and Greece respectively. A similar situation also occurred outside the EU nations. According to the Housing Cost Index, Kyiv was ranked as the most expensive in Bloomberg's Global City (UNCTAD, 2017).

In Africa, there still exists an acute shortage of affordable housing since it has the highest population growth rates globally, speculated to increase from 1.2 billion individuals in 2015 to 2.5 billion individuals by 2050 (frank, 2013). However, countries like Botswana, Gabon, and Zimbabwe have registered high improvement in housing affordability whereas the Democratic Republic of Congo, Ethiopia, and South Sudan continue experiencing shortages in affordable housing (Adedayo & Sulyman, 2013).

Similarly, the East African Community (EAC) countries which include Kenya, Uganda, Tanzania, Burundi, Rwanda, and South Sudan have a total population of 172 million people

hence affordable housing remains a challenge as a result of high costs as well as expensive housing finance (EAC, 2017). However, efforts of the government and other stakeholders have increased to increase the access to finance for home acquisition. Countries such as Kenya, Rwanda, and Tanzania have formed mortgage refinance companies through the establishment of numerous affordable housing development projects. The bank of Africa and Housing Finance bank in Uganda have introduced 100% financing of housing mortgages (Salome, 2016). Housing and mortgage are predicted to grow on the condition that there is an increase in housing affordability alongside house construction as well as the finance value chain. This will positively impact the region's economic development as well as increase access to affordable housing (Kosgei, 2017).

The annual demand for housing in Kenya is approximately 250,000 units with an approximated supply of 50,000 causing a housing deficit of around 200,000 or 80% (KNBS, 2019). Affordable housing in Kenya remains a major challenge with a large population being unable to afford to buy or build their homes. Low-income families can afford only 2% of the constructed houses in the country (Everline, 2016). The total population in Kenya according to the 2019 population census is 47.6 million people out of which, approximately 26.6% reside in urban areas. Approximately, 6.4 million people in urban areas dwell in informal settlements (KNBS, 2019). Among the factors affecting economic growth in the long term, is affordable housing. However, in order to remedy the affordable housing problem, the government established the National Housing Development Fund (NHDF) and the Kenya Mortgage refinancing company (KMRC).

The review of the public-private partnership framework which enables the accommodation of new approaches such as land swaps as well as joint ventures is ongoing (Kimani & Njoroge, 2015). Improvement in living standards of people and an increase in FDI inflows in the real estate sector as well as an additional development of infrastructures especially in main cities promote a favorable condition for affordable housing (Barasa, 2016). This study will find out to what extent has the FDI Inflows in housing, Infrastructural development and human capital development affected the rates of housing development in Kenya. It is expected to inform the government on its policy formulation on housing as

well as the housing incentives that can be given to the foreigners seeking to invest in the country.

1.2 Infrastructural Development and Housing

Infrastructure is a broad term for numerous activities described as "social overhead capital" which comprises public utilities like water supply, sewerage and sanitation, telecommunication, power as well as public works such as drainage, roads, and dams (World Bank, 2015). Infrastructural development and affordable housing provision are closely related (Otegbulu and Adewunmi (2009). For affordable housing to exist, it calls for the need for infrastructural improvement.

There is a global advancement in the development of infrastructure with cities in Asia and the American continent registering an enormous improvement of sizeable infrastructure. Primarily, these sizeable infrastructures are commonly found in developing towns and cities that are currently annexation into metropolitan areas (Swerts & Denis, 2014).

A similar situation is also recorded in China, Brazil, and Europe which has recorded an increase in the construction sector with more effort being put into the expansion of the infrastructure. This in turn leads to an increase in industrial production and the creation of more job opportunities. This has created a need for better housing and improved living conditions (Sheena, 2008).

In Africa, Nigeria experiences a poor infrastructural state as well as a housing deficit of approximately 17 million for her high population which creates a burden for the masses (Wilson, Mann & Otsuki, 2015). Currently, there is an increase in building materials which has a negative effect on housing (Fafchamps, 2009). More effort is put into infrastructural development in the developed countries, however, in developing countries, there is little effort to improve the infrastructure.

Recently, Kenya has experienced a remarkable development of infrastructure between the years 2009-2019, especially in the energy, transport, and real estate sectors. This is caused by the fast-growing population causing an increase in housing demand. Demand for infrastructure is caused by an increase in foreign and local investment and the vision 2030

which is an economic blueprint that aims at making Kenya a middle-class economy by the year 2030 (UN report, 2012). Improved infrastructural development has seen Kenyan luxury housing units' prices increase significantly (Knight Frank, 2013). The value of principal houses in Nairobi increased by 25% while in the Coastal region, the value rose by 20% surpassing other major cities in the world such as London, New York, Miami, Singapore, and Shanghai (Milner & Tandrayen, 2017). This study will inform the government and research institutions on the impact of infrastructural development on housing development and affordability in Kenya.

1.3 HDI and Housing

A statistics composite indicator that estimates primary aspects of human growth and progress is called the Human Development Index (HDI) (World Bank, 2015). The three basic elements include; improved standards of living which is measured by Gross National Income per capita calibrated for the prevailing price level of a country, the life expectancy ratio, and the literacy level which include the overall enrollment ratio, general attendance ratio, and the rate of the literacy (UN-Habitat, 2017). When the three core elements are high, then the country is said to have a higher HDI (Milner & Tandrayen, 2017).

Countries in East Asia specifically Taiwan, Hong Kong, and Korea have experienced improved standards of living and affordable housing for their population as a result of huge investment in the growth and progress of human capital (Donald, 2008). Regions in Central Asia and Europe have recorded the top HDI of 0.777 with the Caribbean and Latin America recording an HDI of 0.758 (UNDP, 2018). Pacific regions and East Asia both recorded an HDI of 1.30 while Central Asia and Europe had 0.62, South Asia 1.39 (UNDP, 2018) which is linked to the better living standards and housing affordability for the citizens (Findlay & Kierzkowski, 2015).

The advancement of human capital in Africa appears to be the fundamental factor behind the development of the housing sector which makes sense to say housing sector growth rates are closely related to the improvement of human capital (Woodhall, 2010). States with the smallest HDI include the Central African Republic, Nigeria, and South Sudan respectively with HDIs of (0.388), (0.367), and (0.354) (Rastogi,2012). Similarly, regions

in the sub-Sahara had the smallest HDI of (0.537) compared to the (0.728) global HDI value in 2017 (UNDP, 2018). The high Human development index signifies a rapid rate at which someone acquires numerous skills, becomes productive, and earns a better income (Boldizzoni, 2008). Therefore, the higher the HDI the higher the living standards and vice versa (De la Fuente, & Ciccone, (2002).

Despite the Kenyan government's huge investments, the literacy rate remains low, and the health status is not healthy either (Okech & Mburu, 2011). This adversely affects the production of human capital and therefore economic growth and thus poor living conditions (Gacanja, 2012). For a long time, Kenya's education and health sectors have not earned the requisite consideration as is apparent in the high level of illiteracy and declining health among the population (Machuki 2013). Kenya had an HDI value of 0.579 in 2018 putting the country in a medium human advancement class. There is a rise in the HDI value of Kenya from 0.467 to 0.579 in the years 1990 to 2018. When the peripheral productivity is incredibly low, it results in low actual income, low savings, low investment and therefore low capital pattern which has a direct effect on housing affordability (Nasir & Iqbal, 2009). This form the basis of this conceived study which intends to examine the extent to which human capital development has affected rates of housing development within the period under study.

1.4 FDI and Housing

Bjorvatvatn (2010) defined foreign direct investment (FDI) as a long-term investment by a foreign country or corporation that has substantial influence over its implementation and income therein. In Kenya, FDI in the real estate sector, particularly the housing sector, has increased significantly in recent years in both developed and developing countries. From the middle of the 1990s to 2009, FDI inflows into China's real estate housing market amounted to approximately 10–15% of overall FDI (He et al., 2009). According to Cordero and Paus (2008), between 2000 and 2008, actual housing prices in Mexico increased by 75 percent, 78% in Hungary, 26% in China, 40% in Poland, and 45% in Tunisia. According to the data, a surge in FDI in the Real Estate industry led to an increase in home prices in beneficiary nations due to an upgrade in the housing standards into classic modern units (Cordero & Paus, 2008).

In Africa's 23 countries, countries has seen a substantial decline in FDI inflows; that is, from $19 billion to $11 billion (World Bank, 2014). In turn, this impacted negatively the housing sector of these African countries. Notably, Nigeria, Angola, Tunisia, Chad and Algeria acquired over one-half of all FDI inflows in the African continent between 2002 and 2010 (UNCTAD, 2017). In turn, this FDI inflow led to substantial growth of housing sector via establishment and construction of new telecommunication, infrastructure, and industrial facilities that sought to enhance social and economic welfare of these countries (Rusike, 2007).

Kenya was among the most preferred FDI locations in East Africa in the 1970s. In the 1970s, FDI inflows were $10 million, and by the 1980s, they had risen to $80 million (Kinuthia, 2010). Kenya got $1.6 billion in foreign direct investment in 2018, up from 1.2 billion in 2017. In 2018, the entire stock of FDI was USD 14.4 billion. FDI may have positive or adverse effect on economy, according to studies conducted throughout the years (Sylvester, 2005). Inflows of foreign direct investment into Kenya have had a significant impact on the housing sector's development (James, 2017). In Kenya, there has been an upsurge in the need for housing, both residential and commercial (Jamesa, 2017). The rising demand for housing in Kenya has enticed both foreign and domestic investors eager to profit from it (Amondi, 2016). Financing and investment through mortgages in Kenya's real estate sector has expanded, impacting home prices in the country, as both investors seek to profit from the growing demand (Salome, 2016).

1.5 Statement of the problem

In 2012, the deficit in housing was 2 million, and it continues to increase at the rate of over 200,000 units per annum (World Bank, 2017). The deficit has led to increased growth of informal settlements in cities and towns. Due to this problem, the Kenyan government has embarked on its initiatives to curb this problem by including affordable housing in its Big Four Agenda. The achievement of this will mostly be connected with the level of economic growth and advancement of the country. However, due to the budget resource constraints, budget allocation needs to be supplemented with other external financial resources in order to achieve affordable housing. Some of the factors considered by the multi-national corporation before making any decision to invest is features of the host country. The

features include development of infrastructure, availability of the human resource and its capacity, economic growth rate as well as the relative exchange rate. It is against this background that this research proposal seeks to empirically analyze the effects of Infrastructure Development, Foreign Direct Investment, and Human Resource Development on Housing in Kenya.

1.6 Research Objectives

The broad objective of the research paper is to approximate the impacts of infrastructure development, development of human capital, and foreign direct investment on housing in Kenya. The specific objectives are:

i. Establish the effects of infrastructural development on the Kenyan housing sector.
ii. Analyze the effect of Human Capital Development on housing in Kenya; and
iii. Estimate the effect of Foreign Direct Investments on the Kenyan housing sector.

1.7 Significance of the Study

The research paper will act as the primary source of literature for further studies on economic development in general and macro-economic dynamics relating to housing development. It will also be important to the Kenyan government specifically by suggesting housing development policies and investment policies aimed at attaining affordable housing which is one of the Big Four agendas.

1.8 Scope of the study

The study will perform a time series regression analysis of the variables using secondary data acquired from the World Bank database and the Kenya Bureau of Statistics (KNBS) reports for the period 2009 to 2020.

1.9 The study limitations.

The research relied on auxiliary sources of data from various sources which include the KNBS, World Bank, United Nation Conference Trade and Development (UNCTAD), and Central Bank of Kenya (CBK), and International Monetary Fund (IMF). In making sure that the data used in the study was reliable, the researcher used triangulation method to choose globally recognized data from KNBS and World Bank that was similar.

CHAPTER TWO
LITERATURE REVIEW

2.1 Introduction

The relevant literature for the study will be analyzed in-depth in this chapter. Theoretical models of concepts and relationships are discussed in Section 2.2. In the preceding sections, the empirical research on infrastructure development, human resource development, and foreign direct investment inflows will be reviewed.

2.2 Theoretical Literature

The Neo-classical investing theory, Human resource development as well as Harrod-Domar model of growth will be the foundation of this research. . These theories explain how Real estate investment in the housing sector is affected by infrastructural development, HDI, and FDI inflows respectively. The next sub-sections go over these hypotheses in detail

2.2.1 Neoclassical Theory of investment

Cockcroft and Riddell (1991) popularized the neoclassical investment theory. This theory posits that FDI inflow leads to increased rate of direct and indirect capital growth in the economy via technology transfer, research and development, and creation of other forms of human capital development in real estate industry. When a state has appropriate policies like the simplicity of acquiring licenses and launching enterprises as well as enhanced infrastructure, it attracts more foreign investors. Multi-National Enterprises will flock to these nations, causing a rise in investment and job creation in the host nation (Cadman, 2015). When the rate of employment of a nation rises, the per capita income will also rise and the standards of living will improve. This will in turn lead to improvement in education standards, health, and recreational facilities. (Casson, 1990).

These requirements must result in increased housing investment in the long run (Bloomstrom & Kokko 2003). For instance, Kenya announced a reduction of 20% of corporate tax from 30% for promoters who build more than 1,000 houses per annum (GoK, 2014). In turn, foreign real estate developers choose to seize the tax incentive opportunity leading to building and expansion of real estate industry. Construction and real estate

registered the highest growth rate of approximately 14.1%, followed by the agricultural sector which had 7.1%, and lastly the financial service sector with 10.1% in the third quarter of 2013 as per the Cytonn Investment (2013).

Furthermore, as the enterprises enlarge their operations in the nation which hosts them, they introduce new business models and strategies like the real estate investment by Stanlin in Kenya that local NSSF and other organizations are eager to copy due to their success (Masron & Nor, 2016). Kenya has a good relationship and network with foreign investors. From this perspective, this research will highlight the significance of FDI Inflows in affecting real housing development rates in Kenya, utilizing ideas from Neo-classical investment theory.

2.2.2 Harrod-Domar Growth Model Theory

The model obtained its name from two economists in the 1930s, RF Harrod and ED Domar. According to the theory, the pace of increase in real estate in the economy is determined by the amount of savings and productivity, as well as investment in infrastructural development. The theory placed a considerable emphasis on infrastructural development, industrial investment, savings and technology as the main agents of real estate development in a country (Donald, 20080. According to the model, raising the savings ratio, the amount of industrial and infrastructure investment, or technological growth rate is critical for the real estate sector's growth. This research paper seeks to review the effects of infrastructure improvement on housing development rates in Kenya. The relevance of this theory is anchored on its ability to explain the relationship between infrastructural development and real estate development in Kenya.

2.2.3 The Human-Capital development Theory

Human capital theory is traceable to studies of Adam Smith. According to the hypothesis, since people have a wide collection of skills and knowledge, there is a strong link connecting human capital and economic growth. Human capital, according to this theory, can definitely help promote overall economic growth (Rastogi, 2012). The hypothesis looked into a country's wealth, knowledge, training, talents, and experiences (Mankiw, 2009). According to Smith, developing human capital through training and education

contributes to a more profitable firm, which increases society's aggregate wealth, thus it's a win-win situation for everyone (Woodhall, 2010). According to economists Gary Becker (2009) and Jacob Mincer (2007), widespread investment in human capital generates the skill-base required for productivity and economic growth in the labor force, resulting in improved income and living conditions in the long run. According to Mincer (2007), when income increases people will raise their living standards opting for better housing units. Human capital, like any other form of capital, works to enhance the quality and degree of production, as per Schultz (2005). Employee advantages are enhanced when a firm invests in its education, training, and skills (Mankiw, 2009). This research paper sought to highlight the significance of human capital investments and development in determining tax revenue performance in Kenya. Therefore, this study finds relevance in this theory in elaborating how the investment in people through skills, training, and Knowledge results in increased productivity in the economy and in the long run the tax revenue growth.

2.3 Empirical Review

2.3.1 Infrastructural development and Housing

Shepherd and Nicita used a gravity model and panel data to review the role of the transport industry in the economic expansion of the housing sector in West African countries from 2005 to 2017. They discovered that housing growth rates in West Africa were impacted by advancements in infrastructure, primarily ports, roads, and railways (Hoekman & Nicita, 2018). These findings relate closely with those of Wilson, Mann, and Otsuki (2015) that using data from Nigeria established that road efficiency together with proxies of infrastructure quality (like internet use, speed, and cost) had positive impact on housing growth rates. These surveys were done in various trading blocs that have varying levels of infrastructure development than COMESA and the EAC. As a result, the goal of this research is to see how infrastructure development influences housing growth rates in Kenya, a member of both COMESA and the EAC.

In their study, Kimani and Njoroge (2015) sought to establish the impact of Kenya’s infrastructural development on housing expansion rate. Notably, the authors discovered that infrastructural development has a positive substantial effect on Kenya’s housing growth. The study used a Least Squares technique to review time-series data collected

between 2005 and 2015. Using Vector Error Correction Model, however, Wamboye and Simiyu (2017) study discovered that infrastructure development had a moderate impact on housing growth in the short-term. On the other hand, infrastructure development does not have substantial effect on housing development in the long-term.

The aforementioned two studies produced conflicting conclusions, necessitating further research into the correlation between infrastructure development and housing growth rates in Kenya using current data, which this proposed study intends to find out. Using the Granger causality test, Kosgei (2017) discovered presence of positive relationship between infrastructural development and the expansion of Kenya's home and housing sector. Likewise, using the Pairwise Granger Causation Test, Kimani (2017), Simiyu (2016), and Wanyama (2018) discovered uni-direct causation between infrastructural development and housing growth rates in Kenya.

Furthermore, infrastructure levels were discovered to induce a 57 percent increase in housing growth rates (Wanyama, 2018). The above research, on the other hand, used non-linear models to portray the relationship of studied variables. Notably, these variables did not take into consideration the long-term correlation of the analyzed variables. Conversely, this study will use Vector Error Correction Model (VECM) to represent the long-term causality between infrastructure development and the pace of housing increase in Kenya.

2.3.2 HDI and Housing

From 2000 to 2015, Fafchamps (2009) looked at the consequences of human capital development and real estate growth and development in Morocco. The study concluded that there was no substantial direct effect of human capital development on real estate development over 15 years utilizing an analytical research model and time-series data. Milner and Tandrayen (2017) showed a favorable association between human capital development and housing growth rates in six Sub-Saharan African nations, although this conclusion contradicts their findings. This disparity in the conclusions of the two authors serves as the foundation for the proposed study, which aims to determine how human development in Kenya influences the rates of housing development and expansion in Kenya over the study period.

For the period 2000 to 2015, Barasa (2016) investigated the causal relationship between human capital development and housing expansion in Kenya. The Granger Causality Test was used to investigate whether housing growth rates in Kenya are causally related to human capital development. The study found a positive causal association between human capital development and housing growth rates, with a coefficient value of 0.6231 $p<0.05$. Likewise, Caroline (2017) and Ng'etich (2017) used the OLS approach to analyze the influence of human capital development on housing growth rates in Kenya and showed that from 2005 to 2016, human capital development had a moderate and substantial beneficial impact on housing growth rates in Kenya. The above research used an OLS approach, which did not show a clear long-run link between the studied variables, necessitating the need to analyze how human capital development affects housing growth rates in Kenya using an error correction approach, which is what this study will accomplish. Andala (2018) used a vector error approach to analyze the effect of human capital development on housing sector growth rates in Kenya from 2007 to 2017. She discovered that human capital development had a substantial impact on housing sector growth with a coefficient value of (0.4527) and ($p<0.05$). Secondary data for the research variables were obtained from the KNBS and the World Bank websites, and the research suggested that the government should increase education quality by investing in technical skills and training to improve people's income and living conditions. To indicate the trend in recent years, an updated study must be undertaken.

2.3.3 FDI and Housing

Alfaro (2014) Employing cross-country data collected between 1975 and 1995 established that FDI contributes significantly to the growth of the housing industry in South Africa, but only with consideration of financially developed markets. FDI has a significant and considerable effect on housing growth rates, according to Baharumshah and Almasaied (2009). To effectively illustrate the Kenyan scenario, this study will employ quarterly time series data.

Salome (2016) investigated the impact of FDI on real estate growth in Kenya. This study used a descriptive research design. The authors reviewed 80 real estate companies in Kenya. One finance manager was chosen at random from each of Kenya's 80 real estate

enterprises for the study. The author used simple qualitative statistical methods – mean, standard deviation, percentages, and frequencies – to analyze the data. SPSS was used the tool of data analysis.

To analyze qualitative data, content analysis was performed. According to the report's regression analysis, FDI has a beneficial effect on the nation's real estate sector's growth. According to the report, the government should improve the implementation of numerous policies aimed at attracting foreign direct investment to Kenya, which will have a substantial effect on the country's real estate development. Nonetheless, the VECM approach was not used in that research to portray short- and long-term causalities in real estate. This proposed research, on the other hand, would use the VECM technique to uncover long and short-term causation in real estate investment and will use an analytical research strategy rather than the descriptive research design used in the prior study.

Everlyne (2016) investigated the impact of FDI on the productivity of Kenya's real estate sector. The researcher relied on descriptive design to analyze secondary data. SPSS was the tool of analysis. In the analysis, the researchers employed both descriptive and inferential statistics. Controlling variables included inflation and interest rates. The analysis revealed that FDI had a beneficial impact on the real estate sector's productivity. On the other hand, interest rates and inflation had adverse impact on real estate sector's productivity. Notably, multiple regression model was influential in elucidating the relationship between Kenya’s real estate investments and FDI. Statistically, the tests showed significance level of $p = 0.004$ and a F-test of 6.89 ($p = 0.05$).

According to the study, the national government should create an atmosphere that encourages both local and overseas investors to venture in the Kenyan real estate sector. Regardless of the study's conclusions, the research employed primary and secondary data, which could lead to inaccurate results because the data came from a variety of sources. This study, on the other hand, will use an analytical research approach, using World Bank and the Kenya National Bureau of Statistics as sources of secondary data, both of which provide comparable data.

CHAPTER THREE
METHODOLOGY

3.1 Introduction

This section presents the methodological base that will be employed in this research. Specifically, the following will be addressed; Research design, study area, model specification, diagnostic tests, target population, study area, data collection method, data types and sources, data analysis technique, and presentation.

3.2 Research Design

Research design can be defined as an outline that gives a direction on the gathering, evaluation, and analysis of the research data as per Cooper and Schindler (2014). This study will adopt an analytical research design because regression and correlation methods will be employed to analyze the quarterly time-series data captured over eleven periods (2009-2020) of the study. Granger causality test will then be applied to test the causation relationship between housing growth rates and the macroeconomic aggregates under study. This research design will produce empirical proof insinuating that two or more variables are correlated and the direction of the correlation (Burns & Groove, 2013). Likewise, the analytical research design will be employed to attain a clear understanding and a more intuitive interpretation of the results.

3.3 Data Types and Sources

This study purely depends on secondary data that will be collected using the document analysis method. The data will be obtained from the following sources; Kenya National Bureau of Statistics (KNBS) reports, economic surveys, and the World Bank website for the period 1980 to 2020.

3.4 Analytical Techniques

The data analysis technique refers to the process by which the researcher summarizes primary data in a more logical and meaningful manner as per Cox and Hassard (2010). Consistency in the measurement of the data will be confirmed using the pre-diagnostic test and the outliers will be eliminated. STATA software will be used for the analysis of the data after it has been refined and converted into ratios. This statistical software is preferred

when dealing with time-series data since it can be used to perform various tests. A second linear relation will be tested with the correlation matrix on the explanatory variables.

Third, Durbin Watson D- statistics will test autocorrelation between the predicted variables and the residuals. Fourthly, the unit root tests will be performed using statistics of the Augmented Dickey-Fuller (ADF) to determine the impact of shock and to avoid false recovery of non-stationary variables. Although it is recommendable to lag the variables once, the number of lag lengths depends on the test statistics as well as that of the critical values at 1%, 5%, and 10%. A variable is said to be stationary if the test statistic is less than that of the critical value. Lagging will be performed until all the variables become stationary. Fifthly, correlation analysis will be carried out which involves a two-step analysis. If all the variables are integrated of order zero then a multiple linear regression model will be adopted. However, if some variables are integrated of order zero while others are integrated of order one then an autoregressive distributed lagged model will be used to estimate both short-run and long-run estimates.

3.5 Model Specification

The model will be specified as shown in equation 1 below

Housing growth rates = f (ID, HDI, FDI,) …… (1)

The study adopted the following econometric model to carry out a multiple regression analysis.

$HSN = \alpha + \beta_{1.}X_1 + \beta_{2.}X_2 + \beta_{3.}X_3 + \varepsilon$

However, the ARDL model may be adopted depending on the unit root test result.

Where; HSN = Housing measured using housing growth rates quarterly figures from the year 2009-2020 available on Kenya Population and Housing Census (KPHC) Website

α = Constants.

$\beta_1 \ldots \beta_3$ = slope which shows the level at which the housing growth rates change when the explanatory variables change by one unit.

X_1 = Infrastructural development (independent variable). Measured using infrastructural development Index. Quarterly figures for the year 2009-2020 retrieved from the KNBS website.

X_2 = Human Development Index (independent variable). Quarterly figures from the year 2009-2020 retrieved from the World Bank website.

X_3=Foreign Direct Investment (FDI) (independent variable). The quarterly figures for the year 2009-2020 will be retrieved KNBS and World Bank website.

ε = error term.

3.5 Description and Measurement of the Variables

Table 1

Description and Measurement of Variables

Variable	Description	Measurement	Prior-Expected Sign
Housing	houses or buildings collectively, for the purpose of sheltering people	As percentage of growth in construction sector	+/-
Infrastructural development	Composite index comprising transport index, Electricity index and ICT index	Estimates from infrastructural development index	+/-
Human capital development	Skills, experience, and other qualities integrated into people and groups	scale that uses statistics for life expectancy, education, and	+/-

	of people gained over their lives and used for the development of goods, services or ideas under market conditions	per capita income known as Human Development Index	
FDI	These are net inflows of investments	As percentage of GDP	+/-

Note. Table denotes measures and expected signs of studied variables.

CHAPTER FOUR
RESULTS AND DISCUSSION

4.1 Introduction

This chapter presents the results alongside a discussion of the study's key findings. During the analysis phase, data on housing growth could not be obtained. Accordingly, access to electricity was used as a proxy to housing growth. This was based on the assumption that only housed individuals could demand electricity in their homes. Data on human capital development too could not be obtained. School enrolment rate, which would have proxied human capital development, was incomplete data-wise. Accordingly, GDP was used to proxy human capital development. This originated from endogenous growth whereby the stock of human capital is assumed to contribute towards growth with growth, in turn, facilitating investment in human capital. GDP was measured in constant local currency unit (Kenya Shillings) based on the suggestion by Prof. Andy McKay that local currency units reflect the day-to-day experiences in many developing countries. The data was sourced from the World Development Indicators spanning the periods 1993 to 2020. 1993 was chosen as the starting point due to absence of data on electricity access for the year 1992 backwards. Similarly, access to electricity data could not be obtained for the years 2021 and 2022.

4.2 Descriptive Statistics

For the 1993-2020 period in Kenya, energy infrastructural development reached a maximum of 71.44% suggesting that 71 out of 100 Kenyans had access to electricity (Table). This also suggested that the number of Kenyans accessing housing had risen over the period. On average, US $1 was exchanged for KSH 78.63 while the highest foreign direct investment inflow stood at 3.095% of Kenya's GDP. The standard deviation suggested that GDP was the most volatile, followed sequentially by electricity access, exchange rate, inflation, and FDI inflow-to-GDP ratio.

Table 2

Descriptive Statistics

Var.	Obs.	Mean	Std dev.	Min.	Max.
Electricity access	28	28.89	19.17	3.473	71.44
Exchange rate (KSH/ US$1)	28	78.63	15.93	51.43	106.5
Inflation rate	28	10.51	9.223	1.554	45.98
GDP (constant KSH)	28	5.363e+12	1.796e+12	3.194e+12	8.757e+12
FDI inflow-to-GDP ratio	28	0.857	0.846	0.0408	3.095

Note. Table denotes descriptive statistics of studied variables.

4.3 Pre-Estimation Test

4.3.1 Normal Distribution

Ideally, when data is not drawn from a normally distributed population, parametric estimations may not be useful. That is, normality assumption is related to the inferences being made. To test for normality, the Shapiro-Wilk test was executed. The results suggested that data on electricity access, inflation rate, GDP, and FDI inflow-to-GDP ratio was not drawn from a normal population. Even then, the estimation will proceed since violation of normality assumption affects inferences but leaves the coefficients unbiased.

Table 3

Normal Distribution

Var.	Obs.	W	V	Z
Prob>z				
Electricity	28	0.91887	2.450	1.845
0.03253				
Exchange	28	0.95089	1.483	0.811
0.20861				
Inflation	28	0.69155	9.315	4.594
0.00000				
GDP Constant	28	0.90205	2.958	2.233
0.01278				
FDI ratio	28	0.80687	5.832	3.631
0.00014				

Note. Table shows normal distribution of studied variables.

4.3.2 Test for Stationarity

Stationarity of a series is important in deciding upon the estimation technique to be employed. For instance, when a series is stationary, OLS can be employed. When a series is not stationary (especially the dependent variable), then ARDL model can be employed. VAR, on the other hand, can be employed regardless of whether a series is stationary or not. At times, however, a series may be nonstationary due to the existence of structural breaks. Now, the study tested for stationarity using the KPSS test since it has high power relative to either ADF or Phillips-Perron tests. In the KPSS, the claim being tested is that the time series is trend stationary. The maximum lag was identified by the Schwert criterion and found to be order 8. The findings suggested that none of the variables was trend stationary since the test statistic for each variable was less than the critical value at 5% significance level given by the KPSS test.

Table 4

Stationarity Test

Variable	Schwert criterion maximum lag	Test statistic	Critical value at 5% significance level
Electricity access	8	0.142	0.146
Exchange rate	8	0.108	0.146
Inflation	8	0.115	0.146
GDP (constant KSH)	8	0.144	0.146
FDI inflow-to-GDP ratio	8	0.106	0.146

Note. Table shows stationarity tests.

It was, nevertheless, suspected that although the series for each variable was not stationary, there could be some co-integrating relationships. Cointegration tests include the Engle-Granger test, Johansen test, and the ARDL. The Engle-Granger test has a setback of indicating more than two cointegrating relationships when more than two variables are modelled. The Johansen test, on the other hand, may produce unreliable results in small samples. This study uses a sample of 28 observations, and hence the sample size is small. To overcome the two problems, therefore, the ARDL model was used to check the presence of cointegrating relationships. To proceed, it was necessary that the variables be tested for structural breaks first. This was accomplished used the Zivot-Andrews's test. The claim being tested was that structural break is absent. That is, there is a unit root without structural break. The lag method chosen was the Akaike Information Criterion (AIC). The 5% critical value was -5.08. The findings revealed that the series for electricity access, inflation, and FDI inflow-to-GDP ratio experienced structural breaks (**Error! Reference source not found.**). The series for exchange rate and GDP, on the other hand, did not experience structural breaks over the period 1993-2020. Therefore, dummy variables were created for the series that had breaks. That is, electricity access, inflation, and FDI inflow-to-GDP ratio in the years 2009, 2010, and 2011, respectively.

Table 5

Structural break

Variable (first difference)		**Lags of the dependent variable included**	**Minimum t-statistic**	**Structural break period**	**Structural break**
Electricity access	17	0	-5.789	2009	Present
Exchange rate	13	0	-3.815	2005	Absent
Inflation	18	0	-5.537	2010	Present
GDP constant KSH	10	2	-3.562	2002	Absent
FDI inflow-to-GDP ratio	19	0	-8.342	2011	Present

Note. Table shows first difference of studied variables

In the ARDL model, FDI inflow-to-GDP ratio was omitted because of multicollinearity. The generated dummies too were omitted because of multicollinearity. The ARDL results are captured in **Error! Reference source not found.**. The results suggested that there is a co-integrating relationship since the coefficient of lag 1 for electricity access in the adjustment equation was statistically significant, and within the interval (-1,0). This suggested that short-run deviations were getting smaller and smaller towards the long-run at the rate of 92% per time period. In the long-run, exchange rate and inflation had a negative effect on electricity access at 5% and 10% significance levels, respectively, whereas GDP had a positive effect on electricity access in the long-run at 5% significance level.

In the short-run, the change in exchange rate two years back positively affected current period's electricity access at 5% significance level. The difference between this year's inflation and last year's as well as the past two lags of the inflation change had a positive effect on this year's electricity access at 5% significance level. Inflation changes three

years back had a positive effect on this year's electricity access at 10% significance level. The change in this year's GDP as well as the change in GDP two years back negatively affected this year's electricity access.

Table 6

ARDL Model

	(1)	(2)	(3)
VARIABLES	Adjustment equation	Long-Run equation	Short-Run equation
LD. Electricity access			-0.178
			(0.195)
D. Exchange rate			-0.366
			(0.250)
LD. Exchange rate			0.387
			(0.238)
L2D. exchange rate			0.690***
			(0.169)
D. inflation			1.056**
			(0.347)
LD. inflation			1.660***
			(0.412)
L2D. inflation			0.634**
			(0.185)
L3D. inflation			0.341*
			(0.163)
D. GDP constant KSH			-0**
			(0)
LD. GDP			0
			(0)
L2D. GDP			-5.09e-11**

			(0)
L3D. GDP			-0*
			(0)
Exchange rate		-0.978**	
		(0.354)	
Inflation		-0.895*	
		(0.443)	
GDP		0**	
		(0)	
L. electricity access	-0.919**		
	(0.337)		
Constant			15.13
			(13.05)
Observations	24	24	24
R-squared	0.950	0.950	0.950
Adjusted R-squared	0.835	0.835	0.835

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Note. Table shows ARDL results of studied variables.

4.4 Model Estimation

4.4.1 Significance and Coefficient Interpretation

Since the ARDL results in **Error! Reference source not found.** left out FDI inflow-to-GDP ratio due to multi-collinearity, complementary estimates were obtained using the vector auto-regressive (VAR) model whose results are captured in **Error! Reference source not found.**. VAR estimates suggested that last year's electricity access, exchange rate two years' ago, and last year's GDP positively affected this year's electricity access at 5% significance level. Inflation two years ago, and last year's FDI inflow-to-GDP ratio, negatively affected this year's electricity access at 10% significance level. At 5% significance level, GDP two years ago negatively affected this year's electricity access.

Table 7

Vector Auto-Regressive Model

VARIABLES	(1) Electricity access	(2) Exchange rate	(3) Inflation	(4) GDP constant KSH	(5) FDI inflow-to-GDP ratio
L. electricity access	0.357**	-0.374**	-0.106	-1.574e+10***	-0.0560*
	(0.157)	(0.165)	(0.176)	(5.820e+09)	(0.0336)
L2. Electricity access	-0.222	0.0724	0.192	-2.695e+08	-0.0703**
	(0.165)	(0.174)	(0.185)	(6.126e+09)	(0.0353)
L. exchange rate	-0.102	0.715***	-0.451**	2.334e+08	-0.0270
	(0.166)	(0.175)	(0.187)	(6.162e+09)	(0.0355)
L2. Exchange rate	0.357**	-0.114	0.260	9.142e+09	0.0478
	(0.176)	(0.186)	(0.198)	(6.530e+09)	(0.0377)
L. inflation	0.105	-0.246**	0.187	6.250e+09	0.0260
	(0.111)	(0.117)	(0.124)	(4.111e+09)	(0.0237)
L2. Inflation	-0.134*	-0.214***	-0.217**	2.345e+09	-0.00629
	(0.0754)	(0.0796)	(0.0847)	(2.799e+09)	(0.0161)
L.GDP	0***	-0	0*	0.918***	0*
	(0)	(0)	(0)	(0.281)	(0)
L2. GDP	-0**	0	-0*	0.241	-0
	(0)	(0)	(0)	(0.333)	(0)

L. FDI inflow-to-GDP ratio	-1.332*	-1.658*	2.290**	6.737e+09	0.101
	(0.802)	(0.846)	(0.901)	(2.976e+10)	(0.172)
L2. FDI inflow-to-GDP ratio	-0.575	0.937	-2.822***	-3.834e+10	-0.0949
	(0.901)	(0.951)	(1.012)	(3.344e+10)	(0.193)
Constant	-28.48***	12.95	23.47**	-9.124e+11***	-3.586**
	(8.170)	(8.620)	(9.180)	(3.032e+11)	(1.748)
Observations	26	26	26	26	26

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Note. Table shows Vector Auto-Regressive Model results of studied variables.

The overall fitness of individual VAR equations was given by R-squared and the corresponding probability value. The table below suggested that the equations for electricity access, exchange rate, inflation, and GDP did fit the data well while the equation for FDI inflow-to-GDP ratio did not fit the data.

Table 8

VAR Equations

Equation	**Parms**	**RMSE**	**R-sq**	**Chi^2**	**P > Chi^2**
Electricity accounts	0.0000	11	3.41573	0.9803	42.52468
Exchange rate	0.0000	11	3.60371	0.9667	103.0723
Inflation	0.0025	11	3.83779	0.6272	27.09638

Gdp constant ksh	0.0000	11	1.3e+11	0.9969	8317.613
Fdi inflow gdp ratio	0.2483	11	.730967	0.4968	12.57641

Note. Tables shows VAR equations

4.4.2 Granger-Causality

In checking for the direction of causality, the Granger causality test was executed, and results captured in the table below. The findings suggested that exchange rate Granger-causes electricity access at 5% significance level. Inflation, GDP, and FDI inflow-to-GDP ratio, on the other hand, do not Granger-cause electricity access. Exchange rate was found to be Granger-caused by inflation and electricity access at 1% and 10% significance levels, respectively.

Table 9

Granger Causality Wald Tests

Equation	**Excluded**	**Chi^2**	**Df**	**Prob** > Chi2
Electricity access	Exchange rate	7.8445	2	0.020
Electricity access	Inflation	3.3758	2	0.185
Electricity access	Gdp constant ksh	0.00	0	0.00
Electricity access	Fdi inflow gdp ratio	3.7455	2	0.154
Electricity access	All	16.669	6	0.011
Exchange rate	Electricity access	5.1278	2	0.077
Exchange rate	Inflation	16.029	2	0.000

Exchange rate	Gdp constant ksh	0.00	0	0.00
Exchange rate	Fdi inflow gdp ratio	4.2028	2	0.122
Exchange rate	All	25.758	6	0.000
Inflation	Electricity access	1.2124	2	0.545
Inflation	Exchange rate	7.4113	2	0.025
Inflation	Gdp constant ksh	0.00	0	0.00
Inflation	Fdi inflow gdp ratio	11.849	2	0.003
Inflation	All	18.831	6	0.004
Gdp constant ksh	Electricity access	7.7775	2	0.020
Gdp constant ksh	Exchange rate	6.6485	2	0.036
Gdp constant ksh	Inflation	4.0297	0	0.133
Gdp constant ksh	Fdi inflow gdp ratio	1.3147	2	0.518
Gdp constant ksh	All	13.103	8	0.108
Fdi inflow gdp ratio	Electricity access	8.7152	2	0.013
Fdi inflow gdp ratio	Exchange rate	1.8943	2	0.388
Fdi inflow gdp ratio	Inflation	1.213	2	0.545
Fdi inflow gdp ratio	Gdp constant ksh	0.00	0	0.00

Fdi inflow gdp ratio	All	9.7439	6	0.136

4.5 Discussion

This research's main objective was to investigate how housing in Kenya is affected by infrastructural development, human capital development, and foreign direct investment. The research intended to use data on housing from KNBS. However, available data was related to census suggesting widespread gaps since census in Kenya is conducted once in a decade. Micro-level data, such as Financial Access Surveys, on the other hand, did not document FDI, and was cross-sectional in nature. A compromise was, thus, struck with housing being proxied by electricity access. The assumption behind using electricity access as a proxy to housing growth was informed by the understanding that a household would demand electricity only after being housed. Thus, electricity access underestimates housing growth. Underestimation is advantageous in this research as opposed to overestimation since the estimates can always be revised upwards. Data on human capital development was also found to be conspicuously incomplete, and hence was proxied by GDP. In using GDP, the research was informed by endogenous growth model whereby human capital development boosts GDP with GDP, in turn, facilitating investment in human capital accumulation. Exchange rate was measured by the direct quote, i.e., Kenya Shillings per US $1.

This research made use of time series data spanning the years 1993 to 2020, and conducted both descriptive analysis as well as regression analysis. The descriptive analysis involved the mean, standard deviation, and the range. Under descriptive analysis, the research established that electricity access (which proxied housing) peaked at 71.44%, GDP exhibited the highest volatility while FDI inflow-to-GDP ratio was the least volatile. Competitiveness of the Kenya Shilling was also scrutinized with the results suggesting US $1 bought KSH 78.63, on average, over the study period. Lastly, the highest foreign direct investment received was 3.1% of the country's GDP.

Since the research involved estimation of parameters in a regression model, it was necessary to test for normality since violation of normality assumption could potentially lead to wrong inferences. Shapiro-Wilk procedure was employed since it is one of the two

most commonly used tests for normal data. The other test for normality is the Kolmogorov-Smirnoff test. The research established that data on electricity access, inflation rate, GDP, and FDI inflow-to-GDP ratio was not drawn from a normal population. Even then, model estimation proceeded since violation of normality assumption affects inferences but leaves the coefficients unbiased.

After testing for normality, the series were tested for the presence of unit roots. This was necessary because the estimation technique to be adopted was to be informed by whether the observed time series was stationary or nonstationary. Consequently, unit root test employed the KPSS procedure since KPSS test has higher power than the ADF or the Phillips-Perron test. KPSS involved selection of maximum lag as well as the computation of the test statistic. The Schwert criterion led to selection of order 8 as the maximum lag. The findings suggested that all the variables were not stationary. This then necessitated an investigation of possible structural breaks as well as an investigation of co-integrating relationships. In realizing the latter, the ARDL model was preferred to both Engle-Granger and the Johansen co-integration tests. Since, unit roots had been earlier established to be present, structural breaks were examined prior to the execution of the ARDL model. This involved utilizing the Zivot-Andrews' test. It was found that the series for electricity access, inflation, and FDI inflow-to-GDP ratio experienced structural breaks. Thereafter, three dummy variables were created to cater for each break. In the ARDL model, however, the three dummies as well as FDI inflow-to-GDP ratio were perfectly collinear, and hence were dropped. The adjustment equation suggested the presence of co-integration with short-run deviations getting smaller and smaller towards the long-run at the rate of 92% per year.

After establishing co-integration, long-run and short-run relationships were investigated in the ARDL model. The long-run equation suggested that exchange rate and inflation negatively affected electricity access at 5% and 10% significance levels, respectively, while GDP positively affected electricity access at 5% significance level. In the short-run, the change in exchange rate two years back positively affected current period's electricity access at 5% significance level. The difference between this year's inflation and last year's as well as the past two lags of the inflation change had a positive effect on this year's

electricity access at 5% significance level. Inflation changes three years back had a positive effect on this year's electricity access at 10% significance level. The change in this year's GDP as well as the change in GDP two years back negatively affected this year's electricity access.

Since the research intended to investigated the role of FDI inflow, an alternative model had to be found to complement the ARDL model which dropped FDI inflow-to-GDP ratio. Consequently, VAR model was employed since VAR model is applicable regardless of the stationarity series test results. VAR estimates suggested that last year's electricity access, exchange rate two years' ago, and last year's GDP positively affected this year's electricity access at 5% significance level. Inflation two years ago, and last year's FDI inflow-to-GDP ratio, negatively affected this year's electricity access at 10% significance level. At 5% significance level, GDP two years ago negatively affected this year's electricity access. In checking for the direction of causality, the Granger causality test was executed. The findings suggested that exchange rate Granger-causes electricity access at 5% significance level. Inflation, GDP, and FDI inflow-to-GDP ratio, on the other hand, do not Granger-cause electricity access. Exchange rate was found to be Granger-caused by inflation and electricity access at 1% and 10% significance levels, respectively.

Andala (2018), Milner & Tandrayen (2017), and Caroline & Ng'etich (2017) established that human capital development increases growth of the housing sector, and thus their findings are in tandem with this research's. That is, this research's findings suggested that GDP (which proxied human capital development) positively affected electricity access (which proxied housing). Barasa (2016) concluded that housing growth and development of human capital were causally-related, and thus this research disagrees with Barasa (2016) since GDP (which proxied) human capital development did not Granger-cause electricity access (which proxied housing expansion). Fafchamps (2009) found no significant effect of human capital development on housing growth, and thus this research's findings disagree with Fafchamps (2009). Lastly, Alfaro (2014), Salome (2016), Everlyne (2016), and Baharumshah & Almasaied (2009) concluded that FDI inflow boosts housing expansion. Their findings, therefore, disagree with this research's findings which

suggested that FDI inflow-to -GDP ratio negatively affected electricity access (which proxied housing).

CHAPTER FIVE
SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

5.1 Introduction

This section captures a summary of the research, conclusions drawn, and recommends policy.

5.2 Summary

This research sought to investigate how housing in Kenya is affected by infrastructural development, human capital development, and foreign direct investment. The research used multiple linear regression model in which housing was explained by FDI inflow-to-GDP ratio, human capital development, exchange rate, and inflation. Housing was proxied by electricity access while human capital development was proxied by GDP. Timeseries spanning the years 1993 to 2020 was utilized, and the estimation technique employed was informed by stationarity test. KPSS test was adopted due to its relatively high power. Stationarity test suggested that none of the variables had a stationary time series. Zivot-Andrews' test led to the conclusion of the presence of structural breaks in the series for electricity access, inflation, and FDI inflow-to-GDP ratio. Dummy variables were then created, and co-integrating relationship tested using the ARDL model. the study established the presence of co-integration, although FDI inflow-to-GDP ratio was omitted in the ARDL alongside the dummy variables due to multicollinearity.

Model estimation under the ARDL suggested that, in the long-run, exchange rate and inflation negatively affected electricity access while GDP positively affected electricity access. In the short-run, the change in exchange rate two years back positively affected current period's electricity access at 5% significance level. The difference between this year's inflation and last year's as well as the past two lags of the inflation change had a positive effect on this year's electricity access at 5% significance level. Inflation changes three years back had a positive effect on this year's electricity access at 10% significance

level. The change in this year's GDP as well as the change in GDP two years back negatively affected this year's electricity access.

Since the research intended to investigated the role of FDI inflow, VAR model was employed to complement the ARDL which had dropped FDI inflow-to-GDP ratio. VAR estimates suggested that last year's electricity access, exchange rate two years' ago, and last year's GDP positively affected this year's electricity access at 5% significance level. Inflation two years ago, and last year's FDI inflow-to-GDP ratio, negatively affected this year's electricity access at 10% significance level. At 5% significance level, GDP two years ago negatively affected this year's electricity access. Lastly, the Granger causality suggested that exchange rate Granger-causes electricity access. Inflation, GDP, and FDI inflow-to-GDP ratio, on the other hand, do not Granger-cause electricity access. Exchange rate was found to be Granger-caused by inflation and electricity access.

5.2 Conclusions

The findings of the study led to the following conclusions:

i. In the long-run, inflation in Kenya as well as exchange rate depreciation reduces housing expansion (as proxied by electricity access).
ii. In the short-run, human capital development (as proxied by GDP) increases housing expansion (as proxied by electricity access).
iii. In the short-run, inflation reduces housing expansion.
iv. FDI inflows reduces next period's housing expansion.
v. Housing expansion is Granger-caused by exchange rate.
vi. Housing expansion is not Granger-caused by either human capital development, inflation, or FDI inflow.

5.3 Recommendations

From the conclusions above, this research recommends the following:

i. Careful attention to be directed at the exchange rate since the findings present a dilemma. On one hand, exchange rate depreciation boosts export which is a good thing. On the other hand, the findings suggested that to expand housing, the

exchange rate has to appreciate. Exchange rate appreciation could negatively affect export trade.

ii. Heavy investment in human capital development in order for the country's level of production to rise which would then lead to higher purchasing power and hence a higher demand for housing. Higher demand for housing would then necessitate housing expansion.

iii. Inflation targeting since high inflation reduces housing expansion by distorting purchasing power of Kenyans.

5.4 Areas for Further Studies

Since it is rare for FDI to be directed towards constructing houses, this research identifies 'an investigation of the barriers to foreign direct investment to the housing sector in Kenya' as an area requiring attention.

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