

Affordable Housing in the Wake of Global Pandemics: A Reality or a Mirage the Kenyan Perspective?

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Authors' contributions

This work was carried out in collaboration between both authors. Author EOK designed the study Authors EOK and PMS performed the statistical analysis, wrote the protocol, wrote the manuscript, managed the analyses of the study and managed the literature searches. Both authors read and approved the final manuscript.

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ABSTRACT

Aim: This was an investigative study on affordable housing in the wake of global pandemics: A reality or a mirage the Kenyan perspective? 22 % of Kenyans stay in towns and the inhabitants in these cities continue to grow at the rate of 4.2 % annually. This growth rate has outstripped the supply of housing units built. For instance, Nairobi needs a minimum of 120,000 new houses per annually to satisfy the demand but a paltry 35,000 units are constructed annually. The excess demand is likely to continue pushing the housing prices beyond the reach of many Kenyans. Studies conducted in Kenya on housing prices focused on non-macroeconomic determinants and more importantly none of the studies globally envisaged how global pandemics can influence housing prices. Therefore, the influence of global pandemics like Corona Virus Disease (COVID-19) and macroeconomic factors on housing prices in Kenya remains unknown.

Study Design: Correlational research design.

Methodology: The study employed unrestricted Vector Autoregressive analysis involving quarterly time series from quarter 1 of 2014 to quarter 1 of 2020 with a dummy variable measuring the influence of COVID-19.

Results: Results indicated that the total money supply had a positive influence on inflation that was highly influenced by extended broad money.

Conclusion: From the results, it was concluded that some macroeconomic factors, time trends and global pandemics like COVID-19 influence housing prices in Kenya. Professional, administrative and support services, time trend, transport and storage, information and communication, real estate and housing prices at lag 1 increased housing prices in Kenya by 0.41%, 0.41%, 0.94%, 0.37% and 0.59% respectively given unrestricted VAR coefficients and t-statistics of 0.41(4.184), 1.27 (9.862), 0.19 (2.740), 0.94 (10.178) and 0.59 (6.055) for the variables. Housing prices at lag 1 and 4, COVID-19, other services and tax on products reduced housing prices in Kenya by 0.26%, 0.99%, 3.29%, 1.01% and 0.05% respectively given unrestricted VAR coefficients and t-statistics of -0.26(-2.366), -0.99 (-8.770), -3.29 (-4.550), -1.01 (-6.568) and -0.05 (-2.807) for the variables respectively. Economic growth, financial and insurance activities and previous housing prices at lag 5 had no influence on housing prices in Kenya.

Keywords: Affordable housing; COVID-19; Kenya.

1. INTRODUCTION

1.1 Background of the Study

Housing is a key basic need and human right which plays a central role in ensuring economic advancement, poverty decline, cohesion and a suitable standard of living are achieved [1,2]. In the World currently, most people are residing in towns with over 1 billion residing in the informal settlement, a number which is projected to double by 2030 [3]. In Kenya, 22 % of Kenyans stay in towns and the inhabitants in these towns continue to grow at the rate of 4.2 % annually. This growth rate has outstripped the number (supply) of housing units built annually. For instance, Nairobi alone a Kenyan capital city as noted by [3] needs a minimum of 120,000 new houses annually to satisfy the demand but a paltry 35,000 units are constructed hence a deficit of 85,000 units annually. This is viewed in the context of demand and supply, excess demand will continue pushing the housing prices beyond the reach of many Kenyans. Affordable housing as envisaged by [4] constitutes adequacy and costing that does not exceed 30% of a household's income per month to rent or acquire. The skyrocketing housing prices due to the forces of demand and supply may make housing affordability to remain a mirage in Kenya.

1.1.1 Policies driving housing affordability in Kenya

The promulgation of a new constitution in 2010 recognizes housing as a basic right wherein

article 43 (1) (b) every person has a right to accessible and adequate housing [4]. Kenya is also a signatory to international declarations such; The Universal Declaration of Human Rights of 1948; Committee on the Elimination of Discrimination Against Women (CEDAW); The Sustainable Development Goal 11; The Habitat Agenda and Agenda 2063 among others. These declarations according to [1] lay the foundation for; the right to adequate housing, better living conditions for women, safe and affordable housing by 2030, using housing development as an instrument for halting the increase in poverty, homelessness and joblessness, addressing issues of urban development and human settlements including housing and providing access to better and affordable housing in clean secure and well-planned environments. Currently, the 2017 Big Four Agenda commits the Kenyan government to target growth in manufacturing, improved food security, universal health care and affordable housing development and based on the 2018 State Housing Programme as noted by [5] the government of Kenya targets to construct one million affordable houses in the coming five years.

1.1.2 Trend of housing prices in Kenya

People staying in cities are increasing at a proportion far quicker than can be absorbed and managed, leading to raised demand on services and amenities which enormously exceed supply. In several upcoming market urban centers, this leaves most of the inhabitants with limited choices but to dwell in informal settlements [3]. To tackle the shortage and affordability of

housing units in Kenya, the Big Four agenda and 2018 housing program aim at constructing a million houses in the coming five years that constitute 800,000 affordable houses and 200,000 social housing units for upgrading slum dwellings [5].

The trend in the housing prices based on the Housing Price Index (HPI) as in Fig. 1 indicates that from quarter 1 of 2013 as the base year, housing prices have been on an upward trajectory to 4th quarter of 2018. A downward trend can be observed from quarter 1 of 2019 which might be an indication that 2017 Big Four agenda on affordable housing and the 2018 housing program of targeting 1 million houses in the coming five years might have started to bear fruits of reducing house pricing.

1.2 Statement of the Problem

For housing policies like the Big Four agenda and 2018 housing programme to be effective [2] notes that policies have to be well-researched, evidence-oriented and receptive to the demand and actual requirements, as well as societal challenges pertinent to housing. This can only be achieved through research. Several studies have investigated the affordability of housing for example, [6,7,8] in their studies in European and Asian Countries found income, wealth,

demographics factors, the housing stock, taxation, rental market guidelines, land and building regulations, building costs, urbanization rate, interest rates, inflation, real estate investments rates, population growth, economic growth, stock returns, interest and unemployment rates as the main determinants of housing prices. In Kenya, studies conducted by [9,10] depicted a bias towards establishing the determinants of housing demand and supply while a study by [11] indicates that the site, age of a house, number of bedrooms, number of bathrooms, type of house and presence of elevators are the main drivers of housing prices. From the studies, it is clear that we have mixed results where [8] find interest as a non-determinant while [7] established interest as a key determinant of housing prices. This is an indication that findings in one country should not be generalized to other countries. Kenyan studies by Kenya Bankers Association majorly focused on non-macroeconomic determinants and more importantly none of the studies globally envisaged how global pandemics can influence housing prices. Therefore, the influence of global pandemics like Corona Virus Disease (COVID-19) and macroeconomic factors on housing prices in Kenya remains unknown calling for an investigative study on affordable housing in the wake of global pandemics: A reality or a mirage the Kenyan perspective?

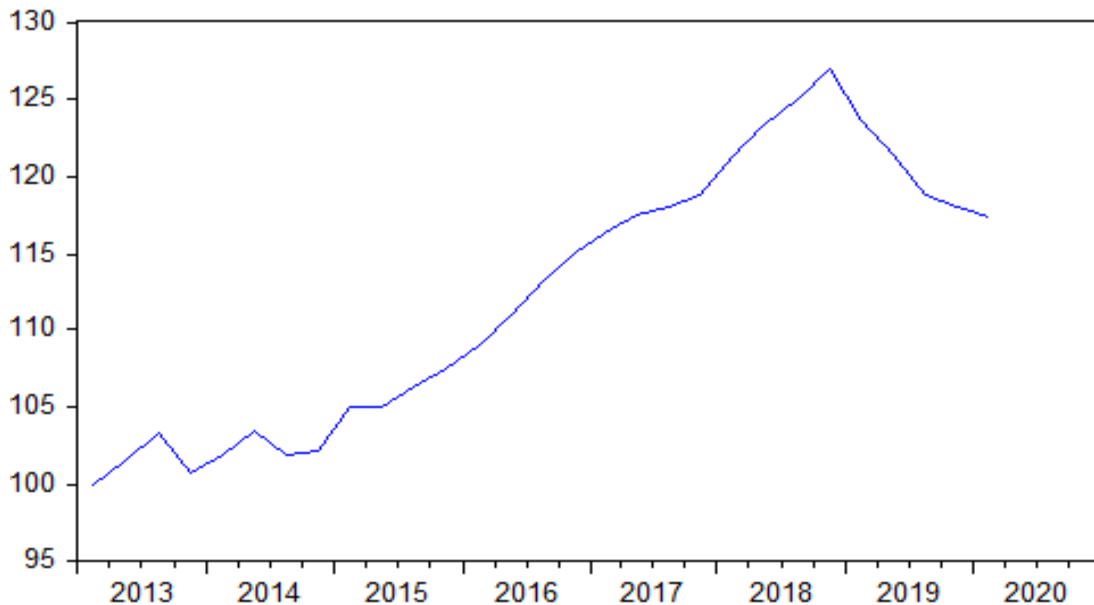


Fig. 1. Housing Price Index in Kenya (2013 Quarter 1 as a base to 2020 Quarter 1)

1.3 Study Objectives

1.3.1 Main objective

An investigative study on affordable housing in the wake of global pandemics: A reality or a mirage the Kenyan perspective?

1.3.2 Specific objectives

- i. Develop a parsimonious model for housing price determinants in Kenya
- ii. Determine the influence of macroeconomic factors, time trend and COVID-19 pandemic on housing prices in Kenya

1.4 Research Question and Hypothesis

- i. What is the parsimonious model for housing price determinants in Kenya?

H_0 : Macroeconomic factors, time trend and COVID-19 pandemic have no influence on housing prices in Kenya.

H_1 : Macroeconomic factors, time trend and COVID-19 pandemic have an influence on housing prices in Kenya.

2. LITERATURE REVIEW

[12], asserts that cities globally are expanding rapidly giving an unbelievable prospect for the growth of the city economies. Conversely, the city's inhabitants require decent and affordable housing which remains a greatest challenge globally. This challenge of affordable housing needs both short term and long term measures that involve the public sector, private sector and nonprofit participants to support the appropriate functioning of property markets that will solve both the supply side and the demand side of the housing market.

[6], in analyzing the various theoretical models noted housing prices depend positively on disposable income, wealth, and demographic needs while the prices are negatively associated with user costs and the housing stock. The study also notes that institutional and structural factors such as tax policies, rental market regulations, land and building regulations can affect house prices by altering demand and supply. Studies conducted in 24 European Countries and China by [7] and [8] respectively showed that per capita disposable income, land transaction price index,

construction cost, urbanization rate, Consumer Price Index (CPI) of residence and investment in real estate had a positive influence while interest rate had no influence on the housing price in Shanghai, China. In 24 European countries, economic growth, stock returns, construction cost and inflation were found to increase the housing prices while interest and unemployment rates had a negative effect on housing prices. Similarly, [13] investigating housing allocation factors in China noted that the faction of agencies, ineffective monitoring systems, the lack of transparency of information and the absence of legal enforcement determines house allocation.

A study by [14] in Turkey based on established that the floor of the apartment, Garden floor, location, American type kitchen, Built-in oven, Balcony, Barbecue, major appliances, picture entry-phone, air conditioning, Built-in kitchen, shutter, ceramic floor, water heater, fire place, sound insulation, sports field, shopping mall, grocery market, park, community clinic, street market, gym, metro and sea were the key determinants of housing prices. [15], in their study in Malaysia established that location, size of the house, recreational facilities, house layout, transportation, land levy, permit fees, stamp duty, government policy and house finishing were the main determinants of housing prices.

Investigating the demand side of housing in Kenya by [9] found that in Nairobi economic growth, the number of households and housing prices influenced demand while [10] in a supply side study established that price of housing, stock of houses, income per capita, inflation and interest rate influenced the supply of houses in Kenya. A housing prices focused study conducted in Kenya by [11] indicates that housing prices are affected by house specific factors that include location, age of a house, number of bedrooms, number of bathrooms, type of house and presence of elevators are the main drivers of housing prices.

3. RESEARCH METHODOLOGY

The study employed correlational design using unrestricted vector autoregression involving quarterly time series data from quarter 1 of 2014 to quarter 1 of 2020 on changes in housing prices (HS), economic growth (G), financial and insurance (FI), manufacturing (M), information and communication (IC), other services (OS), professional, administration and support services

The variables of housing prices at lag 1 and 4, corona virus, other services, tax on products had a significant negative influence on housing prices in Kenya. Coefficients and t-statistics of; -0.26 (-2.366) and -0.99 (-8.770) on housing price at lag 1 and 4 showed that the previous first quarter and fourth quarter housing price reduces housing prices by 0.26% and 0.99% respectively, -3.29 (-4.550) on corona virus indicated that in the presence of pandemics the average housing prices will reduce by 3.29% which may be attributed to reduced demand due to less movement and dwindled incomes witnessed during lockdowns and curfews, -1.01 (-6.568) and -0.05 (-2.807) on other services and tax on

products respectively implied that a percentage increase in other services and tax on products reduces housing prices by 1.01% and 0.05% respectively. Economic growth, finance and insurance service, housing prices at lag 3 and 5 and manufacturing had no statistically significant influence on housing prices in Kenya. The results conform to the findings of [3] and [12] who established that interest rates under financial and insurance sector does not affect housing prices and institutional and structural factors such as tax policies, rental market regulations, land and building regulations affect house prices by altering demand and supply.

Table 1. Unrestricted Vector Autoregression (VAR) Estimates

	HS		HS
HS(-1)	-0.258437* (0.10921) [-2.36636]	OS	-1.005003* (0.15301) [-6.56840]
HS(-2)	0.590910* (0.09758) [6.05585]	PAS	0.413648* (0.09886) [4.18437]
HS(-3)	-0.111921 (0.11490) [-0.97408]	Q	1.271131* (0.12889) [9.86230]
HS(-4)	-0.992198* (0.11313) [-8.77007]	TS	0.189626* (0.06921) [2.73970]
HS(-5)	-0.147305 (0.21450) [-0.68675]	T	-0.497373* (0.17718) [-2.80717]
G	-0.635368 (0.47401) [-1.34040]	RE	0.366886* (0.14993) [2.44702]
FIN	-0.015653 (0.07084) [-0.22097]	IC	0.943360* (0.09269) [10.1777]
CR	-3.292006* (0.72354) [-4.54985]	M	0.061381 (0.25798) [0.23793]
	R-squared	0.991806	
	Adj. R-squared	0.950836	
	Sum sq. resids	0.220980	
	S.E. equation	0.271404	
	F-statistic	24.20827	
	Log likelihood	15.35432	
	Akaike AIC	0.067966	
	Schwarz SC	0.863283	
	Mean dependent	-0.027895	
	S.D. dependent	1.224035	

Values in () & [] are standard errors and t-statistics respectively. * indicates statistical significance at 5% level of significance

The goodness of fit analysis based on a coefficient of determination ($R^2=0.99$) and an F-statistic of 24.208 indicate that the variables in the parsimonious model (2) explained 99% of changes in housing prices in Kenya. Fig. 2 shows that none of the inverse roots fall outside the circle an indication that the unrestricted VAR model is stable. Diagnostic test results in Tables 2, 3, 4, 5, 6 and 7 depicted that the optimal lag length was 5, no autocorrelation, residuals were normally distributed, no multicollinearity, there was no heteroscedasticity and all the time series variables were stationary after differencing.

Table 2. Lag length Determination

Lag Length	LL	AIC	SC
1	-31.42841	3.776383	4.368815
2	-29.24446	3.840405	4.485112
3	-22.08221	3.436401	4.132749
4	-5.570553	2.057055	2.803855
5	15.35432*	0.067966*	0.863283*

LL-log likelihood, AIC- Akaike Information Criterion, SC- Bayesian Schwarz Information Criterion, *Indicates optimal lag length

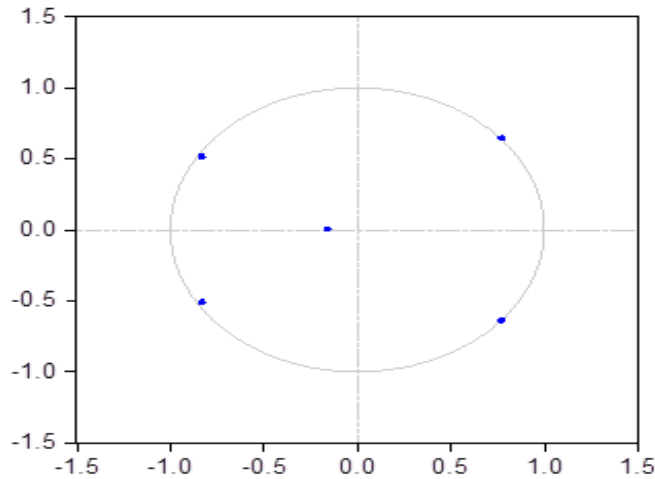


Fig. 2. Inverse Roots of AR Characteristic Polynomial

Table 3. Autocorrelation Test Results

VAR Residual Portmanteau Tests for Autocorrelations					
Null Hypothesis: no residual autocorrelations up to lag h					
Lags	Q-Stat	Prob.	Adj Q-Stat	Prob.	Df
1	0.253161	NA*	0.267225	NA*	NA*
2	0.497812	NA*	0.540658	NA*	NA*
3	0.517430	NA*	0.563956	NA*	NA*
4	0.519872	NA*	0.567049	NA*	NA*
5	0.829994	NA*	0.987929	NA*	NA*
6	0.838904	0.3597	1.000950	0.3171	1
7	2.311106	0.3149	3.331937	0.1890	2
8	2.311847	0.5103	3.333216	0.3430	3
9	2.314480	0.6781	3.338220	0.5029	4
10	2.564550	0.7667	3.866146	0.5688	5
11	2.688557	0.8468	4.160662	0.6549	6
12	2.744514	0.9076	4.312546	0.7432	7

*The test is valid only for lags larger than the VAR lag order. df is degrees of freedom for (approximate) chi-square distribution, *df and Prob. may not be valid for models with exogenous variables

Table 4. Residual Normality Test Results

VAR Residual Normality Tests				
Component	Skewness	Chi-sq	Df	Prob.
1	0.138533	0.060773	1	0.8053
Joint		0.060773	1	0.8053
Component	Kurtosis	Chi-sq	Df	Prob.
1	3.745195	0.439625	1	0.5073
Joint		0.439625	1	0.5073
Component	Jarque-Bera	Df	Prob.	
1	0.500398	2	0.7786	
Joint	0.500398	2	0.7786	

P-value > 0.05 indicates acceptance of null hypothesis of normality distribution of residuals

Table 5. Variance Inflation Factors Test Results

Variance Inflation Factors		
Variable	Coefficient Variance	Uncentered VIF
G	0.533416	4.509002
FIN	0.058737	2.269091
CR	3.059704	1.379408
IC	0.032969	3.613613
M	0.094902	5.695087
OS	0.138377	3.018795
PAS	0.038195	1.746900
Q	0.083494	2.710212
TS	0.017991	1.653458
T	0.061217	4.502410
RE	0.210054	1.695105

VIF > 10 indicates presence of multicollinearity

Table 6. Breusch-Pagan-Godfrey Heteroscedasticity Test Results

F-statistic	1.557035	Prob. F(11,12)	0.2290
Obs*R-squared	14.11240	Prob. Chi-Square(11)	0.2268
Scaled explained SS	6.060477	Prob. Chi-Square(11)	0.8693

*Obs*R-squared with prob. > 0.05 implied acceptance of null hypothesis of no heteroscedasticity*

Table 7. Stationarity Test Results

Null Hypothesis: Unit root (individual unit root process)		
Series: FIN, G, HS, IC, M, OS, PAS, RE, T, TS, Q, CR		
Method	Statistic	Prob.**
ADF - Fisher Chi-square	187.435	0.0000
ADF - Choi Z-stat	-11.6788	0.0000

*** Probabilities for Fisher tests are computed using an asymptotic Chi-square distribution. All other tests assume asymptotic normality*

Intermediate ADF test results UNTITLED				
Series	Prob.	Lag	Max Lag	Obs
FIN	0.0000	0	4	23
G	0.0000	0	4	23
HS	0.0000	0	4	23
IC	0.0001	0	4	23

M	0.0002	0	4	23
OS	0.0000	0	4	23
PAS	0.0017	2	4	21
RE	0.0131	0	4	23
T	0.0004	2	4	21
TS	0.0003	2	4	21
Q	Dropped from Test			
CR	Dropped from Test			

Prob. value < 0.05 implies rejection of null hypothesis hence series is stationary

5. CONCLUSION AND RECOMMENDATIONS

This was an investigative study on affordable housing in the wake of global pandemics: A reality or a mirage the Kenyan perspective? From the results it can be concluded that some macroeconomic factors, time trend and global pandemics like COVID-19 influence housing prices in Kenya. Specifically, professional, administrative and support services, time trend, transport and storage, information and communication, real estate and housing prices at lag 1 had a significant positive influence on housing prices in Kenya at 5 % level of significance. Housing prices at lag 1 and 4, COVID-19, other services and tax on products had a significant negative influence on housing prices in Kenya at 5% level of significance. Economic growth, financial and insurance activities and previous housing prices at lag 5 had no influence on housing prices in Kenya. The study therefore recommends that to realize the objective on achieving affordable housing so that it is not a mirage, the government of Kenya needs to put more emphasis on influencing the relevant macroeconomic variables in the appropriate direction rather than focusing on house specific factors to reduce housing prices. In the wake of pandemics like COVID-19 it is also necessary for the government to come up with measures that can raise disposable incomes of citizens so that the demand for houses may not be affected and lower prices to levels that might discourage investors.

CONSENT

All authors declare that no 'written informed consent was required for the study.

ETHICAL APPROVAL

All authors hereby declare that Ethical approval was not needed for the study based on time series data.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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