ASSESSING HOUSING MARKET DISEQUILIBRIUM IN ENUGU METROPOLIS, NIGERIA – A MICROECONOMIC PERSPECTIVE

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ABSTRACT

The purpose of this study is to assess the housing market disequilibrium in Enugu Metropolis with a view to addressing the problem of arbitrary provision of housing. Using the 1990 – 2020 indices on supply, demand and price, and accompanied with solid estimations, analyses and calculations, it was possible to assess the disequilibrium dynamics in the housing market from a microeconomic perspective. The disequilibrium assessment involved testing for association and variation between demand and supply, establishing housing gaps and estimating the magnitude of disequilibrium. The results helped to give a verdict on how well the housing market is functioning while providing the government and other market participants with valuable reference on how to restore the market back to equilibrium.

Keywords: Supply and demand, Housing Market, Disequilibrium

1.0 Introduction

Housing markets are usually assumed to be at equilibrium, but disequilibrium gives a true reflection of the laws governing the sector. This is because there is no central market place, building construction takes long periods to complete, market participants behave irrationally, information are not fully circulated amongst market participants and prices do not adjust quickly to changes in supply and demand.

In most metropolitan areas, disequilibrium usually occurs within the realm of housing shortage, where demand exceeds supply, and is majorly fueled by rapid population growth, immigration, inelasticity of supply and rising but fluctuating demand. Disequilibrium is not always a negative phenomenon. An efficient housing market should allow for a certain level of disequilibrium,

slightly below the equilibrium point, within the range of 9 – 10 per cent (Smith, 2011) which provides for a reasonable excess demand that will ensure an efficient utilization of the existing housing resources while continually stimulating the house-building industry. A disequilibrium larger than this is seen as socially unacceptable because it signals high prices and a decline in affordability prospects.

The housing market under study has been notorious for inadequate knowledge about the actual housing market disequilibrium, which has made the public and the private sector to resort to arbitrary delivery of housing as a palliative effort towards addressing the shortage that has plagued the housing market. Housing provision have been based on or subject to discretion or preference or sometimes impulse or caprice, as there are no clear metrics that establishes the housing gap by assessing the balance between demand and supply.

The few literatures available on this subject focused more on macroeconomic issues with the development of disequilibrium models being the dominant issue (Augustyniak et al, 2013; Riddel, 2004; Jielu et al, 2014; Mingyang et al, 2014; Gori et al, 2015). Literatures on housing market disequilibrium seems to be under development. Some of these literatures may have overlooked the microeconomics which informed the macroeconomics while the others displayed the expected interdependence between microeconomics and macroeconomics.

The disequilibrium assessment in this study involved testing for association and variation between demand and supply, establishing housing gaps and estimating the degree of disequilibrium in the housing market.

Thus, the aim of this study is to assess the housing market disequilibrium in Enugu Metropolis with a view to addressing the problem of arbitrary provision of housing so as to give a verdict on how well the housing market is functioning while providing the government and other market participants with valuable reference on how to restore the market back to equilibrium.

2.0 Literature Review

Previous studies on housing market disequilibrium were dominated by macroeconomic modelling. Mingyang et al (2014) applied an equilibrium asset pricing model in the Chinese housing market to examine the premium effects from gender gaps and credit constraints. After robust estimations and evaluations, they observed little support that house prices are significantly affected by gender imbalance and credit constraints. Their investigations also discovered risks of bubbles in some major cities in China.

Augustyniak et al (2013) designed a disequilibrium model which helped to understand the cyclical nature of the Warsaw primary housing market. They emphasized that the assumed equilibrium models gaveerroneous results because in reality the housing market is in constant disequilibrium. To restore the market to equilibrium, they suggested that demand should be controlled and stabilized through credit restrictions and advocated for fast reductions in price by real estate developers. These suggestions may be difficult to execute in housing markets with strong excess demand.

Riddel (2004) also developed a disequilibrium model which separated supply side disturbances from demand side disturbances. She found that the market is characterized by sustained periods of disequilibrium.

Jielu et al (2014) used disequilibrium theory to analyze demand and supply in the housing market in Jiangsu. They calculated disequilibrium degrees from 1990 – 2009. The fluctuations in disequilibrium degrees reflected fluctuations in demand and supply in the housing market.

Ewurum&Odenigbo (2018) used Structural Equation Modeling (SEM) to analyze the predictors of housing market disequilibrium in Anambra and Enugu and found that population increase and low housing affordability were significant predictors of housing deficit.

Literatures on housing market disequilibrium seems to be under development. Some of these literatures may have overlooked the microeconomics which informed the macroeconomics while the others displayed the expected interdependence between microeconomics and macroeconomics.

3.0 Methodology

For the purpose of this study, the 1990 – 2020 indices on demand, supply and price were collected.

Demand indices were based on household estimates obtained from National Population Commission (NPC) and National Bureau of Statistics (NBS). Supply indices were based on approved building plans obtained from Enugu State Town Planning Authority.

Price indices were based on average rental values derived from six residential property types including tenement rooms, 1 bedroom flats, 2 bedroom flats, 3 bedroom flats, 3 bedroom bungalows and 4 bedroom duplexes. To obtain this data, a survey was conducted in which questionnaire were distributed to 41 estate surveyors and valuers who are the professionals with

respect to knowledge about the rent passing on these different housing in the study area. 38 out the 41 questionnaire were retrieved.

Correlation analyses were used to test for associative relationship between supply and demand. Freidman's test was used to test for variation or disequilibrium between demand and supply. The analyses were conducted with the aid of the Statistical Package for Social Scientists (SPSS).

Jielu et al's (2014) disequilibrium degree estimation formula was used to calculate the magnitude of disequilibrium in the housing market.

4.0 Analysis and Discussion

Table 1 below shows the data on supply, demand and price from 1990 to 2020. Observe that the demand at the start year is zero. This is because the effective demand was calculated as change in households which is the differences in successive household population every year, as is done with marginal concepts and quantities in economics.

Table 1: Data on Supply, Demand, Households and Price in Enugu Metropolis 1990 - 2020

Year	Supply (SUP_t)	Households	Demand (DEM_t)	Average Price (in Naira)
1990	317	98,117	0	87,261
1991	340	100,705	2,588	91,854
1992	312	101,774	1,069	95,681
1993	309	102,722	2,230	99,668
1994	391	104,570	1,848	103,821
1995	415	107,804	3,234	108,147
1996	260	110,445	2,641	111,347
1997	281	112,227	1,782	117,207
1998	267	114,525	2,298	123,376
1999	260	117,117	2,592	133,524
2000	280	119,775	2,658	144,507

2001	289	122,259	2,484	156,393
2002	292	124,807	2,548	169,256
2003	368	125,715	908	183,178
2004	246	127,891	2,176	198,245
2005	351	128,928	1,037	214,551
2006	288	129,568	640	232,198
2007	320	130,754	1,186	251,296
2008	354	132,466	1,742	271,965
2009	350	133,024	558	294,335
2010	525	137,923	4,899	318,544
2011	526	143,766	5,843	322,444
2012	527	150,139	6,373	343,878
2013	544	156,549	6,410	359,372
2014	579	163,258	6,709	378,394
2015	556	170,588	7,330	387,572
2016	778	177,959	7,371	416,044
2017	623	186,023	8,064	440,706
2018	570	194,129	8,106	474,244
2019	463	202,625	8,496	510,528
2020	451	210,309	7,684	549,328

Source: Field Survey (2021)

4.2 Tests for Association

Correlation analyses were used to test for possible association between demand and supply in the housing market. The data partially satisfied the assumptions for normal distribution because it is quantitative and somewhat large in volume, but seriously fell short because the means and

standard deviations of supply, demand and price are not homogenous as can be seen in the descriptive statistics below:

Table 2: Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Supply	31	246.00	778.00	401.0323	134.13289
Demand	31	.00	8496.00	3661.4194	2705.87113
Average_price	31	87261.00	549328.00	248027.8710	139181.47193
Valid N (listwise)	31				

Source: Field Survey (2021)

Thus, Pearson and Spearman correlations which are parametric and non-parametric tests respectively were jointly used and they would eventually act as corroboration for one another. The test was guided by the hypothesis below:

H_o: There is no significant association between housing demand and housing supply in the housing market

H_1:   There is significant association between housing demand and housing supply in the housing market

Table 3: Pearson Correlation

		Supply	Demand
Supply	Pearson Correlation	1	.824**
	Sig. (2-tailed)		.000
	N	31	31
Demand	Pearson Correlation	.824**	1
	Sig. (2-tailed)	.000	
	N	31	31

Source: Field Survey (2021)

The Pearson correlation coefficient is equal to 0.824 which is close to a perfect association between the supply and demand variables because when approximated to the nearest whole number, the result will be 1. The p-value of 0.000 is significant at the 0.01 level (p<0.01), hence we reject the null hypothesis and accept the alternative.

Table 4: Spearman Correlation

			Supply	Demand
Spearman's rho	Supply	Correlation Coefficient	1.000	.608**
		Sig. (2-tailed)	.	.000
		N	31	31
	Demand	Correlation Coefficient	.608**	1.000
		Sig. (2-tailed)	.000	.
		N	31	31

Source: Field Survey (2021)

Spearman correlation also reflects similarities to the Pearson correlation above, by producing a correlation coefficient of 0.608 which is lower than the coefficient in Pearson correlation, but it is still close to a perfect association because when approximated to the nearest whole number, the result will be 1. The p-value of 0.000 is significant at the 0.01 level, hence we reject the null hypothesis and accept the alternative.

Conclusion: There is a significant degree of mutual dependence or interrelationship between supply and demand in this housing market.

4.3 Test for Variation

A number of statistical methods may be used to test for variation or disequilibrium between demand and supply in the housing market such as independent t-test, z-test, one-way or two-way analysis of variance, analysis of variance within a regression analysis, one-way repeated measures analysis of variance,kruskalwallis test and Friedman's test. The statistical tool to adopt depends on whether the kind of data collected satisfies the assumption for using the test. In this study, Friedman's test was used majorly because of lack of homogeneity in the means and standard deviations of demand, supply and price. Freidman's test is the non-parametric

equivalent of the one-way repeated measures analysis of variance. The test for variation will be guided by the hypothesis below:

H_o: There is no significant disequilibrium in the housing market

H_1:   There is significant disequilibrium in the housing market

The dependent variable is price while the independent variables are supply and demand. Since there are only two independent variables and the interest is to test whether there is significant variation between them, only one trial was required in the analysis. Like the one-way repeated measures analysis of variance, where some variables could be held constant while other variables were analyzed, Friedman's test also allows for the same operation. The dependent variable was held constant while the independent variables were analyzed. The results of the analysis are shown below:

Table 5: Mean Ranks – Friedman's Test

	Mean Rank
Supply	1.03
Demand	1.97

Source: Field Survey (2021)

Table 5 above shows the mean ranks between demand and supply with demand ranking higher than supply. The distribution is dissimilar as reflected by the ranks.

Table 6: Test Statistics – Freidman's Test(dependent variable – price)

N	31
Chi-Square	27.129
Df	1
Asymp. Sig.	.000

Source: Field Survey (2021)

Table 6 above shows a p-value or an asymptotic value of 0.000 which is significant at 0.01 ($p<0.01$), hence we reject the null hypothesis and accept the alternative. Freidman's test also

gives a chi-square value (χ^2) of 27.129 which significantly exceeds the critical value of 0.01 ($\chi^2 > 0.01$), and again the null hypothesis must be rejected.

Conclusion: There is a significant disequilibrium or variation between demand and supply in this housing market which indicates that there is a great disconnect between supply and demand.

4.4 Establishing the Housing Gap

The housing gap at micro level is the difference between demand and supply. Despite this simplicity, inaccurate assessment of demand and supply will affect the validity of housing gap figures. Assessing demand and supply is not an easy feat (Eric et al, 2017).

Supply must represent a measure of development activity such as new development permits ornew approved building plans or new construction orders or development starts or completed development (Ball et al, 2004). The ease at which one can have access to these data depends on the ability of the Statistical Agencies in the area to keep quality records.

Demand, for some researchers, is taken as the total household population. This can be calculated as the ratio of the total population divided by the average household size. However, this estimation of demand comes with its attendant problem of double counting as new households are counted with existing households. The housing gap there from would be an exaggerated figure. Thus, when annual household estimates are available, the actual demand is the additional households every year which is calculated by the differences in successive households. This is suitably called the 'marginal housing demand' or 'change in households' and its essence is to avoid double counting by extracting from current demand newly formed households carried into the succeeding years so as to separate them from existing households already in occupation of a house from the preceding years. The calculations on demand are in the table above.

The table below shows the housing gap in Enugu Metropolis. A total sum of 98,711 housing deficit have accumulated from 1990 – 2020.

Table 7: Data on Housing Gap in Enugu Metropolis 1990 – 2020

Year	Housing Gap
1990	0
1991	1,931
1992	757

1993	1,921
1994	1,457
1995	2,819
1996	2,381
1997	1,501
1998	2,031
1999	2,332
2000	2,378
2001	2,195
2002	2,256
2003	540
2004	1,930
2005	686
2006	352
2007	866
2008	1,388
2009	208
2010	4,374
2011	5,317
2012	5,846
2013	5,886
2014	6,130
2015	6,774
2016	6,593
2017	7,441
2018	7,536

2019	8,033
2020	7,233
Total	**98,711**

Source: Field Survey (2021)

The growing disequilibrium where demand significantly outweighs supply must be tackled by major house building. Using the data collected and assuming that all land costs have been covered (as the government is expected to acquire land through compulsory purchase), this study believes that a capital value that will cover the average replacement costs in the study area can be derived if the rent is capitalized at an initial yield of 3 per cent. The calculation is shown below:

Average rental value as at 2020	549,328
Years' Purchase in perpetuity @ 3%	33.3333
Capital value	**18,310,933**

The government expenditure on building homes would be the multiplication of capital value by total housing gap. This would amount to N1,807,490,507,363, that would be spent by the government to tackle the accumulated housing gap from 1990 – 2020. Approximately N60 billion should be budgeted to build 3,290 units of homes annually if a 30-year plan is adopted.

4.5 Disequilibrium Degree Estimation

In this study, Jielu et al's (2014) formula was used to estimate the disequilibrium degrees. The formula is given by:

$$Zt = \frac{\text{DEMt} - SUPt}{Qt}$$

Where Z_t is disequilibrium degree; DEM_t is effective demand; SUP_t is effective supply and Q_t is stimulated trading volume. The disequilibrium degree becomes the ratio of the housing gap to the stimulated trading volume. The stimulated trading volume is the volume of transactions in the housing market stimulated by either supply or demand. In each year, the lowest quantity between supply and demand is taken as the stimulated trading volume. Observe in the table below, that the supply figures automatically became the stimulated trading volume figures because there was no year a surplus was recorded.

Table 8: Data on Disequilibrium Degree in Enugu Metropolis 1990 – 2020

Year	Stimulated Trading Volume (Q_t)	Disequilibrium Degree (Z_t)	Percentage Disequilibrium Degree (%)
1990	317	0	0
1991	340	5.68	568
1992	312	2.43	243
1993	309	6.22	622
1994	391	3.73	373
1995	415	6.79	679
1996	260	9.16	916
1997	281	5.34	534
1998	267	7.61	761
1999	260	8.97	897
2000	280	9.15	915
2001	289	7.60	760
2002	292	7.73	773
2003	368	1.47	147
2004	246	7.85	785
2005	351	1.95	195
2006	288	1.22	122
2007	320	2.71	271
2008	354	3.92	392
2009	350	0.59	59
2010	525	8.33	833
2011	526	10.11	1011

2012	527	11.09	1109
2013	544	10.82	1082
2014	579	10.59	1059
2015	556	12.18	1218
2016	778	8.47	847
2017	623	11.94	1194
2018	570	13.22	1322
2019	463	17.35	1735
2020	451	16.04	1604

Source: Field Survey (2021)

The table above showed the calculated disequilibrium degrees from 1990 – 2020 in integers and percentages. The disequilibrium degree at the start year was assumed to be zero due to the absence of a calculated effective demand so as to avoid bias in the computation and overall interpretation. This market is typically demand-driven and completely stimulated by supply. However, the fluctuations in disequilibrium degrees reflects fluctuations in demand and supply throughout the housing market.

With respect to the peculiarity of this market where no surpluses were recorded for over 30 years, the disequilibrium degree will always yield a positive value. Positive degrees are a reflection of excess demand while negative degrees are a reflection of excess supply. A positive disequilibrium magnitude can be explained mainly by the inelasticity of supply and it reflects the number of times the current housing supply will be multiplied to cover the housing deficit. Therefore, a higher positive degree means a higher housing gap and a very low supply to absorb it.

The lowest disequilibrium happened in 2009 with a magnitude of 0.59 (59%) and this is still socially unacceptable because the benchmark disequilibrium for a healthy housing market is 9 – 10 per cent. However, one year of low disequilibrium magnitude is not enough to offset many years of accumulated high disequilibrium magnitude. Massive supply for sustained periods is required to reduce the disequilibrium rate significantly.

From 2011, the magnitude of disequilibrium became two-digits which corresponds to four-digits in percentage. 2016 became a remarkable year in Nigeria owing to the beginning of the 'great recession', but a high trading volume stimulated by supply was still recorded that year which dropped the disequilibrium magnitude to one-digit temporarily. Obviously, the negative effect of the recession did not deeply penetrate into the building industry until 2017. From 2017, the disequilibrium degree went back to two-digits and kept rising so that the highest degree was recorded in 2019.The lingering recession and inflation precipitated higher house prices and attracted developers, but eventually only developers with significant economic muscle could afford the high land and construction costs.

The astronomical four-digits percentage disequilibrium magnitude which began in 2011 reflects a very dysfunctional market characterized by high house prices and low affordability. With this disturbing situation, it may be necessary to investigate for the presence of bubbles in the housing market and take active steps to address it, but this is a macroeconomic issue.

5.0 Major Findings

1. There is significant interrelationship between a sluggish supply and a rising demand in the housing market and this is reflected by high prices signals.

2. There is a significant disequilibrium within the realm of housing shortage as demand continued to accumulate every year and supply failed to absorb it, leading to serious housing gap. Thus, disequilibrium is expected to continue to rise at a fluctuating rate as revealed by the disequilibrium degrees.

3. In a perfectly functioning housing market, supply is expected to react to the increase in demand but this is not happening. Thus, the housing market could hardly be considered as functioning well.

4. The market system is broken due to significant disconnect between demand and supply. Demand is rising but supply is not converging towards it to achieve equilibrium.

5. The housing market continues to support the law of supply while violating the law of demand. High prices alongside persistent rise in demand is occurring because housing is a necessity whereas, on the other hand, high prices will attract more developers but high land and construction costs ends up discouraging most house-building activities.

6. Households with low affordability are pushed into slums where cheaper housing with inferior structures and amenities are found. Homelessness is not obvious because these inferior housing have absorbed the excess demand through high occupancy rates.

7. Inelasticity is not the only reason for the sluggish movement of supply. High land and construction costs have also contributed immensely to the decrease in supply, and this is compounded by the recession and inflation.

6.0 Conclusions

The purpose of this study is to assess the housing market disequilibrium in Enugu Metropolis with a view to addressing the problem of arbitrary provision of housing. The disequilibrium assessment involved testing for association and variation between demand and supply, establishing housing gaps and estimating the degree of disequilibrium in the housing market. Armed with the results from this study, it was possible to give a verdict on how well the housing market is functioning while providing the government and other market participants with valuable reference on how to restore the market back to equilibrium.

The disequilibrium analysis embraced supply, demand and price indices which were collected from reliable sources covering 1990 to 2020. Correlation analyses and Freidman's tests were used to test for association and variation respectively. The behavior of the housing market was such that there was significant interrelationship between demand and supply, accompanied by a serious disequilibrium in the form of large excess demand. The great variance between supply and demand and the high percentage disequilibrium magnitudes (which reflects high price signals and decline in affordability) indicates that the housing market is not functioning well.

Housing market disequilibrium is expected to continue to expand in the foreseeable future as revealed by the disequilibrium indices, unless something is done to arrest the situation to prevent it from continuing along its current path. This study believes that supply is key to addressing the disconnect between demand and supply in a dysfunctional housing market. Thus, in order to determine a supply target, the housing gap was established and the cost implication to the government was estimated.

7.0 Recommendations

1. Massive housing supply is needed to address the housing gap quagmire, to repair the broken market system, to stop the upward movement of house price and to revitalize the mortgage system in the country.

2. New Towns should be created to depopulate the overcrowded Metropolis and reduce the demand pressures on housing. However, this is a long term project requiring huge capital investment. In the short run, the government could regulate, provide social or subsidized rents, but this is difficult to execute when the excess demand is so strong and it does not solve the actual issue that the housing market is not providing enough supply to meet long term requirements.

3. A radical reform of the housing market is needed to rectify these growing problems with a higher priority given to the issue of housing reform and house building by the government. This will help to link price levels to the supply of housing, accounting for local factors and encouraging a responsive market. Failure to undertake such reforms, is likely to result in the majority of individuals not able to afford to purchase or rent a home.

4. This study also recommends an annual government expenditure on housing provision of approximately N60 billion to build 3,290 units of housing to address the housing gap that has accumulated for over 30 years if a 30-year plan was adopted.

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