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MORTGAGE FINANCING, MACRO ECONOMIC VOLATILITY AND ECONOMIC GROWTH OF EAST AFRICA COMMUNITY COUNTRIES

[1]Ben Maina, [2] Dr. Herick Ondigo, [3]Dr. Joshua Wanjare and [4]Dr. Zipporah Onsomu

[1]PhD Candidate, Department of Business Administration, Faculty of Business and Management Sciences, University of Nairobi, Nairobi – Kenya - *bfmaina@gmail.com*
[2]Senior Lecturer, Department of Business Administration, Faculty of Business and Management Sciences, University of Nairobi, Nairobi - Kenya
[3]Assoc. Dean, Department of Business Administration, Faculty of Business and Management Sciences, University of Nairobi, Nairobi – Kenya
[4]Senior Lecturer, Department of Business Administration, Faculty of Business and Management Sciences, University of Nairobi, Nairobi – Kenya

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Abstract

Mortgage financing is a critical part of financial systems that contribute to financial markets development and deepening and has potential positive effects on a country's financial and economic growth. An effective mortgage market guarantees long-term returns since it entices investors. Moreover, borrowers have better access to funds when the market is efficient, and this aids in stimulating economic growth. However, most financial institutions attach myriad of conditions and covenants which impede mortgages access which negatively affects mortgage credit to GDP ratio. Further, various macroeconomic fluctuations such as interest rates fluctuation, inflationary conditions and currency fluctuations adversely affects mortgage lending and economic development. The study looked into the moderating effect of macroeconomic volatility on the relationship between mortgage financing and economic growth of EAC member countries. The theory of investment multiplier, new neoclassical economics, financial intermediation, and structural form theory were used in this research. The researcher utilized a positivist research philosophy and both a descriptive and explanatory research designs. Descriptive statistics, correlation analysis, and panel data model estimations were conducted. According to the research, interest rate volatility and exchange rate volatility had no significant moderating influence on the link between mortgage financing and the economic growth of EAC member countries while inflation rate volatility had a significant moderating influence. Also, mortgage financing and macroeconomic volatility significantly influence the economic growth of EAC member countries. Further, the study results inferred that mortgage financing significantly affects economic growth, inflation rate volatility moderates the relationship between mortgage financing and economic growth of EAC member countries, interest rate volatility and exchange rate volatility did not significantly moderate the relationship between mortgage financing and economic growth of EAC member countries. The study recommends the need for policy makers to stabilize the inflation levels prevailing in EAC member countries.

Keywords: *Mortgage Financing, Macroeconomic volatility, Economic Growth .*

Introduction

A stable macroeconomic environment is significant in every effort to formulate a robust mortgage market as it provides the foundation in attracting the needed long-term finance for both housing investments and economic growth (Ahiadorme, 2016).

Theoretically, new neoclassical economics theory postulates that bank transactions like mortgage financing are the major influencers of economic growth such that with a high frequency of transactions taking place, there is a higher potential for economic growth (Akinwunmi, 2012). The structural-form theory states that there are a number of factors affecting formal housing finance in all countries such as adverse institutional, legal, and regulatory environment and macroeconomic instability that results in ineffective collateralization of housing assets (Etyang & Mwengei, 2019).

This would increase access to adequate shelter and impact the region's economic development. Kenya, Tanzania and Rwanda have come up with affordable housing development projects to address the housing issue. In Uganda, banks such as the Housing Finance Bank and Bank of Africa have introduced 100 percent financing for residential mortgages (CAHF, 2020).

Problem of Research

Financial systems contribute to financial markets development and deepening and has potential positive effects on a country's financial and economic growth (Bah, Faye & Geh, 2018). An effective mortgage market guarantees long-term returns since it entices investors. Further, borrowers have better access to funds when the market is efficient, and this aids in stimulating economic growth (Johnson, 2014). Various macroeconomic fluctuations such as interest rates fluctuation, inflationary conditions and currency fluctuations adversely affect mortgage lending, housing investments and economic development (Apergis & Rezitis, 2018).

Contextually, the EAC member countries have also faced macroeconomic volatility challenges such as depreciating currencies, rising inflation rates and fluctuations in lending rates (World Bank, 2018). EAC therefore offered a good context to study the effect of mortgage financing on the economy.

Empirically, this study exhibits a conceptual gap as the effect of mortgage financing on economic growth was not addressed. Filotto, Giannotti, Mattarocci and Scimone (2018) examined how residential mortgages affected Europe's economic growth. The study exhibits a conceptual gap as commercial mortgages were not taken into account.

Literature Review and Research Focus

This section discusses the theoretical framework, empirical review and conceptual framework of this study. This presents reviewed theories which clarify the relation between mortgage financing and economic growth. Covered theoretical reviews include theory of financial intermediation, the theory of investment multiplier, new neoclassical economics theory and structural form theory.

The new neoclassical economics (NNE) theory was presented to the finance and economics discipline in the economic fluctuations models, Kydland and Prescott (1980, 1982). The NNE theory is a combination of transaction cost economics and neoclassical economics and is a theory of the distribution and level of the national product grounded on the social endowments of production factors, like consumer preferences, technical conditions of production, labour and capital (Agboola, 2015). The theory includes an investment/ consumption allocation decision to examine fluctuations between; a time allocation decision to analyze fluctuations in market versus nonmarket time and, investment and

consumption and a production function in which labor and capital inputs yield output (Ohanian, 2010).

The structural form theory was conceptualized by Pottow (2007) to explain the mortgage financing evolution in developing countries in Sub Saharan Africa (SSA) as well as the steps which need to be taken to stretch mortgage loans to middle income earners. The theory was advanced to enable SSA countries to meet their residential needs as far as their affordability is concerned. This theory states that there are a number of challenges affecting the delivery of formal real estate finance among most middle-income class (Etyang & Mwengei, 2019). The theory unearths that there exist various issues when it went to the conveyance of conventional housing account among majority, if not every one of the nations (Pottow, 2007).

Various research linked to the research variables, which have been undertaken by various author around world, were reviewed to establish the conceptual, contextual and methodological gaps in those studies. Kieti and K'Akumu (2018) examined factors influencing investments in the mortgage-housing segment. Using a multivariate regression technique, the researchers created an empirical model to show the underlying factors affecting housing investments in Kenya. The study documented that investments in the mortgage housing segment in Kenya was significantly driven by a collection of factors that include mortgage loan characteristics for instance: - type of mortgage, loan to value and mortgage cost as well as the macroeconomic environment and property attributes. This study focused only in Kenya and so a gap remains on the other EAC member countries. Further, the intervening influence of housing investments was not established.

Tripathi (2019) studied a cross-country perspective to macroeconomic determinants of increasing housing prices. The study's data was collected from 43 countries between 1970 and 2017 and the random-effect panel regression models adopted for analysis. The study documented that price-to-rent ratio, rent, per-capita GDP, price-to-income ratio, GDP growth rate, real exchange rate, inflation and broad money positively and significantly affected on investments and house prices. The study also found that mortgage loan rates and the size of the mortgage significantly affected housing investments. There exists a conceptual gap as economic growth was considered as a determiner of housing investments and house prices but the reverse relationship was not established.

Okuta, Kivaa, Kieti and Okaka (2022) examined the dynamic effects of selected macroeconomic factors on the performance of the housing market in Kenya using Autoregressive Distributed Lag (ARDL) Models. This study aims to explain the dynamic effects of the macroeconomic factors on the three indicators of the housing market performance: housing prices growth, sales index and rent index. The results indicate that household income, gross domestic product (GDP), inflation rates and exchange rates have both short-run and long-run effects on housing prices while interest rates, diaspora remittance, construction output and urban population have no significant effects on housing prices both in the short and long run. However, only household income, interest rates, private capital inflows and exchange rates have a significant effect on housing sales both in the short and long run. There exists a conceptual gap as the study did not establish the link between mortgage financing, macroeconomic volatility and economic growth.

Onyimadu (2016) examined the link between long run economic growth and macroeconomic volatility among African countries. Data for the study was collected from 40 African states for the period between 1980 and 2014 and panel regression adopted for data analysis. The study documented a positive and significant correlation between macroeconomic volatility and economic growth. According to the study findings, investment, financial sector growth, mortgage access, level of openness, government size affected economic growth. There exists a conceptual gap as the study established the effect of macroeconomic volatility on economic growth but did not establish whether they moderate the relationship between mortgage financing and economic growth.

Apergis and Rezitis (2018) analyzed the dynamic effects of various factors including money supply, housing loan rates, inflation, GDP and employment on the price of newly constructed houses sold in Greece. The study documented that mortgage loan rate was the variable with the main explanatory power over the housing investments variations, followed by GDP growth rate, then inflation and employment, while there was an insignificant effect on money supply, while adopting an error correction vector autoregressive model for data analysis. There exists a conceptual gap as the explained variable in this study was price of newly constructed houses and therefore the influence of mortgage financing, housing investments and macroeconomic volatility on economic growth was not established.

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Methodology of Research

General Background of Research Methodology

The study adopted both descriptive and explanatory research designs were used for this research. Explanatory design was used to establish the effect and interrelationship among the selected study variables. Descriptive design was used to describe the study variables namely mortgage financing and macroeconomic volatility as well as economic growth in terms of their mean and standard deviations. These designs were appropriate since they enable the researcher to prudently compare the findings of the research and help in answering the questions of what, where as well as how.

Sample of Research

This study's population and sample comprised of the six countries that form the EAC namely; Kenya, Tanzania, Uganda, Burundi, Rwanda and South Sudan. Due to the aspect of the population is moderately small, a census of the 6 countries was undertaken for the study.

Instrument and Procedures

The study used unbalanced panel data due to some states such as South Sudan that have newly been incorporated into EAC. Secondary data was used in this research. Secondary data was gathered through

country-specific Central Bank reports, World Bank reports, IMF reports, as well as Africa Development Bank (AfDB) reports between January 2001 and December 2020 and captured in a data collection sheet. The 20-year period was considered long enough to provide adequate data to achieve the research objectives. A secondary data collection sheet was used in compiling the secondary data collected. The specific data collected included; annual value of mortgage lending, annual number of mortgage accounts, interest rate, exchange rate, inflation rate as well as GDP growth rate.

Data Analysis

The data obtained on mortgage financing, macroeconomic volatility and economic growth was analyzed using descriptive statistics (mean, standard deviation, skewness and kurtosis). Regression analysis (simple regression analysis, multiple regression analysis and stepwise regression analysis) were used to establish the nature and magnitude of the relationships between the variables of the study and to test the hypothesized relationships. Descriptive statistics such as frequencies and percentages were computed. Data was presented in form of tables. Pearson's correlation analysis was used to measure the degree of linear relationship between the variables of the study. Table 3.2 shows the summary of research objectives, hypotheses, analytical methods, statistical test and interpretation.

Results of Research

The sample statistics show the mean, standard deviation, minimum and maximum values of all the variables from which the observed variables were computed. These values are summarized in Table 1.

Table 1: Summary of Descriptive Statistics of Study Variables

	N	Minimum	Maximum	Mean	Std. Deviation
GDP growth rate	109	-46.1	13.2	4.334	6.1979
Number of mortgage accounts	109	110.0	27993.3	5919.100	6661.0551
Log no. of mortgage accounts	109	2.0	4.4	3.525	.4948
Value of mortgage loans	109	562.8	237715.0	53644.359	57212.3800
Log value of mortgage accounts	109	2.8	5.4	4.463	.5597
Interest rate volatility	109	.0	3.0	2.159	.6233
Exchange rate	109	67.3	3729.3	1139.023	948.1213
Exchange rate volatility	108	52.3	948.1	637.105	254.2593

Inflation rate	109	-2.8	380.0	14.713	41.2980
Inflation rate volatility	108	5	82	45.38	21.516
Valid N (listwise)	108				

These outcomes presented in Table 1 display that economic growth as measured by GDP growth rate had a mean of 4.334 and standard deviation of 6.198 as well as a minimum and maximum values of -46.1 and 13.2, in the order given. The outcomes indicated that the GDP growth rate averaged 4.334. The results are coherent in line with study conducted by Mogaka et al. (2015); UNCTAD (2017) and World Bank (2017) who all said that EAC growth rate averages between 3% and 5%. This indicated that EAC member countries economic growth have been consistent with slight increase over the years. The variation in the results of the research can be traced backed to the market situation when the study was conducted.

The study also sought to establish the descriptive statistics of mortgage financing over the last 20 years (2001 to 2020). The measures of mortgage financing were the number of mortgage accounts and the value of mortgage accounts in each EAC country. The results revealed that the number of mortgage accounts had a mean of 5919.1 and a standard deviation of 6661.1 while the value of mortgage finance had a mean of 53,644 million dollars and a standard deviation of 57,212. This finding is in line with AfDB (2019) and Centre for Affordable Housing Finance in Africa (2020) who found that mortgage financing is scarce in EAC member countries owing to restricted access to capital markets and strict collateral requirements.

The findings relating to GDP growth rate and mortgage financing in EAC member countries could be based on the nature of the data and the macroeconomic situation that prevailed in the country. The interest rate in EAC member countries over the last 20 years had a mean of 16.68 and a standard deviation of 2.93 and minimum and maximum of 10.1 and 26.2 respectively. The results also revealed that exchange rates between EAC member countries currency and the dollar over the last 20 years had a mean of 1139.02 and a standard deviation of 948.12 and minimum and maximum of 67.3 and 3729.3 respectively. The results bestowed in Table 4.1 added that the inflation rate had a mean of 14.713% a standard deviation of 41.298 and min and max of -2.8 and 380 respectively. This is an indication that the country has been experiencing relatively high interest rates compared to other countries around the globe and that the inflation rate has fluctuated from double digits to negative in the last 20 years. These findings are similar to those outcomes from research studies conducted by World Bank (2018); UNCTAD (2017); and Mogaka et al. (2015).

Inferential Analysis

The relationship between number of mortgage accounts (independent variable), interest rate volatility (moderator), the interaction term (IRV*NMA), and economic growth (dependent variable) was estimated using Fixed-effects regression. The results are as shown in Table 3

Table 2: Interaction Term for Number of Mortgage A/Cs and Interest Rate

Economic growth	Coef.	Std. Err.	P>t
No. of mortgage accounts	1.620*	0.522	0.002
Interest rate volatility	-0.132	0.219	0.547
IRV*NMA	-2.245	1.572	0.155
_cons	4.110*	0.129	0.000
R-squared	0.040		
F(3, 105)	3.29		
Prob > F	0.0213		

* p<0.05

This study showed that number of mortgage accounts (β= 1.620, p<0.01) significantly influences economic growth. However, interest rate volatility (β= -0.132, p>0.05), has no significant influence on economic growth. The result of the F-test was statistically significant (p<0.05). The R^2-value of 0.040 indicates that the independent variable (number of mortgage accounts), the moderator (interest rate volatility), and the interaction term (IRV*NMA) account for 4% of the variance in economic growth. Even though the regression model was statistically significant, Table 3 shows that the interaction term (IRV*NMA) was not.

This study indicated that value of mortgage accounts (β= 1.512, p<0.05) was a significant predictor of economic growth, as shown in Table 4. However, interest rate volatility (β= -0.208, p>0.05) has no significant influence on economic growth. F-test statistic was statistically significant (p<0.05), and therefore, the regression model was statistically significant. According to Table 4, the interaction term (IRV*VMA) was also not statistically significant.

Table 3: Interaction Term for Value of Mortgage A/Cs and Interest Rate

Economic growth	Coef.	Std. Err.	P>t
Value of mortgage a/c	1.512*	0.484	0.002
Interest rate volatility	-0.208	0.255	0.415
IRV*VMA	1.771	1.522	0.246
_cons	5.374*	0.282	0.000
R-squared	0.053		
F(3, 105)	4.47		
Prob > F	0.0045		

* p<0.05

The relationship between number of mortgage accounts (independent variable), exchange rate volatility (moderator), the interaction term (ERV*NMA), and economic growth (dependent variable) was estimated using fixed-effects regression.

Table 4: Interaction Term for No. of Mortgage A/Cs and Exchange Rate

Economic growth	Coef.	Std. Err.	P>t
No. of mortgage accounts	1.630*	0.532	0.002
Exchange rate volatility	-0.122	0.239	0.556
NMA*ERV	-0.245	0.472	0.102
_cons	3.110*	0.133	0.000
R-squared	0.041		
F(3, 105)	3.29		
Prob > F	0.0021		

* $p<0.05$

This study showed that number of mortgage accounts ($\beta= 1.630$, $p<0.05$) significantly influences economic growth, as shown in Table 5.20. However, exchange rate volatility ($\beta= -0.122$, $p>0.05$), has no significant influence on economic growth. The result of the F-test was statistically significant ($p<0.05$). The R^2-value of 0.041 indicates that the independent variable (number of mortgage accounts), the moderator (exchange rate volatility), and the interaction term (ERV*NMA) account for 4.1% of the variance in economic growth. Even though the regression model was statistically significant, Table 5 shows that the interaction term (ERV*NMA) was not.

This study also indicated that value of mortgage accounts ($\beta= 1.761$, $p<0.05$) is a significant predictor of economic growth, as shown in Table 6. However, exchange rate volatility ($\beta= -0.212$, $p>0.05$) has no significant influence on economic growth. F-test statistic was statistically significant ($p<0.05$), and therefore, the regression model was statistically significant. According to Table 6, the interaction term (ERV*VMA) was not statistically significant.

Table 5: Interaction Term for Value of Mortgage A/Cs and Exchange Rate

Economic growth	Coef.	Std. Err.	P>t
Value of mortgage a/cs	1.761*	0.437	0.001
Exchange rate volatility	-0.212	0.236	0.418
ERV*VMA	-0.633	1.522	0.242
_cons	4.427*	0.282	0.000
R-squared	0.056		

F(3, 105)	6.52		
Prob > F	0.0005		

* p<0.05

The relationship between number of mortgage accounts (independent variable), inflation rate volatility (moderator), the interaction term (IFV*NMA), and economic growth (dependent variable) was estimated using Fixed-effects regression. This study showed that number of mortgage accounts (β= 1.434, p<0.05) significantly influences economic growth, as shown in Table 5.25. Inflation rate volatility (β= -0.577, p<0.05), also has a significant influence on economic growth. The result of the F-test was statistically significant (p<0.05). The R^2-value of 0.096 indicates that the independent variable (number of mortgage accounts), the moderator (inflation rate volatility), and the interaction term (IFV*NMA) account for 8.46% of the variance in economic growth. The results in Table 7 also reveal that the interaction term (IFV*NMA) was also statistically significant (β= 0.798, p<0.05).

Table 6: Interaction Term for Number of Mortgage A/Cs and Inflation Rate

Economic growth	Coef.	Std. Err.	P>t
No. of mortgage accounts	1.434*	0.363	0.002
Inflation rate volatility	-0.577*	0.205	0.023
IFV*NMA	0.798*	0.443	0.017
_cons	3.216*	0.125	0.000
R-squared	0.096		
F(3, 105)	8.46		
Prob > F	0.0000		

* p<0.05

The relationship between value of mortgage accounts (independent variable), inflation rate volatility (moderator), the interaction term (IFV*VMA), and economic growth (dependent variable) was estimated using Fixed-effects regression. The results are as shown in Table 7.

Table 7: Interaction Term for Value of Mortgage A/Cs and Inflation Rate

Economic growth	Coef.	Std. Err.	P>t
Value of mortgage a/cs	1.667*	0.415	0.000
Inflation rate volatility	-0.601*	0.203	0.011
IFV*VMA	0.801*	0.139	0.009
_cons	4.321*	0.282	0.000
R-squared	0.153		
F(3, 105)	9.63		
Prob > F	0.0000		

* $p<0.05$

This study indicated that value of mortgage accounts ($\beta= 1.667$, $p<0.05$) is a significant predictor of economic growth. Inflation rate volatility ($\beta= -0.601$, $p<0.05$) also has a significant influence on economic growth. F-test statistic was statistically significant ($p<0.05$), and therefore, the regression model was statistically significant. According to Table 8, the interaction term (IFV*VMA) was also statistically significant.

Discussion

The moderating influence of macroeconomic volatility on the link between mortgage financing and economic growth of EAC member countries was studied. To determine the hypothesized link, the researcher utilized Baron and Kenny's (1986) recommended technique, which looked at each mortgage financing indicator separately. According to the findings of this study, the researcher failed to reject H1a and H1b, implying that interest rate volatility and exchange rate volatility insignificantly moderates the relationship between mortgage financing and economic growth of EAC member countries. However, the researcher rejected H1c implying that inflation rate volatility significantly moderates the relationship between mortgage financing and economic growth in EAC member countries.

The findings were consistent with a prior result by Apergis and Rezitis (2018), who found a significant relationship between inflation rate volatility and mortgage financing. Prior investigations, such as Kohlscheen, Mehrotra and Mihaljek (2018) who examined the key drivers of residential housing investments, in 15 countries using a quarterly panel from 1970 to 2015 also found that inflation significantly affected residential investments and GDP growth rates. It is worth emphasizing that none of the above research looked at macroeconomic volatility as a moderating variable but rather at the link between macroeconomic volatility and economic growth or between macroeconomic volatility and mortgage financing.

Conclusions and Recommendations

This study concludes that interest rate volatility and exchange rate volatility do not significantly moderate the relationship between mortgage financing and economic growth among EAC member countries while inflation rate volatility significantly moderates the relationship between mortgage financing and economic growth among EAC member countries. The study suggests measures to be in place to ensure that factors which influence the prevailing levels of

inflation rate are well addressed to ensure that the real estate sector and the economy in general is not adversely affected by the prevailing level of inflation rate volatility. If the country can be able to manage the prevailing level of inflation rate, this would lead to a rise in the real estate sector and this will ultimately translate to growth of the entire economy. The governments and other policy makers in the EAC member countries study should regulate the price of commodities in the market as a rise in prices leads to an increase in inflation which can adversely affect growth of the real estate sector.

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