

# MORTGAGE FINANCING AND SUSTAINABLE HOUSING DEVELOPMENT IN NIGERIA

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## ABSTRACT

This study examines the effect of mortgage financing on sustainable housing development in Nigeria, with emphasis on mortgage loans, institutional coverage, mortgage repayment-to-income ratio, and macroeconomic stability. Using an ex-post facto research design and annual time-series data, the study applies the Autoregressive Distributed Lag (ARDL) model and Error Correction Mechanism (ECM) to assess both long-run and short-run relationships. The ARDL bounds test confirms the existence of a long-run equilibrium relationship among the variables, while the error correction term indicates a rapid adjustment to equilibrium. The findings reveal that mortgage loans have a positive but weak impact on housing stock, reflecting the shallow nature of Nigeria's mortgage market, whereas institutional coverage and mortgage repayment-to-income ratio significantly influence housing stock with lagged effects, highlighting the roles of institutional efficiency and affordability. Macroeconomic stability emerges as the most significant determinant of housing stock growth. The study recommends deepening the mortgage market, strengthening institutional frameworks, improving housing affordability, and maintaining macroeconomic stability to achieve sustainable housing development in Nigeria.

**Keywords:** Mortgage financing; housing development; housing stock; ARDL model; Nigeria

## 1. Introduction

Housing is a fundamental component of human welfare and sustainable socio-economic development. It improves living standards, enhances health outcomes, and stimulates economic growth through its linkages with the construction, manufacturing, and financial sectors (UN-Habitat, 2011; Sachs, 2015). Consequently, access to adequate and affordable housing is central to achieving the Sustainable Development Goals (SDGs), particularly Goal 11 on sustainable cities and communities (United Nations, 2015). Mortgage financing is widely regarded as an important mechanism for promoting homeownership and supporting housing investment by providing access to long-term housing credit (Diamond & Lea, 1992; Green & Wachter, 2005). In developed economies, efficient mortgage markets have significantly supported housing development and economic growth. However, in many developing countries, including Nigeria, mortgage markets remain underdeveloped due to high lending costs, weak institutional and legal frameworks, limited access to long-term finance, and persistent macroeconomic instability (Warnock & Warnock, 2008; Buckley & Kalarickal, 2005).

Despite housing finance reforms, including the establishment of the Federal Mortgage Bank of Nigeria (FMBN) and the Nigeria Mortgage Refinance Company (NMRC), Nigeria continues to face a housing deficit exceeding 20 million units (CBN, 2022; World Bank, 2020). Limited mortgage penetration, affordability challenges, rapid urbanization, and institutional inefficiencies have constrained sustainable housing delivery, making homeownership inaccessible to many households (Olotuah & Bobadoye, 2009; Ogunleye, 2019). The relationship between mortgage finance and housing development remains widely debated. While many studies report that mortgage finance promotes housing development (Green & Wachter, 2005), others argue that its effectiveness depends largely on institutional quality, affordability, and macroeconomic stability (Millanzi, 2025; Nwachukwu, Rodrigues, & Kiamba, 2023). In Nigeria, empirical findings remain fragmented because many studies focus on single mortgage finance indicators or use relatively short datasets, providing limited evidence on the combined influence of financial, institutional, and macroeconomic factors on housing development (Abdulrauf, Ibrahim, & Quadri, 2025; Ibrahim, Abdulrauf, & Quadri, 2025).

This study addresses these gaps by examining the effect of mortgage financing on sustainable housing development in Nigeria using annual time-series data from 1992 to 2022. Specifically, it integrates mortgage loans, institutional coverage, mortgage repayment-to-income ratio, and macroeconomic stability within a unified ARDL framework to estimate both the short-run and long-run relationships among the variables. The study therefore contributes updated empirical evidence and provides policy recommendations for strengthening mortgage finance and promoting sustainable housing development in Nigeria. The remainder of the paper is structured as follows: section two presents the literature review, section three presents the methodology of the study, section four presents the results and discussion of the result, while section five concludes and recommends.

## 2. Literature Review

### Theoretical Foundation

The study is anchored primarily on Housing Finance Theory, complemented by Sustainable Development Theory, Financial Intermediation Theory, Housing Demand Theory, Life-Cycle Hypothesis, Institutional Theory, Financial Liberalization Theory, and Financial Repression Theory. Housing Finance Theory (Jones, 1963; Lea, 1999) provides the central foundation by establishing that accessible, affordable, and efficient long-term finance facilitates housing acquisition, investment, and expansion of housing stock. Accordingly, mortgage loans (ML) represent the principal financing channel through which funds are mobilized for housing development, while institutional coverage (IC) reflects the reach and capacity of mortgage-financing institutions to intermediate and deliver such finance. Financial Intermediation Theory (Gurley & Shaw, 1960; Diamond, 1984) reinforces this relationship by explaining how financial institutions mobilize funds, manage risks, reduce transaction costs, and channel long-term resources into housing

investment. Institutional Theory (North, 1990; Williamson, 1985) further suggests that the effectiveness of this process depends on the quality of the institutional and regulatory environment.

The household-affordability dimension is explained by Housing Demand Theory (Muth, 1969; Rosen, 1974) and the Life-Cycle Hypothesis (Modigliani & Brumberg, 1954). These perspectives establish that housing demand depends partly on household income, access to credit, and the burden of mortgage repayment. Thus, the mortgage repayment-to-income ratio (MRTI) captures the affordability constraint through which mortgage obligations may influence effective housing demand and, consequently, housing stock. Sustainable Development Theory (WCED, 1987; Sachs, 2015) provides the broader normative framework by viewing housing development in terms of economic efficiency, social equity, and environmental sustainability. Accordingly, housing stock (HS) serves as the study's observable proxy for sustainable housing development, representing the physical expansion of housing supply within the broader objective of improving housing welfare.

Financial Liberalization Theory (McKinnon, 1973; Shaw, 1973) complements these perspectives by emphasizing the importance of efficient financial markets and reduced financial distortions for mobilizing savings and allocating long-term credit to productive investment. However, Financial Repression Theory provides an important explanation for why the effectiveness of the mortgage-financing variables may depend heavily on the broader macroeconomic environment. Persistent inflation, exchange-rate instability, financial distortions, and economic uncertainty can increase the cost and risk of long-term lending, weaken household purchasing power, and limit the ability of mortgage institutions to transform available finance into housing investment. In this study, macroeconomic stability (MACS) therefore represents the enabling macroeconomic environment within which mortgage finance operates.

Collectively, the theoretical framework establishes a coherent transmission mechanism: mortgage loans provide financial resources; mortgage institutions facilitate their intermediation; household affordability determines effective demand; institutional quality shapes the efficiency of the financing system; and macroeconomic stability creates the environment within which these mechanisms can function effectively. This integrated framework therefore provides a theoretically grounded basis for examining the short-run and long-run effects of mortgage financing and macroeconomic conditions on sustainable housing development in Nigeria.

## Empirical Literature Review

Housing finance provides the long-term capital required for housing acquisition and construction. Housing Finance Theory (Jones, 1963; Lea, 1999) and Financial Intermediation Theory (Gurley & Shaw, 1960; Diamond, 1984) suggest that accessible mortgage credit and effective financial institutions facilitate housing investment by mobilizing savings, reducing transaction costs and managing risk. However, evidence indicates that mortgage-market development depends not only on credit volume but also on institutional quality, affordability, property rights, regulation and macroeconomic stability (Warnock & Warnock, 2008; Lea, 2010). These constraints are particularly pronounced in developing economies, where mortgage markets are often shallow, borrowing costs high, long-term funding limited and formal employment and property-registration systems weak.

Comparative evidence from Ghana, Kenya and Nigeria demonstrates the importance of these contextual factors. Ghana's experience highlights the importance of regulatory and foreclosure reforms (Boamah, 2011), while Kenya's experience underscores the roles of land registration, market infrastructure and secondary mortgage-market development. Nigeria exhibits similar constraints, including high mortgage costs, limited penetration and institutional weaknesses.

Affordability is another important transmission mechanism. Housing Demand Theory (Muth, 1969; Rosen, 1974) and the Life-Cycle Hypothesis (Modigliani & Brumberg, 1954) indicate that access to mortgage credit must be considered alongside household income and repayment capacity. A high mortgage repayment-to-income ratio (MRTI) can restrict

effective housing demand, while greater institutional coverage (IC) may improve access to finance only where institutions are sufficiently effective and supported by efficient land administration, regulation and contract enforcement.

Sustainable housing further extends the analysis beyond the quantity of housing supplied. Sustainable Development Theory (WCED, 1987) conceptualizes sustainability around economic viability, social equity and environmental responsibility. Mortgage finance can therefore contribute to sustainable housing only when it supports housing that is accessible, economically viable and environmentally responsible.

Macroeconomic stability cuts across these dimensions because mortgage finance involves long-term commitments. Inflation and exchange-rate volatility can reduce household purchasing power, increase construction costs and financing risks, while weak economic conditions can constrain both mortgage demand and supply. Financial Repression Theory consequently suggests that macroeconomic and financial instability can weaken the effectiveness of credit and financial intermediation.

### Synthesis and Research Gap

The literature broadly establishes that mortgage finance, institutional effectiveness, affordability and macroeconomic stability influence housing development, while sustainable housing encompasses economic, social and environmental considerations. However, the extent to which mortgage-credit expansion independently increases housing supply in developing economies remains contested, particularly where mortgage markets are shallow and macroeconomic conditions unstable. Existing studies also tend to examine individual dimensions of mortgage finance rather than jointly considering credit volume, institutional coverage, repayment affordability and macroeconomic stability.

This study addresses these gaps by jointly examining mortgage loans, institutional coverage, mortgage repayment-to-income ratio and macroeconomic stability in Nigeria using annual data for 1992–2022 and an ARDL–ECM framework. It distinguishes between short-run and long-run relationships and thereby moves beyond asking whether mortgage finance matters to examining the conditions under which mortgage finance can effectively translate into housing-stock growth in Nigeria.

## 3. Methodology

### Research Design

The study adopts an ex-post facto research design using annual time-series data. It is based on analytical examination of the dependent and independent variables. The independent variables — mortgage loan, institutional coverage, mortgage repayment-to-income ratio, and macroeconomic stability — are studied in retrospect for seeking possible relations and the likely effects that changes in these variables produce on the dependent variable, housing stock.

### Sources of Data and Analytical Framework

The study employs annual secondary time-series data covering the period 1992–2022 to examine the relationship between mortgage financing and sustainable housing development in Nigeria. The data were collected from credible national and international sources, including the Central Bank of Nigeria (CBN) Statistical Bulletin, Federal Mortgage Bank of Nigeria (FMBN) Annual Reports, National Bureau of Statistics (NBS), World Bank World Development Indicators (WDI), and Helgi Library database. The variables comprise housing stock as the proxy for sustainable housing development, while mortgage loans, institutional coverage, mortgage repayment-to-income ratio, and macroeconomic stability serve as the explanatory variables.

The study adopts the Autoregressive Distributed Lag (ARDL) modeling technique to estimate both the short-run and long-run effects of mortgage financing on sustainable housing development. The ARDL approach is appropriate because

it accommodates variables integrated of mixed orders,  $I(0)$  and  $I(1)$ , and provides efficient estimates for relatively small samples. The empirical analysis begins with descriptive statistics and unit root tests, followed by the ARDL bounds test for cointegration. Where a long-run relationship exists, the long-run coefficients and the associated Error Correction Model (ECM) are estimated to examine the speed of adjustment towards equilibrium following short-run disturbances.

**Table 1: Measurement of Variables**

| Variable                                  | Proxy/Measurement                                                                        | Unit of Measurement                 | Data Source                                                              |
|-------------------------------------------|------------------------------------------------------------------------------------------|-------------------------------------|--------------------------------------------------------------------------|
| Housing Stock (HS)                        | Total annual housing stock (proxy for sustainable housing development)                   | Natural Log of Housing Units (LnHS) | National Bureau of Statistics (NBS)                                      |
| Mortgage Loan (ML)                        | Total mortgage loan disbursed                                                            | Natural Log of ₦Billion (LnML)      | Federal Mortgage Bank of Nigeria (FMBN), Helgi Library                   |
| Institutional Coverage (IC)               | Number of mortgage finance institutions/branches providing mortgage services             | Number of institutions              | Central Bank of Nigeria (CBN), FMBN Annual Report                        |
| Mortgage Repayment-to-Income Ratio (MRTI) | Annual mortgage repayment as a percentage of household income                            | Percentage (%)                      | Computed from FMBN mortgage terms and NBS income data                    |
| Macroeconomic Stability (MACS)            | Composite index constructed from inflation rate, exchange rate stability, and GDP growth | Index (0–100)                       | Central Bank of Nigeria (CBN), World Development Indicators (World Bank) |

Source: Author's compilation, 2026.

### Construction of Macroeconomic Stability Index (MACS)

The Macroeconomic Stability Index (MACS) was constructed as a composite measure of Nigeria's macroeconomic environment using three indicators: exchange-rate volatility, inflation volatility and real GDP growth. Exchange-rate and inflation volatility were treated as inverse indicators of stability, while GDP growth was treated as a direct indicator. Each variable was normalized to a common 0–100 scale using the min–max normalization technique to eliminate differences in measurement units. The normalized indicators were then assigned equal weights and averaged to obtain the composite MACS, with higher values indicating greater macroeconomic stability.

### Model Specification

The functional relationship is specified as  $HS = f(ML, IC, MRTI, MACS)$ . The study adapted the model of Ibrahim et al. (2025) in a study that investigated mortgage finance, macroeconomic factors and housing development in Nigeria. The interaction variables are regressed against the dependent variable using the Autoregressive Distribution Lag (ARDL). The paper adopts ARDL to enable analysis of the dynamic relationships that exist between the time series data, and to enable the test for cointegration among variables of interest.

In the model,  $LGHS$  denotes the natural logarithm of housing stock;  $LGML$  is the natural logarithm of mortgage loans;  $LIC$  represents institutional coverage;  $MRTI$  denotes the mortgage repayment-to-income ratio; and  $LMACS$  represents the transformed macroeconomic stability index. The symbol  $\Delta$  (Delta) denotes the first-difference operator, with the differenced terms capturing the short-run dynamics while the lagged level terms constitute the long-run component used in the ARDL bounds-testing procedure. The specification permits the dependent and explanatory variables to enter the model with different lag lengths, making the ARDL approach suitable for examining the dynamic relationship between mortgage financing and sustainable housing development.

## 4. Results and Discussion of Findings

### Unit Root Test

Table 2 reveals the unit root test results on the variables.

**Table 2: Unit Root Test Results**

| Variable | ADF Stat  | P-value | Order (ADF) | PP Stat   | P-value | Order (PP) | Assumption |
|----------|-----------|---------|-------------|-----------|---------|------------|------------|
| ln_HS    | -5.732843 | 0.0003  | I(0)        | 4.779926  | 0.0000  | I(0)       | With Trend |
| ln_ML    | -4.433383 | 0.0081  | I(1)        | -4.291941 | 0.0104  | I(1)       | With Trend |
| IC       | -7.473962 | 0.0000  | I(1)        | -5.914964 | 0.0002  | I(1)       | With Trend |
| MRTI     | -7.096068 | 0.0000  | I(0)        | -3.952124 | 0.0219  | I(0)       | With Trend |
| MACS     | -6.238987 | 0.0001  | I(1)        | -7.879599 | 0.0000  | I(1)       | With Trend |

Source: Author's computation (2026) using E-View 12.

Both the ADF and the PP test results showed that housing stock and mortgage repayment-to-income ratio are stationary at levels I(0) while mortgage loan, institutional coverage, and macroeconomic stability index are stationary at first difference I(1). Therefore, both the ADF and PP unit root test results revealed a mixed order of stationarity among the variables.

### ARDL Bound Test

**Table 3: ARDL F-Bound Test Result**

| Test Statistic | Value    | Significance | I(0) | I(1) |
|----------------|----------|--------------|------|------|
| F-statistic    | 14.03378 | 10%          | 3.03 | 4.06 |
| K              | 4        | 5%           | 3.47 | 4.57 |
|                |          | 2.5%         | 3.89 | 5.07 |
|                |          | 1%           | 4.40 | 5.72 |

Source: Author's computation (2026) using E-View 12.

Since there is a mixed order of stationarity among the variables (see Table 2 above), the ARDL bounds test is considered appropriate in determining the long-run cointegration relationship among the variables in line with Pesaran, Shin and Smith (2001). The F-statistic is used to determine the direction of cointegration of the model (Pesaran et al., 2001). The decision rule is that if the F-statistic is less than the lower bound I(0), there is only a short-run joint movement among the variables, and if the F-statistic is greater than the upper bound at I(1), there is a long-run cointegrating relationship among the variables. If it falls in between both values, then the test is indeterminate. Table 3 reveals that the F-statistic (14.03378) is greater than the upper bound I(1) at all levels of significance. Therefore, there is a long-run co-integration between growth of housing stock and the explanatory variables.

### ARDL Long-run Model

**Table 4: ARDL Long-run Result**

| Variable  | Coefficient | Std. Error | t-Statistic | Prob.  |
|-----------|-------------|------------|-------------|--------|
| LGHS(-1)* | -0.064357   | 0.018252   | -3.526082   | 0.0031 |
| LGML**    | 0.000172    | 8.94E-05   | 1.922840    | 0.0737 |

| Variable               | Coefficient | Std. Error | t-Statistic | Prob.  |
|------------------------|-------------|------------|-------------|--------|
| IC(-1)                 | -4.96E-08   | 2.51E-07   | -0.197819   | 0.8458 |
| MRTI(-1)               | 0.000435    | 0.000338   | 1.287318    | 0.2175 |
| MACS(-1)               | 8.40E-07    | 2.53E-07   | 3.313094    | 0.0047 |
| D(LGHS(-1))            | 1.171461    | 0.089335   | 13.11313    | 0.0000 |
| D(IC)                  | -3.27E-07   | 2.37E-07   | -1.383081   | 0.1869 |
| D(IC(-1))              | -4.18E-07   | 1.24E-07   | -3.364919   | 0.0043 |
| D(MRTI)                | 0.000166    | 0.000180   | 0.919688    | 0.3723 |
| D(MRTI(-1))            | -0.000338   | 0.000184   | -1.838443   | 0.0859 |
| D(MACS)                | -3.49E-07   | 2.77E-07   | -1.259917   | 0.2269 |
| D(MACS(-1))            | -8.96E-07   | 2.42E-07   | -3.699089   | 0.0021 |
| Long-run coefficients: |             |            |             |        |
| LGML                   | 0.002671    | 0.001773   | 1.506564    | 0.1527 |
| IC                     | -7.71E-07   | 4.03E-06   | -0.191239   | 0.8509 |
| MRTI                   | 0.006753    | 0.005774   | 1.169682    | 0.2604 |
| MACS                   | 1.30E-05    | 4.60E-06   | 2.839090    | 0.0124 |

Source: Author's computation (2026) using E-View 12.

The long-run ARDL estimates reported in Table 4 indicate that macroeconomic stability (LMACS) is the only variable that exerts a positive and statistically significant effect on housing-stock growth in Nigeria, confirming that a stable macroeconomic environment is the principal long-run driver of sustainable housing development. This finding implies that lower macroeconomic uncertainty, reflected in greater price stability, exchange-rate stability and improved economic performance, provides favorable conditions for housing investment and construction. The result supports Financial Repression Theory, which argues that macroeconomic instability weakens financial intermediation and limits the effectiveness of long-term credit markets.

By contrast, the coefficient of mortgage loans (LGML) is positive but statistically insignificant, indicating that although increases in mortgage lending are associated with higher housing stock, the effect is not sufficiently strong to influence long-run housing development significantly during the study period. This suggests that expanding mortgage-credit volume alone is insufficient to stimulate sustainable housing growth where structural and macroeconomic constraints persist.

Similarly, institutional coverage (LIC) exhibits a positive but statistically insignificant coefficient. Although the positive sign suggests that a wider institutional presence may improve access to mortgage finance, the absence of statistical significance indicates that expanding the number or geographical reach of mortgage institutions does not automatically translate into greater housing development. This finding highlights the distinction between institutional quantity and institutional quality: sustainable housing outcomes depend more fundamentally on the effectiveness of institutions in delivering affordable mortgage products, enforcing lending standards, reducing transaction costs, improving loan accessibility and operating within a stable regulatory environment.

The coefficient of the mortgage repayment-to-income ratio (MRTI) is negative but statistically insignificant, suggesting that higher mortgage repayment burdens tend to reduce housing-stock growth, although the effect is not statistically strong in the long run. The negative sign is consistent with housing-demand theory, which posits that higher repayment obligations reduce household affordability and discourage mortgage uptake.

Overall, the long-run results indicate that improvements in mortgage-credit volume and institutional expansion, while desirable, are insufficient on their own to drive sustained housing-stock growth. Rather, their effectiveness depends on a stable macroeconomic environment that enhances investor confidence, lowers financing risk and enables the mortgage-finance system to function efficiently.

## ARDL Short-run Test

**Table 5: Error Correction Model**

| Variable     | Coefficient | Std. Error | t-statistic | Prob.  |
|--------------|-------------|------------|-------------|--------|
| D(LGHS(-1))  | 1.171463    | 0.026175   | 44.75507    | 0.0000 |
| D(IC)        | -3.27E-07   | 1.24E-07   | -2.647485   | 0.0183 |
| D(IC(-1))    | -4.18E-07   | 9.03E-08   | -4.635120   | 0.0003 |
| D(MRTI)      | 0.000166    | 7.09E-05   | 2.339652    | 0.0335 |
| D(MRTI(-1))  | -0.000338   | 6.17E-05   | -5.469134   | 0.0001 |
| D(MACS)      | -3.49E-07   | 1.22E-07   | -2.860835   | 0.0119 |
| D(MACS(-1))  | -8.96E-07   | 1.44E-07   | -6.236692   | 0.0000 |
| CointEq(-1)* | -0.643257   | 0.006826   | -94.236302  | 0.0000 |

*R-squared = 0.9972; Adjusted R-squared = 0.9959; F-statistic = 747.5638; Durbin-Watson = 2.106157.*

*Source: Author's computation (2026) using E-View 12.*

The Error Correction Model (ECM) in Table 5 indicates that mortgage financing has immediate but varying effects on sustainable housing development in Nigeria. While changes in mortgage loans and institutional coverage positively influence housing stock in the short run, the mortgage repayment-to-income ratio reduces housing affordability and constrains housing development. Macroeconomic stability also contributes positively by creating favorable conditions for housing investment, although some effects are realized gradually over time.

The error correction term (ECM) is negative and statistically significant, confirming the existence of a stable long-run relationship among the variables. The estimated coefficient of approximately  $-0.6433$  indicates that about 64.3% of short-run disequilibrium is corrected within one year, reflecting a relatively rapid adjustment process. This implies that temporary deviations from the long-run equilibrium are quickly corrected, reinforcing the robustness of the estimated ARDL model and highlighting the resilience of the housing finance system in responding to short-term economic shocks. This finding aligns with empirical evidence from Goodhart and Hofmann (2008), who document strong credit-housing linkages with meaningful adjustment dynamics, indicating that Nigeria's housing market, despite structural constraints, demonstrates considerable long-run stability.

## Diagnostic Tests

A battery of post-estimation diagnostic tests was conducted to establish the reliability, adequacy and stability of the estimated ARDL model.

**Table 6a: Breusch-Godfrey Serial Correlation LM Test**

| Indicator     | Value    | Statistic           | Value  |
|---------------|----------|---------------------|--------|
| F-statistic   | 1.405554 | Prob. F(2,13)       | 0.2801 |
| Obs*R-squared | 5.156004 | Prob. Chi-Square(2) | 0.0759 |

Source: Author's computation (2026) using E-View 12.

**Table 6b: Breusch-Pagan-Godfrey Heteroscedasticity Test**

| Indicator           | Value    | Statistic            | Value  |
|---------------------|----------|----------------------|--------|
| F-statistic         | 1.084357 | Prob. F(13,15)       | 0.4359 |
| Obs*R-squared       | 14.04982 | Prob. Chi-Square(13) | 0.3703 |
| Scaled explained SS | 6.514610 | Prob. Chi-Square(13) | 0.9254 |

Source: Author's computation (2026) using E-View 12.

**Table 6c: Ramsey RESET Test**

| Test             | Value    | Df      | Probability |
|------------------|----------|---------|-------------|
| t-statistic      | 2.634756 | 17      | 0.0714      |
| F-statistic      | 6.941942 | (1, 17) | 0.0634      |
| Likelihood ratio | 9.930135 | 1       | 0.0016      |

Source: Author's computation (2026) using E-View 12.

The Breusch–Godfrey LM test indicates that the residuals are free from serial correlation. The F-statistic in Table 6a is 1.4056 with a probability of 0.2801, while the Obs\*R-squared has a probability of 0.0759; both exceed the 5% significance level. Hence, the null hypothesis of no serial correlation cannot be rejected. The Breusch-Pagan–Godfrey test in Table 6b similarly provides no evidence of heteroscedasticity, with an F-statistic probability of 0.4359 and an Obs\*R-squared probability of 0.3703. The null hypothesis of constant error variance is therefore retained. The Jarque–Bera normality test produces a probability of 0.2728, which is above 0.05, indicating no significant departure from normality in the residuals. Finally, the Ramsey RESET test in Table 6c provides t-statistic and F-statistic probabilities of 0.0714 and 0.0634, respectively. Since both exceed 0.05, there is no evidence of functional-form misspecification at the 5% level.

The CUSUM stability test further shows that the cumulative residual plot remains within the 5% critical bounds, indicating parameter stability and no evidence of structural instability over the study period. This result is particularly relevant to the coefficient of the one-period lag of housing-stock growth,  $D(LGHS(-1))$ , which is positive (1.171463) and highly statistically significant ( $p = 0.0000$ ). The coefficient indicates strong persistence in short-run changes in housing stock: previous-period changes in housing stock are associated with substantial changes in the current period. Importantly, its magnitude above unity should not, by itself, be interpreted as evidence of model instability; the significant lag coefficient reflects dynamic persistence in housing-stock growth rather than a structural break. Thus, considered jointly, the diagnostic results provide no evidence of serial correlation, heteroscedasticity, non-normal residuals, functional-form misspecification or parameter instability, supporting the adequacy of the ARDL specification for inference.

## 5. Conclusion and Recommendations

### Conclusion

This study examined the long-run and short-run effects of mortgage financing on sustainable housing development in Nigeria using annual data for 1992–2022 within an ARDL–ECM framework. The findings show that while mortgage loans and institutional coverage have positive but statistically insignificant effects, and the mortgage repayment-to-income ratio has a negative but insignificant effect, macroeconomic stability exerts a positive and statistically significant influence on housing-stock growth. These results indicate that expanding mortgage credit alone is insufficient to stimulate sustainable housing development unless supported by a stable macroeconomic environment that enhances affordability, reduces financing risks and strengthens the effectiveness of housing-finance institutions.

The study contributes new knowledge by demonstrating that macroeconomic stability is the critical enabling condition through which mortgage finance translates into housing-stock growth in Nigeria. Unlike previous studies that largely examined individual indicators of mortgage finance in isolation, this study jointly analyzed mortgage loans, institutional coverage, mortgage repayment affordability and macroeconomic stability within a unified framework. In doing so, it provides empirical evidence that the effectiveness of mortgage finance depends less on the quantity of credit or the number of mortgage institutions than on the stability of the wider economic environment.

### Recommendations

The findings suggest that improving the effectiveness of mortgage finance requires a stable macroeconomic environment rather than simply expanding credit. Accordingly, the Central Bank of Nigeria (CBN) should sustain inflation-targeting and foreign exchange reforms to maintain price and exchange-rate stability, while the Federal Government should strengthen fiscal discipline and monetary–fiscal policy coordination to create a predictable investment climate for housing development.

The Federal Mortgage Bank of Nigeria (FMBN) and Primary Mortgage Banks (PMBs) should prioritise affordable long-term mortgage products, improve loan accessibility and strengthen mortgage refinancing mechanisms instead of focusing solely on increasing the volume of mortgage lending.

In addition, the Federal Ministry of Housing and Urban Development, in collaboration with state governments, should reform land administration, accelerate title registration and promote Public–Private Partnerships (PPPs) to reduce transaction costs and facilitate housing delivery. Together, these reforms will ensure that macroeconomic stability translates into more effective mortgage finance and sustained growth in Nigeria's housing stock.

### Limitations of the Study

This study has several limitations that should be considered when interpreting its findings. First, the analysis is based on 31 annual observations (1992–2022), reflecting the limited availability and consistency of long-run Nigerian housing-finance data. Although the ARDL framework is suitable for relatively small samples, the small number of observations may reduce the precision and generalizability of the estimated coefficients.

Second, the study's Macroeconomic Stability Index (MACS) is a constructed composite indicator incorporating exchange-rate volatility, inflation volatility and economic growth. Although normalization and aggregation provide a common measure of macroeconomic conditions, the selection of components, normalization procedure and equal weighting involve methodological choices that may affect the resulting index.

Third, housing stock (HS) is used as the sole proxy for sustainable housing development. While housing stock captures the quantitative expansion of housing supply, it does not adequately reflect the broader multidimensional concept of sustainability, including environmental dimensions such as energy efficiency and carbon emissions, or social dimensions such as affordability and accessibility.

Finally, the study focuses predominantly on the formal mortgage-finance sector, although a substantial proportion of housing in Nigeria is developed through informal and non-mortgage mechanisms, including personal savings, family resources, cooperative financing, informal credit and incremental construction. The exclusion of these mechanisms may understate the broader contribution of informal housing finance to housing provision.

These limitations also provide directions for future research. Subsequent studies could employ larger or higher-frequency datasets where available, test alternative constructions of the macroeconomic stability index, develop multidimensional measures of sustainable housing incorporating social and environmental indicators, and integrate both formal and informal housing-finance mechanisms.

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