EFFECTS OF MACRO-ECONOMIC VARIABLES ON NON-OIL EXPORTS IN NIGERIA

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Abstract

Nigeria's non-oil exports have not been performing optimally as a result of numerous factors of which unprecedented movement in macroeconomic variables constitutes. The study examined the effect of macroeconomic variables on non-oil export in Nigeria from 1986-2022. Data used were analysed with Autoregressive Distributed Lag (ARDL). The dependent variable aggregate non-oil export is made as a function of real gross domestic product, exchange rate, inflation rate, interest rate, and government expenditure. Evident from the result indicated that gross domestic product has a significant direct impact on non-oil exports. The exchange rate and government expenditure were positive but insignificant. Inflation and interest rates are significant but negatively related to non-oil export in Nigeria. The study concluded that the main macroeconomic variables that significantly induced non–oil export in Nigeria are real gross domestic product, interest rate, and inflation rate.

1.0 INTRODUCTION

Nigeria represents the largest economy in Africa and heavily relies on the oil sector, which forms a significant portion of its export base (Lawal, *et al.*, 2022). However, the over-reliance on oil makes the Nigerian economy exposed to external shocks, such as fluctuations in oil prices. Therefore, diversification of the economy to increase non-oil exports is crucial if sustainable growth and development are to be achieved (Adegbite & Adegbite, 2014). Non-oil exports are those exports that do not originate from the oil and gas sector and include agricultural products, solid minerals, and manufactured goods. The Nigerian government has identified non-oil exports as a key driver to economic growth and development as well as a means of reducing the country's

over-reliance on oil (Lawal, *et al.*, 2022). However, various policies and programmes have been implemented by the Nigerian government to promote non-oil exports which include but are not limited to the Export

Development Fund (EDF), the Export Expansion Grant (EEG) Scheme, and the Nigerian Export-import Bank (NEXIM) among others. Despite these efforts, the non-oil exports performance in Nigeria has been relatively poor (Nigeria Export Promotion Council, 2021). According to Lawal, *et al.* (2022), non-oil export accounted for only 4.6% of total export in 2020. The dwindling of non-oil exports performance has been influenced by a variety of factors including macroeconomic variables.

Macroeconomic variables serve as a pointer that reveals the trend of economic activities existing in a country. They are essential indicators used in the determination of a healthy nation and can be used when determining a nation financial strength. According to Dada *et al.* (2022), an economy can be checked accurately when her economic variables are observed. It helps in drawing comparison among developed, developing and underdeveloped economies (Akinbobola & Okunlola, 2020). Macroeconomic variables such as exchange rate, inflation, GDP, interest rate, and government expenditure can have a significant impact on the competitiveness of Nigerian non-oil exports (Adegbite & Adegbite, 2014).

The exchange rate is the value of a domestic currency in with other currencies. A weaker exchange rate can make Nigerian goods cheaper for foreign buyers, which can increase demand for non-oil exports. However, a weaker exchange rate can also increase the cost of importing raw materials and other inputs, which can increase production costs and reduce the competitiveness of Nigerian exporters. The fluctuations in the exchange rate make it difficult for exporters to plan and budget for their transactions, and this increases their transaction costs. In addition, the volatility of the exchange rate makes it challenging for exporters to compete with other countries in the global market (Obi, 2016).

Inflation on the other hand is the rate at which prices are increasing. Higher inflation tends to increase production costs which may lower returns from non-oil exports. It can also lead to a depreciation of the Nigerian currency, which can reduce the competitiveness of Nigerian exports in foreign markets. GDP accounts for aggregate goods and services produced. A higher GDP can indicate a strong economy with high levels of consumer spending and investment, which can increase demand for non-oil exports (Obi, 2016). Interest rates may be affected by borrowing cost and this can impact their ability to invest in production and exports. Higher interest rates can increase borrowing costs and reduce investment in non-oil exports, while lower interest rates can stimulate investment and increase export activity. Government expenditure can have a direct impact on non-oil exports through policies that support export promotion and investment in export-oriented industries. For example, the government can provide incentives for exporters, invest in infrastructure that supports exports, and promote trade agreements that reduce barriers to entry for Nigerian exporters. Overall, these factors can work together to impact the competitiveness and profitability of non-oil exports in Nigeria. A favorable combination of exchange rates, low inflation, high GDP, low interest rates, and supportive government policies can help to boost non-oil exports and support economic growth in the country (Obi, 2016).

Nigeria's non-oil export sector has not been performing optimally and its contribution to the country's GDP is low. The dwindling performance of non-oil exports in Nigeria is a major concern to policymakers and stakeholders in the economy. Despite an effort to promote non-oil exports, the sector over a period has performed below expectation, with the export of agricultural and non-oil contributing to less than 4% of the country's total export earnings in recent years Lawal, *et al.* (2022); Akinbobola & Okunlola, 2018). This poor performance is attributable to several factors among which are unprecedented movement in macroeconomic indicators such as exchange rate, inflation, government expenditure, and interest rate. To date, there is limited research on the subject matter in Nigeria. This study, therefore, filled this gap by examining the impact of macroeconomic variables such as exchange rate, inflation, gross domestic product, interest rate, and government expenditure on non-oil exports in Nigeria.

2.0 LITERATURE REVIEW

Macroeconomic Variables

Macroeconomics is the study of the behaviour and performance of the economy as a whole, including the factors that affect it. On the other hand, macroeconomic variables are indicators that reveal the current status of the economy (Dada, *et al.*, 2022; Mohammed & Aliyu, 2020). They are those indicators that explain the behaviour of an economy on aggregate. They include National income, inflation, international trade, unemployment and employment level, exchange rate, fiscal policy, GDP, exports, population, government budget, finance, international trade balances and productivity etc. (Dada, *et al.*, 2022; John, *et al.*, 2012).

Non-oil Exports

These are goods and services that are produced and sold by Nigeria to other countries, excluding oil and gas products. They represent the invisible coupled with visible exports that are outside the coverage of oil export and therefore, form part of aggregate exports that impact on economic growth of a country (Eriki & Okay, 2020; Aljebrin, 2019). This includes but is not restricted to products from agriculture, solid minerals, and manufacturing services among others.

Theoretical Framework

Quite a number of theories have been documented in the growing literature explaining macroeconomic variables and non-oil export in Nigeria. However, this study is underpinned by the theory of international trade which argued that due to the inconsistency in the documented studies in line with assumptions; theories under the traditional trade have failed in their efforts to provide detail explanation on the world trade structure (Mohammed & Aliyu, 2020; Issah & Antwi, 2017). The traditional trade theories of constant returns to scale, perfect competition, and similar technology do not hold in the current day's world trade. This resulted to the advancement of new theory of trade which relax most of the assumptions of traditional trade and developed a new trade theory that rest on imperfect competition, economies of scale, and variation in technology among nations (Lawal, *et al.*, 2022). The new theory of international trade believes on three aspects:

strategic model of trade that gives the necessary reasons to protect the home market, and subsidise export to increase exports and national welfare. The intra-industry trade emphasises trade between neighbouring nations that can import or export differentiated products while the neo-technological model of trade focused on the relevance of improved technology and the technological gap existing among firms could be linked to the reason(s) for international trade (Ogunleye & Adeyemi, 2018).

Empirical Review

Osinubi and Amaghionyeodiwe (2019) used a panel estimation when analysing non-oil export (manufacturing sector) and how it has been affected by macroeconomic variables. Variables employed are exchange rate, FDI, and government expenditure. The results support a direct impact among the three selected variables on nonoil export and this validates the export-led growth theory. Eriki and Okay

(2020) examined macroeconomic determinants of non-oil export in Nigeria with the aid of OLS. The exchange rate, inflation rate, and government expenditure were the variables used in the analysis. The results showed that exchange rate and government expenditure exhibited a direct significant impact on non-oil exports, while the reverse is the case with the inflation rate. The study suggests that policies that promote export competitiveness and manage exchange rate policies should be implemented.

Mohammed and Aliyu (2020) carried out their study on the analysis of non-oil exports in relation to the prevailing macroeconomic variables of Nigeria. The selected macroeconomic variables employed are inflation, GDP, exchange rate, and the proportion of credit extended to the private sector of the economy. ARDL co-integration approach was the technique employed and the outcome indicated that credit extended to the private sector of the economy coupled with GDP have a direct impact on non-oil export. On the other hand, the impact of inflation and exchange rate are inversely related. Ilegbinosa *et al.* (2012) used Nigerian data to examine the impact of macroeconomic variables on non-oil exports. The balance of payments constraint model was used and included the exchange rate, inflation rate, and government expenditure. It was revealed that exchange rate and government expenditure are significant and directly impact non-oil exports contrary to the inflation rate that showed a negative impact.

3.0 MATERIALS AND METHODS

The model analysis begins with the unit root test which is a pre-condition for the determination of estimation techniques suitable for the model. The mixture of different orders of integration suggested that Autoregressive Distributed lag (ARDL) is suitable. Annual data called from the CBN 2022 bulletin from 1986-2022 to capture how macroeconomic variables impact non-oil export were used.

An adapted model from Nwosa (2019) to examine the impact of macroeconomic variables on non-oil exports was used. The functional mode in this work is hereby formulated as:

$$ANOE = f(RGDP, EXGR, INFR, INTR, GEX) \ldots\ldots\ldots\ldots\ldots\ldots\ldots 1$$

Equation 1 can be stated in econometric form as:

$$ANOE = \beta_0 + \beta_1 RGDP + \beta_2 EXGR + \beta_3 INFR + \beta_4 INTR + \beta_5 GEX + \mu \ldots\ldots\ldots\ldots 2$$

In this case, ANOE represents aggregate non-oil exports, RGDP is real gross domestic product, EXGR is exchange rate, INFR is inflation rate, INTR is interest rate, GEX is government expenditure, F is functional notation, μ is Error Term, β_0 is constant parameter while $\beta_1, \beta_2, \beta_3, and\ \beta_4$ are estimated coefficients

4.0 RESULTS AND DISCUSSION

Descriptive Analysis

Table 1: Descriptive Statistic of Variables

	ANOE	RGDP	EXGR	INFR	INTR	GEX
Mean	11.29951	10.48578	4.294585	2.680462	2.886883	6.820281
Median	11.51503	10.44864	4.836831	2.561088	2.877336	7.213760
Maximum	14.98088	11.18987	5.900527	4.287716	3.394508	9.406248
Minimum	6.313729	9.741426	0.703394	1.686399	2.351375	2.786473
Std. Dev.	2.433616	0.508667	1.396879	0.666863	0.212035	1.946970
Skewness	-0.242659	0.113166	-1.117544	0.906037	-0.107733	-0.598708
Kurtosis	1.813298	1.423531	3.141268	3.001771	3.910577	2.163174
Jarque-Bera	2.465694	3.804722	7.523365	4.925425	1.313365	3.201125
Probability	0.291462	0.149216	0.023245	0.085204	0.518569	0.201783
Sum	406.7823	377.4882	154.6051	96.49661	103.9278	245.5301
Sum Sq. Dev.	207.2870	9.055977	68.29453	15.56470	1.573562	132.6742
Observations	37	37	37	37	37	37

Sources: Authors' Computation (2023)

Table 1 revealed the mean value of aggregate non-oil export (ANOE), real gross domestic product (RGDP), exchange rate (EXGR), inflation rate (INFR), interest rate (INTR), and government expenditure (GEX) stood at 11.29951, 10.48578, 4.294585, 2.680462, 2.886883 and 6.820281 respectively. It recorded standard deviations of 2.433616, 0.508667, 1.396879, 0.666863, 0.212035, and 1.946970 indicating that INTR showed a lowest discrepancy level while ANOE recorded the highest value of discrepancy. The p-values of ANOE, RGDP, INFR, INTR, and GEX that exceeded 5% indicated that they are normally distributed while EXGR has a p-value that is below 5% indicating that EXGR fails to be normally distributed.

Unit Root Test

Table 2 ADF Unit Root Test

Variables	ADF Test @ Level	Critical Values @ 5%	ADF Test at FD	Critical Values at 5%	Decision
ANOE	-1.643260	-2.948404	-7.374630	-2.951125	I(1)

RGDP	-0.598584	-2.951125	-3.785884	-2.951125	I(1)
EXGR	-3.516175	-2.948404	N/A	N/A	I(0)
INFR	-3.222161	-2.948404	N/A	N/A	I(0)
INTR	4.001440	-2.948404	N/A	N/A	I(0)
GEX	-4.291043	-2.981038	N/A	N/A	I(0)

Source: Computed by the Authors' (2023)

Table 2 revealed the tested unit root result at a level and at first differencing. It was deduced that at level, ANOE and RGDP have ADF statistic tests below 5% critical value (at absolute term). While EXGR, INFR, INTR, and GEX all have ADF values above 5% critical value, therefore, justified that EXGR, INFR, INTR., and GEX are all stationary in their plain form. More so, the outcome of the first differencing of unit roots showed that ANOE and RGDP became stationary within the shortest time. Since not all the variables are of the same order ARDL co-integration test was used. To know the number of lags needed for ARDL, Vector Autoregressive Estimates as reported in Table 3 was conducted.

Table 3: Lag Length Selection Criterion

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-78.18735	NA	5.70e-06	4.952197	5.221555	5.044056
1	93.13632	272.1023	2.06e-09	-3.008019	-1.122515	-2.365008
2	157.1847	79.11855*	4.89e-10*	-4.657922*	-1.156271*	-3.463759*

Sources: Author's Computation, (2023)

The result indicated that LR, FPE, AIC, SC, and HQIC take lag 2 and therefore, are employed for the ARDL model.

Test for Co-integration

Table 4 Unrestricted ARDL Model

Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.***
ANOE(-1)	0.286316	0.154794	1.849662	0.0800
RGDP	9.531845	2.002719	4.759453	0.0001
RGDP(-1)	-7.714625	1.810716	-4.260537	0.0004
EXGR	0.867870	0.371422	2.336611	0.0306
EXGR(-1)	-0.739061	0.366360	-2.017310	0.0580
INFR	0.334067	0.156832	2.130094	0.0465
INFR(-1)	-0.335214	0.161918	-2.070266	0.0523
INFR(-2)	0.471063	0.147212	3.199890	0.0047
INTR	-0.299145	0.440738	-0.678737	0.5055
INTR(-1)	-0.531345	0.391556	-1.357010	0.1907
INTR(-2)	-0.555145	0.397006	-1.398329	0.1781
GEX	0.898520	0.453561	1.981036	0.0622
GEX(-1)	0.432955	0.360247	1.201827	0.2442
GEX(-2)	-0.898915	0.460069	-1.953870	0.0656

C	-12.36190	5.631566	-2.195109	0.0408

Source: **Computed by the Authors' (2023)**

R^2 = 0.991415; **Adj. R^2 =** 0.985090; **F-stat.** = 156.7307; **Prob (F-stat.)** = 0.000000

Depicted in Table 4 is the unrestricted ARDL conducted in the examination of non-oil exports and the impact posed by macroeconomic variables. However, the essence of the estimated equation is to provide room for the analysis of the ARDL bound test which is reported in Table 5.

Table 5 Co-integration Bound Test for ANOE

F- Stat.		5.340377
Sig.	**I0**	**I1**
10%	2.08	3
5%	2.39	3.38
2.5%	2.7	3.73
1%	3.06	4.15

Source: **Authors' Computation (2023)**

Table 5 provided evident in support of a long-run for the estimated ANOE model since the F-stat. value of 5.340377 exceeded 5% lower (2.39) and upper bound (3.38).

Short Run Model

Table 6: **Short Run Model using the ARDL Approach**

Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
ARDL (1, 1, 1, 2, 2, 2)				
D(RGDP)	9.531845	1.222165	7.799147	0.0000
D(EXGR)	0.867870	0.188726	4.598571	0.0002
D(INFR)	0.334067	0.088861	3.759430	0.0013
D(INFR(-1))	-0.471063	0.102619	-4.590405	0.0002
D(INTR)	-0.299145	0.271815	-1.100546	0.2848
D(INTR(-1))	0.555145	0.255755	2.170614	0.0428
D(GEX)	0.898520	0.273774	3.281980	0.0039
D(GEX(-1))	0.898915	0.226326	3.971765	0.0008
CointEq(-1)	-0.713684	0.101760	-7.013393	0.0000

Source: Authors' Computation (2023)

Table 6 indicated that in the short run, RGDP, exchange rate, the current period of the inflation rate, lag value of interest rate, and government expedition both at current and its lag values exhibited a significant positive relationship with non-oil export. Lag one value of inflation rate is significant but inversely related to ANOE, the current value of the interest rate is insignificant and negatively related. The ECM is appropriately signed with a -0.713684 coefficient ($p=0.00 < 0.05$) and showed that about 71% of short-run inconsistencies are being adjusted and incorporated into the long-run equilibrium.

Table 7 Long-run ARDL Result

Variable	Coefficient	Std. Error	T-Statistic	Prob.
C	-17.321257	6.829888	-2.536097	0.0201
RGDP	2.546254	0.768846	3.311788	0.0037
EXGR	0.180484	0.388053	0.465102	0.6471
INFR	-0.658437	0.296470	-2.220925	0.0387
INTR	-1.941524	0.670446	-2.895869	0.0093
GEX	0.606095	0.453214	1.337327	0.1969

Source: Authors' Computation (2023)

The coefficient of RGDP is positive and significant with a value of 2.546254 units, meaning that a unit rise in RGDP will result in a 2.546254 units increase in ANOE. The coefficient of EXGR is positive with a value of 0.180484 units, implying that as EXGR rises by a unit will lead to a 0.180484 units increase in ANOE. INFR has a negative and significant value of 0.658437 units which connotes that as INFR rises by a unit will decrease ANOE by 0.658437 units. The coefficient of INTR is negative and significant with a value of -1.941524 units, implying that as INTR rises by a unit will decrease ANOE by -1.941524 units. Lastly, GEX has a direct impact of 0.606095 units with ANOE, meaning that as GEX increases by a unit will result in a 0.606095 units rise in ANOE.

Diagnostic Tests

Table 8: ARDL LM Test

LM Serial Correlation Test			
F-stat.	0.154360	Prob. F(2,24)	0.8578
Obs*R^2	0.444500	Prob. Chi^2	0.8007
Heteroskedasticity Test			
F-stat.	0.322130	Prob. F(8,26)	0.9501
Obs*R^2	3.156252	Prob. Chi^2 (8)	0.9242
Scaled explained SS	1.285689	Prob. Chi^2 (8)	0.9957
Normality Test			
Jarque-Bera	0.599419		
Probability	0.741033		

Source: **Authors' Computation (2023)**

The diagnostics tests revealed in Table 8 indicated that the F-statistics of the observed R^2 (0.444500) and the probability value of 0.8007 is more than 5%, indicating an absence of the LM serial correlation problem. The probability of the observed R^2 for the heteroskedasticity test is 0.9242, implying that the model is free from the heteroskedasticity problem, likewise, normally distributed as the probability of Jarque-Bera of 0.741033 exceeds 5%.

Discussion of Findings and Implication

This study examined how non-oil export has been affected by macroeconomic variables. The result revealed that in the long run, RGDP exhibited a positive significant impact on non-oil export. The

positive impact is supported by the *apriori* expectation stated in this research and it implies that when an economic experience increases in her real gross domestic product, it will boost the non-oil exports. The positive relationship is supported by the works of Iwuoha and Awoke (2019), and Adeniyi *et al.* (2014) among others. The exchange rate also depicted a direct insignificant impact on non-oil exports in the long run. The implication of the insignificant impact of the exchange rate is connected to the unprecedented movement in naira vis-à-vis other foreign currencies. In the same vein, the inflation rate has a significant indirect impact on the non-oil export. It implied that a unit rise in the inflation rate in the country would decrease non-oil exports. The negative relationship is supported by the works of Eriki and Okay (2020), Mohammed and Aliyu (2020), and Iwuoha and Awoke (2019) and also corroborated by the *apriori* expectation stated in this research.

Also, interest rate within an economy has a significant inverse impact on non-oil exports in the long run. It implied that as the interest rate rises by a unit will lower the non-oil exports within the economy. This result is corroborated by the *apriori* expectation and also supported by the works of Adeniyi *et al.* (2014), and Eriki and Okay (2020). The result implied that the high-interest rate charged by banks is inimical to non-oil export. Lastly, the coefficient of government expenditure is positive and also came out to be significant with non-oil exports. This result is supported by the works of Iwuoha and Awoke (2019), Osinubi and Amaghionyeodiwe (2019), and Ilegbinosa *et al.* (2012). The diagnostic tests revealed that the estimated residual from the Jarque-Bera residual normality test shows that the errors are normally distributed, the Heteroskedasticity test reveals homoskedasticity of the residuals at a 5% level of significance, that is, the variances were consistent and the serial correlation LM test showed absence of serial correlation problem.

5.0 CONCLUSION AND RECOMMENDATIONS

It can be adduced that a country's macroeconomic variables is an important factor that can influence non-oil exports in Nigeria. The main findings that emerged from this study indicated that macroeconomic variables within the country influence non-oil exports in Nigeria. From the long-run result, it could be deduced that RGDP indicated a significant direct impact with non-oil export, exchange rate, and government expenditure were positive but insignificant with non-oil export. Inflation rate and interest rate are significant but negatively related to non-oil export in Nigeria. Therefore, concluded based on this result that the main macroeconomic variables that significantly induced non–oil export in Nigeria are RGDP, inflation rate and interest rate. In light of the findings, the study recommended that the government should ensure the stability of macroeconomic variables especially gross domestic product, inflation rate, and interest rate as these three variables significantly influence non-oil export in Nigeria. The monetary authorities within the country should encourage deposit money banks to grant more credit to the non-oil sector at low interest rates as this will further facilitate an increase in their performance.

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