Impact of financial development on manufacturing output: The Nigerian evidence

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Impact of financial development on manufacturing output: The Nigerian evidence

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Abstract: This study examined the influence of financial deepening on manufacturing output in Nigeria. Using the Vector Autoregression (VAR) based Johansen cointegration technique and an Ordinary Least Square (OLS) estimator on annual data spanning 1970 to 2010, we found insignificant coefficients for credit to the manufacturing sector, banking efficiency and the non-oil trade balance. This suggests a fundamental disconnect between the real and financial sectors of the Nigerian economy. Policymakers should therefore innovate with productivity enhancing reforms which are better tailored to the needs of the manufacturing sector. This should work to boost growth prospects for the aggregate economy.

Keywords: Financial deepening, Credit, Manufacturing, Vector Autoregression

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I. Introduction

The answer to the question of what represents the most significant set of growth drivers both within countries and across space is largely ambivalent. In fact, Sala-i-martin (1997) enumerates a plethora of economic growth correlates. Hence, quite a bulk of the literature acknowledges the role of critical inputs such as schooling, health, infrastructure among others, while some other opinions centre on macroeconomic fundamentals, institutions as well as external factors (see Barrro and Lee 1993, Sala-i-martin 1997 and Barro and Lee 1994 among others). Beyond the foregoing emphasis on the determinants of aggregate growth, there are equally age long arguments on which specific sectors of the economy are more suited to growth. Often times this discourse is framed within the confines of factors such as the country's level of development, domestic resource endowment, government behaviour, institutional settings and so on. Although these issues remain contentious, the role of a vibrant manufacturing base in the process of initial economic diversification and subsequent economic prosperity has been widely alluded to. The manufacturing sector, in turn, maximizes opportunity in terms of widening the mix of commodities made available to global markets. The low share of manufacturing in both total output and employment in most developing countries notwithstanding, growth in manufacturing is opined to be a potential engine of modernization, a creator of skilled jobs, and a generator of positive spillover effects (Tybout, 2000).

Complimentary evidence from the Nigerian Manufacturing Enterprise Survey (NMES) conducted in 2001 also point to perceived binding constraints such as, but not confined to, poor physical infrastructure – with power supply at the heart -, inadequate access to credit, insufficient demand/market thinness, high cost of imported inputs and an acute shortage of skilled personnel (Soderbom and Teal, 2002).

The aim of this study is to investigate the impact of financial deepening on manufacturing output in Nigeria. Majority of extant studies on the finance-growth association are skewed towards cross-sectional and panel frameworks. However, it is unarguable that estimates resulting from such approaches hardly convey useable information that can be adapted to policy formulation in specific countries. This has prompted the burgeoning attempts at providing country specific analysis of this key nexus particularly for developing countries. What is intriguing, however, is the dearth of noticeable studies examining the linkage between financial system advancement and economic prosperity from an entirely Nigerian prism. More importantly, a key interesting study on Nigeria by Olomola (1995) embarked on this venture using aggregate indicators of both economic growth and financial sector development, while a more disaggregated assessment was denied the requisite attention. Therefore, the present study fills this lacuna with a head-on focus on the linkage between manufacturing output and the credit directed expressly to the manufacturing sector in Nigeria.

The arrangement of the rest of the paper is as follows. A characterization of the Nigerian economy along the lines of the variables of interest appears in section II, while section III takes up methodology and data issues. Section IV houses the results and attendant discussion. The conclusion, with policy implications appended, is in Section V.

II. Context

The pithy description offered in this section is essentially geared towards providing some portrayal of the Nigerian economic context especially as it relates to developments in manufacturing sector performance as well as key indicators of the evolution of the financial system. The trends, in Figure 1, are telling of the influence of financial liberalization in the wake of the adoption of the structural adjustment programme (SAP) from 1986. The correspondence between increase in number of commercial banks – a consequence of the lowering of entry barriers owing to reforms – and the proliferation of branches echoes the conviction about private sector led growth commonplace at the time. Precisely, the number of banks rose from a total of 22 four years before the commencement of reforms in 1986 to an unmatched 58 by 1990, while the number of branches moved in tandem from 991 (as of 1982) to 1,939 (by 1990). This influence of the dominant "less of government" paradigm also rings loud in the observed trend of credit to the private sector as a share of total national output (See Figure 1). However, a dismal picture comes into view with respect to capacity utilization in the manufacturing sector. Stealing a look at Figure 1, it is clear to see that the rate is by far lower than what prevailed during the pre-reform era.
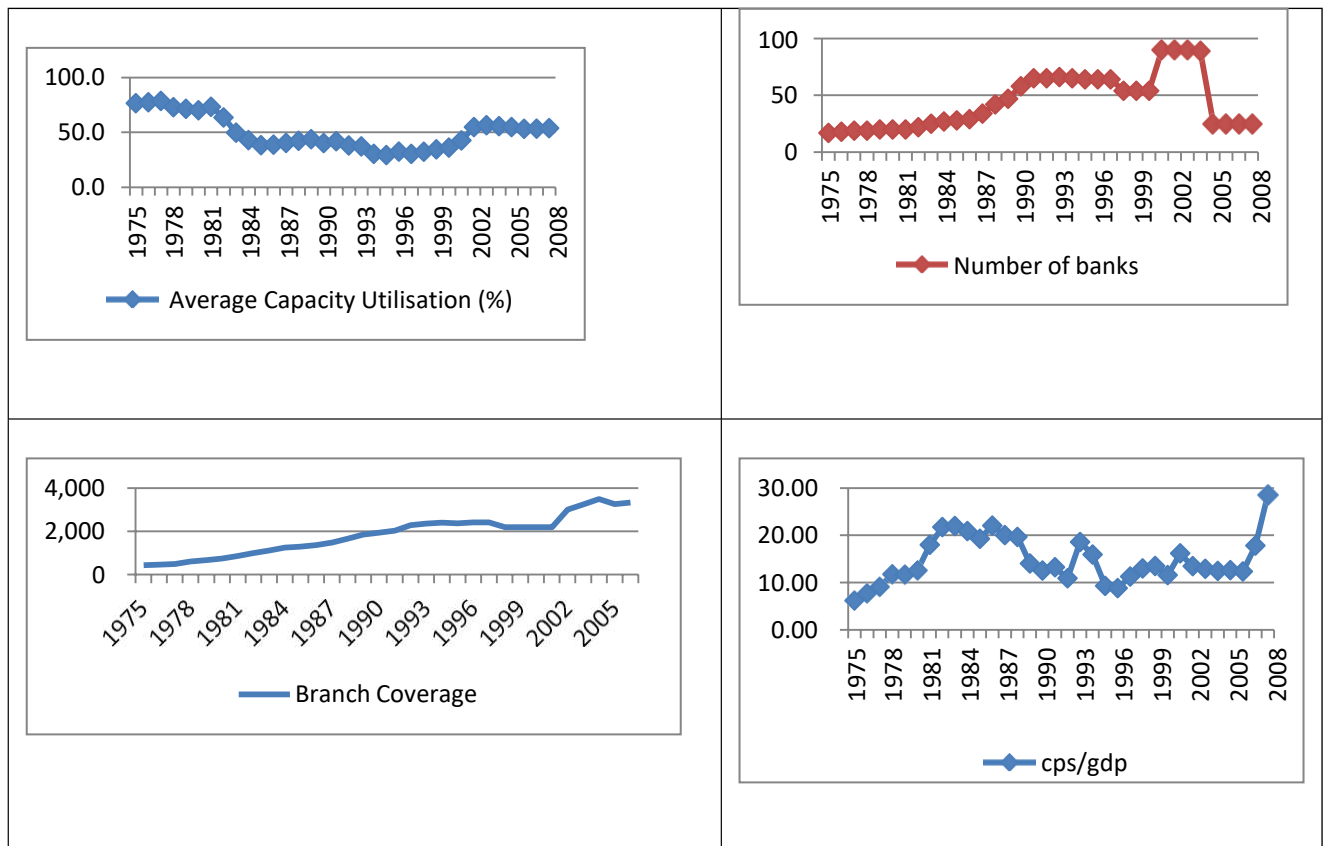
Figure 1: Trends in average capacity utilization, number of banks, bank branch coverage and credit to the private sector as a share of GDP in Nigeria, 1975-2008. The underlying data are derived from the Central Bank of Nigeria (CBN) statistical bulletin 2010.

The foregoing outcome casts considerable doubt on the success of financial reforms especially in terms of bolstering the manufacturing sector's potential to make significant contribution towards moving the Nigerian economy to a higher growth trajectory. At first blush, therefore, it is tempting to reckon that the bulk of attempts to deepen and widen the financial system over the years have yielded no or at best minimal fruits. This seems plausible since the manufacturing sector which has intrinsic capabilities to cash in on gains from learning-by-doing and other spillover-type effects appears to have been relegated to the background with respect to financial reform targets. However, to better nuance this seemingly convincing stylized facts, however, the rest of this study is dedicated strictly to the use of appropriate econometric techniques to gauge the impact of financial development more accurately on manufacturing output.

III. Methodology and data

In line with most empirical studies on the finance-growth literature, we apply the popular Vector Autoregressive (VAR) based cointegration method by Johansen (1991). One of the main assumptions of this framework is that all variables are treated as endogenous in the system, thereby eliminating the challenges posed by the problem of exogeneity. Therefore, considering a VAR with p lags in the form below.

$$y_t = v + A_1 y_{t-1} + A_2 y_{t-2} + \ldots + A_p y_{t-p} + \varepsilon_t \tag{1}$$

where y_t is a $K \times 1$ vector of endogenous variables, v is $K \times 1$ vector of parameters, $A_1 - A_p$ are $K \times K$ matrices of parameters, and ε_t is $K \times 1$ vector of disturbance terms. This VAR can be re-specified, conditional on non-stationarity, as a vector error correction (VEC) model as:

$$\Delta y_t = v + \Pi y_{t-1} + \sum_{i=1}^{p-1} \Gamma_i \Delta y_{t-i} + \varepsilon_t \tag{2}$$

Where:
$$\Pi = \sum_{j=1}^{j=p} A_j - I_k, \quad \Gamma_i = -\sum_{j=i+1}^{j=p} A_j .$$

As shown by Engle and Granger (1987), if the variables y_t are first-difference stationary - I(1), the matrix Π in (2) has a rank $0 \leq r < K$, where r is the number of linearly independent cointegrating vectors and K is the number of included variables (potential endogenous variables). With a reduced rank $0 < r < K$, Π can be expressed as $\alpha\beta$ so that (2) is represented as:

$$\Delta y_t = v + \alpha\beta y_{t-1} + \sum_{i=1}^{p-1}\Gamma_i\Delta y_{t-i} + \varepsilon_t \qquad (3)$$

Before estimating the equations for cointegration, we check for the time series properties of the variables using the Augmented Dickey–Fuller (ADF) test. Following the inception stationarity and cointegration tests, we use the ordinary least squares estimator to obtain estimates for the finance-growth nexus. The underlying rationale for this step-by-step progression is well explicated in the extensively cited paper by Engle and Granger (1987).

To accomplish the goal set out, the study uses annual data from 1970-2010 which are mainly obtained from CBN statistical bulletins and annual reports. The economic growth indicator for this study is manufacturing GDP (MGDP), while the explanatory variables are credit to manufacturing as a ratio of manufacturing GDP (CRDM), banking sector efficiency(BSEF) – proxied by the difference between lending and deposit rate - and non-oil trade balance (TRDB) are all sourced from these databases .

IV. Results discussion

Table 1 shows the results of the Augmented Dickey Fuller unit root test. The test was carried out with intercept and also with intercept and trend in order to ensure that our empirical estimations are not spurious. The results of the test show that all the variables are integrated of order one.

Table 1: Augmented Dickey-Fuller unit root results

	Level		1st Difference	
Variables	**Intercept**	**Intercept and trend**	**Intercept**	**Intercept and trend**
MGDP	0.9864	0.3060	0.0000	0.0000
CRDM	0.9999	0.9995	0.0519	0.0000
BSEF	0.2796	0.0429	0.0000	0.0000
TRDB	1.0000	0.9996	0.0003	0.0000

Note: The figures reported are the probability values for both the regressions with driftand drift plus trend respectively.

Since all the variables are I(1), a formal testing for cointegration becomes critical with a view to guiding against spurious regression and the accompanying biasedness of coefficients. The results

of the cointegration test using the trace statistic, as shown in Table 2, depict that there are three cointegrating vectors at the 5% level of significance. This means that there is long-run relationship among the variables implying the existence of causality in at least one direction.

Table 2: Johansen cointegration test results

Hypothesized No. of CE(s)	Trace Statistic	0.05 Critical Value	Prob.**
None*	326.0612	95.75366	0.0000
At most 1 *	199.2005	69.81889	0.0000
At most 2 *	96.86898	47.85613	0.0000
At most 3	22.31598	29.79707	0.2813
At most 4	8.080047	15.49471	0.4569
At most 5	0.012078	3.841466	0.9123

Next, we ascertain the effect of credit to manufacturing, banking efficiency and non-oil trade balance on the manufacturing GDP. As evident from Table 3, the estimated coefficients for CRDM and BSEF are negative and insignificant, while that for TRDB is positive but insignificant as well.

Table 3: Ordinary Least Squares (OLS) results

Variable	Coefficient	SE	t-Statistic	Prob.
CRDM	-0.001727	0.004766	-0.362414	0.7188
BSEF	-0.001178	0.010195	-0.115500	0.9086
TRDB	0.036200	0.060094	0.602392	0.5501
C	13.02964	4.432707	2.939431	0.0053
R-squared	0.982696			
Adj. R-squared	0.981086			
DW Stat	1.732294			

The insignificance of the coefficients is not, however, surprising since manufacturing in Nigeria faces structural deficiencies that accentuate the risk of lending to the sector. Importantly though, while the negative signs may be counterintuitive, two plausible reasons may be pondered. First, credit extended to manufacturers for the purpose of boosting their production capacities are usually diverted to alternative uses such as power generation. This therefore reduces the availability of needed production boosting inputs. Second, manufacturers almost typically import finished goods into the market implying little or no contribution to the real production base of the Nigerian economy. The impact of the non-oil trade balance on the manufacturing GDP is also not significant because Nigeria's capacity to compete in the export market for manufactures is weak.

V. Conclusion

The role of finance in driving economic growth has long been given due recognition in the literature. Also, most empirical enquiries on the finance-growth nexus have focused on cross-country samples, while the strand focusing more specifically on single country assessments hardly goes beyond the aggregate level. In the present study, the emphasis is solely on a more disaggregated coverage namely investigating the effect of financial development on output in the manufacturing sector. This is the first study on Nigeria, that we are aware of, that attempts to fill this void. Using appropriate econometric techniques, we wind up with a few interesting, albeit unsurprising, results. Put together, our results show that credit to the manufacturing sector, banking sector efficiency and non-oil trade balance have no important bearing on manufacturing output. A quick policy implication drops from the foregoing. The government must ensure the provision of basic infrastructure that has impeded the activities of the real sector- especially manufacturing. The intuition here, of course, is that once the manufacturing sector becomes more productive, credit flow to the sector will be more efficiently used which will go a long way in ensuring that the much talked about diversification of the Nigerian economy away from the oil sector ceases to be a pipedream. To wind up, on a cautionary note at that, it is pertinent to note that these results are in the main indicative particularly against the backdrop of the somewhat small sample size the study hinges on.

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