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Research Paper

An Assessment of the Determinants of Industrial Sector Growth in Nigeria

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ABSTRACT:- The study assessed the determinants of industrial sector growth in Nigeria. The fall in the contributions of the industrial sector to the growth of Nigerians GDP over the years prompted this research work. The need to unravel the problem of the Nigerian industrial sector necessitated studying of the determinants of industrial growth. From the literature the following variables were identified as major determinants of industrial growth in Nigeria; capital (proxy by gross capital formation) labour (proxy by total labour force in the industrial sector) exchange rate, education (proxy by school enrollment, inflation rate, capacity utilization, trade openness and electricity generation. Cointegration and error correction model was adopted and the result shows that all the identified determinants have more of permanent effect on industrial output than transitory effect. Both labour and capital have significant impact, exchange rate shows a positive and significant impact indicating that currency appreciation might be inimical to the growth of the industrial sector.

KEYWORDS:- Industrial output, determinants, transitory and permanent effects

I. INTRODUCTION

In Nigeria, like other developing economies, rapid industrial development is the key to the transition from static and subsistence economy to a dynamic and self-reliant one (Gabriel, 2002). Moreover, it is widely held that a rapid rate of industrial growth would produce the much needed less dependent economy and thus facilitate the attainment of national objectives of enhanced real per capita income, greater employment generation, increased local sourcing of raw materials and development of local industrial technology. Similarly, it is expected that development of necessary linkage effects through massive industrialization will engender optimum utilization of existing resources and stimulate over-all economic growth.

Cognizant of the foregoing, Nigeria not only assigned a fundamental role to industrialization in the process of economic development, but also actively promoted it through a number of strategies ranging from primary exports, import substitution to export promotion in line with the prevailing development (Kibbly, 1969). Nigeria has mounted several other forms of policies to promote industrial output growth. Most of these policies are reflection of different prevailing economic periods/situation in the country and during these periods the patterns of industrial output growth have been uneven. There are four notable periods in the course of Nigeria industrial growth. They are, period of positive global price shocks (1973-1980), period of international oil glut (1980-1985), period of the SAP and the oil price shocks resulting from the Gulf War (1985-1990) and recent trends including the present years of civilian rule (1990-2006) (Nnana 2000).

However, despite all the arrays of policies that conform to different dispensations in the Nigerian economic growth the contribution of industrialization or industries to Nigeria economic growth still appear to be far below expectation. For instance the share of the Nigeria industrial sector in the Nigeria's GDP fell from 13.18% in 2000 to 11.9% in 2001 it fell further to 10.93% in 2004, the falling trend still continues till date. Again the annual growth rate of the sector fell from 4.6 in 2001 to as low as 1.0 in 2003, in fact the annual growth rate of the Nigeria's industrial sector was amazingly negative in 1999 CBN,(2010)

World bank (2002) stated that identification and proper harmonization of factors that influence industrial output growth in developing countries is very crucial to industrial policy formulation, This view was corroborated by Kayode (2000) as discussed under the background of the study. several studies in the past have been conducted around the issue of industrialization in Nigeria but many of these e.g. Akpan (2001), Obioma

(2002) and Olabode (2001) all focused on the impact of industrialization on the Nigeria's economic development. Some, like Adebiyi (2004) and Uwem (2005) stated the relationship between industrialization and other sectors of the Nigerian economy. A few that based their studies on determinants of industrial output growth like Ogun (2004) and Dauda (2003) focused only on the manufacturing sector which is a sub-sector under the industrial sector.i.e other sub-sectors such as transport, mining, building and construction etc. were not involved by these people in their studies.

Based on the foregoing, an empirical work that will critically identify and analyze the determinants of industrial output growth in Nigeria is crucial to industrial policy formulation in Nigeria as posited by World bank (2002). This will be done by taking a holistic view of the whole industrial sector in Nigeria .i.e all other sub-sectors will be involved in this study unlike Ogun and Dauda that proxied industrial output growth with manufacturing sector growth only.

In addition, there has been an increased relevance of primary data analysis in economic research. This is believed will reflect more on the realities on ground than secondary data. Consequently, to further examine the determinants of industrial sector growth in Nigeria, some major firms in the industrial sector of Nigeria will be investigated with the use of research instruments such as questionnaires among others, this will enable us to compare what is happening at the individuals firm levels and the total industrial sector as a whole.

II. SOME LITERATURE

Adenikinuju and Olofin (2007) examine the quantitative effects of the role of economic policy in the growth performance of the manufacturing sector in Africa. The study used panel data for seventeen countries over the period, 1976 to 1993. their econometrist results suggest that level of human capital; proxied by primary and secondary school enrollment rates, have a positive impact on growth in manufacturing. The competitiveness index, that is the unit of labour cost, ahs a negative impact on the growth performance of the manufacturing sector in African countries, though the improvement in terms of trade was found to have a beneficial impact on manufactures. The trade liberalization policy, proxied by index of openness, has an insignificant effect on the growth in the manufacturing. On the other hand, some studies find little empirical evidence to support a link between trade liberaliza - tion and industrial growth (Lucas 1988). For instance, in Adenikinju and Chete (2005), it is shown that in the Nigerian manufacturing sector, import liberalization has had a negative impact on total factor productivity growth. The reason for this was adduced to the fact that domestic manufactures are unable to compete with better quality and often imported products. Several authors have also pointed to the example of Korea and Japan where some form of protection allowed for rapid transformation of the industrial sector (Pack and Westphal 1986).

In Another study by Akpan (2001).A pure desk research was conducted on industralisation and Nigeria;s economic development. He posited that investment in physical capital, skill accumulation and utilization of existing technologies in the world, among other factors, will transform Nigeria's industrial sector. A qualitative government is essential in driving the industrialization-development nexus.

Olabode(2001) studied the Theoretical perspectives on Nigeria's Industrialization. The research work examined the prospects of Nigeria's industrialization by the year 2015 from a theoretical perspective. In order to provide theoretical perspective, two theories of industrialization were analysed namely, the economic stages of growth by Rowstow and the deprived economy model by Gerschenkron. While Rowstow's model states the prerequisites that a country must meet before it can industrialize, Gerschenkron argues that there are advantages that late starters in the field of industrialization can gain. Drawing from these two theoretical approaches, the historical experiences of Latin American countries on the one hand and the newly industrializing countries (NlCs) of South-East Asia on the other, were examined. Based on the above, the prospects of Nigeria's industrialization by the year 2015 were discussed. Among the recommendations were the maintenance of transport infrastructure and the guarantee of stable electricity. Others are innovativeness by Nigerian firms, and the choice by the country of the item with which she wants to compete internationally.

Obioma.etal(2005) considered Industrialization and Economic Development from conceptual and Theoretical perspectives. The study reviewed the major conceptual and theoretical issues on the relationship between industrialization and economic development, drawing some lessons from Nigeria. One major observation from several development theories reviewed by them, in spite of the limited application of some to developing countries, is that industrialization plays a very significant role in economic development. It is, in fact, seen to be synonymous with economic development. Empirical results from a multi-equations regression model estimated by two-stage least squares technique confirm, though not very strongly, the existence of positive correlation between industrialization and economic development. While the parameter estimates of two major indices of industrialization – the index of mining production and the index of manufacturing production – appeared with the expected positive signs, only that of the index of mining production was statistically significant in explaining economic growth/development. The findings were attributed to the country's weak manufacturing sector and near-complete dependence on the mining sector particularly on crude oil.

Uwemetal(2005) studied Industrialization and Import Addiction in Nigeria using Keynesian-Structuralist Perspective. The work aimed at showing how "import addiction", a colonially brewed cultural consciousness, is sustained in Nigeria. Import addiction is the paradoxical condition where excess capacity to produce exists side-by-side with excess effective demand for goods and services. The analytical approach adopted by them were both descriptive and philosophical. The essence is to incorporate the structural content of Nigeria's industrialization problem into the traditional Keynesian mould. Import addiction sustains itself with an expanding "critical import need" gap that is capable of frustrating any form of indigenous technological initiative. However, they concluded that import addiction can gradually be eliminated with a cultural transformation movement that seeks to create the enabling technological and skill infrastructure. They later recommended that reconstructing Nigeria's colonially inspired education sector is central to that cultural transformation movement.

Adebiyietal(2004) conducted an empirical investigation on Trade Liberalization Policy and Industrial Growth Performance in Nigeria. The work studied the relationship between trade policies and industrial growth in Nigeria, using quarterly time series data spanning 1973 and 2001. the model developed by Lucas (1988) is taken as the theoretical framework for undertaking empirical work on the relation between trade liberalization and industrial growth in Nigeria. The study adopted cointegration and error correction mechanism. After the estimation. It was confirmed that trade openness and real export were significant determinants of industrial production in Nigeria.

Ogunetal(2004) empirically explored globalization nexus for economic development in Nigeria. In establishing the globalization-industrialization nexus in nexus in Nigeria, the augmented Solow model was adopted and annual data covering 1970-2001 were employed. The study found that openness to trade and increased Information and Communication Technology (ICT) has significantly influenced the level of manufacturing output in Nigeria. In fact, technology and degree of openness were found to have positive impact on aggregate manufacturing output. The policy implication of this study is that the degree of openness and adoption of globalization, cateris paribus, could stimulate manufacturing production. They concluded that sound policies that promote technical capacities or specific knowledge and outward trade relations between countries, need to be adopted to enhance the competitiveness of Nigeria's manufactured exports in the world market.

Adeoye(2005) examined Industrial Development in Nigeria in the Context of Globalization. the study employed historical analysis of trade and industrial systems in Nigeria. Findings from the study revealed that the Nigerian economy has not changed its export and import structure over the 1970-2002 periods. The only change that has taken place to its export was just a mere shift in exported product indicating a sign of export substitution from primary agro industry-based exports to primary mining industry-based exports (i.e. crude oil). The results also suggest that the structure of imports has not changed significantly over the period. 1970-2002, despite series of strategies and policies put in place by the government. While the reforms favoured domestic resource-based industries, it produced an inverse impact on import intensive, low value-added units. The findings also revealed that over 70 per cent of the total imports were still manufactured goods, most of which consisted of industrial raw materials, spare parts, machinery and equipments and capital goods. He opined that enough incentives for efficient resource allocation that will promote manufactured exports within the context of globalization coupled with economic liberalization and deregulation paradigms have not been created. He later recommended that, a mixture of the invisible hand of the market with the visible hand of the state should guide the process of industrialization, economic diversification, trade and development similar to the case of the East Asian Tigers.

It is very obvious that from all the empirical work reviewed in this study none of them primarily focused on the determinants on industrial growth in Nigeria. Ogun(2004) that did something similar to that used manufacturing sector only under the whole industrial sector in Nigeria while Adebiyi(2005) involved only three determinants out of the numerous determinants highlighted by many scholars in the past. Consequently, this study tends to empirically study the determinants of the industrial sector growth in Nigeria by incorporating a good number of major variables and using the whole industrial sector in Nigeria as a case study.

III. METHODOLOGY

This study is guided by the theoretical framework discussed in the previous section of this proposal with special reference to the Leontiff input and output model particularly the DilipDutta(2006) industrial production function model INDUSVA= f (RCAPITAL, LABOURP, REXPORT, TARIFF, EDU). Where industrial value added was expressed as a function of capital, labour, real export, education and average import tariff. However our model is modified in a way that trade liberalization is proxied by trade openness which has been described as a better proxy for trade liberalization in Nigeria by Adebiyi(2002) and Dauda(2006) this replaces real export and average import tariff used in the Dutta's model. Again, other variables such as capacity utilization, exchange rate, inflationary rate and energy generation has been described by Dauda(2006) and

Anyawu(1997) as very germane to the determination of industrial output growth in Nigeria. These were also included in our model consequently; our model for industrial production function is modified to accommodate these variables and is specified thus:

INOG=f(K,L, EXR,EDU,INFR,CU,TOP,ELEGR)……(3.0)

Specifying the production function in log-linear form (with an error term, *ut*),

the following equation may be written:

$LnINOG_t = a_0 + a_1LnK_t + a_2LnL_t + a_3LnEXR_t + a_4LnINFR_t + a_5LnCU_t + a_6LnEDU_t + a_7LnTOP_t + a_8LnELEGR_t + u_t$

INOG= Industrial output Growth (Contribution of the industrial sector to the GDP)

K = Capital(proxied by Gross Capital Formation)

L = Labour(Proxied by Nigeria labour force)

EXR= Exchange rate

INFR= Inflationary rate

CU = Capacity Utilization

TOP = Trade Openness

EDU = Education Attainment (proxied by Secondary School enrollment)

ELEGR= Electricity generation

U_t = Error term (stochastic term)

$a_i$are regression parameters. i =1,2,3…….

IV. ESTIMATING TECHNIQUE

The estimation procedures employed in this empirical investigation is based on Johansen and Joselius co-integration analysis and the error correction model (ECM).

The choice of this estimation procedure is informed by the need to determine the time series characteristics of the variables that are used in this study. The Johansen co-integration is the statistical equivalence of the economic theoretic notion of stable long-run equilibrium. The existence of the concept among the variables of the model provides somewhat conclusive evidence on the existence of stable equilibrium relationships among them. The process of co-integration is discussed as follows:

(A) Unit Root Test

Testing for the existence of unit roots is a key pre-occupation in the study of time series models and co-integration. What are unit roots? Let us begin with a definition. A stochastic process with a unit root is itself non-stationary. Another way of looking at it is that testing for the presence of unit roots is equivalent to testing whether a stochastic process is a stationary or non-stationary process. In sum, the presence of a unit root implies that the time series under scrutiny is non-stationary while the absence of a unit root means that the stochastic process is stationary, Maddala (1992) has offered an interesting perspective and interpretation on the testing for unit roots.

According to him (1992:578), testing for unit roots is a formalization of the Box-Jenkins method of differencing the time series after a visual inspection of the correlogram. No wonder then that testing for units roots plays a central role in the theory and technique of co-integration.

Currently, there are some commonly accepted methods of testing for unit roots. These are the Dickey-Fuller (DF), Augmented Dickey-Fuller (ADF) test and the Philip Peron (PP) test.

The Augmented Dickey-Fuller (ADF) test is considered superior to the Dickey-Fuller (DF) test because it adjusts appropriately for the occurrence of serial correlation.

$$X_t = b_0 + b_1X_{t-1} + b_2X_{t-2} + b_nX_{t-n} + U$$

Where U is a stationary error term. The null hypothesis that X_t is non stationary is rejected if b_1 is significantly negative.

The number of lag (n) of X_t is usually chosen to ensure that the regression is approximately white noise. It is simply referred to as the DF test if no such lags are required in which case $b_i = 0$ (i = 1……..n). However, the t-ratio from the regression does not have a limiting normal distribution.

An important assumption of the DF test is that the error term are independently and identically distributed. The ADF test adjust the DF test to take care of possible serial correlation in the error term by adding the lag difference terms of the regressand. Phillip and Perron use non-parametric methods to take care of the serial correlation in the error term without adding lagged difference terms. Since the asymptotic distribution of PP test is the same as the ADF test statistic, the PP test is preferred for this study.

Co-integration is based on the properties of the residuals from regression analysis when the series are individually non stationary.

A series is stationary if it has a constant mean and constant finite variance.

Thus, a time series X_t is stationary if its mean E(Xt) is independent of time and its variance $E\{X_t - E(X_t)^2\}$ is bounded by some finite number and does not vary systematically with time. It tends to return to its mean with the fluctuations around this mean having constant amplitude.

(B) **Co-integration and Error Correction Model**

The theory of multivariate co-integration, as propounded and propagated by Johansen and Joselius provides a nexus or connection among integrated processes and the notion of long run equilibrium.

The co integration test commenced with a test for the number of co-`integrating relation or rank (r) of π using Johansen's maximal Eigenvalue of the stochastic matrix and the likelihood Ratio (LR) test based on the trace of the stochastic matrix π which is the long – run multiplier matrix of m x n that is the matrix of the coefficients. Note that the Eigenvalue of π1 are the roots of the kth order characteristic polynomial $\left|\Pi_1 - vI\right|$ obtained by solving the characteristic equation

$$\left|\Pi_1 - v\,I\right| = 0$$

The number of non – zero Eigenvalue is the rank of the matrix π. Also, the trace statistic suggested by Johansen to determine the co- integration rank in a multivariate model is based on the ordered (estimated) Eigenvalue in the following relation.

$$Trace(r_0 / k) = -T \sum_{ir=r_0+1}^{K} \ell n(1-\lambda_i).$$

Where λi= ordered (estimated) Eigenvalue.

This is the relevant test statistic for the null hypothesis $r \leq r_o$ against the alternative $r \geq r_o+1$ following a sequence (This sequence has been fully discussed under chapter three)

Π matrix (the matrix of the coefficient in the VAR models) is a product of two matrices α and β. Let Y denote an n x 1 vector of the I(1) variables the rank of π which is r, determines how many linear combination of the variables in the levels are stationary. If r = o such that π = 0, none of the linear combination are stationary. Π can be factored, that is π = α β. Both α and β are n x r matrices. While β contains the co-integrating vector (the error – correction mechanism in the system), α is the adjustment parameter.

The second is the maximum Eigenvalue $(\lambda_{\max})$ statistic:

$$\lambda_{\max} = -T\ell n(1-\lambda_{r+1})$$

This test allows for the comparison of a cointegrating rank of r against the alternative of a cointegrating rank of r + 1. This test may then be repeated for larger values of r until one fails to reject the null hypothesis.

The Johansen representation theorem establishes formally the theoretical basis of error-correction modeling. According to the theorem, if y_t and X_t are co-integrated, then there is a long run relationship between them. In addition, the theorem proves that the short-run adjustment dynamics can be usefully described by the error correction model (ECM) as stated in the following equation:

$a(L)\Delta Y_t = a_o - \chi(Y_t - d_iX_t) + b(L))\Delta Y_t + C(L)\,\Sigma_t$

In simple terms, the ECM involves using the lagged residual to correct for deviations of actual values from the long run equilibrium values. To fix ideas, consider the equation above and will discover that the residual from that regression is $U_t = y_t$. BX_t which is 1 (0), since y_t and X_t are assumed to be con-integrated. In applied work we require that the coefficient of ECM be significant and negative. Its sign should be negative if it is to play the role of error correction. Specifically, if actual equilibrium value is too high, the error correction term will reduce it while if it is too low, the error correction term will raise it.

V. RESULT AND DISCUSSION

Unit Root Test

Table 3: Results of the Augmented Dickey Fuller (ADF) stationarity test

Variables	Test Statistics	Order of integration
Industrial output	-5.485***	I(1)
Labour	-3.089**	I(1)
Capital	-3.880***	I(1)
Exchange rate	-5.237***	I(1)
Inflation rate	-5.148***	I(1)
Trade openness	-9.194***	I(1)
Capacity utilisation	-3.228**	I(1)
Education(Sec. enrolment)	-3.109**	I(1)

The result of the augmented Dickey fuller {ADF} unit root test is presented above. From the result, all of the variables are stationary at first difference. The condition for testing for contegration has been met. The idea behind cointegration is that even if some variables are not stationary their linear combination may be stationary after all. The existence of cointegration confirms co-movement among the variables and consequently long run relationship exists among the variables.

Being multivariate function Johansen methods of cointegration is employed and the result is presented in table 4.

Table 4 Johansen Co integration test

Trace statistics Value	5% Critical Value	Maximum Rank
259.2643**	156.00	**0**
185.9192**	124.24	**1**
126.1752**	94.15	**2**
82.1676**	68.52	**3**
51.0005**	47.21	**4**
24.4729	**29.68**	**5**

Source: Author's Computation

Note: {**} denotes rejection of the hypothesis at 5% level of significance

The result of the Johansen co-integration test presented above shows that the hypothesis of no cointegration is rejected at 5% level. However, it indicates at least five co-integration equations. The result therefore confirms the existence of cointegration among the variables. Consequently we can conclude that there exists a long run relationship between industrial outputs and tis determinants in Nigeria. The results further show that there are at least five cointegrating vectors. This is an indication of a very strong long run relationship. To assess the long run relationship, we estimate the cointegrating equation which also explains the impact of individual determinant on the industrial output in Nigeria. The cointegrating equation is shown in table 5.

The results in 5 confirm the existence of a strong long run relationship between industrial outputs and its determinants. Firstly, the coefficients of all the independent variables are all statistically significant in the long run equation. Considering the signs of the coefficients, both capital and labour are rightly signed as it shows that there is a significant positive relationship between the two and industrial output. This conforms to the theoretical postulations between the two. Again, the exchange rate shows a positive and significant relationship. The implication of this result is that there exist a direct relationship between industrial output and exchange rate. This shows that currency appreciation might not promote industrial output in Nigeria (see Olomola 2006)

Table 5: Cointegrating equation for industrial outputs

Variables	Coefficients	Standard errors
Log of Labour	.4575859**	.3924982
Log of capital	.1392753***	.048103
Log of Exchange rate	.10366409***	0.057477
Log of Inflation rate	-.1070776***	0.218054
Log of Trade openness	-.3061814***	0.159827
Log of Capacity utilisation	.1055372***	0.021698
Log of Education(Sec. enrolment)	-.6189047***	0.04038
Constant	-5.40e+07*	-1.40e+08

Chi Sq=483.2438 Prob(ChiSq)=0.0000

The coefficient of inflation rate is significantly negative. This is an indication that in the long run inflation tends to have a negative effect on industrial sector growth in Nigeria. The reason for this result might not be farfetched in Nigeria where our economy is chararterised by inflation dynamics that makes the real sector growth to be highly vulnerable to ups and downs in the domestic price movement (see Somoye 2010).

Trade openness appears to exhibit a kind of inverse relationship with industrial output. This shows that if Nigerian economy is opened to the world, the industrial output in the country might not be positively influenced. Notwithstanding, the implication of this is that protectionist theory of trade may tends to favour the industrial sector of Nigeria. The one of the variables representing human capital is education which is proxied by secondary school enrolment. The coefficient of the variable indicates that it does not have significant positive impact on industrial output. This accounts for the low literacy rate in Nigeria.

To examine the short run pattern of relationship between industrial outputs and its determinants, the vector error correction model is examined. The result is presented in table 6.

The vector error correction model results in table 6 shows that the short run results might not be as significant as the long run results. None of the independent variables has significant impact on the industrial output. This is an indication that the effects of these identified determinants might likely be more pronounced in the long run than in the short run.

Table 6: Vector error correction model VECM for DINOG

Variables	Coefficient	Standard error
-ce1 L1.	-.2745989**	.0956961
Linog LD.	-.341035*	.1880162
LL LD.	-5.696273	1.656826
LK LD.	-.0749739	.0550716
Lexr LD.	-.019621	.0372192
Linf LD.	-.0286825	.0240098
Ltop LD.	.0289734	.0421437
LcuLD.	.1651827	.1123783
Ledu LD.	.2336651	.1901
Constant	.0547543	.0611135

R square= 0.6863 Chi= 43.76332 0.0000

However, it should be noted that the error correction coefficient is correctly signed and it is also significant at 5%. The implication is that there is disequilibrium and disequilibrium will bring in adjustment process that will restore the equilibrium position. The feedback is also shown through the error correction coefficient.

Precisely, the error correction coefficient is -0.2745989. this implies that about 27% feedback is expected from the past disequilibrium this shows the speed of adjustment process. On the whole the ECM coefficient is significant and correctly signed and be able to play the adjustment role very well.

Moreover, the short run model shows a moderate R square of 0.6863 which means that about 68% variation in the industrial output is accounted for by its determinants. The VECM chi square value of 43.76332 is statistically significant at 5% level. This simply shows that collectively the determinants might have short run significant impact but individually they might not.

Inferences and comparison with previous empirical studies

Findings from this empirical work has contributed to the growing literetaures that affirm the existence of co-movement between industrial output and many of the variables used in the model of the insudtrial output (see Adenikinju and Chete 2001, Ogun, 2005, Adebiyi, 2007).

Again, economic theory especially the production function which is a precursor for the endogenous growth model seems to have been justified in the study. This is because of the relationship obtained between the important inputs which are labour and capital. Both physical capital and labour in the estimated long run model appear to be significantly positive thus affirming their importance in the growth model. These findings apart from the production theories have also been confirmed by several empirical studies such as Lucas 1988, Dutta and Ahmed 2000, Adenikinju and Chete, 2001, Obioma 2005 among others.

The relationship between exchange rate and industrial output is found to be significantly positive. The implication is that increase in exchange rate is likely to promote industrial output growth in Nigeria. This shows that over-valuation of naira might be injurious to the industrial output growth in Nigeria. The result conforms to what Olomola 2007 obtained when he concluded that an over-valued currency might squeezed out the tradable sector of the economy. He further suggested exchange rate policy that is competitive but not too rigid in such a way that it can adjust to macroeconomic dynamics in the economy.

Trade has been identified as important determinant of industrial output growth by Chinery 1960. However, trade openness is used to capture trade in the model used in this study and the result shows that trade openness might not have the expected positive impact on industrial growth in Nigeria. Notwithstanding, this is contrary to what some researchers like Balassa (1977) obtained. But many of these studies are based on developed economies. The implication is that developed economies appear to benefit more from trade than developing economies. Adenikinju and Olofin (2007) obtained the result similar to our findings because it their study was based on Nigerian economy. They pointed out that foreign goods do compete with domestic goods in Nigeria and this competition is somehow not beneficial to the industrial sector of the Nigerian economy.

The negative effect of inflation on industrial output has been shown clearly in the result from this research work. This has corroborated several studies that have confirmed inverse relationship between inflation and output especially in the long run (see Olabode 2001). Finally secondary school enrolment is a variable used to capture

human capital in the model and the results just followed what Adenikinju and Olofin (2007) also obtained that both primary school and secondary school enrolment do not have significant positive impact on manufacturing output.

VI. CONCLUSIONS

Findings from the study show the evidence of cointegration between industrial output and its identified determinants in Nigeria. From the equation describing the long run relationship the following conclusions can be made. Firstly, the major inputs to production namely; physical capital and labour both have the expected positive significant impact on industrial output. This however conforms to the production function theories as well as growth theories.

Again, the short run relationship between the determinants and industrial output is not strong. The implication is that the determinants might not have significant transitory effect on industrial output in Nigeria but rather a permanent effect. This shown from the individual statistical significance test where all the variables are individually statistically significant in the long run model but they are not in the short run model.

The exchange rate also exhibits a positive and significant relationship with industrial output. This enables us to conclude that over-valuation of naira might be injurious to the Nigeria industrial growth and lead to the decline in the domestic output. High exchange rate are likely going to promote the growth of the Nigerian industrial sector. This is an argument in support of currency devaluation as a impetus to promote the growth of the industries in Nigeria.

It can also be concluded from our findings that trade openness does not exhibit a positive relationship with industrial output. The implication is that if Nigeria opens her borders to outside world for the purpose of trade; it might not significantly and positively influence industrial output. This simply implies that adhering to trade protectionist theory will also industrial output. This indicates that if Nigeria is to gain from trade relationship with outside world, a certain level of restriction is also expected for industrial output to improve.

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