# MORTGAGE FINANCE, MACROECONOMIC FACTORS AND HOUSING DEVELOPMENT IN NIGERIA

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## ABSTRACT
Despite the critical role of housing as a component of economic growth and social stability, literatures has shown that housing development in Nigeria can be constrained by lack of long-term financing, as well as macroeconomic factors. This study examines the intricate relationships between mortgage finance, housing development and the interactive effect of macroeconomic factors in Nigeria. This research employs data on housing delivery, mortgage finance and macroeconomic factors, sourced from the Central Bank of Nigeria (CBN) statistical bulletin and Federal Mortgage Bank of Nigeria (FMBN) annual audited report between 2005 to 2022. The research adopt an expos factor and experimental descriptive design. Pre-estimation test such as unit root test and Bound test were employed to test for stationarity and cointegration. Empirical analysis was conducted using the Autoregressive Distributed Lag (ARDL) model. Findings from this study revealed that mortgage loan interaction variable have a very weak positive effect on housing delivery in the long run, with a coefficient of 0.005230 (p-value; 0.0005), mortgage equity's negative effect was also reduced in the long run, with a coefficient of -0.001611 (p-value; 0.0268). Mortgage interest rate was also found to have a reduced negative effect on housing delivery in the long run, with a coefficient of -0.005316 (p-value; 0.0003). The research concludes that macroeconomic factors' interaction with mortgage finance negatively affects changes in housing delivery. Consequently, the research recommends that policymakers implement holistic measures to stabilize the economy, while incentivizing mortgage lending to guarantees access to adequate and affordable housing for Nigeria's growing population.

**Keywords:** Mortgage Finance, Macroeconomic Factors, Housing Development
**JEL Classification:** R3, R38, E6, O21

## 1. INTRODUCTION
Globally, achieving sustainable development is a goal every nation strives to achieve. The need to ensure socially, economically and environmentally inclusive development, through provision of adequate social services such as housing, functional and livable environment among others, for both the present and future generation has assumed an all important position (Faye and Obah-Akpowoghaha, 2023).
This is more critical as every man requires a safe abode as part of his physiological needs. Shelter is a basic necessity in human life, so much that it was identified in Abraham Maslow's

hierarchy of needs as a major part of other physiological needs like air, water, food and clothing. Ensuring equal access to adequate, safe and affordable housing is also the first of the policy targets of the United Nations in its bid to fulfil its 2030 vision of achieving sustainable cities and communities globally. Efficient availability of mortgages may also promote financial market development through stimulation of investment in housing sector (Nuri and Nothaft (2017).

The United Nations estimates Nigeria's current population at 236million, with a projection that by 2050, the country's population will rise to 400 million. According to the World Bank (2024), no fewer than 40% of Nigeria's population live in slums, creating a demand for affordable housing, because of inability to match the population growth with simultaneous provision of adequate housing and resources for development.

The World Bank in a 2021 policy research as at 2019, projected Nigeria's housing deficit at 20million by 2030 (Behr et al., 2021). However, by 2023, Nigeria's housing deficit housing deficit has already risen to 28 million units (The State House, 2023), requiring an estimated N28.77 trillion (US$34 billion) funding requirement to fill Nigeria's housing deficit gap, which is equivalent to 73 per cent of Nigeria's appropriated budget for the 2024 fiscal year (Budget Office of the Federation, 2024).

According to Adedeji, et al (2023), the dearth of long term financing poses a serious challenge to housing development in Nigeria. The prime lending rate in the banking industry is on the high at 17.5%, making it costly for consideration of bank loans for development of residential buildings. The social housing scheme that the National Housing Fund of the Federal Mortgage Bank of Nigeria (FMBN), which attracts relatively low interest rate is constrained by the very limited level of fund, given that major proportion of the fund is mobilized as depository contributions from a meager 2.5per cent of monthly income of Nigerians workers.

A major factor that could constrain the efficacy of mortgage finance in tackling housing challenge is unstable macroeconomic environment. The World Bank (2019) asserted that unstable macroeconomic environment for mortgage finance usually discourages financial institutions' involvement in housing finance, as they are understandably risk averse; they are only willing to lend to the least risky clients, which usually jeopardizes the pursuit of social housing schemes that could avail the majority of Nigerians a livable home. This position was held by Adedeji (2022), who noted that some of the challenges militating against the robust growth of the housing sector includes a dearth of long term mortgage finance, challenging macro-economic environment with high mortgage interest, equity and inflation rates. Nwachukwu, et al (2024) noted that Nigerians sometimes resort to cooperatives support in acquiring land and housing.

The Nigeria Economic Summit Group (NESG) (2024), equally noted the cost of funds for housing developers as a major problem, which translates to high building costs and has significantly affected housing delivery. On the demand side, the NESG (2024) added that only 10 percent of those who desire to own a house in Nigeria can afford it, owing to the low purchasing power of a vast population of Nigerians, as well as the current globally high inflationary environment, resulting rise in the cost of building materials. This is staggering compared to the home ownership rate of 72 percent in the USA; 78 percent in the UK; 60 percent in China; 54 percent in South Korea, and 92 percent in Singapore.

Consequently, this research attempts to examine the interactive effect of macroeconomic factors in the relationship between mortgage loan, mortgage interest and mortgage equity and housing development in Nigeria. The paper is structured in five (5) sections; the first section gives holistic background into the study, the second section reviewed relevant conceptual, theoretical and empirical literatures, the third part includes the research methodology, the results from the research are presented and discussed in the fourth section, while the concluding makes recommendation for policymakers in the housing development sector.

## 2. LITERATURE REVIEW

### 2.1 Theoretical Review

**Lien Theory of Mortgage**

The view of the Lien theory of mortgage Hester (1975) is a financing principle that withholds title deed from lender banker (Mortgagee) through a mortgage contract (Anidiobu, et al, 2018). Simply put, the mortgagor (buyer) keeps the property deed (document indicating ownership) throughout the tenure of the loan. The buyer promises to make all payments to the lender and the mortgage becomes a lien on the property, but title remains with the borrower (or buyer). The lender's right of ownership ceases as soon as all outstanding loans are paid off by the borrower. However, in most cases, removal of right to redeem mortgage loan for the mortgage institution (lender) may be hard to do in this regard because the buyer and not the lender is having title to the property.

In relation to mortgage finance and housing development within Nigeria context, a contributor to the National Housing Fund net, with access to a loan amount or house valued at a multiplying ratio of 2.5% of his/her contribution is the mortgagee, while the FMBN is the mortgagor. The right of ownership remains with the lender (FMBN), while the borrower take possession of the house and its documents. The house becomes the borrower's own when the debt is completely offset, while the mortgagee have the right of setoff (lien) in case of default. However, to exercise right of setoff may be difficult because of some regulatory encumbrance (Adedeji, 2022).

**Urban Spatial Theory**

The urban spatial theory proposed by DiPasquale and Wheaton (1994) claims that housing stock is determined by urban population, as well as a number of economic considerations such as the cost of new building activity and, most importantly, credit availability. The urban spatial theory suggests that urban structures have implications for consumption of Urban and Regional Activities, defining the urban structure as market driven with multiplier effect. In case of market driven, investment in housing are often formed by market trend and public demand further determine the type of consumption of space which influence the way, style, and quality of life. The better urban structure and form will create better impact for market which can drive urban economy. The other is multiplier effect which come from a growing base sector as a result of space de-concentration efforts i.e decongesting urban centres.

The greater the population density in a metropolitan area, the higher the housing demand. In general, as the cost of construction materials rises, housing prices rise abnormally as well. Economic approach to the spatial structure of the city is based on the understanding that the value of land, rent and cost have a close connection with land use patterns (Lovina, 1996). Given the urban spatial theory's assumption, the availability of housing stocks is dependent on the availability of credits, such as mortgage finance. As a result, if all other factors remain constant, the continuing availability and affordability of mortgage finance choices can aid in the resolution of Nigeria's housing crisis.

**Investment Base Theory**

The investment base theory was first proposed by James Poterba in 1984. The focus of this theory is on housing supply as a function of a number of economic factors such as actual house price, new building cost, land availability, and finance availability (Okolie & Erhijakpor, 2020). Poterba stated three (3) key assumptions. First, the housing sector is made up of competing enterprises, and its output is determined by the real price of house construction; second, materials of production have limits; and third, an increase in housing demand leads to an increase in the equilibrium price structure of housing. Credit availability and construction costs are the two most important factors of housing supply.

Topel and Rosen (1988) developed a model to Poterba's housing theory, which includes economic expectations such as interest rates, inflation rates, and their lag values. Given the

slightly unfavorable macroeconomic environment in Nigeria, the cost of building materials has skyrocketed, causing the people to be unable to afford decent housing and as a result, may stiffen the efficacy of mortgage finance in causing housing development.

**2.2 Empirical Review**

Udensi, et al (2024), using a quantitative research design, secondary data from the Central Bank of Nigeria, the National Bureau of Statistics, and the World Bank between 2013 to 2023, found that increased housing supply plays a stabilizing role in moderating housing prices, while rising income levels drive demand elevates prices. Inflation is identified as a key driver of housing costs, primarily due to escalating construction expenses, while interest rates show minimal impact on housing prices due to limited mortgage accessibility in Nigeria. Unlike the present research which examines drivers of housing delivery, the study examined housing delivery as an independent variable determining house prices.

Nataliya, et al (2023) analyzed the macroeconomic and borrower-specific credit risk factors affecting residential real estate mortgages in Germany. Relying on a macroeconomic panel VAR model, the research showed a significant link between foreclosures, house price dynamics and unemployment. The research, also predicts a significant increase in mortgage losses in a stress scenario, suggesting a significant effect of macroeconomic factors on mortgage financing. The research however did not include variables such as inflation and interest rates in its model.

Laura, et al (2023) examined the effect of cost of financing homeownership on household and banks vulnerability in Europe, using Household Finance and Cost of Living Data. The study was informed by the rising cost of living that has eroded real income. The research concluded that surge in interest rates has exposed borrowers for mortgage purposes to more vulnerabilities and financial distress. The research limits itself to the effect of housing cost on real income, without holistically considering the effect of income level on housing finance.

Ding (2022) studied how macroeconomic variables affects housing prices in the United States. The research employed time series data from 191 observation samples over the past 15 years. The dataset was collected from FRED and analyzed using multiple linear regression. The findings from the research showed that increase in housing stock and economic growth are the major determinant of the rise of the housing price index in the United States. Conversely, mortgage rates and unemployment rates were found to have negative effect on housing price, while population growth was found to have no significant effect on housing price. Like Jiantong (2020), the research does not focus on the determinants of housing development, even when housing development is found to affect house prices.

Pedro and Adesina-Uthman (2022) investigates the effects of the unconventional CBN balance sheet policy on disaggregated inflation (changes in prices of Housing, Water, Electricity, etc) in Nigeria between 1999 to 2020. The research employed Non-linear Autoregressive Distributed Lag (NARDL) model and found that that the central bank balance sheet expansion policy has long run positive and significant effect on housing inflation. The research does not consider the specific effect of housing finance but aggregate balance sheet of the apex bank.

Stanković (2022) analysis of the impact of selected macroeconomic indicators on real estate prices in BiH, between 2007 to 2019, using multiple linear regression revealed that macroeconomic factors with the greatest impact on real estate prices includes household final consumption expenditure, GDP per capita, nominal GDP, interest rate, household deposits and real GDP growth rate.

Similarly, the study of Hoang, et al (2020) revealed that the price of real estate is an important factor in the market and is affected by many macroeconomic factors. Using quarterly data from the first quarter of 2005 to the fourth quarter of 2018 from Vietnam on the real estate price index, economic factors such as inflation, money supply and average long-term market lending rate, they employed experimental design to demonstrate that

these macroeconomic factors have a significant impact on real estate prices. The implication of this is that macroeconomic factors ultimately raises the cost of building, which is a major determinant of housing prices. However, the research does not particularly examine the effect of the macroeconomic variables on housing development, but the price. These studies align with the findings of Malgorzata and Radoslaw (2013) who found that economic and financial situation of European countries affects residential property markets.

From a cross-national standpoint, Tripathi (2019) examines how macroeconomic factors contributed to rising housing prices. Rent, price-to-income ratio, price-to-rent ratio, urbanization, per-capita GDP, inflation, the proportion of the population aged 15–64, GDP growth rate, broad money, and real exchange rate all had a positive and statistically significant impact on real house prices, according to the analysis of random-effect models. The research however only focused on the effect of macroeconomic factors on housing prices, and holistically look at macroeconomic factors' impact on housing development.

Owuor, et al (2018) in their examination of the relationship between selected macro factors and mortgage market growth in Kenya, using quarterly secondary data from 2007 to 2016, established that the mortgage market growth in Kenya is influenced by interest rates and inflation. The study takes into cognizance, only macro factors influence on the mortgage market growth, without the intervention of mortgage finance.

Essia and Mba (2017) asserted that inadequacy of long term financing is responsible for the weak capacity for infrastructural development In Nigeria, as well as poor capital budget implementation, and disconnect of planning and budgeting, among other factors. His research is however a conceptual review, without empirical analysis to validate his position.

## 3. METHODOLOGY

### 3.1 Theoretical Framework

Having examined the lien theory of mortgage, urban spatial theory and investment base theory, this study adopts investment base theory as its theoretical foundations. The propriety of the theory is hinged on the fact that it views housing supply as a function of a number of economic factors such as actual house price, new building cost, land availability and finance availability (Okolie & Erhijakpor, 2020), contrary to the lien theory which focused only on mortgage financing and urban spatial theory that only take into cognizance, population density and availability of land.

Poterba's three (3) key assumptions underscores the assumption that housing development cannot only be affected finance, but equally price level, cost of borrowing, as well as demand for housing which is dictated by purchasing power. This is better demonstrated in Topel and Rosen (1988) development to Poterba's housing theory, which includes economic expectations such as interest rates, inflation rates, and their lag values. Given the slightly unfavorable macroeconomic environment in Nigeria, it may lead to high cost of building materials, causing the people to be unable to afford decent housing and as a result, may stiffen the efficacy of mortgage finance in causing housing development.

### 3.3 Model Specification

This research adjusted the mortgage finance variables for macroeconomic variable, to obtain mortgage finance and macroeconomic interactions variables (MACMLOAN, MACMINT and MACMEQU), as follows:

$HDel_t = \alpha o + \sum_{t=1}^{n} \alpha_1 MLoan_t * Int_t + MLoan_t * PCI_t + MLoan_t * Inf_t + \sum_{t=1}^{n} \alpha_2 MInt_t * Int_t + MInt_t * PCI_t + MInt_t * Inf_t + \sum_{t=1}^{n} \alpha_3 MEqu_t * Int_t + MEqu_t * PCI_t + MEqu_t * Inf_t + \varrho_t$ ……Eq 1

Equation 1 is rewritten as follows:

$HDel_t = \alpha o + \sum_{t=1}^{n} \alpha_1 MLoan_t * Int_t * PCI_t * Inf_t + \sum_{t=1}^{n} \alpha_2 MInt_t * Int_t * PCI_t * Inf_t + \sum_{t=1}^{n} \alpha_3 MEqu_t * Int_t * PCI_t + * Inf_t + \varrho_t$ ……Eq 2

Where:
HDel = Housing Delivery
MLoan = Mortgage Loan
Mint = Mortgage Interest Rate
MEqu = Mortgage Equity
PCI = Per Capita Income
ExchR = Exchange rate
Inf = Inflation rate
Int = Interest Rate (Int)
α = Coefficient of estimators
t = time period

The interaction variables are then regressed against the dependent variable using the Autoregressive Distribution Lag (ARDL). The paper adopts ARDL to enable analysis of the dynamic relationships that exists between the time series data, especially as the stationarity test indicates they are not stationary at levels (Hurley and Papanikolaou, 2021). It also enables the researcher test for cointegration among the variables of interest. Generation of interaction variable by multiplying two or more variables is rooted in statistical literatures (Cohen, Cohen, West and Aiken, 2003).

The ARDL model is specified as;

$\Delta LnHDEL_{(t)} = \delta_0 + \alpha_1 \Delta LnHDEL_{(t-1)} + \alpha_2 \Delta LnHDEL_{(t-2)} + \alpha_3 \Delta MACMLOAN_{(t)} + \alpha_4 \Delta MACMLOAN_{(t-1)} + \alpha_5 \Delta MACMINT_{(t)} + \alpha_6 \Delta MACMEQU_{(t)} + \alpha_7 \Delta MACMEQU_{(t-1)} + \delta_1 LnHDEL_{(t-1)} + \delta_2 LnHDEL_{(t-2)} + \delta_3 MACMLOAN_{(t)} + \delta_4 MACMLOAN_{(t-1)} + \delta_5 MACMINT_{(t)} + \delta_6 MACMEQU_{(t)} + \delta_7 MACMEQU_{(t-1)} + \varepsilon_t$

Where:

$LnHDEL_{(t)}$ is the dependent variable at time t.

$LnHDEL_{(t-1)}$ and $LnHDEL_{(t-2)}$ are the lagged values of the dependent variable.

$MACMLOAN_{(t)}$, $MACMLOAN_{(t-1)}$, $MACMINT_{(t)}$, and $MACMEQU_{(t)}$ and $MACMEQU_{(t-1)}$ are the current and lagged values of the interaction variables of mortgage loan, mortgage interest rate and mortgage equity, adjusted for macroeconomic factors).

*MACMloan = MLoan(Int*PCI*Inf)*

*MACMint = $MInt_t$(Int*PCI*Inf)*

*MACMequ = $MEqu_t$(Int*PCI*Inf)*

$\varepsilon_t$ is the error term at time t.

$\Delta$ is the change in variables over the past years.

$\alpha_0$, $\alpha_1$, $\alpha_2$, ..., $\alpha_7$ are the coefficients of the short run dynamic.

$\delta_1, \delta_2, \delta_3, \ldots \delta_7$ are the coefficients of the short run dynamic

### 3.3 Estimation Technique

This study employs time series data that covers a period of 17 years (2005-2022), transformed to quarterly data to obtain 68 observations. A number of diagnostic tests were conducted prior to the estimation of the specified model, they include unit root test, lag length selection and bound test. Model Estimation was carried out using Autoregressive Distributive Lag (ARDL) Regression

Analytical Technique. The Autoregressive Distributed Lag (ARDL) model is a widely used method for analyzing time series data relationships, thus suited for this research. It allows for simultaneous estimation of long-run and short-run relationships and ideal for small samples, in practical scenarios. The estimation procedure includes stationarity test, optimal lag length selection and bound test, before estimating the coefficient.

## 4. RESULTS AND DISCUSSION OF FINDINGS

### 4.1 Unit Root Test

**ADF Unit Root Test**

Intermediate ADF test results

| Series | Prob. | Lag | Max Lag |
|---|---|---|---|
| LnHDEL | 0.2813 | 1 | 1 |
| LnMLOAN | 0.3541 | 1 | 1 |
| LnMEQU | 0.1304 | 1 | 1 |
| LnMINT | 0.0034 | 1 | 1 |
| LnPCI | 0.1323 | 1 | 1 |
| INT | 0.0535 | 1 | 1 |
| INF | 0.0899 | 1 | 1 |

*Source: Authors' computation (2025) using Eviews 12*

The above table shows the result of the Augmented Dickey-Fuller (ADF) test, which is used to determine if a time series is stationary or has a unit root. The test is used to examine the null hypothesis that a series has a unit root (i.e., it is non-stationary) against the alternative hypothesis that the series is stationary. The ADF - Fisher Chi-square is 49.5027, with a p-value of 0.0073, while the Choi Z-stat is -2.31235, with a p-value of 0.0104. The p-values are used to determine whether the null hypothesis can be rejected. Since the p-value is less than the 5% level of significance, the null hypothesis is rejected, and the series is considered to be stationary.

However, the results indicate that some series individually have a p-value less than 0.05, indicating that they stationary. Specifically, mortgage interest (LnMINT) has a p-value of 0.0034 (< 0.05), interest rate (INT) has a p-value of 0.0535 (< 0.05). The other series LnHDEL, LnMLOAN, LnMEQU, LnPCI and INF) have p-values greater than 0.05, suggesting that these series may have a unit root or not likely to be stationary and may require differencing or other transformations to make them stationary before analyzing them, hence, the differencing.

### 4.2 Model Selection Table

| Model | LogL | AIC | BIC | HQ | Adj. R-sq | Specification |
|---|---|---|---|---|---|---|
| 15 | -0.376629 | 0.922079 | 1.260086 | 0.939387 | 0.705829 | ARDL(2, 1, 1, 0) |

*Source: Authors' computation (2025) using Eviews 12*

The table presents the model selection table for model 2, having consider the log likelihood of the model, which measures the goodness of fit of the model; Akaike Information Criterion (AIC), Bayesian Information Criterion (BIC), Hannan-Quinn criterion (HC) and adjusted R-squared values. The model with the best performance, which has a log likelihood of -0.376629, AIC of 0.922079, BIC of 1.260086, HQ of 0.939387, adjusted R-squared value of 0.705829, and is an ARDL(2, 1, 1, 0) model is the most well-fitting and best-performing model among the set of competing models.

**4.3 ARDL Bounds Test**

F-Bounds Test

| Test Statistic | Value | Signif. | I(0) | I(1) |
|---|---|---|---|---|
| | | | Asymptotic: n=1000 | |
| F-statistic | 10.03603 | 10% | 2.01 | 3.1 |
| K | 3 | 5% | 2.45 | 3.63 |
| | | 2.5% | 2.87 | 4.16 |
| | | 1% | 3.42 | 4.84 |
| | | | Finite Sample: n=35 | |
| Actual Sample Size | 16 | | | |
| | | 10% | -1 | -1 |
| | | 5% | -1 | -1 |
| | | 1% | -1 | -1 |
| | | | Finite Sample: n=30 | |
| | | 10% | -1 | -1 |
| | | 5% | -1 | -1 |
| | | 1% | -1 | -1 |

t-Bounds Test

| Test Statistic | Value | Signif. | I(0) | I(1) |
|---|---|---|---|---|
| t-statistic | 1.934059 | 10% | -1.62 | -3 |
| | | 5% | -1.95 | -3.33 |
| | | 2.5% | -2.24 | -3.64 |
| | | 1% | -2.58 | -3.97 |

*Source: Authors' computation (2025) using Eviews 12*

Table 4.3 shows the results of the ARDL bound test and long run result. It test for the presence of a long-run relationship among the variables of interest. Compared to critical values for I(0) and I(1) at various significance levels, the F-statistic exceeds the 10% critical value (2.01), which suggests that there is a long-term relationship among the variables, as it is above both 5% and 1% critical values. This implies that there is long run cointegration among the variables.

## 4.4 ARDL Estimation

This paper aims to establish the effect of macroeconomic variables in the relationship between mortgage finance and housing development. Each variables of mortgage finance were adjusted for macroeconomic influence. The dependent variable is housing delivery (LnHDEL), and the independent variables are MACMLOAN, MACMINT and MACMEQU, which are interaction variables generated by adjusting mortgage finance variables for macroeconomic variables. In the context of regression analysis and time series modeling, variables can be multiplied by two or more variables, to essentially create a new variable that captures the interaction or joint effect of those variables. The concept of interaction term in regression Analysis and interdependence: The idea of interactions between variables is rooted in econometric analysis (Gujarati, 2003).

The ARDL model is estimated as follows:

$$\text{LnHDEL}_{(t)} = \alpha_0 + \alpha_1 \textit{LnHDEL}_{(t-1)} + \alpha_2 \text{LnHDEL}_{(t-2)} + \alpha_3 \textit{MACMLOAN}_{(t)} + \alpha_4 \text{MACMLOAN}_{(t-1)} + \alpha_5 \textit{MACMINT}_{(t)} + \alpha 6 \text{MACMEQU}_{(t)} + \alpha_7 \text{MACMEQU}_{(t-1)} + \varepsilon_t$$

Where:

$LnHDEL_{(t)}$ is the dependent variable at time t.

$LnHDEL_{(t-1)}$ and $LNHDEL_{(t-2)}$ are the lagged values of the dependent variable.

$MACMLOAN_{(t)}$, $MACMLOAN_{(t-1)}$, $MACMINT_{(t)}$, and $MACMEQU_{(t)}$ and $MACMEQU_{(t-1)}$ are the current and lagged values of the independent variables.

$\varepsilon_t$ is the error term at time t.

$\alpha_0, \alpha_1, \alpha_2, ..., \alpha_7$ are the coefficients to be estimated.

**4.5 ARDL Short Run Result**

Dynamic regressors (2 lags, automatic): MACMLOAN MACMINT MACMEQU
Selected Model: ARDL(2, 1, 0, 1)

| Variable | Coeff. | Std. Error | t-Statistic | Prob.* |
|---|---|---|---|---|
| LnHDEL(-1) | 0.411181 | 0.150906 | 2.724744 | 0.0234 |
| LnHDEL(-2) | 0.646104 | 0.161316 | 4.005213 | 0.0031 |
| MACMLOAN | 0.003183 | 0.000555 | 5.732241 | 0.0003 |
| MACMLOAN(-1) | 0.000961 | 0.000608 | 1.580878 | 0.1484 |
| MACMINT | -0.005038 | 0.000850 | -5.929700 | 0.0002 |
| MACMEQU | 0.000163 | 0.000549 | 0.296992 | 0.7732 |
| MACMEQU(-1) | -0.000932 | 0.000579 | -1.611109 | 0.1416 |

| | |
|---|---|
| R-squared | 0.823497 |
| Adjusted R-squared | 0.705829 |
| Durbin-Watson stat | 2.530875 |

*Source: Authors' computation (2025) using Eviews 12*

The result of the ARDL, which sought to establish the interactive effect of macroeconomic variables in the relationship between mortgage finance and housing development. The dependent variable is LnHDEL and the independent variables are mortgage loan (MACMLOAN), mortgage interest (MACMINT) and mortgage equity (MACMEQU) interaction variables. The coefficients represent the estimated change in the dependent variable LnHDEL for a one-unit change in each of the independent variables, while controlling for the lagged values of the dependent variable and the other independent variables. The coefficients on the lagged values of LnHDEL ($LnHDEL_{(-1)}$ and $LnHDEL_{(-2)}$) are 0.411181 and 0.646104, respectively, which means that the current value of LnHDEL is influenced by its own lagged values.

The ARDL result above revealed that over 82% variation in housing delivery is explained by mortgage loan, mortgage equity and mortgage interest, influenced by macroeconomic factors such as inflation, interest rate, exchange rate and per capita income, with R-squared of 0.823497.

The coefficient of mortgage loan (0.003183; p-value 0.003) revealed that macroeconomic factors severely downplays the potency of mortgage loans in causing housing delivery, as the coefficient suggest a very weak positive but significant effect of mortgage loan, when influenced by macro factors. This impact is however delayed by one period, as the lagged value suggested.

The result also demonstrate a negatively weak but insignificant effect of mortgage equity interaction variable on housing delivery. This implies that the prevailing economic condition

in Nigeria stiffen the potency of mortgage equity contribution by prospective mortgagees in enhancing housing delivery.

Mortgage interest also showed a weak negative and significant effect on housing delivery, with a coefficient of -0.005038: p-value 0.002. This implies that a percentage increase in mortgage interest rate, given prevailing macroeconomic conditions, will lead to 0.5per cent decline in the level of housing delivery in Nigeria. Overall, the current value of housing delievry is influenced by its own lagged values, as well as by the current values of mortgage loan, interest and equity interaction variables.

**4.6 ARDL Long Run Result**

**Conditional Error Correction Regression**

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| LnHDEL(-1)* | 0.057285 | 0.029619 | 1.934059 | 0.0851 |
| MACMLOAN(-1) | 0.004144 | 0.000774 | 5.357443 | 0.0005 |
| MACMEQU(-1) | -0.000769 | 0.000500 | -1.537364 | 0.1586 |
| MACMINT** | -0.005038 | 0.000850 | -5.929700 | 0.0002 |
| D(LnHDEL(-1)) | -0.646104 | 0.161316 | -4.005213 | 0.0031 |
| D(MACMLOAN) | 0.003183 | 0.000555 | 5.732241 | 0.0003 |
| D(MACMEQU) | 0.000163 | 0.000549 | 0.296992 | 0.7732 |

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| MACMLOAN | -0.072341 | 0.038444 | -1.881719 | 0.0926 |
| MACMEQU | 0.013423 | 0.010271 | 1.306874 | 0.2237 |
| MACMINT | 0.087945 | 0.047597 | 1.847709 | 0.0977 |

EC = 0.057285 – **(**-0.072341* 0.004144 + 0.013423*-0.000769 + 0.087945*-0.005038) = 0.057132 *Source: Authors' computation (2025) using Eviews 12*

The ARDL long run result shows the long run relationship between the dependent variable and the independent variables. The coefficients of mortgage loan interaction variable (MACMLOAN) at 0.004144 (significant at 0.5%) depicts a weak positive and significant effect of mortgage loan, influenced by macroeconomic factors on housing delivery in the long run. Mortgage equity however still maintained an insignificantly negative effect on housing delivery in the long run.

Mortgage interest (MACMINT), with a coefficient of -0.005038 (significant at 0.2%), reflect a weak negative and significant effect on housing delivery in the long run. The error correction term of 0,057132 indicates the speed of adjustment required to restore housing delivery to equilibrium, considering the interactive effect of mortgage finance and macroeconomic factors. The small nature of the error term implies that housing delivery will adjust gradually to reach its equilibrium level, with a correction of about 5.71% of the deviation from equilibrium, indicating a minor impact of the interaction variables on housing delivery.

**4.7 Discussion of Findings**

The findings from this research reveal a significantly negative interactive effect of macroeconomic factors in the relationship between mortgage finance and housing development both in the short run and long run, especially for mortgage loan and mortgage interest rate. This is reflected in the very weak positive effect of mortgage loan on housing development, when influenced by macroeconomic factors. Ditto, mortgage equity also reflect a negative effect on housing development with the interference of macroeconomic factors with the interference of

macroeconomic variables, however, it is insignificant. Macroeconomic factors equally influenced a negative effect of mortgage interest on housing development (-0.000932), in the short and long run.

The weak positive effect of mortgage loans on housing delivery implies that despite the potentials of mortgage loans by the Federal Mortgage Bank of Nigeria to mortgagees, the consequential home delivery with such funds are significantly downplayed by unfavorable macroeconomic conditions. This indicates that the potency of mortgage financing as a tool for enhancing housing delivery in Nigeria is constrained in the presence of unfavorable macroeconomic factors such as inflation, interest rates and economic per capita income. While this aligns with findings of literatures (Nataliya, et al, 2023; Laura, et al, 2023), it is contrary to the findings of Udensi, et al (2024), who posited that rise in income levels drive demand raises house prices.

The significant negative effect of mortgage interest rates on housing delivery validates the hindrance high borrowing costs could cause to financing for housing projects. Findings from this study suggest that high mortgage rates can deter potential homeowners from purchasing homes and can lead to a slowdown in housing construction and development activities. This aligns with the positions of Ding (2022), Tripathi (2019) and Owuor, et al (2018), who reported an inverse relationship between interest rate and house prices.

The insignificant effect of mortgage equity interaction variable signals the ineffectiveness of the reliance on mortgage equity as a financing source to drive housing delivery in Nigeria, given the prevailing economic reality. The 2.5% statutory deduction as contribution into the National Housing Fund by Nigerian workers appears to be grossly ineffective to mobilize the required funding to fill the huge housing deficit in the country, resulting in limited access to capital through equity by prospective homeowners.

## 5. CONCLUSION AND POLICY RECOMMENDATION

Mortgage loans remains a vital source of funding for the housing development, but in order to fully realize their potential, significant changes to the macroeconomic environment are required. The results validate that, in order to improve housing delivery in Nigeria, macroeconomic stability must be given cognizance in housing financing policy, while equally reviewing the Nigerian housing financing framework to match the economic reality of the country.

This research established that macroeconomic conditions act as moderating factors affecting the potency of mortgage loans on housing delivery. The regression analysis revealed that mortgage finance effectiveness is eroded under unfavorable macroeconomic conditions.

The research therefore recommends that the Federal government of Nigeria, through the Central Bank of Nigeria should ensure economic stability, while equally creating conducive environments for mortgage lending by implementing policies aimed at stabilizing inflation rates. The Federal Ministry of Housing, through the Federal Mortgage Bank of Nigeria should review the framework for the National Housing Fund, as the 2.5% monthly statutory deduction has become grossly inadequate to secure a matching loan for house construction under prevailing economic reality. The Federal Mortgage Bank should equally reduce mortgage interest rates and provide incentives for mortgage lending to stimulate housing delivery, both in the formal and informal sector.

## REFERENCES


Adedeji, I. , Deveci, G. and Salman, H. (2023) The Challenges in Providing Affordable Housng in Nigeria and the Adequate Sustainable Approaches for Addressing Them. *Open Journal of Applied Sciences*, 13, 431-448. doi: 10.4236/ojapps.2023.133035.

Ahiadorme, J. (2016). Assessing the interaction between the macro economy and the mortgage market: evidence from Ghana. *International Journal of Contemporary Applied Sciences, 3*(10), 40-53.

Anidiobu, G., Okolie, P. & Ugwuanyi, W. (2018). Effect of mortgage finance on housing delivery in Nigeria: the primary mortgage institution (PMI) perspective. *Journal on Banking Financial Services & Insurance Research.* 8(2), 36-51.

Awe, C., Adeboye, A., Akinluyi, M., Okeke, F., Yakubu, S. & Awe, F. (2023). Assessment of the relationship between housing quality and income in urbanizing city of Ado-Ekiti, Nigeria. *World Journal of Advanced Research and Reviews*, 2023, 18(02), 969–978. DOI: https://doi.org/10.30574/wjarr.2023.18.2.0941

Bet, M. (2011). Effects of inflation and interest rates on mortgage finance offered by commercial banks in Kenya. A Research Project Submitted in Partial Fulfilment of the Requirements for the award of Masters Degree in Business Administration, University of Nairobi, Kenya. https://erepository.uonbi.ac.ke/bitstream/handle/11295/58539/Bett_Effects%20of%20inflation.pdf?sequence=3

Behr, D. M., Chen, L., Goel, A., Haider, K. T., Singh, S., & Zaman, A. (2021). Introducing the Adequate Housing Index: A New Approach to Estimate the Adequate Housing Deficit within and across Emerging Economies (Policy Research Working Paper 9830). Retrieved from the World Bank Group Open Knowledge Repository https://openknowledge.worldbank.org/handle/10986/36481

Budget Office of the Federation (2024). 2024 Appropriation Act. Retrieved from https://www.budgetoffice.gov.ng/index.php/2024-appropriation-act/2024- appropriation-act/download Federal Ministry of Finance Budget and Planning (2020). Reviewed National Integrated Infrastructure Master Plan. Federal Republic of Nigeria.

Boamah, N. (2009). Secondary mortgage market (SMM): Is it right for financing housing in Ghana? *Journal of Science and Technology*, Vol. 29(1), 17-29

Brealey, R., Stewart, C. & Franklin, A. (2006). *Principles of corporate finance*. New York.

Cohen, J., Cohen, P., West, S. G., & Aiken, L. S. 2003. *Applied multiple regression/correlation analysis for the behavioral sciences*, 3rd edn. Mahwah, NJ: Erlbaum.

Di Pasquale, D., & Wheaton, W. (1994). Housing market dynamics and the future of housing prices. Journal of Urban Economics, 35, pg 1-27. doi:10.1006/juec.1994.1001

Ding, X. (2022), Macroeconomic factors affecting housing prices: take the United States as an example. *Advances in Economics, Business and Management Research,* 211(1), 2335-2340.

Dobson, P. (1976). *Titles and priorities: An analysis of the mortgage instrument*. Journal of Finance and Real Estate, 4(1), 23-35.

Ekeocha, D., Ogbuabor, J., Ekeocha, P. & Orji, A. (2023), Analysis of sectoral outcomes and institutional quality nexus in Sub-Saharan Africa.

Essia, U. and Mba, P. (2017). Financing Model for Sustainable Development of Infrastructures in Nigeria. *Journal of Economics and Allied Research.* 2, (1), 35-51.

Etyang, D. & Mwengei, O. (2019). Mortgage financing on performance of real estate sector in Kisumu city, Kenya. *International Journal of Recent Research in Commerce Economics and Management (IJRRCEM)*. 6, (3), 141-155.

Faye, N. and Obah-Akpowoghaha, N. (2023). An Assessment of the Social Protection Project: The Gambia Social Safety Net Programmes and the Standard of Living in the Country. *Journal of Economics and Allied Research* 8(1), 70-83

Gujarati, D. N. (2004)**.** *Basic Econometrics* (4th ed.). McGraw-Hill.

Hoang, N., Thanh, N., Duc, M., Thuy, V. Thuy, M. (2020). Factors Affecting Real Estate Prices: Evidence from Macroeconomic Data In Vietnam. *Journal of Southwest Jiaotong University*. Vol 55(4), 1-15 . DOI:https://doi.org/10.35741/issn.0258-2724.55.4.65

Hurley, D. and Papanikolaou, N. (2021). Autoregressive Distributed Lag (ARDL) analysis of U.S.-China commodity trade dynamics. Quarterly Review of Economics and Finance, Vol. 81, 454-467. https://doi.org/10.1016/j.qref.2020.10.019

Iwundu, C. (2022). Mortgage financing and economic growth in Nigeria during 1996 – 2020. *Asian Journal of Economics, Finance and Management* 4(1), 337-345.

Jiatong, L. (2020), The effects of macroeconomic factors on housing prices in china: empirical research and linear regression analysis. *Advances in Economics, Business and Management Research,* Vol. 155, 471-474

Kama, U., Yakubu, J., Bewaji, P., Adigun. M., Adegbite, O. & Elisha, O. (2013). Mortgage financing in Nigeria. *Central Bank of Nigeria Occasional Paper* No. 50

Laura, V., Patrik, G., Marina, M. & Petia, T. (2023), European housing market at a turning point – risks, households and banks vuLnerabilities, and policy options. *IMF Working Paper,* WP/23/76.

Małgorzata, R. and Radosław, W. (2013). The Impact of Macroeconomic Factors on Residential Property Price Indices in Europe. *Folia Oeconomica Stetinensia.* 12(2), 103-123. DOI: 10.2478/v10031-012-0036-3.

McDonald, D. & Thornton, D. (2008), A primer on the mortgage market and mortgage finance. *Federal Reserve Bank of St. Louis Review, January/February 2008,* 90(1), 31-45.

Mondal, B. & Dipendra, N. (2018). "How residential compactness and attractiveness can be shaped by environmental amenities in an industrial city?" 41(1), 363-377.

Nataliya, B., Philipp, H. & Anne, K. (2023). No reason to worry about german mortgages? an analysis of macroeconomic and individual drivers of credit risk. *Journal of Financial Services Research.* Vol. 64(1), 369–399. https://doi.org/10.1007/s10693-023-00409-3

Nigeria Economic Summit Group (NESG) (2024). APRIL 2024 Bridging the Housing and Urban Development Divide. *Infrastructure Policy Commission Whitepaper.*

Nuri, S. & Nothaft, F. (2017). The role of affordable mortgage in improving living standard and stimulating growth; A survey of MENA countries. *IMF Working Paper WP/02/17*

Nuria, R. (2018). Mortgage finance and culture. *Regional Review.* 58(4), 786-821. https://doi.org/10.1111/jors.12385

Nwachukwu, O., Ibrahim, M., Lawal, K. and Abdulahi, T. (2024). Cooperative Societies and Promotion of Sustainable Development in Southwest Nigeria. *Journal of Economics and Allied Research.* 9(4), 83-97.

Okolie, J. & Erhijakpor, E. (2020). Mortgage financing and housing development: evidence from Nigeria. *DELSU Journal of Management Science (DELJOMS).* (2)1, 132-151

Olanrewaju, S. & Oyebiyi, S. (2016). Role of mortgage bank in housing production. *International Journal of Engineering and Innovative Technology (IJEIT).* (6)2, 1-14 *DOI:10.17605/OSF.IO/U5XKR.*

Owuor, N., Githii, W., Mwangi, M. (2018). The Relationship Between Macroeconomic Factors and Mortgage Market Growth in Kenya. *European Scientific Journal*. 14(10),.68-83). Doi: 10.19044/esj.2018.v14n10p68 URL:http://dx.doi.org/10.19044/esj.2018.v14n10p68.

Pedro, I. and Adesina-Uthman, G. A. (2022). Modelling the Effect of the Central Bank Balance Sheet Policy on Disaggregated Inflation in Nigeria: A Non-Linear ARDL Approach. *Journal of Economics and Allied Research* 7(2), 111-131.

Rosen, S. and Topel, R. (1988). A time series model of Housing Investment in the U.S. *National Bureau of Economic Research*. Working paper series 1818.

Siyan, P., Adegoriola, A. & Erivwode, O. (2019). The development of mortgage finance in nigeria and its impact on the economy. *International Multilingual Journal of Science and Technology (IMJST).* 4(3), 455-467.

Stanković, D. (2022).Analysis of the Impact of Macroeconomic Factors on Real Estate Prices in Bosnia and Herzegovina. *Innovative and Economics Research Journal.* 10(2), 147-160. DOI: https://doi.org/10.2478/eoik-2022-0015

Udensi, I. U., Oyama, O. S. and Abbey, M. E. (2024). Impact of Housing Supply, Income Levels and Macroeconomic Factors on Housing Prices in Nigeria. *Global Academic Journal of Economics and Business.* 6(6), 140-155. D**OI:** https://doi.org/10.36348/gajeb.2024.v06i06.001. Available online at https://www.gajrc.com.

United Nations Global Goal. Sourced from https://www.globalgoals.org/goals/11-sustainable-cities-and-communities/ on 14/07/2022

Uwaegbulam, C. Nwannekanma, B. & Gbonegun, V. (2019). How non-implementation of local building materials' policy is worsening housing delivery. Available at: https://guardian.ng/property/how-non-implementation-of-local-building-materials-policyis-worsening-housing-delivery.

Uwatt, B. (2019). Housing sector, economic growth and development: conceptual issues and theoretical underpinnings. *Central Bank of Nigeria Economic and Financial Review.* (57)4, 1-17.

Warnock, V. and Warnock, F. (2008). Market and housing finance. *Journal of Housing Economics,* 17, 239-251.

World Bank (2019), Nigeria affordable housing project.*Working paper P165296.*

World Bank (2024). Energy Efficient Housing Finance (GreenHF) Program - Global Benchmark Report.