HOUSING FINANCE AND SUSTAINABLE HOUSING DEVELOPMENT IN NIGERIA

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ABSTRACT

This study set out to investigate the relationship between housing finance and sustainable housing development in Nigeria. The study adopted the Geographically Weighted Regression (GWR) methodology and the panel fixed effect model to study housing finance, and sustainable housing development in a bid to explore their implications for urbanisation in Nigeria. Geographically weighted regression (GWR) is an exploratory technique mainly intended to indicate where non-stationarity is taking place on the map, that is, where locally weighted regression coefficients move away from their global values. Results suggests that housing finance has a positive and significant effect on sustainable housing availability in Nigeria. Results also suggest that housing development has positive significant impact on urbanisation in Nigeria. The study concludes that housing finance is indispensable in the pursuit of decent urbanisation and should be shored-up at all quarters in order to help control the housing deficits in Nigeria. The study recommends that Governments at all levels and its agencies should strive harder to increase public capital spending in a bid to provide more infrastructure and housing for the populace since it was shown by this study's finding to have positive significant impact on sustainable housing development in Nigeria.

Keywords: Housing, Finance, Development, Urbanization, Sustainable, Banks.

INTRODUCTION

Because public finance has an impact on most human endeavours in a variety of spheres of life, including housing, production, building, technology, and urbanization, the economy grows (Babatunde, 2018). Nigeria's formal housing finance market does not have anything to offer the bulk of would-be homeowners. Establishing institutions to supply home credit, allegedly aimed for common urban Nigerians, has been a theme throughout history. However, these initiatives chose to target the high-income sector for riskier lending, leaving most urban people without access to home finance. The macroeconomic situation is unstable, which discourages private sector organizations from providing house financing. Banks only lend to the least hazardous customers—the

wealthy and consistently well-paid—because they are understandably risk-averse.

The occupation status of various families is connected with household purchasing power and the distribution of poverty. According to the general household survey (GHS), most Nigerian households own their home, and renting housing is common in urban areas. In Nigeria, more than two-thirds (66%) of households own the home they reside in, while 33% have a different occupancy status; 14.4% of households live in rent-free homes, and 17% reside in rented space. Only 1% of people reside in housing that is provided by the employer of the household head. Renting homes and rooms is more common in urban regions (35%) than in rural ones (81%) but home ownership is more prevalent in rural areas (44%) than in both (4 percent). Both in urban and rural areas, where the percentages are 17 and 13 percent, it is rather typical to live rent-free. According to gender, 54.3 percent of households with a female head of household own their home, while only 29 percent rent a home and 29 percent live for free in a home with permission from the owner. In comparison, only 17% of households led by men own their home and 68% of them own their property (World Bank, 2018).

Table 1: Type of Occupancy Status per Sector

Sector	Owned	Provided by employer	Free with authorization	Free no authorization	Rented
Urban	43.8	1.56	17.14	1.79	35.72
Rural	81.11	0.87	12.65	1.19	4.19
Total	66.25	1.14	14.43	1.43	16.75

Source: National Bureau of Statistics (NBS), 2019

Despite the relatively high ownership percentage, housing costs account for 12 percent of household spending, surpassing spending on health and education. Although households in urban areas spend more on rent in absolute terms than their counterparts in rural areas, the GHS shows that the share of rent in total household expenditure is generally stable across regions.

Nigeria has a limited supply of housing financing because of an existing maturity mismatch. Nigeria has 21 Deposit Money Banks (DMBs) and 84 Primary Mortgage Banks (PMBs) (as at January, 2020). Less than 1% of the DMBs' total assets go toward lending for mortgage loans. The largest portion of loans, or around 22% of overall credit to the private sector, goes to the oil

and gas industry. Data for the 10 biggest banks in Nigeria demonstrate that, when the entire banking industry is included, short-term customer deposits account for, on average, 84 percent of total liabilities. Most of the remaining cash comes from stock. There are very few other long-term funding sources, accounting for only 11 percent of the balance sheet on average. As demonstrated in Colombia and India, opening up the residential housing market through the growth of housing financing can offer a variety of revenue prospects through the building sector and allied companies (World Bank, 2018).

Nigeria, like many other African nations, offers the bulk of would-be homeowners little in the way of formal housing financing. Establishing institutions to supply home credit, allegedly aimed for common urban Nigerians, has been a theme throughout history. However, these initiatives chose to target the high-income sector for riskier lending, leaving most urban people without access to home finance. In Nigeria and other developing African nations, the issue of housing is now often discussed in both public and private settings. It is becoming more and more obvious that the majority of urban residents live in dehumanizing living conditions, while those who can afford typical housing must pay abnormal prices to do so.

According to Onibokun (2016) and Nubi (2015), the average worker's disposable income for rent in major African cities is roughly 60%. This is much greater than the 20 to 30 percent that the UN advises.

The expansion of mortgage lending in Nigeria is severely constrained by the lack of access to long-term capital. It was clear from a poll of financial institutions conducted by the Central Bank of Nigeria in 2012 that this was the biggest barrier to the mortgage market's expansion, surpassing foreclosure, housing supply, and title registration. Despite being permitted to do so by the legal framework, lenders are unable or unwilling to further stretch maturity mismatches on their balance sheets in the absence of access to long-term funding. Lenders are unable to create large- scale mortgage lending operations because they lack access to long-term capital that would allow them to invest in personnel and infrastructure (Africa Yearbook, 2020). The broad objective of the study is to investigate the effect of housing finance on housing development in Nigeria.

REVIEW OF EXTANT LITERATURE

Theoretical Review

Bid Rent Theory

With increasing distances from the central business district (CBD) to other locations, the price and demand for real estate fluctuate, according to this theory's analysis

of the housing market. According to the hypothesis, various land uses fight for the land that is close to the city center. A "bid rent curve" that uses the premise that land in the center of a city is the most accessible and also the most expensive can be used to illustrate this. This is predicated on the idea that since retail companies aim to maximize their profits, they will be ready to pay more rent for properties close to the CBD and less rent for those farther away. The premise behind bid rent theory is that if a location is made more accessible to clients, profit margins will rise along with the volume of goods sold. In the long run, this improved access will result in a greater population within the business's catchment area. This is especially important for department stores and mega markets because they need a lot of turnover. They will be prepared to pay the higher land rent value whenever this degree of turnover is practicable. Housing developers design multi-story buildings to maximize the use of every square inch of space on their site, utilising as many resources (both potential and actual) as they can. This explains the abundance of multi-story structures in cities like New York, the Marina district of Lagos Island, etc. The amount that businesses and people are ready to pay as rent decreases at an increasing rate each meter or kilometer away as one travels further from the city's center.

According to the hypothesis, land users would always vie for the most convenient real estate in the commercial center. The "bid rent" refers to the sum that they are willing to give up. This results in a pattern of land use layers/rings that generates the concentric zone model, wherein social groups are arranged in a series of rings. The aforementioned says that the poorer buildings and economically less strong land users will naturally be located on the fringes of cities located distant from the CBD.

The trend in housing for residential use has evolved in the modern era. The convenience of access to CBD is now traded off by those with the financial means in favor of moving to the suburbs, where it is probably possible to buy more land for roughly the same price and with more surface area. .

Empirical Literature Review

Due to its direct impact on residents' overall well-being and the results of several other industries and sectors in the economy at issue, the housing sector is crucial to the welfare levels that prevail in a nation.

The variables influencing housing prices have garnered considerable attention from academics both domestically and internationally due to the real estate market's phenomenal development and the quick rise in housing costs. In macroeconomics [real estate investment (Shen, Wang, & Zhang,

2010), economic growth (Gholipour, Al-mulali, & Mohammed, 2014; Wang, Yang, & Liu, 2011), monetary policy (Tsai, 2015; Jiang, Zhao, Sanderford, & Du, 2018) and inflation (Yu, & Huang, 2016)] and politics [urban hierarchy], the existing research on the factors influencing housing prices has produced very fruitful results (Gong, Boelhouwer, & de Haan, 2016), and Governmental directives [Li, & Xu, 2016] society [urbanization (Wang, Hui, & Sun, 2017; Liu, Su, Chang, & Chu, 2018), social environment (Youn, 2013), and population variables (Reed, 2016; Song, 2017)] environmental health concerns, physical geography [geographical location (Meijers, Hoekstra, & Spaans, 2013), and natural features (Irwin, Jeanty, & Partridge, 2014) (Tian, Wei, & Li, 2017; Trojanek, Tanas, Raslanas, & Banaitis, 2017), and Walled buildings (Li, Cheng, & Shoaib, 2018), the price of construction and installation (Rashid, & Hasan, 2015; Jayantha, & Lau, 2008), the type of home (Ik, 2017; Ma, & Cai, 2018), locational conditions (Ibrahim, 2017), educational resources (Zhang, & Chen, 2018), infrastructure (Nazir, Othman, & Nawawi, 2015; Hou, 2017 (Wu, Li, & Wang, 2011; Pijnenburg, 2017), and the income (Song, 1998; Ma, Yan, Du, Ma, Cai, & Xu, 2017), the Dutch measure of consumer confidence (Rouwendal, & Longhi, 2008), and consumer expectations (Shen, 2008) of household buyers. The primary research topics have steadily shifted to include governmental spending, housing finance, and the human dimension as they relate to purchasing, using, and disposing of real estate.

Studies conducted in Nigeria have revealed an association between housing investment, availability of quality housing, employees' productivity, and welfare (Adedeji and Olufemi, 2004; Spiller; 2013, Nnaemetu et al, 2015). This could explain why both private and public sector employers of labor offer housing options. Agbola (1987) acknowledged that finances were a factor in housing issues, but gave land and construction supplies a higher priority. This prompted in-depth study in these areas. Their research inspired the development of relevant programs and organizations including the Site and Service Programme and the National Institute of Road and Building Research, as well as government housing policy.

The principles of sustainable social, economic, and environmental factors are typically adopted by studies on sustainable housing development (SDH) in order to produce national housing plans and policies for the masses with the least amount of negative effects on the environment and future generations (Priemus, 2005; Olotuah, and Bobadoye, 2009). The principles of SHD often cover a variety of multi-

disciplines, such as urban regional planning, construction management, sustainable building materials, and waste valorization (Ayedun and Oluwatobi, 2011; Ibem, 2010). (Bashir, Mohd, Adetunji, & Dodo, 2013; Nyakuma, 2015; Nyakuma, 2015), Sustainable energy technologies, green buildings, and smart grids (Otegbulu, & Adewunmi, 2009; Otegbulu, & RSV, 2011; Dodo, Nafida, Zakari, Elnafaty, Nyakuma, & Bashir, 2015). (Oyedepo, 2012; Ingwe, Inyang, Ering, S. & Adalikwu, 2009; Oyedepo, 2012). Additionally, SHD includes all of the procedures, frameworks, and parties involved in the design, development, and administration of cities worldwide. Williams, Dair, and De Groot (2007); De Groot (2006).

METHODOLOGY

The Geographically Weighted Regression (GWR) methodology will be used in the investigation. The fundamental goal of the exploratory technique known as geographically weighted regression (GWR) is to show where non-stationarity is occurring on a map, or more specifically, where locally weighted regression coefficients deviate from their global values. Its foundation is the worry that, in light of various local regression implementations, the fitted coefficient values of a global model, fitted to all the data, may not appropriately capture precise local differences in the data. However, it differs in that it moves a weighted window over the data, estimating one set of coefficient values at each selected "fit" point instead of searching for local variance in the "data" space. In order to explore spatial differences in the correlations between urban expansion and its pertinent influencing elements, GWR may prove to be a beneficial technique. A local statistic known as a GWR is one that considers the possibility of future changes in the regression results. In general, this would improve our understanding of traditional liberal principles.

The Model

The GWR model adopted for this study follows Fotheringham *et al*. (2012) for the broad objective of the study with some modifications to address the objectives. The GWR model is stated as follows:

$$lnSHD_j = \alpha_0(u_j, v_j) + \sum_{i=1}^{p} \alpha_1(u_j, v_j)\, lnHFN_{ij} + \alpha_2(u_j, v_j) lnNCS_{ij} + \varepsilon_j \qquad (3.1)$$

where SHD_j is the dependent variable of observation j, HFN_{ij} represents the explanatory variables *(NHF, HFMB, HFCB)*HFN_i at location j, u_j and v_j are the coordinates for the location of observation j, $\alpha_0\ (u_j,v_j)$ is the intercept for observation j, and $\alpha_i\ (u_j,v_j)$ is the local parameter estimate (regression coefficient) for independent variable HFN*i* at location j. *NCS* is the control variable. The variables are defined

thus, HFN is Housing finance, SHD is Sustainable Housing development, NHF is National Housing Fund, HFMB is Housing fund from Mortgage Banks, HFCB is Housing fund from Commercial Banks, NCS is National Capital Spending.

According to Fotheringham et al., the optimal bandwidth in this study would be found by minimizing the adjusted Akaike Information Criterion with a correction for finite sample sizes (2012). There is a distinct region for the bi-square kernel where kernel weighting would be greater than zero. This was chosen because it can be used to define local extents for model fitting. In contrast, the adaptive kernel maintains a fixed number of areas so that employing the bi-square kernel is secure. It can adjust the bandwidth sizes to the spatial fluctuations in the regions where data is denser. The following form can be used to express the weighting function for the adaptive bi-square kernel bandwidth:

$$W_{ij} = \begin{cases} (1 - d_{ij}^2/\theta^2)^2 & d_{ij} < \theta_{i(k)} \\ 0 & d_{ij} > \theta_{i(k)} \end{cases} \quad (3.2)$$

Where *i(k)* is an adjustable bandwidth size denoted by the kth closest neighbour distance, d_{ij} is the Euclidean distance between observations *i* and *j*, and W_{ij} is the weight of observation at position *j* for estimating the coefficient at site *i*. The spatial changes in the associations between the dependent and independent variables would be examined using the regression results of the GWR model, including the local parameter estimates and associated t-test values. A set of parameter estimations for each place that can be mapped and examined to reveal information on spatial non-stationarity in relationships would be the primary result from GWR. A map of what would be referred to as "parameter space" would be produced by GWR. Although the parameters are not directly indicative of spatial autocorrelation, regions with high parameter values would indicate particularly strong correlated links between the regressor and regressand variables. It makes sense to assume that high beta values would have an impact on the spatial autocorrelation pattern in the system since the values would depend on the spatial weighting scheme to the extent that W captures the impacts of spatial autocorrelation in each of the variables.

Estimation Procedure

Global and Local Moran Index: The scope or scale of the investigation can be used to distinguish between different spatial autocorrelation measurements and tests. They are traditionally divided into "global" and "local" categories. Global denotes that all components of the W and Y matrices combined are used to evaluate spatial autocorrelation, i.e., all relationships

between spatial units are taken into account when computing spatial autocorrelation. The formula of Global and Local Moran's *I* can be expressed as follows (Anselin, 1995):

$$I = \frac{\sum_{i=1}^{n}\sum_{j-1}^{n} W_{ij}(Z_i - \hat{Z})(Z_j - \hat{Z})}{S_z^2 \sum_{i=1}^{n}\sum_{j-1}^{n} W_{ij}} \quad \text{.....(3.3)}$$

$$I_i = \frac{\sum_{j-1}^{n} W_{ij}(Z_i - \hat{Z})(Z_j - \hat{Z})}{S_z^2 \sum_{j-1}^{n} W_{ij}} \quad \text{.....(3.4)}$$

$$= (Z_j - \hat{Z}) \sum_{j=1}^{n} W_{ij}(Z_j - \hat{Z}) \quad \text{..... (3.5)}$$

$$= (Z_j - \hat{Z}) \frac{\sum_{j=1}^{n} W_{ij}(Z_j - \hat{Z})}{\sum_{j-1}^{n} W_{ij}} \quad \text{..... (3.6)}$$

Where: *I* = Global Moran's Index, I_i = Local Moran's *I*, Z_i = value of interest of variable *Z* for point *i*, $\bar{Z}$ = average value of *Z*, W_{ij} = contiguity matrix; representing the proximity of point *i's* and point *j's* locations, with $W_{ii} = 0$ for all points, *n* = total number of points, S_z^2 = variance of the observed values.

The data would be sourced from Nigeria General Household Survey Panel 2018-2019, National Bureau of Statistics 2020 publication, Central Bank of Nigeria Statistical Bulletin 2020 edition and World Bank data base (development indicators) 2020, Federal ministry of lands, housing and urban development 2020 publications, and State ministries of land and housing 2020 publications.

RESULTS AND DISCUSSION OF FINDINGS

Descriptive Statistics

The study presents descriptive statistics in the table 2 in order to exhibit the data characteristics and nature of the variables in the model for objective two. Hence, the study examines the variables of the model for objective two in a bid to determine if they exhibit sufficient variation in the values of the variables. Thus, this study looks at the mean, standard deviation, and minimum and maximum values of these model variables. In line with this, the summary statistics of the variables used in the model for objective two are given in table 2 below:

Table 2: Summary Statistics Results of the Variables

Variable	Obs	Mean	Std. Dev.	Min	Max
shd	41	42.4865	20.72564	13.08044	88.3895
hfn	41	42.85244	44.6442	1.14	212
nhf	41	33.4561	24.8864	3.3	92
hfmb	41	30.31192	25.70396	.0357	80.44041
hfcb	41	60.4878	27.58906	15	97
ncs	41	5.316146	2.957726	1.884755	11.43743

Source: Author's computation from available data using STATA 15

The results of the summary statistics in table 2 indicates that all the variables of the model have sufficient variations in their mean, standard deviations values and their associated minimum and maximum values. Further, the results also revealed that the number of observation for the study is 41 (that is, from 1980 – 2020). The mean score for sustainable housing development (shd) is about 42.487%, housing finance (hfn) is about 42.852%, national housing fund (nhf) is about 33.456%, housing fund from mortgage banks (hfmb) is about 30.312%, housing fund from commercial banks (hfcb) is about 60.488%, while that of national capital spending (ncs) is about 5.316%. The study further looked at pre-estimation tests such as the unit root and cointegration tests.

GWR result for the contribution of housing finance to sustainable housing in Nigeria

This subsection presents the results of the GWR model used to capture objective one of the study. Therefore, in order to ascertain the contribution of housing finance on sustainable housing availability in Nigeria, the study adopted the GWR model specified in equation (3.3) of the study. The summary results of the GWR model can be seen in Table 3 as given below

Table 3: Summary Results of the GWR (Dependent variable = shd)

shd	Coef.	Std. Err.	t	P>|t|
hfn	.5049903	.055213	9.15	0.000
nhf	-.0014537	.1036842	-0.01	0.989
hfmb	.4340757	.1080484	4.02	0.000
hfcb	.5133392	.0921618	5.57	0.000
ncs	1.725916	.2999576	5.75	0.000
_cons	75.41086	8.769994	8.60	0.000

Source: Author's computation from available data using STATA 15

Table 4.3 reveals that in line with objective two (which ascertains the contribution of housing finance on sustainable housing availability in Nigeria), it can be seen that housing finance (hfn) has positive significant impact on sustainable housing development (shd) in Nigeria. The implication of this result is that a ₦1billion increase in housing finance (hfn) significantly contributes positively to sustainable housing development (shd) in Nigeria by about 50.499 percent. Hence, any time housing finance (hfn) is increased by ₦1billion, sustainable housing development (shd) in Nigeria would also increase very significantly by 50.499%. The housing finance (hfn) p-value is less than 0.05 (that is; 0.000) while the absolute value of its t-statistics is greater than 1.96 (that is; /9.15/) thereby, indicating that it is positively and statistically very significant in affecting sustainable housing

development in Nigeria. This finding supports the finding by Arilesere (1997), Abiodun (2000), Okupe (2000), and World Bank (2018), who found that housing finance encourages the sustainability of housing development.

It was however shown by the results seen in table 4.2 that national housing fund (nhf) has negative insignificant impact on sustainable housing development (shd) in Nigeria. The implication of this result is that an increase in national housing fund (nhf) by a ₦1billion, insignificantly decreases sustainable housing development (shd) in Nigeria by about 0.145 percent. Therefore, any time national housing fund (nhf) is increased by ₦1billion, sustainable housing development (shd) in Nigeria would fall, although, insignificantly by about 0.145 %. This result is surprising since it is expected that any time national housing fund (nhf) is increased, sustainable housing development (shd) would rise as well. However, the reason for this result may be that increased expenditures on national housing fund (nhf) do not translate to sustainable housing development in Nigeria due to corruption, inadequate funds to complete abandoned housing projects, and inflating of housing funds due to kickbacks that contractors must return to stakeholders who facilitated the contract to them. Hence, increase in housing funds therefore ends up in private pockets thereby, insignificantly and negatively contributing to sustainable housing development. The national housing fund (nhf) p-value is greater than 0.05 (that is; 0.989) while the absolute value of its t-statistics is less than 1.96 (that is; /-0.01/) hence, signifying that it is negatively and statistically insignificant in encouraging sustainable housing development in Nigeria.

Further, the results revealed that housing fund from mortgage banks (hfmb) also has positive significant impact on sustainable housing development (shd) in Nigeria. The implication of this result is that a ₦1billion increase in housing fund from mortgage banks (hfmb) significantly increases sustainable housing development (shd) in Nigeria by about 43.4076 percent. Hence, whenever housing fund from mortgage banks (hfmb) is raised by ₦1billion, sustainable housing development (shd) in Nigeria would as well rise very significantly by about 43.4076%. The housing fund from mortgage banks (hfmb) p-value is less than 0.05 (that is; 0.000) while the absolute value of its t-statistics is also greater than 1.96 (that is; /4.02/) hence, showing that it is positively and statistically very significant in encouraging sustainable housing development in Nigeria.

Regarding housing funds from commercial banks (hfcb), it was revealed by the study's

results that it also has a positive significant impact on sustainable housing development (shd) in Nigeria. The implication of this result is that a ₦1billion increase in housing funds from commercial banks (hfcb) significantly increases sustainable housing development (shd) in Nigeria by about 51.3339 percent. Thus, whenever there is an increase in housing funds from commercial banks (hfcb) by ₦1billion, sustainable housing development (shd) in Nigeria would rise very significantly as well by about 51.3339%. The housing fund from commercial banks (hfcb) p-value is less than 0.05 (that is; 0.000) while the absolute value of its t-statistics is also greater than 1.96 (that is; /5.57/) hence, suggesting that it is positively and statistically very significant in encouraging sustainable housing development in Nigeria.

Again, national capital spending (ncs) was also revealed to have significant positive impact on sustainable housing development (shd) in Nigeria. The implication of the result here is that a ₦1billion increase in national capital spending (ncs) significantly increases sustainable housing development (shd) in Nigeria by about 172.5916 percent. Therefore, whenever national capital spending (ncs) is raised by ₦1billion, sustainable housing development (shd) in Nigeria would as well rise significantly by about 172.5916%. The national capital spending (ncs) p-value is less than 0.05 (that is; 0.000) while the absolute value of its t-statistics is greater than 1.96 (that is; /5.75/) thereby, revealing that it has positive and statistically significant impact on sustainable housing development in Nigeria.

CONCLUSION

The study applied the GWR model and the panel fixed effect model to study housing finance, and sustainable housing development in a bid to explore their implications for urbanisation in Nigeria. The study concludes that housing finance has a positive and significant effect on sustainable housing availability in Nigeria. In other words, housing finance (hfn) has a positive significant impact on sustainable housing development (shd) in Nigeria hence, a ₦1billion increase in housing finance (hfn) significantly contributes positively to sustainable housing development (shd) in Nigeria by about 50.499%.

POLICY RECOMMENDATION

The study therefore recommends that Governments, both Federal, State and Local, and its agencies should strive to harder increase public capital spending in a bid to provide more infrastructure and housing for the populace since it was shown by this study's finding to have positive significant

impact on sustainable housing development in Nigeria. Also, more housing finance should be encouraged at all quarters in order to help control for the housing deficits that are common in Nigeria. Finally, government at all levels should also increase its involvement in housing finance since it was found by the study that their presence in sponsoring housing in the country has significant impact on sustainable housing development in Nigeria.

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