FINANCIAL INCLUSION AS A PANACEA FOR INCOME INEQUALITY IN NIGERIA

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ABSTRACT. Given the perception that financial inclusion is a critical tool for the eradication of income inequality, this paper investigates its impact on income inequality in Nigeria via three financial variables: depth, access and stability. The study adopts the Autoregressive Distributed Lag (ARDL) methodology on selected variables from 1981 to 2021. The study found that in the short run, financial stability shows a negative impact which is not statistically significant on inequality, while financial depth has a statistically significant (10%) positive effect. Also, standard of living has a statistically significant (1%) negative impact on inequality while economic growth reveals a statistically significant (1%) positive effect. However, in the long run, financial stability shows a positive and insignificant effect on inequality whereas both financial access and economic growth have positive and significant effect. Also, while financial depth has negative and insignificant effects on inequality, standard of living has a negative but significant effect. This study reccomends that financial inclusion should focus mainly on the financially excluded while the government should create incentives for private financial institutions to extend their services and activities towards the rural dwellers and those who are likely to benefit more from their services.

1. INTRODUCTION

The economic literature establishing financial inclusion, economic growth and inequality nexus suggests that financial inclusion reduces inequality and increases economic growth (Kling, et al. 2020). This relationship has been thoroughly investigated over the years to provide answers to research questions like how financial inclusion has affected income inequality and by extension, economic growth. The World Bank (2016) defined financial inclusion as the availability and accessibility of financial services and information to all divisions of the population. However, Zia and Prasetyo (2018) defined it as the fundamental right of every individual in a society to have access to an effective, timely and affordable service and information from financial institutions, with premium acknowledgement of such individual's dignity and prestige. Hitherto, financial inclusion has been limited to accessibility of financial services but as the concept gained wider prominence, affordability and comfortability were additionally taken into consideration in its definition (Le, et al. 2019). Over time, increasing employment and financial inclusion have been regarded as veritable means of attaining macroeconomic goals such as poverty eradication, income equality, unemployment reduction and achieving sustainable and inclusive economic growth (World Bank, 2018; Omar and Inaba, 2020). This potential notwithstanding, report has shown that over 70% of the world's population are still financially excluded (Sehrawat and Giri, 2016). Despite the continuous growth of financial innovation and increased

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accessibility to financial services, the gap between the rich and poor countries as well as the rich and poor segments of the population has not narrowed down. This leads to the issue of whether financial inclusion truly reduces income inequality or it is just a means to achieving economic growth.

Even though it is the largest economy in Africa, the financial inclusion index of Nigeria is worse when compared to some other African countries with its ranking of 135 out of 176 countries globally. For example, while about 32% of South Africans have access to credit only, about 2% of Nigerians have access to formal credit. Furthermore, only about 21.6% of Nigerians have access to formal payment system compared with South Africa's 46% (Orekoya, 2020). Also, the level of income inequality and poverty has become a major concern. Resources in Nigeria are unevenly distributed, resulting in persistent inequalities across generations and regions. Regionally, industrial and economic developments are basically concentrated in three states in Nigeria: Kano, Lagos and Rivers with Lagos state alone accounting for 25% of national economic output. This dispersion also creates large income gap among states. For example, 81% of the population in Sokoto state is poor while Niger state has 34%. Ironically, while about 112 million Nigerians are living in extreme poverty, it will take Nigeria's richest man 42 years to exhaust his wealth even if he spends one million naira per day. The level of inequality in Nigeria is so high that the top five richest men in the country could lift 80 million Nigerians out of poverty (OXFAM International, 2021).

Studies have empirically examined the relationship between financial inclusion and income inequality widely. However, most of the studies (Mookerjee and Kalipioni, 2010; Park and Mercado, 2015; Omar and Inaba, 2020) are cross-country based which tend to aggregate both developed and developing countries. This approach assumes structural homogeneity for the countries thus making it ineffective to address country-specific issues. This study attempts to address this by considering the effects of financial inclusion on income inequality as it specifically relates to Nigeria. Also, despite the fact that financial inclusion is a multi-dimensional concept, previous studies on financial inclusion in Nigeria employed a variable that captures just one dimension of financial inclusion without acknowledging the others. This study fills this gap by considering the various dimensions of financial inclusion and then investigate their relative impacts on income inequality in Nigeria.

2. Overview of Financial Inclusion in Nigeria

The history of financial inclusion in Nigeria dates back to 1976 when a 14-member committee led by Pius Okigbo was set up to review the structure of the Nigerian financial sector and suggest ways of improvement in order to bring about economic growth and development. The reports of the committee led to the development of the rural banking programme which resulted in the setting up of bank branches in every local government area in Nigeria. The programme aimed at increasing financial access in rural areas to engender rural transformation by providing platforms for the mobilisation of savings to those parts of the country. It also aimed at enhancing the delivery of credit to SMEs and reduce fund-flight in rural areas as well as decrease rural-urban migration (Kama and Adigun, 2013; Okoye, et al. 2017).

Over the years, the rural banking scheme developed and birthed other schemes like the People's Bank of Nigeria and Community Bank which were established in 1989 and 1990 respectively. The purpose of these banks was to increase loan accessibilities for low and middle-income earners in the country. In 2005, the national microfinance policy was also established to facilitate the growth of microfinance banks beyond government ownership and increase active participation of private associations and organisations in the microfinance model (Ogwumike, 2002; Okoye, et al. 2017). The programme was later re-launched as the National Financial Inclusion Strategy (NFIS) in 2012. The NFIS addressed the demand side, supply side and regulatory barriers to financial inclusion in Nigeria. Also, it identified areas of focus, set targets, determined key performance indicators and established its implementation structure. The

framework development of the NFIS identified four areas of priority namely, Tiered know-your-customer-regulations, Agent Banking regulations, National Financial Literacy Strategy, and Consumer protection. One of the main targets of the NFIS was to reduce the percentage of financially excluded adults to 20% by 2020.

In discussing financial inclusion, the impact of advanced technological development cannot be underestimated. In terms of technological advancement, the cashless policy which focuses on the use of mobile money services was introduced in Nigeria. This cashless policy in Nigeria, according to Adurayemi (2016), was designed to break down the traditional barriers of millions of Nigerians, amongst other goals. Basically, the Central Bank of Nigeria (CBN) adopted this policy to increase the development and modernisation of the Nigerian payment system; minimise the cost of banking services and increase economic growth; increasing the level of financial access by providing more efficient transaction options, thereby increasing financial inclusion in the country; and to improve the effectiveness of monetary policy as a major driver of economic growth (John, et al. 2020).

3. DIMENSIONS OF FINANCIAL INCLUSION

3.1. **Financial Depth.** Financial depth captures the size of the financial sector relative to the economy. That is; the size of banks, other financial institutions and financial markets in a country taken together and compared to a measure of economic output (The World Bank, 2021). Empirically, the main variable used to capture financial depth is private sector credit relative to gross domestic product (GDP). This variable is defined as the ratio of domestic private credit to the real sector by deposit money banks as percentage of local currency GDP. Based on this measure, Canada, Australia, and South Africa are among top economies with deep financial system (The World Bank, 2016). Other variables adopted are bank asset, stock market capitalisation and portfolio debt plus equity flows. Financial depth has been discovered to have a significant relationship with long term economic growth and to be positively related to poverty reduction (The World Bank, 2021). Empirical studies have further examined the relationship between financial depth and income inequality. While Clarke, et al. (2006); Roine, Vlachos and Waldenström (2009); Jauch and Watzka (2012); Maldonado (2017) found a significant positive relationship between financial inclusion and income inequality, the studies of Beck, et al. (2007) and Naceur and Zhang (2016) found a negative relationship.

3.2. **Financial Access.** The relationship between financial access and income inequality has also received global scholarly attention especially in developing countries. Financial access is the ability of individuals and organisations to obtain financial services such as credit, deposit, payment, insurance and other services. Access to financial services and use of financial services are not the same. It is possible for individuals/organisations to have access to financial services and decide to not use it whereas individuals/organisations can have an indirect access to bank services by using someone else's account or close substitute. Cultural, religious or ethnic bias are some other reasons why people may have access to financial services and still refuse to use them.

There are dangers attached to increased financial access that could widen income gap. One of such is the growing concern that if the benefits from increased financial access are not effectively and equitably distributed among the populations and economic sectors, it could bring about financial crisis, negative economic growth and increased poverty. To empirically measure financial access, scholars have used variables like number of ATMs, ATM per capita or number of bank branches (Weychert, 2020; The World Bank, 2021). Empirical studies on financial inclusion and income inequality nexus by Honohan (2008); Jaumotte, et al. (2013); Barajas, et al. (2015) and Maldonado (2017) found a positive relationship between the two variables while Beck, et al. (2007) and Delis, et al. (2012) found a negative relationship. Further study by Brune, et al. (2011) on the impact of financial access in rural areas in Malawi found that

improved finacial access through increased savings. This improved the general welfare of rural dwellers in Malawi.

3.3. **Financial Stability.** Following the 2007/2008 global financial crisis, financial stability has become one of the main and relevant components of financial development and also a very important aspect of financial inclusion. Financial stability is a state in which the financial system is resistant to economic shocks and is fit to seamlessly fulfill its basic functions of financial intermediation, management of risks and arrangement of payment. A stable financial system efficiently allocates resources, assesses and manages financial risk, mitigates inflation and minimises unemployment. A financial system is seen as stable when it is capable of absorbing shocks via self-corrective mechanisms, preventing economic crisis from causing a disruption on the real economy or other financial system (The World Bank, 2021). The variables used to empirically measure financial stability include market volatility, bank concentration and skewness of stock returns (Weychert, 2020; The World Bank, 2021). Empirical investigation by De Haan and Sturm (2017) showed that banking crisis lowers the income share of top income earners.

4. Empirical Review

Empirically, there are three main streams of findings on the financial inclusion and income inequality nexus namely; positive, negative and insignificant. However, there is more consensus on the negative relationship between financial inclusion and income inequality. A growing number of empirical studies which posited that increased financial inclusion reduces the economic inequality gap lends credence to this assertion. For instance, Beck, et al, (2007); Le, et al. (2019) and Beck, et al. (2007) examined the impact of banking deregulations across different states in the USA. The study found that banking deregulation in the USA helped boost the income of low-income workers and ultimately reduced income inequality in the investigated states as well as the country at large. Also, Le, et al., (2019), using a dataset from 22 transition economies from 2005 to 2015, found that financial inclusion has a negative relationship with income inequality in these economies.

Other cross-country studies like Kipoh (2019), Menyelim, et al. (2021), and Neaime and Gaysset (2016) have also validated the negative relationship between financial inclusion and income inequality employing the Generalised Method of Moments (GMM) and Generalised Least Square (GLS) methodologies. Kipoh (2019) used a sample of 27 Sub-Saharan African (SSA) countries to examine the impact of financial inclusion on income inequality and found that the estimated financial inclusion index has a negative effect on income inequality. The study, therefore, concluded that an increase in the depth of commercial bank branches and the effective use of bank accounts resulted in income inequality reduction. A similar study by Menyelim, et al. (2021) which used dataset from 1995 to 2017 on 48 SSA countries found that increased financial access led to a reduction in income inequality in the short run. Also, using a panel dataset from 2002 to 2015 from 8 Middle East and North African (MENA) countries, Neaime and Gaysset (2016) showed that there is a negative and significant relationship between financial inclusion and income inequality in MENA countries.

Park and Mercado (2015) deployed a panel data set of 37 Asian countries to show that financial inclusion significantly and effectively reduced income inequality and poverty. The study further found that variables like per capita income, rule of law and demographic characteristics significantly affect financial inclusion in these countries and therefore opined that these factors be taken into consideration in policy-making. The study, therefore, recommended the provisions (for young and old-age populations) of rule of law and enforcement of financial contracts that will broaden financial inclusion and contribute to poverty and income inequality reduction. Park and Mercado (2015) further extended the study to cover 151 economies comprising high,

low, middle-high and middle-low-income countries. Findings revealed that greater financial inclusion has a significant correlation with higher output growth in high and middle-high-income countries which contributes to poverty and income inequality reduction.

In contrast to the above stream of findings, some empirical investigations have also found a positive relationship between financial inclusion and income inequality. For instance, Dabla-Norris, et al. (2015) research on Guatemala, El Salvador and Peru showed that, for Guatemala and El Salvador, financial inclusion policies (like lowering collateral level) only worsened the inequality gap. This is because in these countries the marginal benefit of such policies is better accessed and enjoyed by the wealthier populace. Naceur and Zhang (2016) examined the impact of financial inclusion (measured as financial sector liberalisation) on income inequality across 146 countries using regression analysis on dataset spanning 1961 to 2011. The result showed that financial liberalisation has a positive relationship with income inequality as it widened the income gap in those countries. De Haan and Sturm (2017) employed a panel fixed effects model for a sample of 121 countries covering 1975 and 2005 to examine the impact of financial inclusion (measured as financial development and liberalisation) on income inequality. The result showed that all financial inclusion variables had a positive relationship with income inequality.

Using a dataset of 138 developed and developing countries from 1960 to 2008, Jauch and Watzka (2016) found a positive relationship between financial inclusion (measured as financial development) and income inequality. The study equally found that financial effectiveness has a positively significant relationship with income inequality. Zia and Prasetyo (2018) investigated the relationship and influence of financial inclusion on income inequality and poverty in 33 provinces in Indonesia. The study reported that financial inclusion has a positive relationship with income inequality and that although financial inclusion is highly effective in reducing poverty in society, it is ineffective in closing income gap.

The third stream of literature comprises those that found an insignificant relationship between financial inclusion and income inequality. For example, Park and Mercado (2018) examined the impact of financial inclusion on poverty and income inequality using panel data for 176 countries, of which 37 are Asian developing countries. The results showed that there is no relationship between financial inclusion and income inequality in the Asian developing countries. However, the result showed that per capita income, rule of law, and demographic characteristics had significant effects on financial inclusion for all countries.

The few studies on financial inclusion in Nigeria rather focused on its relationship with other macroeconomic variables. For example, Babajide, et al. (2015) investigated the impact of financial inclusion on economic growth in Nigeria and found that financial inclusion is a significant determinant of the total factor productivity, as well as capital per worker, which invariably determines the economy's final level of output. Also, Omojolaibi (2017) examined the relationship between financial inclusion, governance and economic development in Nigeria. He found that financial inclusion and governance indices are significant in infrastructural development in Nigeria and that financial inclusion is very effective in bridging the economic gap and poverty reduction.

5. Theoretical Framework and Methodology

The theoretical framework underpinning this study is conceptualised on intensive and extensive theory of margins. The intensive theory of margin, on one hand, examines how financial inclusion improves inequality by enhancing financial abilities of agents who have easy access to financial systems and services. The extensive margin, on the other hand, considers how financial inclusion can cover a wider margin through increased access to financial services by economic agents who would have been unable to access these services due to various economic or social constraints. In other words, financial inclusion will bring about increased economic opportunities to the less privileged group and reduce intergenerational persistence of disparities in relative incomes (Becker and Tomes, 1979). The extensive margin theory focuses on how financial development can be aimed at reducing inequality through the inclusion of formerly

financially excluded populace by giving them opportunity to increase their participation in the formal economic systems (Menyelim, Babajide, Omankhanlen, & Ehikioya, 2021) .

Simon Kuznets (1955) hypothesis, however, explains the relationship between per capita income and extent of income inequality. In his seminal paper, Kuznets (1955) used time series data for USA, UK and Germany, and cross-sectional data involving these three countries as well as Ceylon, India and Puerto Rico. He speculated that in the course of economic development, the level of income inequality normally rises during the early phase, levels off during the middle phase and then declines during the later stages of development. According to this hypothesis, a country in an underdeveloped state tends to have relatively higher inequality in income distribution as all the populace have low standard of living. As the economy develops, the income inequality gap increases as some economic agents will benefit more from the development than some others. This trend continues until government intervention through policymaking to correct the level of inequality and poverty (Smith, 2015). This relationship later became known as the Kuznets inverted U-hypothesis. Using the ratio of the richest 20% and the poorest 60% of the population as a measure of inequality, Kuznets (1955) found that inequality was higher in India, Sri Lanka and Puerto Rica compared to USA and United Kingdom. Accordingly, the Kuznets' U-hypothesis states that as per capita income increases at the initial stage of growth, income inequality distribution, which is shown by the inverted U-shape of the Kuznets curve, increases and after reaching the highest level, the income inequality reduces.

5.1. **Model Specification.** The main objective of this study is to examine the relationship between financial inclusion and income inequality in Nigeria. This is succinctly captured in this model which was developed after a critical review of previous empirical literature, distinctly the work of Neaime and Gaysette (2018). Based on this, the functional form of the model is given as:

$$gini_t = \ \gamma_0 + \gamma_1 \sum FI_t + \gamma_2 PCI_t + \gamma_3 CPI_t + \varepsilon_t \qquad (1)$$

Where Gini measures income inequality, FI captures the financial inclusion variables which include NCB (number of commercial bank branches) which measures financial access, LDR (loan to deposit ratio) measures financial stability, LQR (liquidity ratio) measures financial efficiency and DCP (domestic credit to private sector) captures financial depth (Zahogono, 2017; Weychart 2020); PCI captures the per capita income and CPI captures inflation.

5.2. **Methodology.** Based on the work of Pesaran and Shin (2001), this study adopted the Autoregressive Distributed Lag Model to examine the relationship between financial inclusion and income inequality in Nigeria. The ARDL model is generally specified as:

$$
\begin{aligned}
\Delta Gini_t \ = \ & \beta_0 + \beta_{1j} \sum_{j=1}^{n} \Delta Gini_{t-j} + \beta_{2j} \sum_{j=0}^{n} \Delta NCB_{t-j} + \beta_{3j} \sum_{j=0}^{n} \Delta LDR_{t-j} + \qquad (2) \\
& \beta_{4j} \sum_{j=0}^{n} \Delta LQR_{t-j} + \beta_{5j} \sum_{j=0}^{n} \Delta DCP_{t-j} + \beta_{6j} \sum_{j=0}^{n} \Delta PCI_{t-j} + \\
& \beta_{7j} \sum_{j=0}^{n} \Delta CPI_{t-j} + \varphi_1 Gini_{t-1} + \varphi_2 NCB_{t-1} + \varphi_3 LDR_{t-1} + \\
& \varphi_4 LQR_{t-1} + \varphi_5 DCP_{t-1} + \varphi_6 PCI_{t-1} + \ \varphi_7 CPI_{t-1} + \varepsilon_t
\end{aligned}
$$

In the event of existence of long run relationship among our variables, the Error Correction Model is specified as:

$$\Delta Gini_t = \beta_0 + \beta_{1j}\sum_{j=1}^{n}\Delta Gini_{t-j} + \beta_{2j}\sum_{j=0}^{n}\Delta NCB_{t-j} + \beta_{3j}\sum_{j=0}^{n}\Delta LDR_{t-j} + \qquad (3)$$

$$\beta_{4j}\sum_{j=0}^{n}\Delta LQR_{t-j} + \beta_{5j}\sum_{j=0}^{n}\Delta DCP_{t-j} + \beta_{6j}\sum_{j=0}^{n}\Delta PCI_{t-j} +$$

$$\beta_{7j}\sum_{j=0}^{n}\Delta CPI_{t-j} + \pi ECT_{t-1} + \varepsilon_t$$

Where Δ, ECT and π signifies change, error correction term and speed of adjustment respectively.

Data used for the study was sourced from the National Bureau of Statistics, the World Bank database and the Central Bank of Nigeria Statistical Bulletin. The time series data span a period of 41 years, 1981 to 2021. The data for Gini co-efficient was last updated in 2018, hence data for 2019 to 2021 for Gini co-efficient was generated by the authors using moving average method.

6. EMPIRICAL ANALYSIS AND RESULT

6.1. **Descriptive Statistics.** Table 1 shows the descriptive statistics of our variables of interest. Gini coefficient ranges from 0.204 to 0.743 with an average of 0.55. NCB has it highest value as 5809 and its lowest as 869 with an average of 3257.231. LQR ranges from29.1 to 75.8 with an average of 48.437. LDR ranges from 37.965 to 85.661 and an average of 67.074. DCP ranges from 4.948 to 22.267 with an average of 9.641. PCI ranges from 270.224 to 3222.694 and an average of 1369.233 and CPI recorded 5.388 at its lowest and 72.836 at its highest with an average of 18.949.

Table 1: Descriptive Statistics of variables							
	GINI	**NCB**	**LQR**	**LDR**	**DCP**	**PCI**	**CPI**
Mean	0.551912	3257.231	48.43721	67.07448	9.641166	1369.233	18.94905
Median	0.579314	2407	46.8	66.9	8.162148	1007.874	12.87658
Maximum	0.7432	5809	75.8	85.66147	22.26722	3222.694	72.8355
Minimum	0.204	869	29.1	37.965	4.948032	270.224	5.388008
Std. Dev.	0.142787	1717.155	11.00695	12.11376	4.196922	900.6834	16.65935
Skewness	-0.79622	0.322727	0.397517	-0.56213	1.255948	0.409206	1.854175
Kurtosis	2.995637	1.506398	2.629265	2.791717	4.118635	1.706437	5.306552
Jarque-Bera	4.015148	4.30212	1.3146	2.233346	12.60161	4.002803	32.58139
Probability	0.134314	0.116361	0.518249	0.327367	0.001835	0.135146	0.0000
Sum	20.97267	127032	1985.926	2750.054	385.6466	56138.55	776.9108
Sum Sq. Dev.	0.754361	1.12E+08	4846.117	5869.727	686.9521	32449223	11101.36
Observations	41	41	41	41	41	41	41

6.2. **Unit Root Test.** The stationarity test result using both the Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) methods is shown in Table 2. The result shows that the variables are of mixed order of integration. According to the PP test result, GINI, LDR, LQR and CPI are stationary at levels (I(0)), while NCB, DCP and PCI are stationary at first difference (I(1)). The ADF test result shows that LDR, LQR, DCP and CPI are stationary at levels (I(0)) while GINI, NCB and PCI are only stationary at first difference (I(1)).

Table 2: Summary of Unit Root Test Result						
	Phillips-Perron			**Augmented Dickey Fuller**		
Variables	**Levels**	**First-Difference**	**I(D)**	**Levels**	**First Difference**	**I(D)**
GINI	0.0969*		I(0)	0.1178	0.0055***	I(1)
NCB	0.7733	0.0008***	I(1)	0.7967	0.0008***	I(1)
LDR	0.0703*		I(0)	0.0025***		I(0)
LQR	0.0225*		I(0)	0.0271**		I(0)
DCP	0.4316	0.0000***	I(1)	0.1644	0.0000***	I(1)
PCI	0.7142	0.0071***	I(1)	0.7103	0.0053***	I(1)
CPI	0.057*		I(0)	0.0426**		I(0)
*, ** and *** signifies 10%, 5% and 1% level of significance						

7. Regression Result

7.1. **Bounds test result.** From the unit root test result, it is confirmed that the variables of interest are of mixed order of integration and based on this, ARDL model estimation is conducted. The optimal lag structure based on the Akaike Information Criteria yields ARDL (2,1,0,2,0,0) model. Based on this, the long-run relationship is estimated using the Bounds-test. The Bound test result in Table 3 shows the existence of a long run relationship between the variables. Based on this, long-run model and error correction model were estimated for the variables.

Table 3: Bounds Test Result				
Test statistics	**Value**	**Significance level**	**Critical valules**	
			I(0)	**I(1)**
F-statistic	3.30112	10%	1.99	2.94
		5%	2.27	3.28
		2.50%	2.55	3.61
		1%	2.88	3.99

7.2. **Long Run cointegration between Financial Inclusion and Income Inequality.** In estimating the relationship between financial inclusion and income inequality in Nigeria, Table 4 shows the long-run relationship between the variables.

Table 4: Long Run Cointegration Between				
Financial Inclusion and Income Inequality				
Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
DCP	-0.04703	0.024171	-1.94566	0.0652
LDR	-0.00046	0.002559	-0.17903	0.8596
NCB	0.000168	5.43E-05	3.091575	0.0055
LQR	-0.00296	0.003418	-0.86726	0.3956
PCI	-0.00015	8.14E-05	-1.80648	0.0852
CPI	0.0014	0.002011	0.696183	0.4939
C	0.890335	0.323248	2.75434	0.0119

The result shows that only domestic credit to private sector (DCP) and number of commercial banks (NCB) significantly impacted on income inequality in the long-run. Domestic credit to private sector has a negative coefficient, indicating that increase in DCP reduces income inequality in Nigeria. This is consistent with the findings of Olohunlana and Dauda (2019). In contrast, the number of commercial banks has a positive coefficient, indicating that increase in NCB increases income inequality in Nigeria. This result is consistent with the study of Seven and Coksum (2016) and Olohunlana and Dauda (2019). The result also shows that increase in liquidity ratio (LQR) and loan to deposit ratio (LDR) reduces income inequality in Nigeria although they are not statistically significant. Also, increase in per capita income (PCI)

reduces income inequality significantly while increase in consumer price index (CPI), signifying increased inflation, increases income inequality in Nigeria, although not statistically significant.

7.3. **Error Correction Model (ECM).** The ECM shows the short-term dynamics and long-term behaviour of the model. The ECM was estimated based on the long-run relationship between the variables to show the short-run dynamics between financial inclusion and income inequality. From Table 5, the coefficient of the ECM, also known as the stability or adjustment parameter is negative and significant, showing that the model will eventually converge in the long-run. The coefficient of the error-correction term is -0.1708 which implies that there exists a long-run relationship among the variables and that shocks to the system adjust at the rate of about 17% per year.

Table 5: Error Correction Model				
Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
D(GINI(-1))	-0.23761	0.137768	-1.72469	0.0993
D(DCP)	-0.00233	0.001955	-1.19252	0.2464
D(NCB)	2.52E-05	1.76E-05	1.434716	0.1661
D(NCB(-1))	4.14E-05	1.53E-05	2.71219	0.0131
CointEq(-1)*	-0.1708	0.028784	-5.93396	0.0000
R-squared	0.53643	Durbin Watson statistics	2.158496	
Adjusted R-squared	0.470205			

7.4. **Residual Diagnostics.** After the analysis, some residual diagnostics tests were carried out. These include: the serial correlation LM test which is used to investigate the presence of autocorrelation in the model, the Breusch Heteroskedasticity test which tests for the problem of heteroskedasticity in the residuals and the CUSUM and CUSUM-Square test which tests for stability. From the serial correlation LM test result in Table 6, the null hypothesis is that there is no serial correlation. Since our probability value is above 10%, we do not reject the null hypothesis. Hence, there is no problem of autocorrelation in the series.

Table 6: Breusch-Godfrey Serial Correlation LM Test			
F-statistic	1.311173	**Prob. F(2,19)**	0.2928
Obs*R-squared	4.002222	**Prob. Chi-Square(2)**	0.1352

Figures 1 and 2 show the result of the CUSUM and CUSUM squares test respectively. The result confirms the stability of the estimated model.
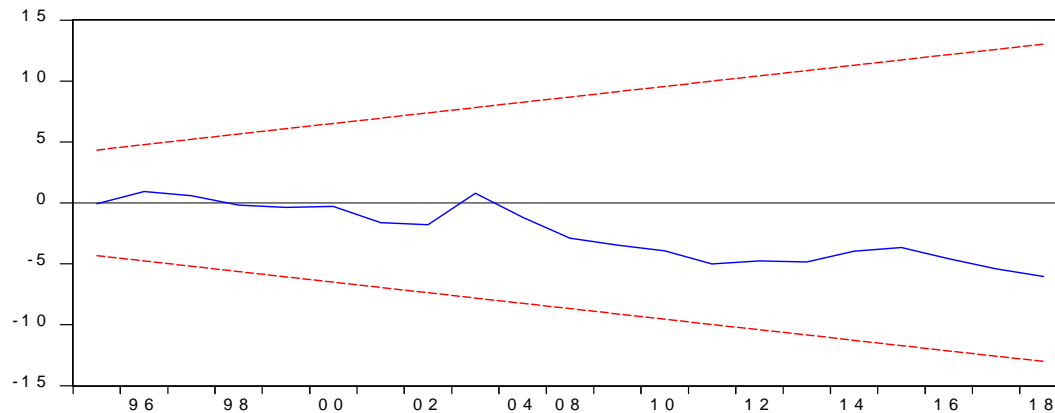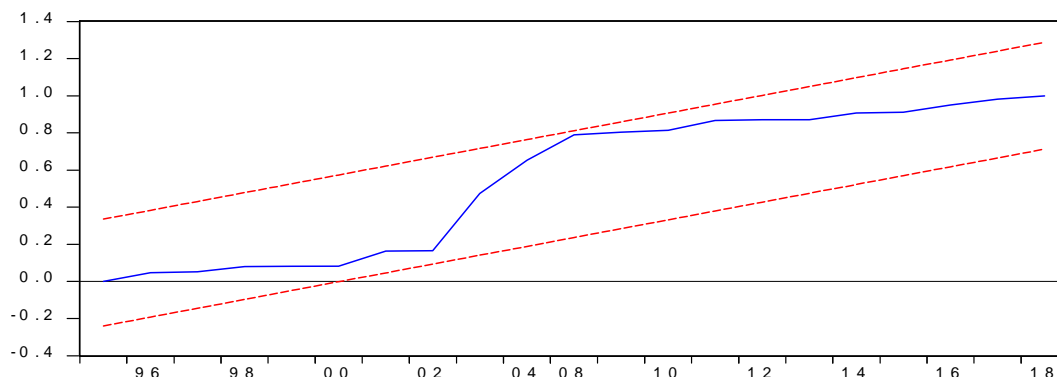

Figure 1: CUSUM Test

Fig 2: CUSUM Squares Test

8. Conclusion and Recommendation

From the analysis and result, it was found that the different components of financial inclusion had different effects on inequality. Financial access, measured by the number of commercial banks, was found to have a positive and significant effect on inequality in Nigeria. This result is consistent with the findings of Barajas, et al. (2015) and Jaumotte, et al. (2013). Financial depth, measured by domestic credit to private sector, returned a negative and significant effect on inequality which is consistent with the findings of Olohunlana and Dauda (2019). Other measures of financial inclusion such as loan to deposit ratio which captures financial stability and liquidity ratio which measures financial efficiency were found to have a negative, although insignificant influence on inequality .

One of the main causes of the seemingly counterintuitive results in some of the financial inclusion measure, is due to the fact that financial inclusion is most times targetted towards those that can meet the condition, and these are usually 'the haves' in the society. Banks would build more branches in the city and urban areas where people already have access to financial services and resources than rural areas where it is equally needed. Hence, rather than reducing the inequality gap, increased financial inclusion may be widening the inequality gap.

This study reccomends that rather than focusing on those who can meet the conditions, financial inclusion should focus on the financially excluded and those that actually need these services. Government should create incentives for private financial institutions to encourage them to extend their services and activities to the rural areas and those who are in need and not just focus on those who will bring them profits.

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