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Monetary Policy Transmission, Labour Force Participation and Real Sector Performance in Nigeria

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Abstract: *This study investigates the relationship that exist between the two major real sectors (Manufacturing and Agricultural sectors) and some selected explanatory variables (Bank loan to manufacturing and agricultural sector, interest rate, money supply, government expenditure and labour force participation). Using the Johansen cointegration technique, findings from the study confirmed the evidence of long-run co -movement among all the selected variables in the study. Findings from the study further reveal that the expansionary monetary policy stimulates and improves both manufacturing and agricultural sectors outputs. Also, the findings showed that labour force participation enhances the manufacturing sector output, while in the other way round, it retards and decreases the agricultural sector output.*

Keywords: *Monetary Policy, Labour Force, Real Sector, Agricultural Sector, Manufacturing Sector.*

I. Introduction

The highest degree of attainment for any country is to achieve strong and stable economic growth and development with major focus on the equitable distribution of income, security of lives and properties and welfare of the citizens. In order to achieve this, every country, particularly the developing countries strive so hard to enhance the performance of the real sector. The real sector in a country stimulates the economic growth and development which would eventually translate to increase in country's real output and services. In this regard, productivity in any country cannot be achieved without making reference to the manufacturing and agricultural sectors which are the two major pillars of the real sector (Simon-Oke and Awoyemi, 2010). Both the manufacturing and agricultural sectors play vigorous roles in the economic transformation of any nation, whether developed or developing country.

According to Ukoha (2013), manufacturing sector could be described as any economic unit that processes or creates new commodities through the transformation of raw materials or semi-finished goods. In terms of capacity utilization, the manufacturing sector makes use of available raw materials and other inputs both locally and internationally at selective cost in order to make meaningful impact on the economy. Manufacturing sector helps to reduce the situation of unemployment in the country, in the sense that when more firms are set up by the private sectors, government and foreigners, more people are in turn being employed, which will as a result bring about high standard of living of the people (Loto, 2012).

Agricultural sector on the other hand is vital in the area of providing food for the teeming population of the economy thereby ensuring food security and also the only source of raw materials that is used as input in the production process of other sectors of the economy (Ijaiya and Abdulraheem, 2005). Likewise, the agricultural sector, through the rearing of animals, provides agro-allied products for industrial growth and development, provision of employment opportunities, especially to the rural populace, provision of market for the industrial sector and provision of the needed linkage between the traditional sector and the modern sector (Ijaiya and Abdulraheem, 2005). In the light of this, agricultural sector serves as a catalyst for the growth of the entire economy.

In a bid to achieve an increased performance in both manufacturing and agricultural sectors in Nigeria, the Nigerian government has embarked on both monetary and fiscal policies towards the improvement of the two sectors given the increase in Nigeria's population and labour force. Monetary policy as one of the macroeconomic tools is used to stimulate the economy towards the achievement of the macroeconomic goals, such as, price stability, exchange rate stability, maintenance of equilibrium balance of payment, employment

generation and promotion of output and sustainable growth. The Nigerian monetary authority through the Central Bank of Nigeria (CBN) has introduced several monetary policies, particularly, the one succeeding the SAP period from 1994 till date which was marked with what is termed as the guided deregulation monetary system. This was actually implemented in a bid to curtail the activities of players in the economy. As a result of this, the cashless policy and bank consolidation system were introduced to strengthen the financial system.

Even, despite various strategies and reforms put in place by the Nigerian monetary authority, there have been a growing concern on the declining in productivity of the real sector which has resulted in unemployment generation, high exchange rate, inadequate financial support and lack of proper harmonization and coordination of monetary policy. It is therefore pertinent to understand the relationship between monetary policy, labour force participation and the real sector performance in the Nigerian economy. In addition, very few studies have tried to examine the relationship between monetary policy, labour force participation and economic performance. Even, a critical analysis of the existing literatures, showed that most studies in this area majorly focused on the relationship between monetary policy and economic performance without using a sectorial analysis. This study is therefore unique in the sense that it intends to contribute to the economic literature by segregating the real sector of the Nigerian economy into agricultural and manufacturing sectors. This will actually help to understand how effective the monetary policy has influenced the real sector based on the two sectors.

The remaining parts of this study are designed as follows: section 2 explains the review of empirical literatures, section 3 presents the data set and research method. Section 4 reports the results and discussion of findings, while section 5 presents the conclusion

II. Empirical Literature

Nneka (2021) applied Vector Error Correction (VEC) and Ordinary Least Square (OLS) estimation to investigate the performance of monetary policy on manufacturing sector in Nigeria between the period of 1986 and 2018. The study revealed that money supply positively affect manufacturing output index, while company lending rate, company income tax, inflation rate, exchange rate has a negative impact on the performance of the manufacturing sector over the years. The study therefore recommends that expansionary policies are vital for the growth of the manufacturing sector in Nigeria which in turn would lead to economic growth.

Odior (2018) used the Augmented Dickey Fuller (ADF) test and error correction model to examine the impact of macroeconomic factors on manufacturing productivity in Nigeria over the period of 1975 to 2011. The findings of the study showed that there is a long-term equilibrium relationship as shown by the cointegrating equation of the VECM. The findings further revealed that credit to the manufacturing sector in the form of loans and advances and foreign direct investment have the capacity to increase the level of manufacturing productivity in Nigeria. Broad money supply in its own case has less impact. The study therefore concluded that expansionary policies are vital for growth of the manufacturing sector in Nigeria which in turn will lead to economic growth.

Kolawole (2018) employed the error correction model (ECM) with the framework of OLS regression estimation to investigate the effect of interest rate and some macroeconomic variables on the performance of the Nigerian agricultural sector between the period of 1980 and 2011. Findings from the study confirmed a long run relationship among the variables of interest. The ECM results equally revealed that there is an inverse relationship between interest rate spread and agricultural productivity. Likewise, there is a negative relationship between exchange rate and agricultural productivity. The study therefore concluded that if interest rate spread and exchange rate are increased, there will be a decrease in the level of agricultural value added in Nigeria.

Okafor (2020) adopted error correction model and granger causality test to assess the relationship between banking sector credit and the performance of agricultural sector in Nigeria between the period of 1981 and 2019. In the granger causality test, share of agricultural in GDP was regressed on commercial bank credit to agriculture, agricultural credit guarantee scheme and government expenditure on agriculture. Findings of the study revealed that there is no significant relationship between government expenditure on agriculture and share of agriculture in GDP.

Muftaudeen and Hussainatu (2017) used the multivariate Vector Error Correction estimation to examine the short and long run relationship between macroeconomic policies and agricultural output, specifically crop production in Nigeria between the period of 1978 and 2011. The study showed that there is a co-movement among agricultural output, government expenditure, agricultural credit, inflation, interest rate and exchange rates. The findings further revealed that in the long-run, agricultural output responded significantly to changes in government spending, agricultural credit, inflation rate, interest rate and exchange rate. The impulse response function results confirmed that one standard deviation innovation on government expenditure and interest rate

reduces the agricultural output, thereby threatening food security in the short, medium and long terms. In addition, variance decomposition results revealed that a significant variation in Nigeria's agricultural food output was due to changes in exchange rate and government expenditure movements.

III. Research Method

i Theoretical Framework

The analysis of this research work is based on the traditional production function of the cobb-Douglas which explains the true production of a given industry. It is presented as follows:

$Y = AK^{\beta_1}L^{\beta_2}$ ……1

Where:

A is the technological shift parameter which is generally assumed to be exogenous

Y is the level of output

K is the stock of capital

L is number of workers, β_1 *and* β_2 are the output elasticity of labour and capital respectively

$\therefore Y = AK^{\beta_1}L^{\beta_2}T^{\beta_3}$……2

The explicit form of the model in a log linearized form is presented as follows:

$LnY = LnA + \beta_1 LnK + \beta_2 LnL + \beta_3 Lni + \mu_t$ ……3

The above production function follows a constant return to scale such that

$\beta_1 + \beta_2 + \beta_3 = 1$

ii Model Specification

Following from the theoretical proposition of Cobb Douglas production function presented in this study, the model specification is hereby presented as follows:

$$MANFO_t = \alpha_0 + \alpha_1 MS_t + \alpha_2 INT_t + \alpha_3 MANFOCR_t + \alpha_4 GEX_t + \alpha_5 LABP_t + \mu_t$$

$$AGRICO_t = \beta_0 + \beta_1 MS_t + \beta_2 INT_t + \beta_3 AGRICR_t + \beta_4 GEX_t + \beta_5 LABP_t + \mu_t$$

Where:

$MANFO$ = Manufacturing Output

$AGRICO$ = Agricultural Output

MS = Broad Money Supply

INT = Interest Rate

$MANFOCR$ = Bank Loan to Manufacturing Sector

$AGRICR$ = Bank Loan to Agricultural Sector

GEX = Government Expenditure on Agriculture

$LABP$ = Labour Force Participation

μ_t = Error Term

iii Sources of Data

The data set for this research work consists of annual time series spanning between the period of 1991 and 2023. Data on all variables were sourced from Central Bank of Nigeria (CBN) Statistical Bulletin.

IV. Results and Discussions

i Unit Root Test Results

This part of the study examined the stochastic properties of the series. This is achieved by testing the order of integration of the variables, also known as unit root test. Therefore, for the purpose of determining the stationary process of the variables, this research work adopted the Augmented Dickey-Fuller unit root test as presented in the table 1 below:

Table 1: Augmented Dickey-Fuller Unit Root Test

Variables	T-Statistics	P-Value	Order of Integration
AGRICO	-4.311719	0.0083***	I(1)
MANFO	-4.784101	0.0025***	I(1)
AGRICR	-6.948843	0.0000***	I(1)

MANFOCR	-4.846412	0.0021***	I(1)
INT	-6.163122	0.0001***	I(1)
MS	-4.537950	0.0407**	I(1)
GEX	-7.659097	0.0000***	I(1)
LABP	-4.169681	0.0142**	I(1)

Source: Author's Computation, 2024
Note: (**) (***) represent the level of significance at 5% and 1% respectively

Results of the Augmented Dickey-Fuller unit root test in table 1 above revealed that all the series are not stationary at levels, but are stationary at their first difference. The result therefore implies that any shock to the series will not be sustained, even for a very short period of time.

ii **Lag Selection Results**

Johansen cointegration test is highly sensitive to the nature of the Data Generating Process (DGP) and the choice of lag length. Therefore, it is important to conduct series of nested likelihood ratio tests on level VARs in order to determine the optimal lag length (P) before conducting the cointegrating test. In this regard, the lag selection results in the study is presented in table 2 below:

Table 2: Lag Selection by Information Criterion

Lag	LogL	LR	FPE	AIC	SC	HQ
0	122.6023	NA	9.73e-12	-8.328735	-8.043262	-8.241463
1	282.7284	240.1892	1.46e-15	-17.19488	-15.19658*	-16.58398
2	330.4028	51.07977*	9.46e-16	-18.02877*	-14.31763	-16.89424*

Source: Author's Computation, 2024
Note: (*) denotes the lag order selected by the criterion
LR is the sequential modified LR test statistic (each test at 5% level)
FPE is the final prediction error
AIC is the Akaike Information Criterion
HQ is the Hannan-Quinn Information Criterion

The result in table 2 above confirmed that LR, FPE, AIC and SC selection criteria chose optimal lag of two for VAR model in level. Following this procedure will help to do away with specification error and inconsistency both in the parameter estimates and the innovation accounting. In this regard, VAR of lag length two is selected and estimated in level and Johansen cointegration test is conducted while taking lag one into account.

iii **Johansen Cointegration Test**

In line with the results of the Augmented Dickey-Fuller Unit root test, in which all series are integrated of the same order, I(1), it is therefore pertinent to verify if all the variables have a long-term co-movement among themselves. In this regards, the Johansen cointegration tests for the two models are presented in the tables 3 and 4 below.

Table 3: Johansen Cointegration Test for Manufacturing Output Model

Maximum Rank	Eigenvalue	Trace Statistics	5% critical Value
None (0)*	0.954608	236.7873	117.7082
At most 1*	0.854621	153.2919	88.80380
At most 2*	0.806769	101.2247	63.87610
At most 3*	0.688530	56.84025	42.91525
At most 4	0.478802	25.34605	25.87211
At most 5	0.249576	7.752148	12.51798

Source: Author's Computation, 2024

Table 4: Johansen Cointegration Test for Agricultural output Model

Maximum Rank	Eigenvalue	Trace Statistics	5% critical Value
None (0)*	0.957852	254.4159	117.7082
At most 1*	0.930246	168.9189	88.80380
At most 2*	0.769922	97.02372	63.87610
At most 3*	0.724011	57.35161	42.91525
At most 4	0.374529	22.59196	25.87211
At most 5	0.307529	9.922206	12.51798

Source: Author's Computation, 2024.

The results of the Johansen cointegration test for the two models above affirmed that there are four cointegrating vectors in which the trace statistics are greater than the critical values at 5% level of significance. The results further denote that the null hypothesis of no cointegration is rejected which mean that there is long run relationship among all the variables for the two models.

iv Long-Run Estimates

Table 5: Estimated Long-Run Parameters for Agricultural Output Model

Variables	Coefficient	Standard Error	T-Statistics	Probability
AGRICR	0.290872	0.097702	2.977127	0.0066***
GEX	-0.016375	0.190388	-0.086008	0.9322
INT	0.130284	0.250666	0.519753	0.6080
LABP	-1.417412	1.383398	-2.395353	0.0000***
MS	0.513762	0.136885	3.753232	0.0000***
C	259.2298	44.46385	5.830124	0.0000***

Source: Author's Computation, 2024

Table 5 above depicted the estimated long-run relationship between Agricultural output and government expenditure (GEX), Bank loan to Agricultural sector (AGRICR), Interest Rate (INT), Labour force participation (LABP), Broad money supply (MS). The results showed that the bank loan to Agricultural sector has a positive and significant effect on the level of agricultural output. It can be seen that when (AGRICR) increases by 1%, Agricultural output (AGRICO) increases by 0.29%. However, government expenditure on the other hand has a negative and insignificant effect on the Agricultural sector output and this is in contrast to the a priori expectation. This result might be hinged on the fact that the government expenditure does not trickle down to the Agricultural sector which might be due to the misappropriation of public funds on the part of the Nigerian government. In addition, interest rate had a positive and insignificant impact on the level of Agricultural sector output which is also contrary to the a priori expectation. Money supply in its own case has a positive and significant impact on the level of Agricultural sector output in Nigeria. This is an indication that when money supply increases in the economy, the level of Agricultural sector output also increases.

Table 6: Estimated Long-Run Parameters for Manufacturing Output Model

Variables	Coefficient	Standard Error	T-Statistics	Probability
MANUFCR	0.117867	0.145748	0.808707	0.4266
MS	0.195122	0.122931	1.587250	0.1255
LABP	43.32528	9.093485	4.764431	0.0000***
INT	0.270101	0.211268	1.278477	0.2133
GEX	-0.167749	0.174912	-0.959051	0.3471
C	-150.5742	34.93824	-4.309725	0.0000***

Source: Author's Computation, 2024

The table 6 above showed the estimated long-run relationship between manufacturing output and broad money supply, labour force participation, interest rate, bank loan to manufacturing sector, government expenditure in Nigeria. Results from the model revealed that bank loan to manufacturing sector had positive and insignificant impact on the level of manufacturing output in the economy of Nigeria. Government expenditure in

its own case had negative and insignificant effect on the manufacturing output. In addition, interest rate and money supply had positive and insignificant effect on the level of manufacturing sector output in Nigeria. Labour force participation had positive and significant effect on the manufacturing sector output in Nigeria.

V. Short-Run Estimates and Error Correction Model

Table 7: Estimated Short-Run Parameters for Agricultural Sector Output

Variables	Coefficient	Standard Error	T-Statistics	Probability
D(AGRICR)	0.176842	0.106777	1.656184	0.1113
D(GEX)	0.151342	0.141794	1.067340	0.2969
D(INT)	-0.240993	0.207185	-1.163177	0.2567
D(LABP)	-3.799241	1.132642	-1.599386	0.1234
D(MS)	0.466327	0.168603	2.765831	0.0110
ECM(-1)	-0.704018	0.197189	-3.570268	0.0016

Source: Author's Computation, 2024.

The results in table 7 above exhibited the short-run relationship between Agricultural output and government expenditure, interest rate, labour force participation, broad money supply, bank loan to Agricultural output. Results from the short-run effects confirmed that bank loan to agricultural sector, government expenditure and broad money supply have positive impacts on agricultural sector output in the short-run. While labour force participation and interest rate have a negative effect on the agricultural sector output in the short-run. Among all the explanatory variables, it is only the broad money supply that impact significantly on the agricultural sector output while the remaining variables have insignificant impacts on the agricultural sector output in the short-run. Furthermore, the sign of the error correction model is correctly signed and statistically significant at 1% significance level. This is an indication that the estimated model truly converged. The ECM shows that about 70% of disequilibrium in agricultural output, due to one-time temporary shock to Nigerian economy, is corrected within a year.

Table 8: Estimated Short-Run Parameters for Manufacturing Sector Output

Variables	Coefficient	Standard Error	T-Statistics	Probability
D(MANFCR)	-0.016536	0.114245	-0.144745	0.8862
D(MS)	0.158778	0.104875	1.513973	0.1437
D(LABP)	1.979045	1.117585	1.370607	0.1837
D(INT)	0.129754	0.140008	0.926763	0.3637
D(GEX)	-0.098523	0.094512	-1.042438	0.3080
ECM2 (-1)	-0.304709	0.142631	-2.136342	0.0435

Source: Author's Computation, 2024.

Table 8 above showed the short-run relationship between manufacturing sector output and government expenditure, bank loan to manufacturing sector, broad money supply, labour force participation, interest rate. Results from the short-run model revealed that the bank loan to manufacturing sector and government expenditure have negative and insignificant impacts on the manufacturing sector output in the short-run. While broad money supply, labour force participation and interest rate have positive and insignificant impacts on the manufacturing sector output in the short-run. The sign of the ECM is correct and statistically significant at 5% significance level. This is an indication that the estimated model truly converged. The ECM showed that about 30% of disequilibrium in manufacturing output due to one-time temporary shock to Nigerian economy is corrected within a year.

VI. Discussion of Findings

Findings from the study revealed that bank loan to agricultural sector has positive and significant impact on the agricultural output in the long-run. The implication of this finding is that the loan and credit given to the agricultural sector can enhance aggregate output in the sector in the long-run, this finding is in line with the study of (Rafiu and Aminu, 2019). Another finding from this study is the negative and significant impact that the labour force participation has on the agricultural output in Nigeria in the long-run. This finding might be hinged on the wrong notions that the labour forces have about the nature of agricultural sector's job compared to

other sectors. Finding from the study equally revealed that the government expenditure has negative and insignificant impact on the agricultural sector output in Nigeria. This finding is an indication that the government expenditure does not reach down to the agricultural sector, which might be as a result of mismanagement of funds on the part of the government. The finding is in agreement with the work of (Oloni et al, 2017). Broad money supply was discovered to have positive and significant impact on the level of agricultural sector output in Nigeria. This implies that when there is an expansionary monetary policy in term of increase in money supply, the level of agricultural sector output also increases.

On the part of manufacturing sector, finding from the results showed that the bank loan to manufacturing sector has positive impact on the manufacturing output. This finding might be hinged on the fact that access to credit by manufacturing firms can help them adopt sophisticated technologies, thereby enhancing productivity and efficiency. Just like the results from the agricultural sector output, finding from the study equally revealed that government expenditure has negative and insignificant impact on the manufacturing sector output, the reason which might be attributed to embezzlement of public funds by the Nigerian government. Finding from the results also depicted that interest rate has negative and significant impacts on the Nigerian manufacturing output while broad money supply has positive and significant impact on the manufacturing output in Nigeria. Similar to the finding of the agricultural sector output results, the implication of the finding is that, expansionary monetary policy, in term of an increase in money supply and reduction in interest rate may stimulate and enhance manufacturing sector output. Unlike the results from agricultural sector output, labour force was discovered to have positive and significant impacts on the manufacturing sector output.

VII. Conclusion

Based on the findings in this research work, this study therefore concludes as follow: First, there is a long-run relationship between agricultural sector output and all the selected explanatory variables in Nigeria during the period under review. Likewise, there is an evidence of long-run co-movement between the manufacturing sector output and the selected independent variables in Nigeria. Second, expansionary monetary policy in term of an increase in money supply and reduction in interest rate boost and enhance both agricultural and manufacturing sector outputs. Third, labour force participation stimulates and improves manufacturing sector output while it retards the growth of agricultural sector output. Fourth, bank loan to both agricultural and manufacturing sector enhance and improve the two real sectors. Lastly, government expenditure impacts negatively on both agricultural and manufacturing sector outputs in Nigeria.

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