

IMPACT OF SERVICE SECTOR PERFORMANCE ON INCOME INEQUALITY IN NIGERIA

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ABSTRACT

The service sector is critical in every country's economy. This is due to its capability in driving economic growth and development in Nigeria. This study examined the impact of service sector growth on income inequality in Nigeria for the period 1980-2025. The specific objectives of the study were: to ascertain the impact of trade sub-service sector output on

income inequality, examine the impact of information and communication technology sub-service sector output on income inequality, and to investigate the impact of finance sub-service sector output on income inequality. To achieve these objectives, the Vector Error Correction Model (VECM) of estimation as well as the descriptive statistics was used. The study revealed that the service sector output to GDP has a negative and significant impact on income inequality, information and communication service sub-sector showed a negative and significant impact on income inequality, while finance sub-service sector output was also negative and significant. The study recommend that the negative coefficient of trade sub-service sector output suggests that increase in the volume of trade services led to increase in income generation by household thereby, reducing income gap, this situation has also led to poverty reduction in Nigeria. The significant coefficient of information and communication sub-service sector output, showed that a rise in the number of ICT users and entrepreneurs can help reduce income inequality in Nigeria. Similarly, the negative coefficient of finance service sector output shows that an increase in financial credit could boost private investment, generate employment and increase capital accumulation.

Keywords: Service Sector, Trade, ICT, Finance, Income inequality. Vector error correction model.

1. INTRODUCTION

Service has long been the main source of economic development in advanced economies. Perhaps an integral means of development by assuming a significant percentage of GDP, and growth in output has exceeded that in industry for most developing economies. This is witnessed by the growth of modern commercial services, insight and communication technology, and finance.

In the past, it was believed that economic growth, structural transformation of agriculture could best be achieved through advancement of a labour-intensive manufacturing sector. The development of the sector was seen as the bedrock of slow growth, substandard, and hushed output sector, minimal income with little or no progress, insufficient learning and low spillovers. Today the sector could be classified among the most dynamic sectors in an economy, even in poor nations. (Ghani, 2011)

About 75 percent of the world economy is now accounted for by services (45 percent in developing economies), World Bank (2023). The sector is critical in every nation's economy. It seen as a sector with the potentials of becoming a significant driver of bridging income gap. It is a catalyst for economic expansion which is driven in part by the rapid changes in wholesale as well as retail trade, finance, insight, and communication technology that support service delivery.

Services contribute to income distribution in two ways. Directly, they provide new jobs. Indirectly it provides the income that, when spent, stimulates consumer demand. It has witnessed the fastest growth in the number of jobs created in recent years. (World Bank, 2023). This study therefore, tend to disaggregate services into three major components: trade, information and communication technology, and finance.

Trade sub-service sector have an immense contribution to increasing income redistribution, arising from the large number of households earning daily incomes from trade services. The sector can be a pathway to reducing income gap, through its effects on investment, technology transfer, and market competition. It is seen as a powerful mechanism for advancing the economy, and increasing real incomes (World Bank, 2023). Developing economies now constitute 48 per cent of world trade, up from 33 per cent in 2000, and the number of people living in extreme poverty has been cut by half since 1990, to just under one billion people as a result of improved trade services. (UNCTAD, 2023).

Trade services have boosted job creation and improve job standards, increasing income redistribution, stimulating economic growth, and driving output. Contributions from trade have brought about a higher living standard and lower income gap among households. Fair trade promotes equality and fair conditions in the production of goods and services. (World Bank Group & World Trade Organization, 2023).

Additionally, the insight and communication technology sector enable an increase in job opportunities directly for the poor both in the production of software and hardware (World Bank, 2024). As a means of reducing income gap and poverty rate, the sector play's a major role in improving the activities of the poor by enhancing their output, as well as opportunity to market insight and reducing the trading costs of rural agriculturists and traders. In addition to insight and communication technology role in helping to improve livelihood, healthcare and education, ICT can address several other aspects of poverty. ICT helps entertainment industry by allowing positive ideas especially, among the youth. Using ICT to aid income redistribution and reduce poverty rate could be possible, practical and affordable.

Consequently, finance sub-service sector has also been of great importance in the provision of micro-credit and has subsidized credit to both the agricultural and small-scale industrial sectors. Also, by allocating resources efficiently, the finance sub-service sector promotes investments leading to increased levels of employment, and income. It also ensures higher levels of financial inclusion which is critical at increasing income distribution in developing economies.

1.2 Statement of the Problem

Despite the laudable contributions of the service sector, income inequality still takes the lead even with great developmental efforts in developing economies. According to world inequality report (2024), Nigeria's data on income inequality has remained high since the 1990's with a 35.1 score in the 2022 Gini coefficient making her the 11th and 100th out of 163 countries in the world. Nigeria has an income inequality of 1 to 14 for the top 10% to the bottom 50% of the population and 1 to 37 for the top 10% to the bottom 50%. The estimated annual average income in the country is equivalent to \$7,600 for the entire population. The top 10% of the population, who make about 32% of the national income, earn an average of \$32,700. While 1% of the population earns \$88,600 average annual income, and this category contributes 25.2% of the national income.

While those in the middle class earns average annual income of \$50,446 average annual income. However, those in the bottom 50% earn \$2,400, equivalent to NGN587,583. This

group of persons contribute 15% of the total national income culminating to increasing poverty in Nigeria. Income inequality remains a significant challenge. The Gini coefficient in Nigeria is forecast to amount to above 47% in 2024, while the number of people in Nigeria who are earning less than \$2.15 per day is forecast to amount to 65.97 million in 2024. This situation affects people's life expectancy and access to basic services such as healthcare, education, water, and sanitation, (World Bank, 2024).

On the other hand, their contribution to overall domestic activity and economic growth increased significantly, rising from less than 30% in the 1980's to become the largest share of the GDP in 1990s. The share of services to employment in developing economies grew by 10 percent points, to 50 percent in 2010, 55 percent in 2012 and 58 percent in 2015. The sector contributed to 60 percent share of employment in Nigeria in 2018, 63 percent share in 2019 and thereafter grew by 73 percent in 2023. This implies that service contribute more to growth, and this is important for poverty reduction. NBS, (2023). The contradiction in the empirical literature provides the motivation for re-examination of the relationship between service sector and inequality.

1.3 Research Objectives

The objectives of the research are specific and measurable goals that outline the accomplishment of the researcher within a study. Therefore, the study is carried out grounded on three objectives:

- 1 To ascertain the impact of trade sub-service sector output on income inequality in Nigeria.
- 2 Examine the impact of information and communication technology (ICT) sub-service sector output on income inequality in Nigeria.
- 3 Investigate the impact of finance sub-service sector output on income inequality in Nigeria.

1.4 Significance of the study

This study will inform policies, efforts and programmes directed towards narrowing income gap in Nigeria by highlighting the interrelationship between service sector performance and income inequality in Nigeria. An example of such programmes are anti-poverty programs such as cash transfer programs, education and training programs, microfinance programs, public works programs, tax credit programs, and youth empowerment schemes (YESSO), as Nigeria aspires to lift all of its people out of poverty by 2030. The study also aligns with the new policy window of the federal government 'A Better Future for All Nigerians': aimed at reducing income gap across Nigeria.

Additionally, the study will provide empirical evidence and contributes to the body of existing studies on service sector performance and inequality; hence, it would be of immense value to the government, researchers and policy makers.

2.0 EMPIRICAL LITERATURE

Many studies have looked into the complex interplay between trade, insight and communication technology and finance service and their combined impact on income inequality in Nigeria. Research have put forth that these indicators have significantly contributed to reducing income inequality among individuals Lim & McNelis (2016). Moreover, Trade sub-service sector have an immense contribution to increasing income

redistribution, arising from the large number of households earning daily incomes from trade services. The sector can be a pathway to reducing income gap, through its effects on investment, technology transfer, and market competition. It is seen as a strong tool to promote economic development. Additionally, insight and communication sector enabled an increase in job opportunities directly to the poor both in the manufacturing of hardware and software. As a means of reducing income gap and poverty rate, this sector play a major part in improving the activities of the poor by increasing their output as well as access to market insight or reducing the trading costs of rural agriculturist and traders (World Bank, 2023). Consequently, finance sub-service sector has also been of great importance in the provision of micro-credit and has subsidized credit to both the agricultural and small-scale industrial sectors. Also, by allocating resources efficiently, the finance sub-service sector promotes investments leading to increased levels of employment, and income. It also ensures higher levels of financial inclusion which is critical at increasing in income distribution in developing economies.

2.1 Trade services and income inequality

Lim & McNelis (2016) investigated the relationships between trade services and income inequality using a comprehensive econometric analysis. Using Panel data for (42 low to middle-income countries) and the error correction mechanism (ECM). They found a positive and significant impact of trade services on income inequality, but its impact varies depending on the level of development. Additionally, the results showed that economic growth brought about to a decrease in inequality and can increase or decrease the Gini. Foreign direct investment and aid flows have minimal effects on developing nations, but they appear to benefit middle-income countries. Overall, the result showed why mixed results associated with trade and financial openness mute the overall effect of globalization on inequality.

Roser and Cuaresma (2016), addressed the dynamics of trade on income inequality among industrialized economies. Estimated a panel of 32 advanced economies in the past four decades using the system (GMM) and found a Gini Index elasticity to trade services of about 0.01, controlling for public spending, GDP growth, GDP per capita and the structure of international trade. Findings showed that increase in trade services influences income distribution in developed countries of the World. Cassette, Cassette, Fleury & Petit (2016) evaluated the association between international trade in service and income inequality using the panel regression analysis. In a sample of 10 OECD nations between 1980-2015. Findings from the study showed a significant relationship on income inequality and trade in the OECD nations. It also revealed that income inequality is influenced not just by the difference between the high and low income earners, but by the difference between the median and lowest incomes countries.

Similarly, Ahuja, (2018), explored the nexus between trade services and income inequality in India which is by and large a service-driven economy. Using the (ARDL) econometric technique and descriptive statistics. The study found a significant impact on trade and income inequality in both short-run and long-run periods, corroborating the assertion that trade services contribute bridging income gap in India and developing countries.

Cordeiro and Komaromi (2019), conducted an analysis on the effects of trade on income inequality in 118 countries from 2000-2015 within the Caribbean and Latin America, using the poisson pseudo-maximum likelihood and gravity models, controlling for country size while looking at the impact of international trade. Their research found trade coefficient models being strongly significant with income inequality. Consequently, correlating with country-level openness measure of actual trade openness even after controlling for country size.

Dizikes (2022), investigates trade and earnings inequality in Ecuador from 2009 to 2015, with the use of logit regressive technique to examine revenue from 1.5 million firms with a tax ID and income for 2.9 million founders and employees of those firms. The study found a positive association between trade in services and inequality. Related study by Dizikes (2022), used the logit regressive econometric technique to examine Ecuador's personal income data while looking at the link between Ecuador's economy and international trade. The study found that trade services has a negative relationship with income gains that are about 7 per cent greater for those at the 90th income percentile, compared to those of median income, and up to 11 per cent greater for the top percentile of income in Ecuador.

2.2 Information and Communication Services and Income Inequality

Asongu and Odhiambo (2018), observed that strengthening information and communication technology lowers income inequality in 48 countries in Africa within the period 2004-2014. Using the Atkinson index and Palmer ratio the Gini coefficient. Using the Generalized Method of Moments. Strengthening internet reach and fixed broad band enrollment have a net effect on lowering the Atkinson index and the Gini coefficient, while, increasing mobile phone reach and internet access reduces the Palmer ratio. The study recommends increased engagement of individuals in the information and communication technology (ICT) sector to narrowing income gap.

Asongu and Odhiambo (2018) made use of quartiles regressions to ascertain the correlation between inclusive development and mobile banking during the conditional distribution of inclusive development. The result showed that, an increase in mobile banking mechanisms to a specific limit would increase quality of growth and decrease inequality at the top-end of the inclusive development pattern. The study posits that enhancing usage of mobile banking applications could bring about growth inclusivity, and thereby reduce income inequality.

Richmond and Triplett (2018), examined the connection between information and communication technology and inequality in a cross-sectional and longitudinal data for 109 economies between 2001-2014. Their findings suggests that ICT could have an effect on inequality, depending on the type of ICT and the measure of inequality. Ali, Alam, Taylor and Rafiq (2019), explore the responsiveness of information and communication technology low-end to income re-distribution and socio-economic inequality. Using random and generalized linear mixed effects model on Australia household panel data between 2011-2017. The result showed that information and communication technology low-end could be relative to income distribution and socio-economic inequality. Remarkably, it is revealed that for low-income sub-groups, inequality has a significant impact on ICT accessibility, while it is low for high income

households. This result is in agreement with the studies of Richmond and Triplett (2018), Asongu and Odhiambo (2018) respectively.

Perara, Siriwardana & Stuart (2023) examined the relationship between ICT and inequality in 5-Asian economies for 2009-2018. Using static and dynamic panel data estimation methods. Findings revealed that mobile-cellular telephone subscriptions has an effect on inequality. It also implies that nations with successful digitization can raise their economic performance. On the other hand, it could help to bridge the income gap of households whose daily livelihoods are on information and communication technology. The findings suggest that most economies concentrate on the innovation of ICT, particularly on mobile-cellular telephone subscriptions and fixed telephone subscriptions to boost economic performance by narrowing income inequality.

Ndjobo and Otabela (2023), analyzed the interplay between ICT and HDI on inequality for 89 developing countries within the period 2000 to 2015 based on the panel, fixed effects technique. The study found that the interplay between ICTs and HDI lowers overall inequality on one hand, and on the other, leads to an increase in the income shares of the poorest and to the richest in developing countries.

Dossou, Kambaye, Berhe & Asongu (2023) examined the correlation between ICT and inequality for 42 Sub-Saharan African countries between 1996-2020 using generalized method of moment. Findings revealed that while ICT contributes to increasing income re-distribution, governance quality could reduce income inequality promote E- governance and improve social welfare and lower income gap.

2.3 Financial Services and Income Inequality

Brei, Ferri and Gambacorta (2018), investigates the correlation between financial services and inequality for 97 developing economies from 1989-2012. The fixed effect model found a non-monotonic relationship, implying that more finance narrows income gap. While income gap increases if finance is broadened through private sector finance. Meniago and Asongu (2018) ascertained the role of financial development on inequality in a panel of 48 African countries between 1996-2014. The Generalized Method of Moments found that using financial development indicators as exogenous variables in the identification process reveals that access to credit and intermediation efficiency have favourable income distributive effects than financial stability.

Madu (2023), examined the impact financial development on income inequality in Nigeria from 1980-2012. Using ARDL estimation technique. The study measured financial development in its comprehensive dimensions as financial depth, financial efficiency, financial stability and financial liberalization. While gross and net Gini coefficients were used as measures of income distribution. The findings revealed that financial development has a positive impact on income inequality in the long term. On the other hand, financial liberalization had a negative impact.

Tita and Aziakpono (2020), analyzed the relationship between financial inclusion and inequality in Sub-Saharan Africa using the ARDL model and the World Bank Global Findex 2011 to determine which aspect of financial inclusion has the higher effect on inequality. The

result showed that electronic payments, formal savings, and accounts used for business have a positive relationship with inequality.

Okafor, Olurinnola, Bowale and Osabohien (2023), examine the effects of financial development on inequality in Africa using Pooled Ordinary Least Square (OLS), and the system Generalized Method of Moments estimation techniques. The result showed that financial access has a negative and significant effect on income inequality. Bank branches per 100, 000 have a coefficient of -0.0207, which suggests that as the bank branches per 100,000 adults rise by a percentage point, income inequality could be reduced by 0.0207% in Africa at a 5% significant level. Similarly, the financial efficiency dimension measured by the bank cost-to-income ratio had a positive significance with a coefficient of 0.235 at 5% significance.

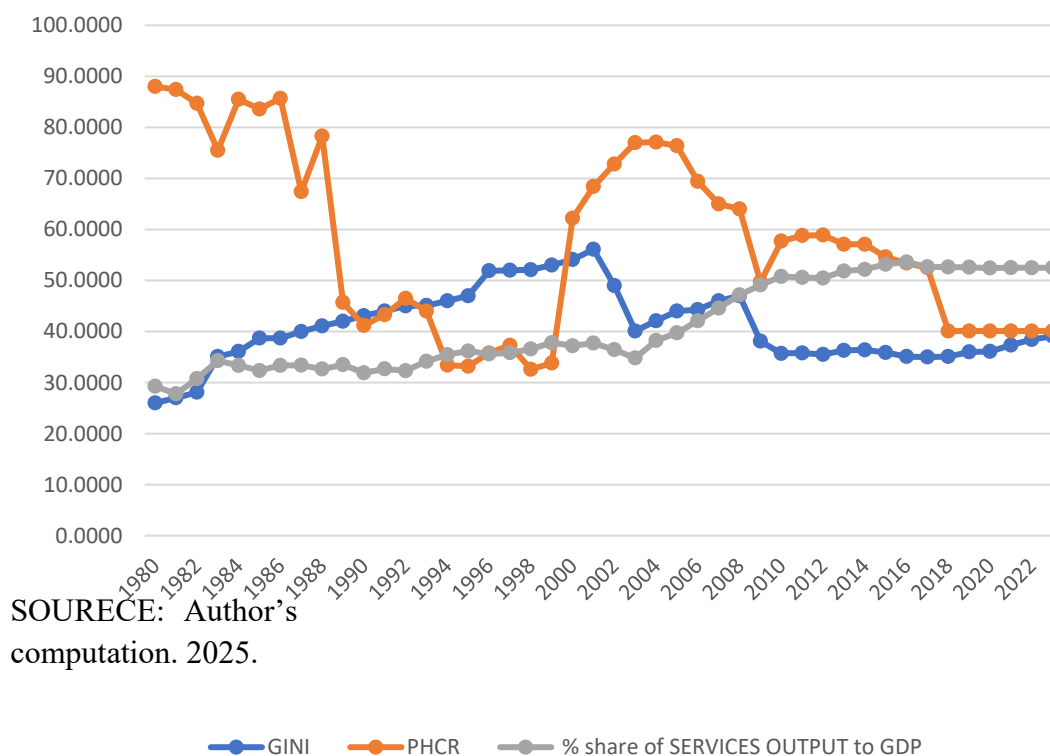
This happens to be a favourable outcome as the result indicates that a rise in bank cost-to-income ratio, suggesting bank inefficiency could encourage income inequality to increase by 0.235%. As the bank cost-to-income ratio increases, it indicates that the income derived by the bank is less than making funds financial stability a favourable outcome that corresponds with a priori expectation. The coefficient of financial stability which is -0.0240, is also significant which indicates that a percentage increase in bank Z-score could reduce income inequality by about 0.02%. This outcome corresponds to the a priori expectations that financial access should reduce income inequality.

The study revealed that financial depth, financial stability, financial access, and financial efficiency significantly contribute immensely to improving income inequality reduction in Africa. Therefore, policies should be aimed at ensuring that all dimensions of financial development experience development. Priority should not be placed on how broad the financial system is but also on how efficiently the responsibility of the financial system is carried out; how accessible are the financial products and services being offered, and how effective can the financial system withstand shocks.

On the other hand, Zungu, Greyling and Kaseeram (2022), examined the nonlinear dynamic impact of financial development on income inequality in an unconventional policy regime in a panel of 21 African Countries. Most importantly, the study used Panel Smooth Transition Regression to extend the existing debate on the subject matter, with roots back to the seminal work of G-J and many others, and add a twist by distinguishing between a conventional (1990-1999), as well as the threshold level at which financial development reduces income inequality. They found evidence of a non-linear effect between the two variables, with the threshold found to be 21.90 % of GDP, below which financial development reduces income inequality in Africa, and this confirms the U-shape in conventional policy regimes. Unconventional monetary policies were found to trigger the financial inequality relationship.

The study therefore recommended that the financial sector be given adequate consideration and recognition. This can be effected by implementing appropriate financial reforms, developing an adequate investment strategy, and maintaining spending on science and technology investment in African countries below the threshold. Again, when implementing unconventional monetary policies in African countries, extreme caution is required.

FIGURE 1



SOURCE: Author's computation. 2025.

Trend Analysis of Service Sector output and income Inequality in Nigeria

Trend of Service Sector Output to GDP, Poverty rate and income inequality in Nigeria

The trend of service sector output to GDP, and income inequality in Nigeria between 1980-2024. From the chart, between 1980-1985 poverty headcount ratio stood at 85.60 percent and then fell to 75.50 percent in 1986, it then rose to about 80.00 percent in 1988, and then fell consistently between the years 1990-2000. The poverty rate however, rose to 80.00 percent in 2006, reduced to 55.2 percent in 2010-2018 respectively, and further decreased to 40.00 percent between the years 2019-2023 respectively. The trend of the GINI coefficient has been from an average of 2.5 per cent in 1980 to 5.9 per cent in 2000. It however decreased to 4.00 percent in 2002 and fell further to 3.5 percent in 2010-2018 respectively and increased steadily to a region of 4.00 percent over the years till 2023. The service sector output to GDP stood at 3.50 per cent in 1980 to 3.90 per cent in 1984-2002 respectively. The sectorial output further increased from 4.00 per cent in 2004 to 54.00 per cent in 2016 per cent, the sector witnessed a steady increase from 56.00 in 2018 to 58.40 per cent in 2023 respectively.

2.2 THEORETICAL FRAMEWORK

The Augmented Kuznets Hypothesis/Theory

The Kuznets curve was proposed by Simon Kuznets to comprehend the interplay between a country's income per capita and its inequality of income distribution. According to the theory, having an inverted U-shaped graph, representing the impact of inequality on income distribution showing that at the initial stage, income inequality increases as people begin to earn more, but it reaches its peak and starts declining at a certain point. In the latter stages, further, development does not lead to more inequality but reduces it, resulting in an inverse U-curve. This implies that, developing economies have the highest income difference, as a result of underdevelopment, while the middle-class and the upper-class are causing economic inequality.

4 METHOD AND DATA

In examining the interplay between service sector performance and income inequality in Nigeria. Based on the ex-post research design with secondary data sourced from the Central Bank of Nigeria, statistical bulletin as well as annual reports and statements of accounts from the National Bureau of statistics and the World Bank data sheet. The study was analyzed using vector error correction model (VECM) technique which is a special form of a VAR for I(1) variables that are co-integrated. The VECM model allows us to capture the short-run and the long-run relationship. For the purpose of this study, if the variables are co-integrated, then the short-run relationship based on the VECM specification can be expressed as:

$$\Delta Y_t = \alpha_0 + \alpha_1 \Delta Y_{t-1} + \dots + \alpha_p \Delta Y_{t-p} + \beta_0 \Delta X_t + \beta_1 \Delta X_{t-1} + \dots + \beta_p \Delta X_{t-p} + \mu_t$$

A VECM consist of one period lagged co-integration equation $et-1$ and the lagged first difference of the endogenous variable X_t and Y_t .

Furthermore, the study is anchored on the "Augmented Kuznets hypothesis which reflects the relationship between a country's income per capita and its inequality of income distribution. The augmented Kuznets hypothesis is a modified version of the Kuznets curve that considers other components of inequality such as education, technological development, globalization, and economic growth. Therefore, let G_t be the income inequality at time t and (A, X) be the service sector variables and other control variables at time t . The augmented Kuznets model incorporates the idea that a Gini index of 0 represents perfect equality. While an index of 100 implies perfect inequality. Where G represents Gini coefficient, assuming income inequality is influenced by factors such as literacy rate, financial inclusion and total government expenditure and other services.

$$G_t = f(A, X) \text{-----} (1)$$

Here, G_t represents the Gini coefficient at time t , and A represents the service sector variables disaggregated into trade, insight and communication and finance. While X represents other control variables determining the extent to which the distribution of income or consumption among individuals within an economy deviates from a perfectly equal distribution. Therefore,

assuming that this distribution of income affects individual income level. Hence, leading to unequal distribution of income.

$$A = f(TSS, ICT, FSS) \text{-----}(2)$$

Thus,

$$G_t = f(TSS, ICT, FSS, X) \text{-----}(3)$$

Where: X is a vector of control variables such as secondary school enrollment, financial inclusion and total government expenditure, given as:

$$X = (SENROL, FINC, GEXP)$$

Where: SENROL = secondary school enrollment, FINC=financial inclusion, GEXP = total government expenditure

Based on this, equ (3) is restated as:

$$G_t = f(TSS, ICT, FSS, SENROL, FINC, GEXP) \text{-----}(4)$$

Substituting G_t for INEQ, equ (4) is for the purpose of this study as follows:

$$INEQ = f(TSS, FSS, ICT, SENROL, FINC, GEXP) \text{-----}(5)$$

Including the stochastic error term, equation (5) is re-specified as follows:

$$INEQ_t = \beta_0 + \beta_1 TSS_t + \beta_2 ICT_t + \beta_3 FSS_t + \beta_4 SENROL_t + \beta_5 FINC_t + \beta_6 LOG(GEXP_t) + \mu_t \text{-----}(6)$$

Where U_t is the stochastic error term at time t. β_1 to β_6 are the coefficients to be estimated. The a priori expectations. The expected signs of the coefficient according to economic theory are:

$$\beta_1 < 0; \beta_2 < 0; \beta_3 < 0; \beta_4 > 0; \beta_5 < 0; \beta_6 < 0.$$

A positive relationship is expected between the dependent variable (income inequality) and TSS, FSS, ICT, SENROL, GEXP, and FINC. The used the VECM specification can be expressed as:

$$\Delta Y_t = \alpha_0 + \alpha_1 \Delta Y_{t-1} + \dots + \alpha_p \Delta Y_{t-p} + \beta_0 \Delta X_t + \beta_1 \Delta X_{t-1} + \dots + \beta_p \Delta X_{t-p} + \mu_t.$$

Where:

ϵ_{t-1} is the lagged value of the error correction term (ECT) from the regression $Y_t = a + bX_t + \epsilon_t$ and p is the number of lags.

Table 1: Definition and naming of variables:

Variable	Definition
Dependent variable :(INEQ) Inequality	Inequality measured by the GINI coefficient in Nigeria.
Independent variables: (TSS) Trade service sector to GDP	The trade service sector ratio to GDP encompasses industries and activities that facilitate the exchange of goods and services across Nigeria borders

(ICT) insight and communication technology service sector to GDP	Insight and communication service sector ratio to GDP in Nigeria.
(FSS) Finance sub-service sector to GDP	This is the contribution of finance service sector to GDP in Nigeria in years.
(SENROL). Secondary School Enrollment rate, ratio to GDP.	Secondary school enrollment rate in years in Nigeria (this is used as proxy for literacy rate in years in Nigeria),
(FINC) Financial Inclusion.	FINC= Rate of financial inclusion in years in Nigeria. (this is captured by the number of deposits of commercial banks in the rural areas).
(GEXP)government expenditure	GEXP=Total government expenditure in years in billion naira.

Source: Compiled by Author 2025.

3.1 RESULTS

Table 2
Descriptive Statistics for Inequality Equation

	INEQ	TSS	FSS	ICT	SENROL	FINC	LOG(GEXP)
Mean	41.43864	31.22104	8.270376	11.88215	32.69014	140132.2	6.341045
Median	39.35000	31.81485	6.762230	8.342359	29.47209	12096.85	6.925681
Maximum	56.10000	33.71931	13.89568	28.70181	56.20540	988588.0	9.571213
Minimum	35.00000	26.06616	4.637797	3.223870	13.67927	35.90000	2.265558
Std. Dev.	6.247035	1.844637	2.930938	8.858409	9.984350	284973.7	2.433671
Skewness	0.758455	-1.052613	0.415034	0.521681	0.343869	1.947969	-0.425176
Kurtosis	2.409580	3.381890	1.513693	1.681801	2.065517	5.088363	1.773066
Jarque-Bera	4.857624	8.392659	5.313220	5.181462	2.468108	35.82258	4.085523
Probability	0.088141	0.015051	0.070186	0.074965	0.291110	0.000000	0.129670

Source: Author's computation, 2025.

The descriptive statistics showed that the mean values of the variables were: 41.43864 for income inequality, 31.22104 for trade service sector (TSS), 8.270376 for finance service sector (FSS), and 11.88215 for insight and communication service sector (ICT). The maximum values of the variables were: 56.10000 for income inequality, while trade service sector has 33.71931, 13.89568 for finance service sector, 28.70181 for insight and communication service sector. While, secondary school enrolment rate showed 56.20540, financial inclusion rate. While, the minimum values of the variables were: 35.00000 for income inequality, 26.06616 for trade service sector, 4.637797 for finance service sector and 3.223870 for insight and communication

service sector. The low Jarque-Bera values showed that the individual variables are normally distributed.

TABLE 3
Unit Root Test

Philip Perron (PP)					
Argumented Dicky-Fuller (ADF)					
Level	1 st difference	Order of Integration	Level	1 st difference	Order of integration
-	-	I(1)	-1.370995	-4.566131	I(1)
1.195458	4.893989				
-	-	I(1)	-1.923495	-4.585893	I(1)
2.318314	4,629031				
-	-	I(1)	-1.310221	-5.081236	I(1)
1.054030	5.053259				
1.156881	-	I(1)	0.891221	-5.418549	I(1)
	5.341285				
-	-	I(1)	-1.573784	-7.137722	I(1)
1.558847	7.138573				
-	-	I(1)	-2.613300	-11.52656	I(1)
2.698507	7.507677				

The result of the unit root test for both Augmented Dickey Fuller unit root test and the Phillip Peron unit root test revealed that the all the variables were stationary at level I(1). Showing a uniform order of integration.

3.2 Lag Length Selection Criteria

Several information criteria are commonly employed to determine the optimal lag length. According to Johansen (1995), the lag length was selected to capture the dynamic interaction among the variables, eliminate serial correlation as well as improve the accuracy of parameter estimates and forecasts. It was therefore used to ensure the validity of the cointegration and the VECM results.

The VAR lag length was determined using five selection criteria. Each criteria attempts to balance model fit with model simplicity. The result as presented below showed that the Akaike criterion indicated lag two. Which determines the fit of the VAR model for the equation. For this reason, the study proceeded to employ lag two in estimating the vector error correction model.

TABLE 4 (LAG LENGTH SELECTION)

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-1045.167	NA	6.40e+14	53.95730	54.25589	54.06443
1	-815.7408	364.7293	6.39e+10	44.70466	47.09336*	45.56171*
2	-758.4447	70.51828*	5.37e+10*	44.27922*	48.75804	45.88618

* indicate lag order selected by the criterion

LR: sequential modified LR test statistic (each test at 5% level)

FPE: Final prediction error

AIC: Akaike insight criterion

SC: Schwarz insight criterion

HQ: Hannan-Quinn insight criterion

EVIEWS: 9 (2025)

VECTOR ERROR CORRECTION MODEL

TABLE 5

	Coefficient	Std. Error	t-Statistic	Prob.
CointEq1	-0.699846	0.230707	-3.033486	0.0063
D(INEQ(-1))	0.426236	0.177816	2.397060	0.0259
D(INEQ(-2))	-0.506390	0.188650	-2.684280	0.0139
D(TSS(-1))	-0.717019	0.681292	-1.052441	0.3046
D(TSS(-2))	-0.265033	0.510000	-5.196710	0.0434
D(FSS(-1))	-0.432154	0.558858	-7.731282	0.0480
D(FSS(-2))	-0.941913	0.516607	1.823267	0.0825
D(ICT(-1))	0.554359	0.621864	0.891447	0.3828
D(ICT(-2))	-0.898588	0.164014	5.478727	0.0104
D(SENROL(-1))	0.025569	0.165360	0.154629	0.8786
D(SENROL(-2))	0.155030	0.148173	1.046276	0.3073
D(FINC(-1))	-5.48E-06	3.14E-06	-1.742272	0.0961
D(FINC(-2))	-5.80E-06	2.66E-06	-2.181776	0.0406
D(LOG(GEXP(-1)))	-5.389241	1.575070	-3.421588	0.0187
D(LOG(GEXP(-2)))	-1.565006	2.240287	-0.698574	0.4925
C(16)	0.159548	0.756591	0.210877	0.8350

R-squared	0.633309	Mean dependent var	-0.117568
Adjusted R-squared	0.371386	S.D. dependent var	2.710325
S.E. of regression	2.148886	Akaike info criterion	4.666246
Sum squared resid	96.97196	Schwarz criterion	5.362859
Log likelihood	-70.32555	Hannan-Quinn criter.	4.911835
F-statistic	2.417923		
Prob(F-statistic)	0.031201		

3.3 Analysis of Vector Error Correction

The result of the vector error correction model (VECM) has the expected negative coefficient of -0.699846 and significant. Implying that previous year error would be corrected in the following year at an adjustment rate of 69.98 per cent; indicating a high speed of adjustment from the disequilibrium in the short-run to equilibrium in the long-run. The R-squared of 0.733309 showed that the estimated short-run equation has a good fit and high explanatory power. The F-statistic value of 2.417923 showed that on the overall, the model is statistically significant in addition to a high degree of linear relationship between the dependent and the independent variables.

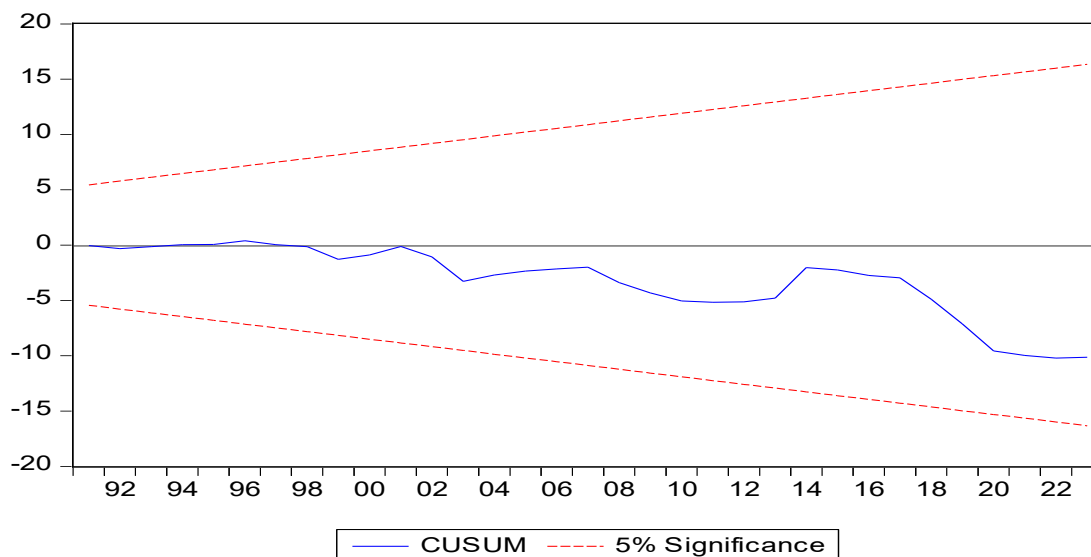
Consequently, two year lagged value of trade service sector output to GDP (TSS) was negative and significant with income inequality. This is in conformity with a priori expectation. From the result, 1 per cent increase in two year lagged value of trade service sector led to 0.20 per cent decrease in income inequality. The probability value of lagged two year trade service sector output TSS (-0.0265) was less than the test significance level at (0.05) per cent. Thus, the study concluded that two period lagged value of trade service sector output had a statistically significant effect on income inequality. From the result, one year lagged value of finance service sector output to GDP (FSS) was negative and significant with income inequality.

This is in conformity with a priori expectation. From the result, 1 per cent increase in one year lagged value of finance service sector output to GDP led to 0.43 per cent decrease in income inequality. The probability value of lagged one year finance service sector output FSS (-0.0480) was less than the test significance level at (0.05) per cent. Thus, the study concluded that one period lagged value of finance service sector output had a statistically significant effect on income inequality. Also, two year lagged value of information and communication technology sub-service sector output to GDP (ICT) was negative and significant with income inequality. This is in line with a priori expectation. From the result, 1 per cent increase in two year lagged value of information and communication technology sub-service sector output to GDP led to 0.89 per cent decrease in income inequality. The probability value of lagged two year information and communication technology sub-service sector output ICT (0.0104) was less than the test significance level at (0.05) per cent. Thus, the study concluded that two year lagged value of information and communication sub-service sector output had a statistically significant effect on income inequality.

Similarly, two year lagged value of financial inclusion (FINC) was negative and significant with income inequality. This is in line with a priori expectation. From the result, 1 per cent increase in two year lagged value of financial inclusion rate led to 0.58 per cent decrease in income inequality. The probability value of lagged two-year financial inclusion rate (0.0104) was less than the test significance level at (0.05) per cent. Thus, the study concluded that two year lagged value of financial inclusion had a statistically significant effect on income inequality. One year lagged value of log of total government expenditure LOG(GEXP) was negative and significant with income inequality. This is in conformity with a priori expectation. From the result, 1 per cent increase in one year lagged value of total government expenditure led to 0.53 per cent decrease in income inequality. The probability value of lagged one year log of total government expenditure (0.0187) was less than the test significance level at (0.05) per cent. Thus, the study concluded that one year lagged value of log of total government expenditure had a statistically significant effect on income inequality.

Economic implication of the positive relationship between trade service sector, finance service sector, and ICT service sector as well as secondary school enrollment rate and inequality suggests that the service sector contribute meaningfully to economic development, thereby helping to bridge the income gap among Nigerians. While the negative and significant relationship between financial inclusion rate and total government expenditure on income inequality implies that the more we have financial inclusion in Nigeria, the more income inequality reduces in Nigeria.

FIGURE 2 STABILITY TEST



To ascertain the adequacy of the estimated equation, several diagnostic test were conducted. The cumulative sum of recursive residuals (CUSUM) test were used to check the condition of stability of the estimated model. Other post estimation test such as Breusch-Godfrey serial correlation Lagrange Multiplier (LM) test. Breusch-Pagan-Godfrey Heteroskedasticity test

were employed to check the existence of the normality or adequacy of the estimated model. The result of the test are summarized in figures below.

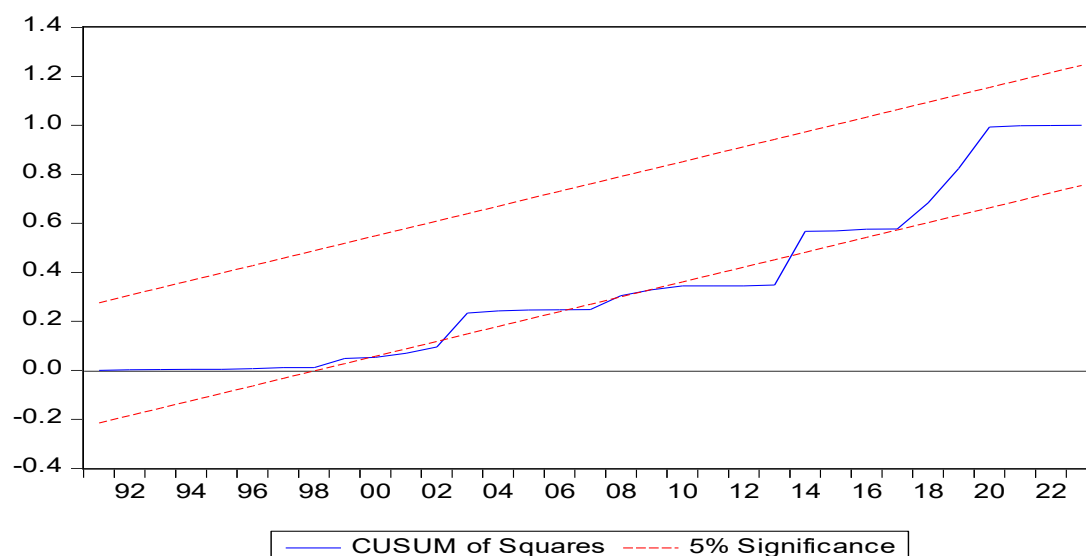
The cumulative sum of recursive residual (CUSUM) and the cumulative sum of squares of recursive residuals (CUSUMSQ) test on the income inequality equation revealed that the parameters of the equation are structurally stable. This is because at the five per cent critical lines showed that they clearly wander in between the critical lines, indicating the stability of the estimated service sector performance on inequality in Nigeria.

3.4 Diagnostic Test

Various test conducted showed that the estimated equation is adequate and well behaved. The Breusch-Godfrey serial LM test statistics of 4.406349 with its high probability value of 0.3403 showed that there is no problem of autocorrelation in the model. This indicates that the residual terms are independent and hence there is no autocorrelation in the estimated equation.

Similarly, the Breusch-Pagan Godfrey Heteroskedasticity test value of 12.53194 with its high probability value of 0.8736 showed that there is no problem of heteroskedasticity and hence the disturbance terms are normally distributed.

FIGURE 3



Cumulative Sum (CUSUM) Stability test result for income inequality.

Cumulative sum of Squares (CUSUMSQ) stability test for income inequality equation.

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	1.149118	Prob. F(2,17)	0.3403
Obs*R-squared	4.406349	Prob. Chi-Square(2)	0.1105

Heteroskedasticity Test: Breusch-Pagan-Godfrey

F-statistic	0.572431	Prob. F(17,19)	0.8736
Obs*R-squared	12.53194	Prob. Chi-Square(17)	0.7669
Scaled explained SS	2.982283	Prob. Chi-Square(17)	0.9999

CORRELOGRAM OF RESIDUALS

SQUARED TEST

Date: 05/18/24 Time: 05:38

Sample: 1980 2023

Included observations: 37

Autocorrelation	Partial Correlation	AC	PAC	Q-Stat	Prob
** .	** .	1	-0.212	-0.212	1.8095 0.179
. *.	. .	2	0.091	0.048	2.1497 0.341
. .	. .	3	-0.091	-0.066	2.5039 0.475
. .	. .	4	0.077	0.044	2.7622 0.598

4.1 Discussion of Findings

From the income inequality equation, the study revealed that trade sub service sector output to GDP has a negative and significant impact on income inequality in Nigeria within the period of the study. In other words an increase in the share of trade services to GDP will lead to decrease in income inequality in Nigeria. This result is in line with the study's a priori expectation.

The result is in agreement with the findings of Lim and McNelis (2016), Roser and Cuaresma (2016) who found a negative and significant relationship between trade services and income inequality. This implies that an increase in trade services can reduce income inequality in Nigeria.

This result also conforms to the findings of Cassette, Fleury and Petit (2016) who found a negative and statistical relationship between trade in service and long-term effects on income inequality in the OECD. Moreover, they find that this impact on income inequality is not only between the highest and lowest incomes but also between the median and low incomes countries. This result is line with the study's a priori expectation.

Additionally. The study of Ahuja, (2018), is also in agreement with the result of the study who found a negative and significant relationship between trade services and income inequality in developing countries with an emphasis on India which is by and large a service-driven economy. This result is in line with the study's a priori expectation.

The result is in agreement with the findings of Isah & Hamzat (2019), who found a negative and statistically significant relationship between finance services and income inequality in

Nigeria. Also the study of Tita & Aziakpono (2020), found a positive and significant impact between finance services and income inequality. This outcome might be attributed to the effort of Nigerian government over the years towards increasing access to financial services, and improving on financial deepening. Among these effort was the Central Bank of Nigeria policy on increasing financial deepening, electronic banking and number of account holders in Nigeria. On the other hand, the findings of Ashenafi and Dung (2022), found evidence of a non-linear effect between the two variables, with the threshold found to 21.90 per cent of GDP. Similarly the studies of Okafor, Olurinnola Bowale & Osabohien (2023), found that financial services have a negative and significant effect on income inequality.

Also, information and communication technology (ICT) had a negative and significant impact on income inequality in Nigeria. This outcome is in tandem with theoretical expectation. Given that increase engagement of people in insight and communication technology services will bring more income in the hands of people. This will reduce income gap in Nigeria. This outcome corroborates Asongu & Odhiambo (2018) which found negative and significant effect of enhancing internet penetration and fixed broadband subscriptions having a net effect on reducing the gini coefficient. Also the findings of Ali, Alam, Taylor and Rafiq (2019), found that gross information and communication technology (ICT) affordability is positively associated with income distribution and socio-economic inequality.

Furthermore, the study showed that secondary school enrollment rate was positive and not statistically significant on income inequality in Nigeria. This outcome is not in line with theoretical expectation. Given that a decrease in literacy rate will help to widen income gap in Nigeria. This outcome corroborates, Bakare (2022) which found a negative and not significant effect of literacy rate on income inequality. Also, the findings of Ehigiamusoe (2013) found a positive but not significant long-run relationship between education and income inequality in Nigeria. This outcome is not surprising given the persistent increase in budgetary allocation to education in Nigeria over the years have not been able to transform the educational sector.

Consequently, the study showed that financial inclusion had a negative and significant impact on income inequality in Nigeria. This outcome is in conformity with a priori expectation. Given that an increase in financial inclusion bring about increase in financial depth in the economy. This outcome is in agreement with the findings of Edame, Willie, Aja, Ebonghor, Yoruba (2023), who found evidence of a linear relationship between financial inclusion and income inequality. The works of Okafor, Olurinnola & Osabohien (2023), also found that financial access has a negative and significant effect on income inequality. The study found that as bank branches per 100,000 adult rises by a percentage point, income inequality has not reduced in Nigeria.

Finally, the study showed that total government expenditure had a negative and significant relationship with income inequality. This outcome is in conformity with a priori expectation. Given that an increase in government expenditure brings about an increase in income redistribution among household in Nigeria.

4.2 Conclusion

This research critically examined the link between service sector performance and income inequality in Nigeria for the period 1980-2024. Reviewed literature showed quite a few literature on the subject matter in Nigeria. There have been a number of studies but, none have been carried out but none have attempted to look at the service sector performance in a disaggregated form and its impact on income inequality has been carried out Okafor, Olurinnola, Bowale and Osabohien (2023); Dossou, Kambaye, Berhe & Asongu (2023); Asongu and Odhiambo (2018); Tita and Aziakpono (2020), among others and a limited number of others focused on service sector growth in a holistic manner. Looking at the void in extant studies, the study explored a new dimension in service sector performance using trade, insight and communication as well as finance services and its impact on reducing income gap. The study adopted the VECM methodology, in order to establish the long-run relationship between the disaggregated service sector variables and income inequality.

In explaining the long and short run elasticities, findings showed that service sector metrics have positive long run and short run impact on income inequality. This implies that the growth of the service sector potentially trigger economic growth by narrowing income gap, reducing poverty and also bring about capital accumulation.

4.3 Limitations of the study

This study acknowledges several limitations that should be considered when interpreting the findings. First, data quality poses a notable constraint, particularly for variables such as financial inclusion and information and communication technology (ICT). These variables may suffer from measurement inconsistencies arising from differences in how financial access and digital penetration are recorded across different national and international databases over the study period (1980-2024). The proxies used- including, the number of rural commercial bank deposits for financial inclusion and ICT sector output as a share of GDP, may not fully capture the multidimensional nature of these concepts, potentially introducing measurement error into the estimates.

Also, the Gini coefficient used as the measure of income inequality, while widely applied, has known limitations in capturing the full distributional distribution.

Another limitation of this study is that it does not investigate the direction of causality between service sector growth and income inequality. Future research may employ Granger causality Toda-Yamamoto causality, or frequency-domain causality approaches to explore the direction of influence.

4.4 Recommendations

The significant coefficient of trade sub-service sector suggests that an increase in the volume of trade services led to increase in income generation by household thereby, reducing income gap, this situation has also led to poverty reduction in Nigeria. The study recommends that government should minimize trade barriers to enable increase in the volume of trade services.

The negative and significant impact of information and communication technology (ICT) sub-service sector showed that ICT has helped in reducing income gap as well as poverty rate in Nigeria. The study recommends that government should minimize structural rigidities within

the ICT sub sector to encourage improved engagement of people who earn daily income for survival.

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