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Financial Development, Manufacturing Sector and Sustainability: Evidence from Nigeria

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Abstract

Dependence on the oil sector by the Nigerian government has generated a question about economic sustainability. Even though the country experienced substantial growth in the economy before the economic recession in mid of 2016, the growth had not improved unemployment and poverty rate. Therefore, the study investigates the impact of financial development indicators on the manufacturing sector in Nigeria with the aim to promote sustainable growth and development using the Vector Error Correction Model. The findings from the study show no bi-directional causal effects between financial indicators and output in the manufacturing sector. However, the study showed the presence of joint long-run and short-run causality when output in the manufacturing sector is used as a dependent variable. Likewise, the variance decomposition showed that the forecast error shocks of the financial development indicators affect output in the manufacturing sector at different horizons The implication is that long-run policies can be considered to improve the manufacturing output in Nigeria via the financial sector to promote sustainable growth. There is a need to develop a framework for policy mix and evaluate conflicting policies to ensure effectiveness in policy implementation among others.

Keywords: Financial, Manufacturing Sector, Sustainable Development, Nigeria.
JEL Classification: G20; O14; D69

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1. Introduction

The implications of financial development to promote growth and development have received attention in recent time in growth and finance literature (Ibrahima and Alagidedebe, 2018). However, less attention has been given to the relationship between financial sector and manufacturing sector, and its ability to promote sustainable growth and development most especially in the developing economies. Sustainability is the ability to meet the needs of the present without compromising the ability of future generations to meet their own need. Sustainability of the manufacturing is measured by the effect of its operation and its product throughout the lifecycle and its ability to promote employment (Campbell and Asaleye, 2016). Similarly, a well-developed manufacturing sector will generate income, reduce poverty and increase the overall welfare of the citizens, thereby more people are integrated into the growth system. Scholars have stressed that the economic growth recorded in Nigeria before the economic recession in 2016 is not pro-poor (Asaleye A. J. *et al.*, 2017a; Oloni *et al.*, 2017). The manufacturing sector is presumed to promote inclusive growth if well finance and integrate to the economy due to its linkages with other sectors of the economy.

The Nigerian government has employed several strategies to promote growth in the manufacturing sector, and at the same time enhanced the financial sector in achieving these goals. Few among the policies and programmes include import substitution industrialization strategy, stabilization policy, exchange control measures, structural adjustment programme, national economic empowerment and development strategy (NEEDS), seven-point agenda, transformation agenda, economic growth and recovery plan. Despite all these attempts, the performance of the manufacturing sectors has not improved over time (Asaleye J. A. *et al.*, 2018). One of the main objectives identified

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in NEEDS is to strengthen the financial system to promote sustainable growth and development in manufacturing sector. The bank recapitalization was also one of the notable efforts of the Nigerian government in 2004.

In the literature, focus has been on aggregate growth, foreign direct investment, employment, stock market, financial sector with less emphasis on manufacturing sector (Asaleye A. J. *et al.*, 2017b; Ibrahim and Alagidede, 2017; Inegbedion, 2018; Lawal *et al.*, 2016; Lawal *et al.*, 2017; Moradbeigi and Law, 2017). It is believed that improving the output of the manufacturing sector will create employment opportunity, income and will reduce the poverty level in Nigeria. Nigeria reliance on the oil sector has raised questions about the sustainability of the economy. Due to the pressure of importation and the reduction in the oil price in the international market in the year 2016 adversely affects the country. Likewise, the emphasis has been on diversification of the economy by the Nigeria government. In vein of the importance of the manufacturing sector to promote growth and development, this study investigated the role of the financial sector on manufacturing output with an emphasis on sustainable growth and development.

The study is divided into five sections streamlined as follows; after the introductory section, then follows by the review of literature in section 2. Section 3 discusses the model specification and technique of analysis. Section 4 presents the result while section 5 concludes.

2. Review of the Literature

One of the most common models used in the relationship between output and factor inputs such as labour and capital is the endogenous growth model Allen and Gale (1997); Campbell and Asaleye (2016); Romer (1986). Romer (1986) and Lucas (1988) made contributions using the endogenous growth model to link output and input through capital and human capital (which is on the role of financial institution especially provision of capital or fund). Though Romer (1986) stressed the importance of human capital but in the model, capital is also recognised as a vital factor to promote output (which include output in the manufacturing sector). It was also deduced in the model that technology on the hand through improve capital can promote growth. From the model, it can be deduced that output in the manufacturing sector with improving technology can enhance sustainable growth and development through an increase to scale (Ghali, 1999; Magrini, 1997). However, it is essential to note that this relationship can be affected negatively by intense government intervention in financial institutions.

On empirical review, Orlica *et al.* (2018) investigated the nexus between foreign direct investment spillover and productivity in the manufacturing sector in five selected European countries. It was reported by the scholars that local manufacturing firms gain in the upstream services and downstream services in the sector most especially in relation to knowledge. In a similar study, Desbordesa and Wei (2017) examined the relationship between financial development and foreign direct investment. It was shown by the scholar that there is a causal relationship between financial development and foreign direct investment. Tayssir and Feryel (2018) examined the impact of central banking on financial development in developed, developing and emerging economies. The findings of the scholars revealed that the central bank significantly influences the development of the financial sector in the countries under examination. Moreover, Ductor and Grechvna (2015) examined the interdependence between financial development and real sector output and the effect on economic growth based on panel data sourced between for some selected developed and developing economies. The study observed that the impact of financial development on growth is largely influenced by net credit to the private sector and that this impact becomes negative if it is not accompanied by a corresponding growth in the real output.

In Africa, Ibrahima and Alagidedebe (2018) analysed the impact of financial development on economic growth in sub-Saharan Africa using the Generalized Methods of Moments. The scholars documented that promoting financial development will enhance growth in sub-Saharan Africa. Abu-Bader and Abu-Qarn (2008) examine the relationship between financial development and economic growth in Egypt. The result of the scholars showed that there is a two-way relationship between financial development and economic growth. Studies have focused more on the financial market, money supply, trade openness, financial reforms, economic development, financial development with less attention to the manufacturing sector (Campbell and Asaleye, 2016; Freytag and Fricke, 2017; Ibrahim and Alagidede, 2017; Inegbedion *et al.*, 2016; Lawal *et al.*, 2016; Lawal *et al.*, 2017; Lawal *et al.*, 2018; Moradbeigi and Law, 2017). Although some studies investigated the relationship between manufacturing sector and financial development, few among other include Campbell and Asaleye (2016), who examined the relationship between financial sector reforms and output growth in the manufacturing sector in Nigeria. The scholars reported that the financial sector enhanced the development of the manufacturing sector in the post-reform era more relative to the pre-reform era.

Interestingly, a recent study by Asaleye J. A. *et al.* (2018) investigated the impact of the financial sector on manufacturing performance with emphasis on shock, causality and long-run relationship using VECM, Granger Non-Causality and Dynamic least square method. The indicators used for manufacturing performance by the scholars are employment and output in the manufacturing sector. It was reported by the scholars that shock from the credit to private sector and interest rate affect output more than employment. Also, it was concluded by Asaleye J. A. *et al.* (2018) that the result of the causal relationship is in line with the 'supply-leading view' and 'demand-following view'. However, the study did not relate to the ability of the manufacturing sector to promote sustainable growth and development. More so, the causality was tested on the financial sector indicators on manufacturing sector without examining the joint short and long-run causality.

This research work is distinguished from others by examining the relationship between financial development and its contribution to the manufacturing sector with the aim to promote sustainable growth and development in Nigeria. The paper tested the joint short and long-run relationship between selected financial market indicators and

output in the manufacturing sector following the approach outlined by Masih and Masih (1996). The study by Asaleye A. J. *et al.* (2017b) has adopted this approach as well to investigate the impact of trade openness on employment in Nigeria. Furthermore, the study examined the causal relationship and shock effects of the selected financial indicators on output in the manufacturing sector in Nigeria.

3. Model Specification and Techniques of Estimations

3.1. Model Specification

Following the study by Asaleye J. A. *et al.* (2018) the model for this study is specified as follows:

$$MI_t = a_o + b_1 CRPSY_t + c_2 BM2Y_t + d_3 SMCY_t + e_4 IRS + f_5 LLY_t + \varepsilon_t \quad 3.1$$

In equation 3.1, MI is the output in the manufacturing sector (proxy by the contribution of the manufacturing sector in the aggregate GDP), CRPSY is the credit to the private sector, BM2Y represents the money supply (proxy by M2), SMCY is the market capitalization, IRS is the interest rate and LLY is liability deposit. In the presence of non-stationarity of the series in the level and presence of cointegration among the series, the Vector Correction Error Model (VECM) is specified as follows:

$$\Delta X_t = \alpha + \alpha_1 \Delta X_{t-1} + \alpha_2 \Delta X_{t-2} + ... + \alpha_n \Delta Y_{t-p} + ECM_t + \varepsilon_t \quad 3.2$$

In equation 3.2, X_t is series used in the study and assumed not to be stationary at the level form. The symbol Δ is the first difference operator and ECM is the error correction term.

3.2. Model Estimation Procedure and Measurement

This study considered the unit root test and the cointegration test to determine the properties of the time series used. The reasons for these tests are to determine the most appropriate technique to be used. If non-series data has a linear combination, then the long series is said to have a long-run relationship (Engle and Granger, 1987). Based on the outcome of the cointegration test, this study uses the Vector Error Correction Model to investigate the relationship between financial development and manufacturing sector in Nigeria. The study further follows Masih and Masih (1996) to examine the joint and short-run causality. The system of equations from the VECM was used to investigate the long-run and short-run joint causality, the long-run was determined by the significance of the error correction term while the study imposed restrictions on the lags of the coefficients of the independent variable and tested if they are statistically different from zero using the WALD statistics to establish the joint short-run causality. The implication of the long-run relationship among the series cannot guarantee the direction of causality, however, the study further tested for the direction of causality employing the Granger causality approach. The impact of the selected financial development indicator shock on manufacturing output was investigated using the variance decomposition. This study uses secondary data of annual data set of Nigeria from 1984 to 2016. The data used for the empirical analysis are obtained from Central Bank of Nigeria (2018) statistical bulletin and the annual report of various years.

4. Presentation of Result

4.1. Presentation of the Unit Root Test

Table-1. Test of the Unit Root Hypothesis

Series	Levels	First Difference	Order of Integration
MI	1.222293	-3.025273**	I (1)
LLY	2.484974	-6.065559**	I (1)
CRPSY	2.352340	-3.871796**	I (1)
IRS	-2.030411	-7.981873**	I (1)
BM2Y	-2.075021	-5.470327**	I (1)
SMCY	-0.704018	-5.615203**	I (1)

* and ** shows stationarity at 1 % and 5 %level of significance respectively
Source: Author's computation using Eviews 9.5

From table 1, it can be observed that all the series are not stationary at the level form. However, the series is stationary at the first-differenced form. Hence, the variables are integrated of order one. Evidence from the Johansen cointegration revealed the existence of a long-run relationship among the series. The trace statistics and the maximum Eigen shows 3 co-integrating and 1 co-integrating vector respectively[1]. However, this study used the result of the maximum Eigenvalue in the VECM specification. Studies have shown that the maximum Eigenvalue test is more appropriate in a small sample size (Lutkepohl and Saikkonen, 2000).

[1] Not reported in the work, however, can be provided if requested

4.2. Presentation of the Causality Test

Table-2. Causality Test between Financial Development and Manufacturing Sector

Causality Test between MI and SMCY			
Null Hypothesis	No. of Observations	F-Statistic	Probability
SMCY does not Granger Cause MI	33	1.97926	0.1570
MI does not Granger Cause SMCY		3.56222	0.0418
Causality Test between MI and BM2Y			
Null Hypothesis	No. of Observations	F-Statistic	Probability
BM2Y does not Granger Cause MI	33	1.05689	0.3610
MI does not Granger Cause BM2y		0.69673	0.5066

Source: Author's computation using Eviews 9.5

Table 2 shows that there is unidirectional causality between the two pairs of variables SMCY and MI; MI granger cause SMCY but SMCY does not Granger cause MI, this means that the past values of SMCY do not help in predicting the current value of MI in Nigeria, under the period of investigation. Likewise, the causality test between MI and BM2Y shows independence between the two pairs of variables BM2Y and MI; this means that the past values of SMCY and BM2Y do not help in predicting the current value of MI in Nigeria and vice versa.

Table-3. Joint Short-run and Long-run Causality

Joint Long-run Causality			
Coefficient	Standard Error	t-statistics	Probability
-2.596031	0.278995	-9.307081	0.0000
Joint Short-run Causality			
F-statistics Value	8.756028	Probability	0.0001
Chi-Square Value	122.5844	Probability	0.0000
R-squared: 0.969715	**DW:** 1.823574	**F-Stat.**: 29.88489	**Prob. Stat.**: 0.000
Diagnostic Checks			
Serial Correction LM Test	Obs. R-squared Probability: 0.9364		
Heteroskedasticity Test: ARCH	Obs. R-squared Probability: 0.6835		

Source: Authors' Computation using Eviews 9.5

Table 3 shows that there is an existence of both joint short-run and long-run causality using the output in the manufacturing sector (MI) as the dependent variable. It is depicted that the coefficient of the joint long-run causality is negative and significant at 5 per cent. Also, the probability of the chi-square value is less than 5 per cent shows joint short-run causality runs from the independent variables to the dependent variable (output in the manufacturing sector). The model is further tested for the null hypotheses of no serial correlation and heteroskedasticity since the probability values of the tests are greater than 5 per cent, the study failed to reject the null hypotheses. Hence, the model is correctly specified in the presence of no serial correlation and ARCH effect (Fashina *et al.*, 2018).

In Variance decompositions of LLY, CRPSY, IRS, BM2Y and SMCY[2]; indicate that there is a variation in MI within the period of 1 to 3. Also, there is more variation in MI within the period of period 4 to 10 in Variance Decomposition of IRS and LLY. Conversely, the Variance Decomposition of SMCY affects MI through the time horizon.

4.3. Discussion and Implication of Result

The series used for this study are not stationary in the level form as revealed by the Augmented Dickey Test. Similarly; the study reveals the presence of cointegration among the series, this shows that long-run policies can be considered to improve the manufacturing output in Nigeria via the financial sector to promote sustainable growth and development. This result was also confirmed by the existence of joint long-run and short-run relationship when output in the manufacturing sector is used as the dependent variable and financial development indicators are used as independent variables. Evidence from the causality test showed that: there is unidirectional causality between SMCY and MI; MI granger cause SMCY and; independence is suggested between BM2Y and MI. There is a need for the authority concern to develop a framework for policy mix and evaluate conflicting policies to ensure effectiveness in policy implementation. Also, there is a need to guide against inconsistency policies and ensure continuity in respective any changes in programmes that might occur.

The VECM result, through the variance decomposition, showed that IRS and LLY forecast error shocks showed more variation in explaining the variation in MI in the within the period of 1 to 7; while SMCY shows more variation within the period of 7 to 10. Evidence from the result suggested that IRS and LLY can be the target variables within the period of 1 to 7 to promote growth in the manufacturing sector while SMCY can be targeted to promote growth in the long-run. The official statistics have also shown that the economic growth that the country witness before the recession-era has not improved the unemployment rate (National Bureau of Statistics, 2016). Manufacturing Sector is one the major driving force of most developed economies, helps in generation of

[2] presented in the appendix

employment and the enhancement of income. This study argued that to revamp the manufacturing sector in Nigeria and maximised the benefit in order to promote sustainable growth which in the long run will reduce the dependence on the oil sector; there are needs to implement right policies and investment considering IRS (interest rate) for short-term goals, BM2Y (credit to private sector) for long-term goals and policies to improve market capitalization should also be considered to achieve the long-term goals.

5. Conclusion

In Nigeria, the financial sector has evolved in response to the challenges posed by developments in the system such as systemic crisis, globalization, technological innovation, financial crisis and inconsistency policies which believed to have hampered its contribution to the manufacturing sector. Nigeria depends on the oil sector as the main source of revenue for a long period of time, this has generated a question about sustainability. The oil sector in the second quarter of 2016 was affected by both external and internal shocks which have resulted in adverse effects on the economy. Amongst some many others, macroeconomics problems and issues that the country is facing is high unemployment rate and low income. In view of this, this study investigates the relationship between manufacturing sector and financial development with the aim to promote sustainable growth using the Vector Error Correction Model (VECM) to examine the shock effect and the causal relationship was as well test. From the findings of the study, no bi-directional causal effects between financial indicators and output in the manufacturing sector. However, the study showed the presence of joint long-run and short-run causality when output in the manufacturing sector is used as the dependent variable. The economic implication is that long-run policies can be considered to improve the manufacturing output in Nigeria via the financial sector to promote sustainable growth and development. There is a need for the authority concern to develop a framework for policy mix and evaluate conflicting policies to ensure effectiveness in policy implementation. Also, there is a need to guide against inconsistency policies and ensure continuity in respective any changes in programmes that might occur.

The VECM result, through the variance decomposition, showed that the forecast error shocks of the financial development indicators affect output in the manufacturing sector at different horizons. Evidence from the result suggested that interest rate liability deposit can be the target variables in the short-run to promote growth in the manufacturing sector while credit to the private sector can be targeted to promote growth in the long-run. This study argued that to revamp the manufacturing sector in Nigeria and maximised the benefit in order to promote sustainable growth which in the long run will reduce the dependence on the oil sector; there are needs to implement right policies and investment considering interest rate for short-term goals, credit to the private sector and market capitalization for long-term goals. One of the main factors affecting the performance of the economy in Nigeria is mismanagement of resource which was not considered in this study. It is recommended that further study should examine the implication of corruption and institutional changes on manufacturing performance in Nigeria.

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Appendix

Table-A1. Variance Decomposition of IRS

Variance Decomposition of IRS:

Period	S.E.	MI	IRS	BM2Y	CRPSY	LLY	SMCY
1	3.517731	16.86263	83.13737	0.000000	0.000000	0.000000	0.000000
2	4.165772	14.30764	71.22726	0.270704	6.259770	5.863133	2.071491
3	4.728876	12.83966	64.50490	0.380095	9.371829	8.624316	4.279202
4	5.396347	9.897302	61.10634	3.852690	12.31277	7.685979	5.144927
5	6.080210	7.817128	56.75745	3.177477	13.89620	13.12933	5.222415
6	6.657395	6.521270	54.10642	2.886194	13.37857	17.79033	5.317215
7	6.995284	5.908012	55.00841	2.641369	12.51678	18.72207	5.203361
8	7.379027	5.312388	54.53458	2.390788	11.38897	21.52921	4.844058
9	7.671090	4.967366	54.35335	2.212265	10.73893	23.01957	4.708527
10	7.929283	4.733915	55.12559	2.292041	10.27409	22.90927	4.665091

Table-A2. Variance Decomposition of BM2Y

Variance Decomposition of BM2Y:

Period	S.E.	MI	IRS	BM2Y	CRPSY	LLY	SMCY
1	2.694199	0.907109	9.439648	89.65324	0.000000	0.000000	0.000000
2	4.012451	1.032292	11.32018	80.35727	4.855105	0.664141	1.771016
3	5.925960	1.662059	5.354087	73.41320	13.80420	1.361796	4.404658
4	6.522658	2.316407	4.430857	69.72049	16.53867	2.904469	4.089110
5	7.040024	3.446707	3.805456	60.07220	14.20343	14.91467	3.557543
6	7.302338	4.771461	4.617516	58.73955	14.41453	14.10003	3.356906
7	7.698334	4.972303	4.704005	59.56391	14.16954	13.48720	3.103044
8	7.952798	4.787320	5.243166	60.15310	13.61439	13.18194	3.020077
9	8.262343	4.523862	5.087263	62.18695	13.00745	12.39544	2.799032
10	8.465599	4.490121	5.009876	63.12024	12.76288	11.88562	2.731263

Table-A3. Variance Decomposition of CRPSY

Variance Decomposition of CRPSY:

Period	S.E.	MI	IRS	BM2Y	CRPSY	LLY	SMCY
1	6.95E-06	0.015828	6.958301	2.606504	90.41937	0.000000	0.000000
2	1.64E-05	0.289384	2.217562	15.67163	66.83254	9.964605	5.024287
3	2.88E-05	0.113693	0.746509	10.15067	67.68232	13.01772	8.289090
4	3.94E-05	0.090236	0.743713	7.876729	74.70476	7.329106	9.255462
5	4.70E-05	0.254992	0.539525	5.742640	78.69032	5.159514	9.613007
6	5.49E-05	0.927333	0.400222	4.977624	78.84247	4.004106	10.84825
7	6.40E-05	1.298461	0.295230	5.010575	78.89334	3.529416	10.97298
8	7.20E-05	1.422296	0.260010	4.469800	79.83106	2.832194	11.18464
9	7.93E-05	1.653386	0.215543	3.986006	80.30670	2.384683	11.45368
10	8.64E-05	1.941856	0.202452	3.927353	80.12400	2.058532	11.74580

Table-A4. Variance Decomposition of LLY

Variance Decomposition of LLY:

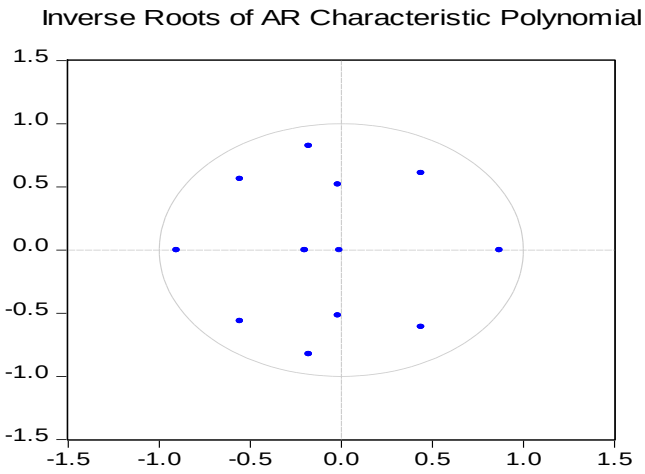
Period	S.E.	MI	IRS	BM2Y	CRPSY	LLY	SMCY
1	0.000207	0.897096	5.460906	11.13826	6.589454	75.91429	0.000000
2	0.000233	3.624808	4.874856	8.958574	12.96985	69.42053	0.151388
3	0.000272	8.822529	4.413511	6.615718	20.11718	56.86784	3.163218
4	0.000331	9.249447	4.001261	4.635461	31.13135	47.40956	3.572922
5	0.000392	8.250856	3.213143	5.019146	27.05530	53.68435	2.777205
6	0.000425	10.37377	2.769092	6.152316	25.86256	51.94206	2.900193
7	0.000453	11.95422	2.560727	5.513745	28.27438	48.27623	3.420706
8	0.000491	11.50446	2.299230	5.047256	29.36922	48.60059	3.179243
9	0.000527	11.49602	2.126394	5.038726	29.01525	49.02165	3.301962
10	0.000548	12.48332	2.039305	4.664602	30.48212	46.76579	3.564863

Table-A5. Variance Decomposition of SMCY

Variance Decomposition of SMCY:

Period	S.E.	MI	IRS	BM2Y	CRPSY	LLY	SMCY
1	3.23E-05	7.449479	4.269457	13.38606	55.59329	3.742817	15.55890
2	5.26E-05	4.731769	4.891265	11.85050	63.84988	3.189001	11.48759
3	6.74E-05	4.820300	8.075947	10.94983	53.08715	13.44557	9.621201
4	7.36E-05	7.401752	7.758345	11.31596	51.26290	12.62702	9.634022
5	7.77E-05	9.720297	7.636897	10.15484	50.78870	11.78370	9.915573
6	8.30E-05	10.43513	7.091829	8.988660	52.46998	11.08312	9.931271
7	8.91E-05	10.35525	6.848993	7.969296	54.36842	9.887020	10.57102
8	9.50E-05	10.59238	6.922665	7.003444	55.96598	8.733456	10.78208
9	0.000101	10.82234	7.130066	6.301924	55.65216	9.290178	10.80333
10	0.000106	11.26491	6.921278	5.982901	55.99362	9.058450	10.77884

Figure-A1. Stability Test



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