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Financial Reforms and Industrial Productivity Growth in Nigeria

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Abstract
The effective performance of industrial sector of every economy depends largely on the level of development in the financial system of the country and also on the intermediation between the surplus and the deficit units of the economy. Based on these assertions, the study empirically investigated the impact of financial reforms on industrial productivity growth in Nigeria. A vector auto-regression analysis with impulse-response and variance decomposition was employed, using a time series data between the period of 1986 and 2013. The study however found out that the various financial services reforms put in place since the introduction of the Structural Adjustment Programme (SAP) in Nigeria have not significantly brought about the needed improvement in the level of industrial productivity growth in the country. It is imperative for the financial reform operations to specifically target the industrial sector of the economy through a growth engendering reform policy capable of ensuring a sizeable and economically viable lending interest rates regimes. The provision of expansionary grants for the real sector of the economy would also serve as opportunity to increase the percentage contribution of industrial sector to the country's gross domestic product.
Keywords: Industry, GDP, VAR Model, Financial Reforms and Nigeria.

INTRODUCTION

The emergence of free market economy in the emerging economies of the world has generally been perceived as a conscious attempt towards drifting the productive and economic space towards a more friendly market oriented economic system. This idea has provided debatable platforms in development economics. The concept of financial reform became a national phenomenon in Nigeria after the introduction of the Structural Adjustment Programme (SAP) in 1986 and thereafter gave birth to various policies aimed at the development of the financial system of the country specifically to increase the level of output in the real sector of the economy. The role played by a consciously articulated financial system of any economy cannot be over emphasized as it provides the necessary and desired impetus to the growth and development of the productive base of the economy.

Adekunle *et al.* (2013, p: 1) thought of a robust financial system as capable of performing several critical functions which includes "enhancing the efficiency of intermediation by reducing information, transaction and monitoring costs. Besides, a well-developed financial system enhances investment by identifying and funding good business opportunities, mobilizes and encourages savings and trading, hedging and diversification of risk, as well as facilitating the exchange of goods and services". Also in their own concept of financial reform, Duru and Kehinde (2012,p:1) described it as "the changes that are needed in order to establish a modern financial system capable of acting as a catalyst for allocating the economy's savings in the most productive way among competitive investment outlets. This is to ensure soundness in making the financial sector to be the most regulated sector of many developing economies."

Apart from the perceptions of the various authors on financial reforms, several authors have also made series of contributions and conclusions on this topical issue from different angles. One of such contributions was made by Obamuyi and Olorunfemi (2011, p: 6)where long run study approach was adopted to examine the effect of interest rates reform on the productivity growth in the economy. The study found a positive and significant effect of interest rates on productivity growth, but failed to take into account how other financial services reform factors affect the behavior of interest rates itself, to impact on the productivity growth.

Another contribution made by Udoh and Ugbuagu (2012, p: 17) was to examine the nexus between the development in the financial sector and industrial growth in an aggregate production framework, using an auto regressive distributed lag model. The study however concluded that the link between the financial development and industrial growth in Nigeria produced an adverse effect. This development was attributed to the distortions that followed the reform policies that came with the introduction of the Structural Adjustment Programme (SAP) which according to the study, would further impoverish the people and discourage investment drive. Based on the argument of Udoh and Ugbuagu, further financial sector reforms should be introduced, to improve the efficiency of the domestic financial sector as a prerequisite for the achievement needed for growth in industrial sector.

A concerted effort was also made by Duru and Kehinde (2012) to assess the impact of financial sector reforms on performance of industrial sector with emphasis on the growth and development of small and medium scale enterprises (SMEs) in Nigeria. Using a non-parametric approach, the study came to conclusion that financial sector reforms had remained a significant determinant of the performance of SMEs which is an integral part of the

growth process in industrial sector.

Ogunleye and Saliu (2013, p: 9) based their own contribution on the study of financial institutions reform and performance of the manufacturing sub-sector, which is also a sub element of the industrial sector of the country. The study, using a long run estimation approach with manufacturing share of gross domestic product as a measure of performance in the sector, revealed that financial institutions reform has not impacted positively on manufacturing sub- sector in Nigeria.

Owolabi *et al.* (2013,p:6), while also reviewing a specific study on banking sector reforms and output growth of manufacturing sub-sector, a long run and causality test was employed to determine the direction of causality and relationship between banking sector reforms and Output growth of the manufacturing sub-sector in Nigeria. The study however discovered that there was no evidence of causal relationship between reforms in the banking sector and growth of manufacturing output despite the general belief that a well-developed financial sector is capable of accelerating growth in the real sector of the economy.

Although many studies have been carried out with mixed results in this direction,this study in particular seeks to investigate the impact of financial reforms on industrial productivity growth in Nigeria, using vector auto-regression model as analytical technique. Also by extension the study employed the innovative cumulative impulse-response and variance decomposition analysis respectively. This study also accommodates other financial services reform factors as well as the total share of industry in the country's GDP, to capture industrial productivity growth which many studies in this area failed to consider.

METHODOLOGY

Theoretical Underpinning and the Model

In consonance with the Augmented Solow Growth model which was proposed by Mankiw *et al.*(2011) in their treatise "A Contribution to the empirics of Economic Growth", capital accumulation is directly correlated with the level of savings and population growth and inclusion of capital lowers the impact of savings and population. The model, quoted from Lucas (1988) states that although there exist decreasing returns to physical capital accumulation when human capital is held constant, the returns to all reproducible capital (human and physical) are constant. The Augmented Solow growth model provides a liberal approach to this analysis in that it allows the incorporation of other factors other than the traditional inputs of capital and labour. This empirical analysis is altered, as capital accumulation and financial components are included as variables in the regression to explain differences in economic growth and adding human capital to the production function. The augmented Solow equation then becomes;

$Y(t) = K(t)\ \partial H(t)\ \beta\ (A(t)\ L(t))\ 1-\partial-\beta$ ---------- (i)

In achieving the main objective of this study, the model is thereby modified, specified functionally and explicitly as follows;

SIG = *f* (FID, INT, EXR, BDY) ---------- (ii)

$SIG = \beta_0 + \beta_1 FID + \beta_2 INT + \beta_3 EXR + \beta_4 BDY + \mu_i$--------- (iii

Where;

SIG is the share of Industry in the GDP. The Industrial sector of the economy refers to the goods-producing segment of an economy, including agriculture, construction, fisheries, forestry, solid minerals and manufacturing. The industry share of gross domestic product measures the total contribution of the sector to the value of total domestic output. This is estimated as a percentage of the entire output.

FID is the level of Financial Deepening. This refers to the increased provision of financial services with a wider choice of services to all levels of society. Financial deepening generally means an increased ratio of money supply to GDP or some price index. It refers to liquid money. The more liquid money is available in an economy, the more opportunities exist for continued growth. It can also play an important role in reducing risk and vulnerability for disadvantaged groups, and increasing the ability of individuals and households to access basic services like health and education, thus having a more direct impact on poverty reduction (Wiki, 2014).

INT is the Lending Interest Rates. Lending rate according to World Bank (2014) is the bank rate that usually meets the short- and medium-term financing needs of the private sector. This rate is normally differentiated according to credit worthiness of borrowers and objectives of financing. The terms and conditions attached to these rates are regulated and coordinated by the central monetary authority of the concerned country.

EXR is the average Exchange Rates. The exchange rate which is also known as the foreign exchange rate, forex trade between two currencies specifies how much one currency is worth in terms of the other. It is also regarded as the value of one country's currency in terms of another currency

BDY is the ratio of bank deposit liability to GDP. The ratio of Bank deposit liability to gross domestic product refers to the transactions that are recorded on the bank's books, and the resulting balance is recorded as a liability for the bank and represents the amount owed by the bank to the customer as a ratio of the total domestic output level.

Analytical Technique

In order to establish the relationship among the variables used in this study, the Vector Auto Regressive Analysis (VAR) was employed. From the literature, different techniques have been adopted to establish the impact of one or more variables on the other; or relationship between a particular variable and the other. Odeniran and Udeaja (2010, p:11) used the combined effect of Vector Auto regression and Johansen Co-integration techniques to establish the relationship between financial sector development and Economic growth in Nigeria which however did not distribute the expected cumulative impulse response of financial reforms effects on output growth. Gujarati (2007), Udah and Obafemi (2011, p: 9) suggested that the vector auto regression (VAR) is formulated as a unified system and variables are chosen based on how they fit into the system as a whole rather than how they contribute to a particular sub-system. Exogeneity problem is taken care of by treating all variables as endogenous and that VAR model takes care of expectations by allowing lags of every variable to enter the equation explaining each variable. The interesting thing about VAR model, according to these authors is that it allows for decomposition of the variance into parts attributed to each set of the innovation or shock process. The superiority of the VAR model over the OLS and other estimation techniques is quite clear. The OLS assumes a particular variable to be endogenous while the rest are exogenous. Vector Auto regression (VAR) is a statistical model used to capture the linear interdependencies among multiple time series. All variables in a VAR model are treated symmetrically in a structural sense; with (although the estimated quantitative response coefficients will not in general be the same) each variable having an equation explaining its evolution based on its own lags and the lags of the other model variables.

Data Requirements, Sources and Limitations

The data for this study include share of Industry in the gross domestic products as a percentage of the GDP (SIG), Financial deepening which is the ratio of money supply (M2) to the Gross Domestic Product (FID). The (M2-GDP) ratio measures the degree of monetization in the economy, depth of the financial sector as well as the expansion of payment and saving functions. Also the Lending rate (INT), the average exchange rate (EXR) and the ratio of bank deposit liabilities to gross domestic product (BDY).All these were identified and obtained from 2013 edition of CBN Statistical Bulletin and Annual Reports and Statement of Accounts. The time series data spanned through1986 and 2013.

RESULTS AND DISCUSSION

The results and discussion section of this study begins with the presentation of unit root test result, using the Augmented Dickey-Fuller approach.

PRE-ESTIMATION TEST

Table 1*: Unit Root Test (Augmented Dickey-Fuller)*

Variables	ADF statistics @level	ADF statistics @First diff.	Critical value @ 5 %	Order of Integration	Remarks
SIG	-4.651185		-2.981038	I(0)	Stationary
FID	-1.605563	-5.467892	-2.981038	I(1)	Stationary
INT	-4.416754		-2.976263	I(0)	Stationary
EXR	-0.472720	-4.933990	-2.981038	I(1)	Stationary
BDY	-1.207836	-4.537978	-2.981038	I(1)	Stationary
ECM	-4.073694		-2.976262	I(0)	Stationary

Source: Author's Computation from data, 2014.

Table1 presents the results of the Augmented Dickey-Fuller (ADF) test statistics. The test produced mixed results; while some of the variables were stationary at levels others were at first difference. The results further shows that industry share of the gross domestic output (SIG) and the Lending interest rates (INT) were stationary at level while financial deepening (FID), average exchange rates (EXR) and the ratio of bank deposits liability to gross domestic output (BDY) were differenced twice to attain the stationary level. The ECM series generated from the data shows that it is stationary at level. In view of the above and considering the fact that the series contains both I(0) and I(1) variables, the study therefore proceed further by specifying an unrestricted Vector Auto-regressive model with Impulse response, Cumulative impulse response and Variance decomposition respectively.

Vector Auto-Regression Analysis

Table 2: ***Vector Auto-Regression (VAR) Estimates***

	SIG	FID	INT	EXR	BDY
SIG(-1)	0.472482	-7.584616	-8.067863	-1.192035	-9.970429
SIG(-2)	-0.346378	6.935865	-2.406923	69.76124	2.654302
FID(-1)	-0.006310	-0.380640	0.771207	0.396121	-0.371295
FID(-2)	-0.004464	0.490607	-0.255446	-1.328777	0.051903
INT(-1)	-0.008880	0.118452	0.078473	0.905383	-0.004397
INT(-2)	0.005711	0.011465	0.035502	-0.998127	-0.034468
EXR-1)	0.002223	-0.031683	-0.045414	0.835286	0.000742
EXR(-2)	-0.002022	0.026692	0.039867	0.038396	0.012602
BDY(-1)	-0.002944	3.258251	-1.159759	2.074474	1.364981
BDY(-2)	0.022017	-1.061438	-0.253739	0.612451	-0.001579
C	0.470582	2.337516	20.67034	-7.274033	7.413663
R^2	0.631987	0.853144	0.447922	0.958381	0.851331
F-STAT	2.575943	8.714100	1.217007	34.54081	8.589546

Source: Author's computation from data, 2014.

Table 2 presents the results of the vector auto regression tests, which revealed the direction of causality of the endogenous variables. The VAR model treats all the variables as endogenous and the table thus portrays the level of endogeneity as well as simultaneous comparison of both the F-statistics and the coefficient of multiple determinations (R^2). The VAR estimates show that the share of industry in gross domestic product (SIG),level of financial deepening(FID), average exchange rates(EXR) and the ratio of bank's deposits liability to output level (BDY) were more endogenous than being exogenous with their respectiveR^2 of 63.2%,85.3%, 95.8% ,85.1% and correctly fitted F-statistics of 2.5759,8.714,34.541, 8.5896 respectively. But the bank lending rates(INT) was found to be less endogenous owing to the fact that its R^2 is as low as 44.8% and the estimated-statistics as 1.217. The result of the VAR tests truly shows the evidence of endogeneity level of the variables in the model.

Table 3: Results of Joint Significance Test

Equation	R^2	*F*-stat	*F*-stat @ 5%
SIG	0.631987	2.575943	3.05
FID	0.853144	8.714100	3.05
INT	0.447922	1.217007	3.05
EXR	0.958381	34.54081	3.05
BDY	0.851331	8.589546	3.05

Source: Author's Computation from data, 2014.

Table 3 also presents the results of significance test for the variables in each equation of the VAR system. It however revealed that the equation of the financial deepening, the average exchange rates and ratio of banks deposits liability to output level were statistically significant at 5% level. This confirms the relevance of the components of the financial reforms. The R^2 captures the variation in the dependent variable that is jointly explained by the explanatory (right hand side of the model) variables. On this note, the explained variations of the dependent variable in each equation of the VAR system can be ordered according to their explanatory power as follows; Average exchange rates (95.8%), financial deepening (85.3%), ratio of bank deposit liability to output (85.1%), share of industry to GDP (63.2%) and the lending interest rates (44.8%).

POST-ESTIMATION TESTS

Impulse Response Analysis

Table 4: ***Impulse- Response to one S.D of 5%***

PERIOD	SIG	FID	INT	EXR	BDY
1	0.062175	0.000000	0.000000	0.000000	0.000000
2	0.044480	-0.006428	-0.014510	0.032746	-0.002845
3	0.007094	-0.021569	0.012029	0.020412	0.010591
4	-0.002054	-0.010257	0.000269	0.000855	0.003812
5	0.006630	-0.014627	-0.005550	-0.000500	0.002851
6	0.010489	-0.015145	0.000171	0.006662	-0.010700
7	0.011890	-0.008155	0.003471	0.006200	-0.010975
8	0.011331	-0.004140	0.001946	0.004088	-0.007677
9	0.007881	-0.003522	0.001329	0.002015	-0.004446
10	0.003668	-0.002847	0.000750	-0.000685	-0.002641

Source: Author's computation from data, 2014.

Table 4 presents the results of the impulse response analysis of the vector auto-regression (VAR) model, which traces the effects of one standard deviation on current and future values of the endogenous variables. The impulse-response analysis is used to forecast the pattern of the endogenous variables to a standard deviation shock on the share of industry to gross domestic output. The impulse-response estimates shows that a standard deviation shock on the share of industry in the gross domestic product brings about a sharp and gradual decrease in the ratio of industrial output in GDP from the first period to the third period and an unusual negative response in the fourth period and later continued the reduction to the tenth period under consideration.

Meanwhile, the estimates show the evidence that the innovation in the components of financial system captured by the level of financial deepening, responded negatively to the productivity growth of the industrial output. This is explained by the response of the financial deepening variable (FID) which deteriorated from the zero level of standard deviation shock accounted for to negative from the first period to the tenth period under consideration. It was also observed from the table that lending rates (INT), exchange rates (EXR) and the ratio of bank deposits liability to output (BDY) had inconsistent and fluctuating response to innovation in the share of industry in the domestic output level from zero in the first period to the tenth period and with some negative response experienced within the periods considered for the variables. The implication of this is that while the financial deepening was improving owing to the financial reforms which became a national phenomenon from 1986, the industrial output performance had continued to plummet and fluctuate over the same period. This submission supports the findings of Ogunleye and Saliu (2013, p: 7)

Cumulative Impulse-Response Analysis

Table 5: ***Cumulative Impulse Response Estimates***

PERIOD	SIG	FID	INT	EXR	BDY
1	0.062175	0.000000	0.000000	0.000000	0.000000
2	0.106655	-0.006428	-0.014510	0.032746	-0.002845
3	0.113749	-0.027997	-0.002481	0.053158	0.007746
4	0.111695	-0.038254	-0.002212	0.054013	0.011558
5	0.118325	-0.052881	-0.007762	0.053512	0.014409
6	0.128815	-0.068026	-0.007591	0.060174	0.003708
7	0.140705	-0.076181	-0.004120	0.066374	-0.007267
8	0.152036	-0.080320	-0.002175	0.070461	-0.014944
9	0.159917	-0.083842	-0.000846	0.072476	-0.019390
10	0.163585	-0.086689	-9.62E-05	0.071791	-0.022030

Source: Author's Computation from data, 2014.

Table 5 presents the results of the cumulative impulse-response analysis. However, the estimates revealed that the innovation in the ratio of industrial output to the gross domestic output (SIG) grows cumulatively from 0.062175 in the first period to 0.163585 in the tenth period under consideration. This establishes the evidence that the industrial output in Nigeria actually experienced growth on its own, even as the financial deepening (FID) and lending interest rates regime continued to make a negative cumulative innovation response. Consequently, the operations of the reforms in the financial system have failed to engender the desired growth in the industrial sector of the economy despite its level of significant activities on the sector. This conclusion actually agrees with the earlier study of Owolabi et al (2013, p: 6).Meanwhile, the average exchange rates (EXR) and the ratio of bank deposits liability to gross domestic output (BDY) also recorded cumulative and fluctuation response respectively. While exchange rates (EXR) shows cumulative and fluctuation response from the first period with 0.0000 and

0.071791 in the tenth period, the ratio of bank deposits liability to output level (BDY)recorded cumulative and fluctuation response to innovation from 0.00000 also in the first period and a negative cumulative at the second, and thereafter from seventh to tenth periods respectively.

Variance Decomposition Analysis

Table 6: ***Variance Decomposition of SIG***

Period	S.E	SIG	FID	INT	EXR	BDY
1	0.062175	100.0000	0.000000	0.000000	0.000000	0.000000
2	0.084714	81.43597	0.575739	2.933856	14.94163	0.112807
3	0.091463	70.46221	6.054994	4.246591	17.79853	1.437676
4	0.092143	69.47647	7.205186	4.185041	17.54559	1.587707
5	0.093741	67.62779	9.396358	4.394117	16.95523	1.626505
6	0.096362	65.18368	11.36215	4.158638	16.52329	2.772240
7	0.098308	64.09149	11.60497	4.120280	16.27329	3.909969
8	0.099446	63.93187	11.51427	4.064834	16.07208	4.416940
9	0.099948	63.91296	11.52305	4.041777	15.95165	4.570566
10	0.100096	63.85867	11.56992	4.035458	15.90927	4.626681

Source: Author's Computation from data, 2014.

Table 6 presents the results of the variance decomposition of the ratio of industry share in gross domestic output. The variance decomposition measures the proportion of forecast error variance in each variable explained by the innovation in it and other variables. The variance decomposition estimates however revealed that the variation in the share of industry in domestic output (SIG) explained by the level of financial deepening (FID) assumed an increase from the third period and maintained the increase to the peak in the seventh period, then fluctuated to a record a bit lower in the tenth period despite the estimates showing a decline in the variation of the industry share of domestic output from the peak in the first period to the lowest record in the tenth period. Also, the variation in the ratio of industry in the GDP as a result of the variation in the lending interest rates (INT) and the ratio of bank deposit liability to output (BDY) assumed an increasing level from the second period to third and the tenth period respectively. Thereafter, the lending and exchange rates continue to decrease from the third period down to the tenth period under consideration.

Conclusion and Recommendation

The emerging conclusion from various analyses carried out in this study is that financial reforms undertaken so far have not significantly impacted on the country's industrial productivity growth. This is evident in the response of the various financial variables such as financial deepening, prevailing lending rates regime, bank deposit liability and the exchange rates among others which were subjected to empirical tests. The study further revealed that despite the fact that there might have been an increase in the gross domestic product as evident in the recently released facts and figures by the concerned authorities in the country; the share of industrial output in the GDP has continued to record a deteriorating trend. Consequently, it is recommended that the financial reform policy operations should be geared towards specifically targeting the industrial sector of the economy through a growth engendering reform policy that will ensure a sizeable and economically viable lending interest rates regimes. This financial reform operation should also be skewed to assist in the provision of expansionary grants for the real sector of the economy in order to ensure a sustainable industrialization and boost the industrial output contribution to the gross domestic product of the economy.

References

Adekunle O. A., Salami, G. O. and Adedipe, O. A. (2013), "Impact of Financial Sector Development on the Nigerian Economic Growth", *American Journal of Business and Management* Vol. 2, No. 4, Pp. 347-356.

Akingunola, R.O.,Adekunle, O.A., Badejo, O. and Salami, G. O. (2013), "The Effect of the Financial Liberalization on Economic Growth", *International Journal of Academic Research in Economics and Management Sciences,* Vol. 2, No. 1, Pp.123-155.

Duru, M. and Kehinde, L. M. (2012), "Financial Sector Reforms and the Growth of Small and Medium Scale Enterprises (SMEs) in Nigeria", *Universal Journal of Management and Social Sciences*, Vol. 2, No.8, Pp.86-97.

Gujarati, D.M. (2007), "Basic Econometrics", *Third Edition New York McGraw Hill*

Mankiw, N. G., Romer, D. and Weil, D. N. (2011), "Augmented Solow Growth Model", *StudyMode.com*. Retrieved 02, 2011, from http://www.studymode.com/essays/Augmented-Solow-Growth-Model-588295.html

Obamuyi, T. M. and Olorunfemi Sola. (2011), "Financial Reforms, Interest Rate Behavior and Economic Growth in Nigeria", *Journal of Applied Finance and Banking*, Vol.1, No.4, Pp.39-55.

Odeniran, S. O. and Udeaja, E. A. (2010), "Financial Sector Development and Economic Growth: EmpiricalEvidence from Nigeria", *Central Bank of Nigeria Economic and Financial Review*,Volume 48, No.3 Pp. 91-124.

Ogunleye, E. O. and Saliu, M. (2013), "Long-Run Relations between the Financial Institutional Reformsand the Nigerian Manufacturing Performance (1970 - 2005)", *Journal of Economics and Sustainable Development*, Vol.4, No.15, Pp. 80-87.

Owolabi, S. A., Olanrewaju, G. O.and Okwu, A. T. (2013), "The Causality between Banking Sector Reforms and Sectoral Output Growth: Empirical Evidence from Nigeria", *Unique Journal of Business Management Research,* Vol. 1, No.3, Pp. 042-048.

Udah, E. B. and Obafemi, F. N. (2011), "The Impact of Financial Sector Reforms on Agricultural and Manufacturing Sectors in Nigeria: An Empirical Investigation", *Journal of Sustainable Development in Africa*, Vol. 13, No.8, Pp.193-213.

Udoh, E. and Ogbuagu, U. R. (2012), "Financial Sector Development and Industrial Production in Nigeria (1970-2009): An ARDL Co integration Approach", *Journal of Applied Finance and Banking*, Vol.2, No.4, Pp. 49-68.

Wikipedia (2014), "Financialdeepening", retrieved on 7th July, 2014, *Available at: http://en.wikipedia.org/wiki/Financial_deepening*

World Bank (2014), "Lending Interest Rates", *World Development Indicators, available at: http://data.worldbank.org/indicator/FR.INR.LEND*