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FINANCIAL DEEPENING AND SECTORAL PERFORMANCE IN EMERGING MARKETS: EVIDENCE FROM THE NIGERIAN AGRICULTURAL AND MANUFACTURING SECTORS

Purpose. *The formal sector in Nigeria has experienced some transformation in the last 20 years. This has led to advancement and deepening of sector. Despite the progression achieved in financial sector, it has not yielded the desired impacts on the economy as experienced in other emerging economies. Hence, this research assessed the advantageous effects of financial deepening on sectoral advancement in Nigeria.*

Methodology / approach. *The research used the proxies of broad money (M2) to GDP ratio, and the ratio of credits to private sector to GDP for financial deepening. The data regarding time series were retrieved from Thomson Reuters DataStream and Augmented Dickey-Fuller unit root test and Johansen co integration approaches used for the long-oriented effects and Error Correction approach for short orientation estimation.*

Results. *The impact of financial deepening was positive and statistically significant in explaining agricultural growth, but the performance of the manufacturing sector was not significantly impacted in the reviewed period, hence government should make efforts to reduce the interest rate on loan bestowed to the private sector.*

Originality / scientific novelty. *The variables assortments have never been describing in the literature. Particularly, this study considers financial deepening as a significant determinant of sectoral development in the Nigerian context.*

Practical value / implications. *According to the results of the study, it is recommended to increase credits to the manufacturing sector through specialized banks and ensures the growth of the financial industry in terms of provision of quality financial instruments, sound financial and money markets, and transparent legislation for healthy competition in the industry for better sectoral performance.*

Key words: *financial deepening, sectoral growth, agricultural sector, manufacturing sector.*

Introduction and review of literature. World policy makers are concerned about rising problem of Africa's development and are also focused on overcoming this challenge. Moreover, there is a question why the region has remained poor for so long despite the experience of growth achieved by some of the countries in the region. It is generally acceptable in development economics that a country needs a certain level of growth to move away from the cycle of poverty and underdevelopment. The economic evolution assists to decline the poverty rate in a state. Rodrik (2007) asserted that economic progression is more vital than all other operations. A double-digit

improvement in growth rate makes societies enable to develop and improve the life of a common citizen. In recent time, Africa has experienced some impressive growth. However, it has not been transformed into poverty reduction, thereby there is a question why policies that worked in some regions become ineffective in Africa. One important explanation to this is that Africa's growth needs to be inclusive and sustainable (Mlachila et al., 2016).

According to Kedir et al. (2017), Africa requires annual growth rate of 16.6 % between 2015 and 2030 to eliminate extreme poverty by 2030. There are different ways through which financial development helps to achieve sustainable growth. One of them is to move idle funds from where they are not needed to the active sector through saving and investment. Despite the growth achieved in the financial sector, it has not yielded the desired impacts on the economy. According to Oriavwote and Eshanake (2014), the financial sector in Nigeria has achieved some noticeable developments recently, but the majority has not been performed yet. According to Torruam et al. (2013) the Nigeria financial sector has persisted enormously uncompetitive, where few gigantic banks dominate the biggest portion of the market in the shape of total assets, liabilities, and loans in the banking sector which fails to induce economic growth. Despite the deepening of the financial sector, it has not been able to fill the saving-investment gap in the economy because the country is still characterized with low saving, capital flight etc., and the country has not been able to achieve sustainable growth. Over the last decade, Nigeria has been ranked among countries with highest attraction of foreign investment in Africa. However, since 2014, the country has been experiencing a substantial decrease in the flow of foreign investment into the country.

According to UNCTAD (2016), foreign direct investment fell by 34 % from 4.7 billion USD in 2014 to 3.1 billion USD in 2015. Also, according to CBN (2016), capital inflow into the country in the second quarter of 2016, was 647 million USD, representing 75.73 % declines from the volume of capital inflows in the corresponding period of 2015. Ironically, the periods also correspond to the periods of decline in oil prices, suggesting that foreign investment inflow in Nigeria is mostly concentrated in the oil sector. As a result of these, the economy growth rate declined from 6 % in 2014 to 2.82 % in 2015 and became negative in 2016. At the same time, inflation also rose from a single digit to 18.3 % by October 2016. It is therefore pertinent to concentrate on mopping idle funds locally, halt capital flight, and reduce the saving-investment gaps to guarantee the necessary sustainable growth. The key focus of this research is to determine the advantageous effects of financial deepening on sectoral performance in emerging economies, drawing evidence from the Nigerian agricultural and manufacturing sectors and examining the direction of causality among financial deepening, manufacturing sector output, and agricultural sector outputs.

Relationship between financial deepening (FD1) and agriculture sector productivity in Nigeria.

Narrowly, financial liberalization denotes the deficiency of bottlenecks in loan allocation, stringent reserve conditions and permitting rates of interest are easily allotted by the forces of demand and supply in the market despite of allotment by

regulations. The term financial deepening is proxied by two measures which are as following: the ratio of money supply (M2) to GDP referred to as FDI and the credit to private sector as percentage of GDP referred to as FD2. Also, we provide the trend analysis showing the connection between financial deepening and agriculture sector valued added as percentage of GDP. The FD was proxied by the ratio of money supply (M2) to GDP. Fig. 1 shows that FD has a positive movement with agricultural sector value added as percentage of GDP for most of the periods. Between 1981 through 1983, there was steady rise in FD, and this was also followed by a rise in agricultural sector value added as percentage of GDP. However, between 1983 and 1988, there was some rise in the movement of FD as it increased from 10.9 % to 12 % respectively. This was also reflected in the effect on agricultural sector value added as percentage of GDP. One reason for this is the introduction of Structural Adjustment Program, introduced during the period, which led to the liberalization of the financial sector, as well as the liberalization of agriculture marketing board.

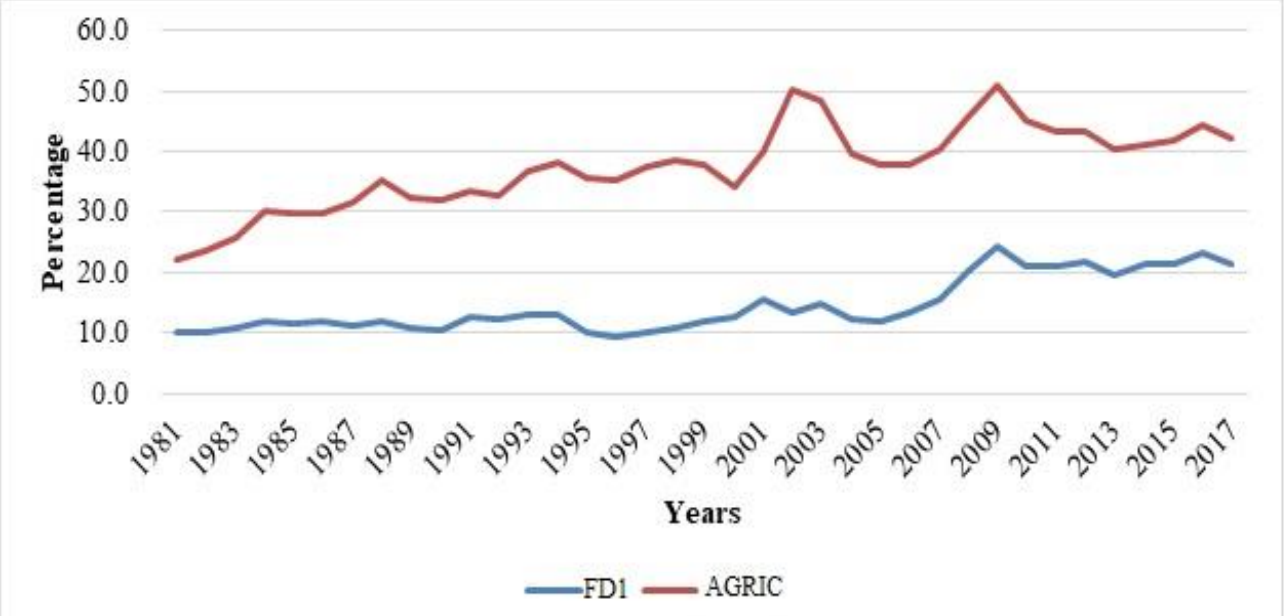

Fig. 1. FD1 and agriculture (AGRIC) value added (% of GDP)

Source: authors' own calculations.

Though there were some declines in FD between 1993 and 1996, the contribution of agriculture to GDP was still on the increase. The reason for this might be due to other factors such as weather condition, and some intervention policies put in place by government to boost the productivity of the sector that affected agriculture productivity. Also, FD decreased from 24 % in 2009 to 19.6 % in 2013, as result of the global financial meltdown that began in 2008, and this were also reflected in a decline the agricultural sector value added as percentage of GDP from 27 % in 2009 to 19 % in 2014. Hence, it can be concluded that financial deepening has some significant influence on productivity of agriculture sector in the country.

Relationship between financial deepening (FD1) and manufacturing sector productivity in Nigeria.

Fig. 2 shows a similar movement between FD and Manufacturing Sector Value

Added as percentage of GDP. However, while FD had a steady growth between 1981 and 1989, manufacturing sector productivity oscillated. This shows that FD did not have much relationship with manufacturing sector productivity during the periods. However, during the post SAP era (1991–1995), there was some noticeable increase in FD, and this was also followed by an appreciable increase in manufacturing sector productivity during the same periods. Beyond 1997, the two variables both moved in the same pattern with some marginal fluctuations in manufacturing sector productivity. This shows that the financial liberalization which resulted from the SAP introduction in the country had some significant impact on manufacturing sector productivity.

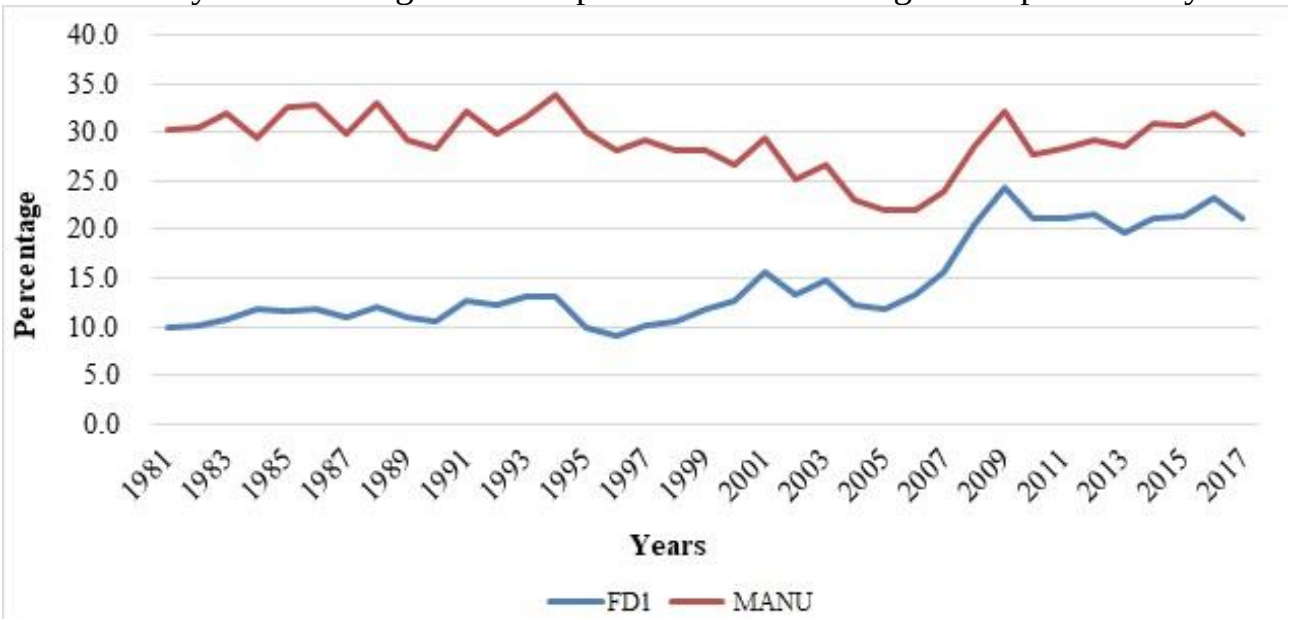

Fig. 2. FD1 and Manufacturing (MANU) value added (% of GDP)

Source: authors' own calculations.

Relationship between financial deepening (FD2) and agriculture sector productivity in Nigeria.

The relationship between the second proxy of financial deepening, FD2, and agriculture sector productivity is presented in Fig. 3. It shows that while there is volatile movement experienced in the agriculture sector productivity as percentage of GDP, there was a steady movement in the FD2 between 1981 through 2007. This shows that there is no significant relationship between the movement in agriculture sector productivity and FD2. It confirms the problem of credit financing which the agricultural sector is confronted with in this country.

Relationship between financial deepening (FD2) and manufacturing sector productivity in Nigeria.

Similarly, between 1981 and 2007, there was a divergence between the movement of FD2 and manufacturing sector productivity as % of GDP (Fig. 4). Between 1981 and 2006, there was downward movement, with some up and down movements intermittently in the trend of manufacturing sector product during the same period; there were steady movements in the trend of FD2. This also shows that during the periods, FD2 does not have much influence on the manufacturing sector productivity. This again shows the problem of credit financing facing the manufacturing sector in

the country. However, between 2007 and 2017, manufacturing sector productivity and FD2 had similar movements.

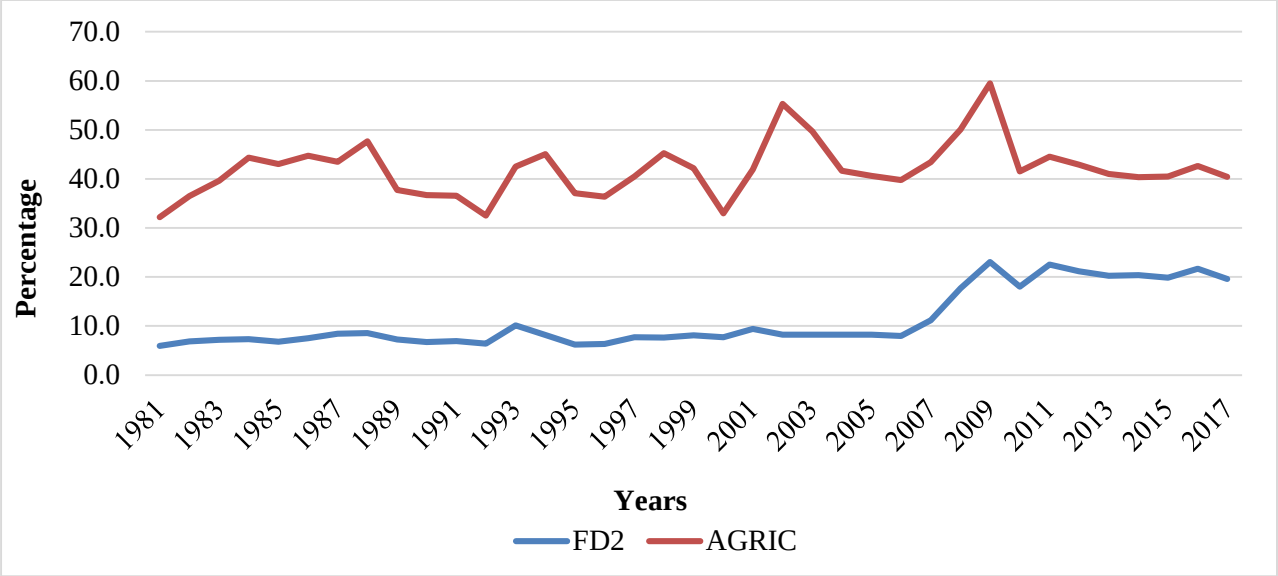

Fig. 3. FD2 and agricultural sector value added (% of GDP)

Source: authors' own calculations.

This can be traced to the banking sector recapitalization which was done at the end of 2005. This therefore shows that the recapitalization made the financial sector stronger and can produce the work of financing to the manufacturing sector of the economy.

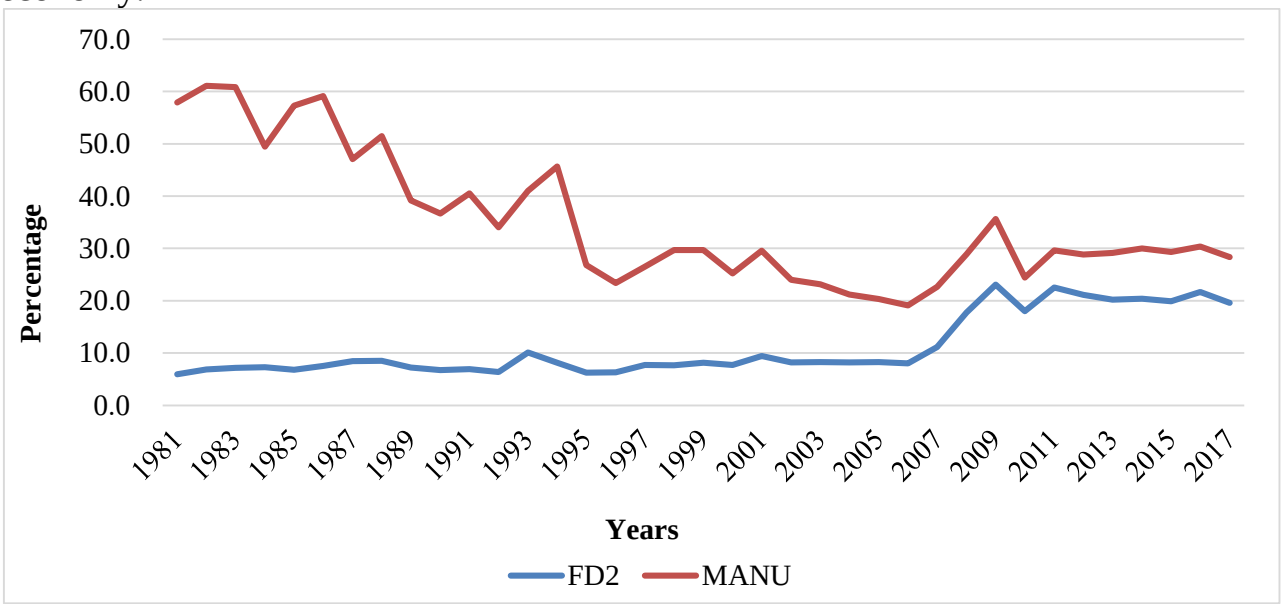

Fig. 4. FD2 and manufacturing sector value added (% of GDP)

Source: authors' own calculations.

Many scholars developed economies during 1950s and 1960s had experienced financial depression. The forced saving was the main cause of the problem which was enormously inspired by quotation of the Keynesian school. They asserted that investment or savings do not hamper economic growth; a low (negative) real interest rate provokes individuals to avert holdings of financial assets to private investment. Hence, high rate of inflation was associated low real interest rate because moderate

inflation is a sacrifice the economy bears to achieve growth. The implication of such policy were in financial repression which came in the form of low interest rate cap.

Supply – Leading Hypothesis and Demand. This hypothesis generally suggests financial deepening is a stimulus for economic growth. The presence and development of a good financial market makes an increase of saving and hence investments to boost capital accumulation. Also, the Demand following Hypothesis means that the presence of financial market brings what is called lagged response to economic growth.

Financial Development. The experts have adopted numerous proxies to disclose the practicality of this problem. Shaw (1973) implemented real interest rate as a proxy of the condition of financial development. Moreover, they stated that a lessening of real interest rate under an efficient stage is a measure for financial sector load and it leads for economic stagnation (Fry, 1997). They functioned a comparatively high positive real interest rate to signify a relatively developed financial system and opposed that it was a significant positive regressor of economic progression by enhancing savings, financial mediation, and thus the supply of loans for fruitful use. However, the participation of high real interest rate on the wider spectrum of empirical studies remains an equivocally one.

The development in financial sector is directly associated with numerous prospects of real economic operations comprising local investment; productivity, employment, and long-term orientation economic progression by controlling other factors which have long term effect. They took sample of 80 countries in which it had started from 1960–89. Moreover, their research indicates that enlargement and deepening of the financial system headed to swift economic growth. Developed Financial setup enriches economic execution by evaluating investment opportunities and exercising corporate control, alleviating risk management, and declining the cost of resource mobilization (Levine, 1997). Among others, Rioja and Valev (2004) have suggested that financial development has direct impact on economic growth, however, these comprehensive and comparative analyses arranged at the average level are unable to account for the perplexity of the financial environment and specific institutional context of every individual country.

Mostly research evaluate the connection of finance with economic progression e.g., Johannes et al. (2011) used Johansen co-integration approach and found direct association between financial progression and economic development in the long oriented and short oriented one for Cameroon during 1970–2005. The outcomes validated that progression in financial sector leads economic development in the long oriented and short oriented one. It simply means that the growth in economic sector is caused by development in financial sector. Darrat (1999) examined the role of financial deepening on economic growth on Middle East states e.g., U.A.E, Turkey, and Saudi Arabia. He used multivariate Granger causality approach within an error-correction structure. He tried to determine the causal connection between financial deepening and economic growth to distinguish between numerous substitutes theoretical hypotheses. The outcomes commonly strengthen the prospect that financial deepening is an essential causal factor for economic growth, even though the intensity of the evidence

contrasted across borders and across the proxies used to enumerate financial deepening. The causal connections were also predominately long-term oriented in nature thus their suggestions that official authority' policies targeted at fostering financial deepening in those states must be lasting and sustainable to encourage economic progression. There are some certain studies which have done on relevant theme (Beck et al., 2000; Otchere et al., 2017; Alabi et al., 2018; Ademola et al., 2018; Akinmulegun et al., 2019; Peter et al., 2019; Oriyomi and Muibi, 2020; Paramati et al., 2020; Ogundipe et al., 2020; Ngong et al., 2021; Ogbuagu et al., 2021; Macharia et al., 2021).

The purpose of the article. This research intends to explore the nexus between financial deepening and sectoral performance in Nigerian perspective.

Material and methods. The model is therefore structured such that sector's output is a function of saving, investment, and a proxy of financial deepening. Two models were used to achieve each specific objective. The models are:

$$\begin{aligned}\mathrm{LARGIC_t} = \delta_\circ + \sum_{t-1}^{k-1} \delta 1\mathrm{i}\,\mathrm{LARGIC_{t-1}} + \sum_{t-1}^{k-1} \delta 2\mathrm{i}\,\mathrm{LrM2GDP_{t-1}} + \sum_{t-1}^{k-1} \delta 3\mathrm{i}\,\mathrm{LrCrPS_{t-1}} + \sum_{t-1}^{k-1} \delta 4\mathrm{i}\,\mathrm{LSAVING_{t-1}} \\ + \sum_{t-1}^{k-1} \delta 5\mathrm{i}\,\mathrm{LSIZE_{t-1}} + \varphi_1 \mathrm{LAGRIC_{t-1}} + \varphi_2 \mathrm{LrMGDP_{t-1}} + \varphi_3 \mathrm{LrCrPS_{t-1}} + \varphi_4 \mathrm{LSAVING_{t-1}} \\ + \varphi_5 \mathrm{LSIZE_{t-1}} + \epsilon_t \qquad (1)\end{aligned}$$

$$\begin{aligned}LMANU_t = \delta_\circ + \sum_{t-1}^{k-1} \delta 1i\, LMANU_{t-1} + \sum_{t-1}^{k-1} \delta 2i\, LrM2GDP_{t-1} + \sum_{t-1}^{k-1} \delta 3i\, LrCrPS_{t-1} \\ + \sum_{t-1}^{k-1} \delta 4i\, LSAVING_{t-1} + \sum_{t-1}^{k-1} \delta 5i\, LSIZE_{t-1} + \varphi_1 LMANU_{t-1} + \varphi_2 LrMGDP_{t-1} \\ + \varphi_3 LrCrPS_{t-1} + \varphi_4 LSAVING_{t-1} + \varphi_5 LSIZE_{t-1} + \epsilon_t \qquad (2)\end{aligned}$$

Financial deepening and agriculture sector.

The model is given as:

$$AGRIC = f(FD1, FD2, Saving, Capital), \qquad (3)$$

where AGRIC is the output of agriculture sector, FD1 is the financial deepening, proxied by the ratio of M2 to GDP, FD2 is the second indicator of financial deepening, proxied by the ratio of loan to private sector to GDP, and Saving is ratio of saving to GDP, and Capital is capital stock.

The model is presented in empirical form as in equation 3

$$LAGRIC_t = \beta_0 + \beta_1 LCAPITAL_t + \beta_2 LFD1_t + \beta_3 LFD2_t + \beta_5 LSAVING_t + \varepsilon_t \qquad (4)$$

The sign ε is the residual term. The following are anticipated $\beta_1>0$,$\beta_2>0$,$\beta_3>0$ and $\beta_4>0$. The natural log is applied to efficiently linearize exponential trend (if any) in the time series data since the log function is the inverse of an exponential function.

Financial deepening and manufacturing sector. The second model assessed the effect of financial deepening on the manufacturing sector. It is given in equation 5.

$$MANU = f(FD1, FD2, Saving, Capital) \qquad (5)$$

The model is presented in empirical form as in equation 6.

$$LMANU_t = \gamma_0 + \gamma_1 LCAPITAL_t + \gamma_2 LFD1_t + \gamma_3 LFD2_t + \gamma_5 LSAVING_t + \mu_t, \qquad (6)$$

where MANU is manufacturing sector output and all other variables are as previously defined;

μ is the error term.

The following are expected $\gamma_1>0$,$\gamma_2>0$, $\gamma_3>0$ and $\gamma_4>0$.

Testing for the Unit Root Properties. The approach was conducted by using ADF and Philip-Peron unit root approaches. The applied approaches validate the existence of unit root in each variable. The decision criterion is that the t-statistic should be higher than the benchmark values at each stage of significance for the null hypothesis to be refused. In the case of ADF unit root test, the level value t-statistics for the log of agriculture output is 0.255886, in absolute value, which is lower than the benchmark values of 3.632900, 2.948404, and 2.612874 at 1 %, 5 %, and 10 % respectively. However, when the variable was differenced once, the value of the t-statistic is 5.721 which is higher than the benchmark value at all stages of significance. Similarly, in the case of Phillips-Perron unit root test, the value of the t-statistics is also lower than the benchmark values at each stage of significance when LAGRIC was tested at level. However, when the variables were differenced once, the t-statistics is higher than the critical values at every level of significance. This shows that the variable, LAGRIC is stationary only at first differenced form.

Similarly, for LMANU, LFD1, LFD2, LSAVING, and LSIZE, the ADF result shows that the t-statistics in each case is lower than the critical values when they were tested for unit root in their level forms. However, when the variables were subjected to first differencing, and unit root tests were performed on them, the t-statistics became higher than the critical values. This indicates that all the series are stationary at first differenced form. The Phillips-Perron unit root test also confirms the result of the ADF unit root test. It shows that the t-statistics are higher than the critical values when the variables were differenced once. The implication of the results is that the variable in each model needs to be subjected to a test of long run relationship among them. This was done through the Johansen co-integration technique.

Results and discussion. In this section, we will report results and their explanation.

Unit Root Test. Firstly, we were testing for the unit root properties. The approach was conducted by using ADF and Philip-Peron unit root approaches. The applied approaches validate the existence of unit root in each variable. The decision criterion is that the t-statistic should be higher than the benchmark values at each stage of significance for the null hypothesis to be refused. In the case of ADF unit root test, the level value t-statistics for the log of agriculture output is 0.255886, in absolute value, which is lower than the benchmark values of 3.632900, 2.948404, and 2.612874 at 1 %, 5 %, and 10 % respectively as shown in Table 1. However, when the variable was differenced once, the value of the t-statistic was 5.721 which was higher than the benchmark value at all stages of significance. Similarly, in the case of Phillips-Perron unit root test, the value of the t-statistics was also lower than the benchmark values at each stage of significance when LAGRIC was tested at level. However, when the variables were differenced once, the t-statistics was higher than the critical values at

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Table 1

Results from Augmented Dickey-Fuller (ADF) Unit Root Test

Indicators	Augmented Dickey-Fuller	Phillips-Perron	Order of integration
LAGRIC	-0.255	-0.064	
	-5.721***	-5.721***	I (1)
LMANU	-0.697	-0.973	
	-5.091***	-5.090***	I (1)
LFD1	-0.877	-0.961	
	-5.320***	-5.444***	I (1)
LFD2	-0.686	-0.501	
	-5.453***	-5.981***	I (1)
LSAVING	-0.195	-0.209	
	-4.443***	-4.456***	I (1)
LSIZE	-1.439	-1.430	
	-5.177***	-5.177***	I (1)
Critical Values			
-	-3.632	-3.632	-
-	-2.948	-2.948	-
-	-2.612	-2.6128	-

Source: authors' compilation 2019.

Effect of financial deepening on the agriculture sector (Johansen Co-integration Test). One important step in co-integration test is establishing an appropriate lag length. This was chosen as two using the Schwarz information criterion. The Johansen co-integration results are divided into Trace statistic and Max Engen Statistics. The results are presented in Table 2. It shows that Trace test indicates at least one co-integration equation at 5 % level. Similarly, the Maximum Eigen value reveals at least one co-integrating equation at 5 % level. This shows that there is long run relationship among the variables in the model. The co-integration result also consists of the Normalized co-integrating coefficients which represents the long run effects of the independent variables on the dependent variables.

Normalized Co-integrating Coefficients. The normalized co-integrating coefficients represent the long orientation coefficients of the effect of financial deepening on the agriculture sector.

Table 2

Unrestricted Co-integration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigen value	Trace statistic	Critical value 0.05	Prob.**
None *	0.719	83.908	69.818	0.002
At most 1	0.467	40.660	47.856	0.199
2	0.329	19.205	29.797	0.478
3	0.124	5.592	15.494	0.743
4	0.031	1.075	3.841	0.299
Trace test indicates 1 cointegration eqn (s) at the 0.05 level				
Unrestricted Cointegration Rank Test (Maximum Eigen value)				
Hypothesized No. of CE(s)	Eigen value	Max-Eigen Statistic	Critical value 0.05	Prob.**
None *	0.719	43.248	33.876	0.002
At most 1	0.467	21.454	27.584	0.249
2	0.329	13.613	21.131	0.397
3	0.124	4.516	14.264	0.801
4	0.031	1.075	3.841	0.299
Max-eigen value test indicates 1 cointegration eqn (s) at the 0.05 level				

Source: authors' compilation 2019.

The results of the long run coefficients are presented in Table 3 as calculated in model 1. It shows that in the long run, financial deepening 2, proxied by the ratio of money supply to GDP, is positively related to agriculture sector outputs. A 1 % increase in the ratio of money supply to GDP brings about 13.5 % increases in agriculture sector outputs. An explanation for this is that the deepening of the financial sector, proxied by the ratio of money supply to GDP, increases more money available in the economy. This will increase the aggregated demand in the economy, and consequently increases the demand for agricultural products. In the contrary to common, the 2nd measure of financial deepening is inversely associated to agricultural sector outcomes in the long run. A narrative for this is that when credits are approved by financial sector to agriculture sector, the burden of interest and reimbursement in the long orientation tends to become a stress to farmers, given that it drops the yield of the agriculture sector. Thus, financial deepening that is proxied by ratio of loan to private sector to GDP has an inverse effect on agriculture sector productivity in the long orientation.

On the other hand, there is a positive relationship between saving and agriculture sector productivity in the long run as stated in equation 7.

$$LAGRIC = 2.91 + 13.5LFD1 - 12.3LFD2 + 1.3LSAVING - 1.2LSIZE \quad (7)$$

An increase in saving may reduce production in the short run, but in the long run, savings provide avenue to channel idle funds into active agriculture sector. However, the size of financial sector has a negative relationship with agriculture sector productivity. A similar explanation could be made regarding credit to private sector. If financial sector grows as result of increase in interest income, it may impact agriculture sector output negatively.

Table 3

Normalized Long-Run of Co-integration Result: Dependent Variables (LAGRIC)

Variables	Coefficient	Std. error	t-statistic
LFD1	-13.519	(2.013)	[-6.716]
LFD2	12.317	(1.651)	[7.457]
LSAVING (-1)	-1.300	(0.791)	[-1.643]
LSIZE	1.216	(0.603)	[2.016]
CONSTANT	-2.907	-	-

Source: authors' compilation 2019.

Error Correction Model. The co-integration helps to show the connection among the variables in the long orientation. The short orientation dynamics is enumerated by the ECM, and it reveals the short orientation outcomes of the effects of financial deepening on agriculture sector. The results are reported in Table 4 and it unveils that prior two periods of agriculture sector outcomes are inversely connected to current agricultural output. One percent up surge in the level of agriculture sector outcomes of prior two periods heads to 0.5 % declines in the current level of agricultural outcomes.

Table 4

Results of Error Correction Model

Indicators	Coefficient	Std. error	t-statistic	Prob.
ECT (-1)	-0.061**	0.022	-2.700	0.013
D (LAGRIC (-1))	-0.346	0.249	-1.388	0.180
D (LAGRIC (-2))	-0.572**	0.263	-2.173	0.041
D (LFD1(-1))	-0.157	0.239	-0.657	0.518
D (LFD1(-2))	-0.209	0.217	-0.967	0.345
D (LFD2(-1))	0.475**	0.226	2.098	0.048
D (LFD2(-2))	0.262	0.196	1.334	0.197
D (LSAVING (-1))	-0.421**	0.187	-2.251	0.035
D (LSAVING (-2))	-0.209	0.176	-1.190	0.247
D (LSIZE (-2)	0.146	0.141	1.028	0.315
D (LSIZE (-2)	0.011	0.124	0.090	0.929
Constant	0.209**	0.076	2.749	0.012
R-squared	0.403	-	-	-
Durbin-Watson stat	2.178	-	-	-
Residual Diagnostics				
-	Statistics	Prob.	-	-
Jarque-Bera	107.707	0.408	-	-
Residual Heteroskedasticity	344.968	0.706	-	-
Serial Correlation LM	23.311	0.559	-	-

Note. *** 1 %, ** 5 %, * 10 %.

Source: authors' compilation 2019.

This is persistent with the projected outcomes provided the law of diminishing return that says the marginal outputs lessens the more variables inputs are added to fixed inputs. The financial deepening, proxied with credit to private sector has a positively effect on agricultural outputs in the short run. A 1 % increase in credit to private sector leads to 0.47 % increase in agricultural outputs. Saving in the short run,

however, decreases agriculture sector productivity. This is also consistent with theory. This is because an increase in saving in the short run reduces consumption, and consequently decreases the demand for agriculture products.

The error correction term is negative and significant at 5 %, and it shows that only 6 % of the deviation in the short run is corrected annually. The R-squared shows that there are other variables that were not captured in the model that affect agriculture sector productivity as only 40 % of variation in agriculture sector outputs could be explained within the model. The DW shows no presence of first order serial correlation. This is also confirmed by the result of the LM test. The result of the Jarque-Berra confirms that the residuals are normally distributed, while Heteroskedasticity test shows no problem of Heteroskedasticity.

Effect of financial deepening on the manufacturing sector (Johansen Co-integration Test). As in the previous section, the lag length was chosen as one using the Schwarz information criterion. Table 5 shows that Trace test indicates at least two co-integration equations at 5 % level, while Maximum Eigen value reveals no co-integrating equation at 5 % level. However, since the number of observations is higher than thirty, we rely on the Trace test, and conclude that there is long run relationship among the variables in the model. The normalized co-integrating coefficient is presented in the next section.

Table 5

Unrestricted Co-integration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigen value	Trace statistic	Critical value 0.05	Prob.**
None*	0.598	78.963	69.818	0.007
At most 1*	0.504	47.938	47.856	0.049
2	0.366	24.066	29.797	0.197
3	0.142	8.536	15.494	0.409
4	0.092	3.307	3.841	0.069
Unrestricted Cointegration Rank Test (Maximum Eigen value)				
Hypothesized No. of CE(s)	Eigen value	Max-Eigen statistic	Critical value 0.05	Prob.**
None	0.598	31.024	33.876	0.105
1	0.504	23.871	27.584	0.139
2	0.366	15.529	21.131	0.253
3	0.142	5.229	14.264	0.712
4	0.092	3.307	3.841	0.069
None	0.598	31.024	33.876	0.105
Max-eigen value test indicates no co-integrating eqn(s) at the 0.05 level				

Source: authors' compilation 2019.

Normalized Co-integrating Coefficients. Table 6 portrays the outputs of the long orientation coefficients, and it is presented in equation 8 for interpretation purpose.

$$LMANU = 6.17 + 0.5LFD1 + 1.07LFD2 + 0.24LSAVING - 0.55LSIZE \quad (8)$$

It shows that in the long orientation, the first proxy of financial deepening (ratio of money supply to GDP) is directly linked to manufacturing sector outcomes. However, it is not statistically significant as shown by the value of t-statistics. Also,

the proxy regarding financial deepening (ratio of credit to private sector to GDP) is directly connected to manufacturing sector outputs in the long orientation. One percent surge in financial deepening, (enumerated with ratio of loan to private sector to GDP) leads to 1.07 % increment in manufacturing sector outcomes. Furthermore, there is also positive liaison between saving and manufacturing sector production in the long orientation. However, the size of financial sector has a negative relationship with manufacturing sector productivity.

Table 6

Normalized Long-Run of Co-integration Result: Dependent Variables (LAGRIC)

Variables	Coefficient	Std. error	t-statistic
LFD1	-0.508952	(0.52187)	[-0.97524]
LFD2	-1.071162	(0.71098)	[-1.50659]
LSAVING (-1)	-0.240756	(0.11803)	[-2.03977]
LSIZE	0.555954	(0.30822)	[1.80373]
CONSTANT	-6.172149	-	-

Source: authors' compilation 2019.

Error Correction Model. Table 7 describes regarding those variables which are not significant in influencing manufacturing sector outcomes in the short orientation. This shows that both proxies of financial deepening are not significant to influence manufacturing sector outcomes in the short orientation. An explanation for this is because of the state of development of the financial sector, especially, financial institution which does more of banking than financing.

Table 7

Error Correction Model

Indicators	Coefficient	Std. error	t-statistic	Prob.
ECT (-1)	-0.217332***	0.061510	-3.533280	0.0015
D (LMANU (-1))	-0.000889	0.157541	-0.005641	0.9955
D (LSAVING (-1))	0.167641	0.163185	1.027306	0.3134
D (LSIZE (-1))	-0.037839	0.158881	-0.238158	0.8136
D (LFD2(-1))	-0.207768	0.164009	-1.266807	0.2160
D (LFD1(-1))	-0.161830	0.228543	-0.708092	0.4850
Constant	0.013626	0.039131	0.348206	0.7304
R-squared	0.396489	-	-	-
Durbin-Watson stat	1.699569	-	-	-
Residual Diagnostics				
-	Statistics	Prob.	-	-
Jarque-Bera	12.98803	0.2243	-	-
Residual Heteroskedasticity	163.6153	0.8040	-	-
Serial Correlation LM	29.88695	0.2285	-	-

Note. *** 1 %, ** 5 %, * 10 %.

Source: authors' own calculations.

It also implies the finance bottlenecks faced by the manufacturing sector in the country. The error correction term is inverse and significant at 1 %, and it shows that only 21 % of the deviation in the short run is corrected annually. The R^2 reveals that there are other variables that were not captured in the model that affect agriculture

sector productivity as only 40 % of variation in agriculture sector outputs could be explained within the model. DW shows no presence of first Order serial correlation. This is also affirmed by the outcomes of the LM test. The outputs of the Jarque-Berra validate that the error terms are leniently circulated, while Heteroskedasticity approach authenticates no problem of Heteroskedasticity.

Conclusions. This study explores the liaison between financial deepening and sectoral performance in Nigeria. The results of the applied approach revealed the impact of financial deepening were direct and statistically significant in briefing agricultural growth, but the progress of the manufacturing sector was not significantly impacted in the considered period, thus it is suggested that government should make an endeavor to decrease the interest rate on loan imparted to the private sector. The findings have further important policy implications. This increases the aggregated demand in the economy, and consequently increases the demand for agricultural products. The developed financial sector activates agriculture sector by the easy accessibility of the loan amount. But additional interest and reimbursement enhance the financial stress and it will unveil a negative movement in productivity of the agriculture sector.

It is recommended that government should make efforts to reduce the interest rate on loan approved to the private sector. This can be done by reducing the monetary policy rate. It will help to reduce the burden of paying back loans on the part of farmers. Similarly, government should concentrate on making a special fund at very low interest rate available to the agriculture sector. Also, increase credits to the manufacturing sector through establishment of industrial banks will have more benefit to the manufacturing sector, and consequently, economic progression. Moreover, the further research can be conducted by considering more determinants of sectoral performance. It will unequivocally reveal the determinants of the sectoral performance.

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