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Export-Led Growth in a Public Sector Dominated Economy: a Macroeconomic Model of Nigeria

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Abstract

This study develops a price dynamic version of the modified Mundell-Fleming macroeconomic model to test the hypothesis that in a public sector dominated economy like Nigeria, exports and government expenditures are the major determinants of aggregate output. The major assumption of the study is that petroleum produced in Nigeria can be sold locally or exported abroad, giving Nigeria the monopoly power in its exports, but is only a price-taker in terms of imports in the world market. The empirical model was estimated using two stage least-square estimation method. The results showed that exports and government expenditure are significant determinants of aggregate output. The results also show that increasing productivity growth in exports and government expenditures has positively impacted output growth. The present study marks an improvement over the earlier studies in that it has some unique dimensions. First, it establishes that the manufacturing base need not be fully developed for exports to have significant effects on output growth. Second, the analysis shows that the consumption demand is liquidity constrained. The practical implication of this study is that it offers policy makers the set of options and tools for accelerating economic growth through exports promotion and appropriate management of government expenditures.

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1. Introduction

Since 1960, Nigeria has had at least five development plans aimed at transforming its agrarian economy to that of an industrialized economy. A wide variety of economic policies were experimented during this period. The policy environment during the 1960s, which favored an import-substitution strategy of economic transformation and development, put the economy on the path of an "inward-looking" growth.

In tune with the "inward-looking" growth path that Nigeria had set upon, the primary focus of Nigeria's economic policies has been the protection of local manufacturing with high tariff walls. It is in this context that Nigeria undertook to build basic and heavy industries during the 1970s through 1980s. It was argued that such a course was necessary not only to ensure expansion of its industrial base and self-reliance in the long run but also to create employment and enhance capacity utilization.

The dramatic increase in oil revenues in the 1970s left the government with excess money. During the same period, the country was undergoing reconstruction and rehabilitation following the two and one half year Civil War. This large increase in government revenues was expended in expanding the infrastructures and productive capacity of the other sectors of the economy, especially the manufacturing, construction, mining, and communications sectors. These accelerated public investments were undertaken without adequate study of their importance and contribution to the overall economic development and output growth of the economy.

Another noteworthy aspect of the Nigerian economy is that since the oil boom of the 1970s, the public sector has assumed a dominant role. Apart from the accelerated public investment in infrastructure, there has been increased public sector participation in manufacturing activities and in providing growth incentives for agriculture. Besides, as a capital-deficit, oil exporting country striving to achieve rapid economic development, the overriding focus of the general economic policy in the post-oil boom period has shifted to affecting a transition to a diversified and broad based economy in the long run.

In its attempt to diversify and restructure the economy, away from the dominance of the oil sector and towards expansion of nonoil productive activities including agriculture, the Nigerian economy became a public-sector dominated economy. While Nigeria continues to remain a public-sector dominated economy, recent developments in economies of the newly industrialized countries have reinforced the importance of "outward-looking" growth policies. Export-led growth not "import-substitution" industrialization, and liberalization not protection is currently the recognized thrust of the

economic policies in Nigeria, and most of the developing countries of the world. Against this background, the research question for this study is: What are the effects of exports and government expenditures on output growth in the Nigerian economy? Section Two focuses on the review of the pertinent literature.The role that trade, exports, and government expenditures have played in both economic development and output growth in developed and newly industrializing countries is presented. Section Three provides the theoretical framework and model specification. Section Four summarizes the results and analysis.

2. Determinants of Economic Growth

The impact of international trade on economic growth has been widely debated in the literature, from Adam Smith's absolute advantage and Ricardo's comparative advantage to Mills's efficient employment or productive process. The current debate is no longer on the importance of trade, as most economists agree that there are benefits that come with trade: rather, it is on the method and use of trade as a development tool (Krueger, 1990 at Amsden, 1991).

Amsden (1991) has argued that in the market model, the plight of a low-wage country that cannot compete in the labor-intensive industries against the higher productivity of a higher-wage country is resolved by introducing either inward direct foreign investment from more technologically advanced countries or further exchange rate devaluations. Krueger (1990a) attributed the rapid development of the Asian countries of Korea, Singapore, Taiwan and Hong Kong to the rapid growth of exports, although these countries had earlier pursued inner-oriented trade strategies and quantitative controls over imports. (Lucas, 1990, p. 94). concludes that political risks which he described as "the existence of an opportunity where effective mechanisms for enforcing international borrowing agreements are lacking." Lucas argues that political risk can become an important factor in limiting capital flows and transfer of capital towards international equalization of factor prices. Where labor is immobile, as is the case in Nigeria, policies designed on the accumulation of human capital surely have a much larger potential for attracting capital needed for development. While the argument of Lucas appears to address the non-flow of capital to the developing nations, it failed to point out the fact that foreign policies of the developed nations in many instances have determined the direction of the institutional factors that make capital flow and not the economies.

Grossman and Helpman (1990) conclude that countries that have adopted an outward-oriented development strategy have grown faster and achieved higher levels of standard of living than their counterparts who engaged in protectionist trade

policies.They argue further that the less developed nations stand to gain more in international trade since they do not have capital, both human and physical, to bring about new products by way of research and development (R&D). Michaely (1977) tested the hypothesis "that a rapid growth of exports accelerates the economy's growth of a country." He justified the use of proportion of exports rather than absolute export by arguing that correlation in the absolute case is expected since exports are part of national output.

Heller and Porter (1978) applied Michaely's data to non-export components of output growth and found a higher correlation than Michaely did. Both studies established that a 'minimum threshold' of development is needed before export growth and economic growth are associated. This conjecture which we have no way of knowing, which they failed to explain, clearly allowed them to lump their answer to a level of development which is an unobservable variable.

Balassa (1978) argues that export-oriented policies provide incentives to sales in both domestic and foreign markets, and as such, lead to an efficient resource allocation. Balassa observes that the correlation between export growth and output growth provides an indication of the total effects of exports on economic growth.

Balassa (1985) concluded that "trade orientation has been an important factor contributing to intercountry differences in the growth of output. "Dornbusch and Reynoso (1988) concluded that there was no evidence to attribute rapid development of a country to financial liberalization alone. However, they noted that financial liberalization helped in channeling resources away from the 'curb' market to the financial institution, and this made savings available for investments in those countries that pursued financial liberalization.

Edozien (1973) notes that Nigeria's international economic relation was based on widening both the geographic and commodity concentration of its external trade.Hence, it has trade agreements with both eastern European countries as well as the European Economic Community. Nigeria, he notes, has increased her efforts for trade within Africa, hence Nigeria's unflagging commitment to the Economic Community of West African States.

Tyler (1981) argues that "the dramatic economic success of some countries pursuing export oriented policies, along with the equally dramatic failures of those countries pursuing autarkistic policies, has provided examples necessitating a reexamination of the

role of international trade in the development of poor countries."Empirically, he concluded that a 17.5 percent increase in exports is associated with a one percent increase in GDP.Thus, he concluded that "countries which neglect their export sectors through discriminatory economic policies are likely to have to settle for lower rates of economic growth as a result." (Tyler, 1981, p. 129).However, his study suffers from problems of simultaneity.

Feder (1982) used marginal factor productivity to study the impact that exports have on the growth of output.Using two sectors that he termed exports and non-exports, he formulated an output equation where GDP (Y) was equal to N+X by definition, where:

Y = Gross Domestic Product

N = Non-export sector

X = Exports sector

Feder found evidence that marginal factor productivities in the export sector were higher than in the non-export sector. Reducing his model to the format that other studies have used (Balassa, 1978; Michaely, 1977; Heller, 1978; Tyler, 1981), he established that a ten percent increase in exports will bring about 1.3 percent growth in the non-export sector. Balassa (1985) tested the effects of the 1973 external shocks on the exports to see if the earlier results obtained before this period will hold. Using a single equation model he found support for the earlier study.He concluded that "the rate of growth of exports importantly affected the rate of economic growth and that the numerical magnitude of this effect increased compared to the earlier period." (Balassa, 1985, p. 32). Furthermore, he found support that the rate of Gross National Product (GNP) growth was higher in the countries that adopted outward orientation and export promotion policies in response to the external shocks.

The proponents of the classical and neoclassical paradigms have long argued that the economy moves faster to general equilibrium the less government activity there is in the economy. However, even among this school of thought there is a general agreement and understanding of market failure.The role of government in economic development is an ongoing debate.We will present the various views on the issue.

Barro (1990) concludes that the role of public service (infrastructure) creates positive linkage between government and growth.Aschauer (1988) found that government

infrastructures are particularly important in economic growth. However, Barro's work established that there is a negative correlation between growth in government expenditure and economic growth, as well as savings rates for governments whose expenditures provide consumption services only.

Bardhan (1990) argues that it is becoming important to recognize externalities in the areas of information processing, learning and acquisition of technological capability which is the core of the development process.These externalities are internalized in non-market institutions like large corporations in the developed economies and in the newly industrialized states. The state has acted as a catalyst in promoting this crucial learning stage and has also acted as a surrogate for the missing capital markets. What appears to be important is the efficiency of the government in directing resources in the developing countries to the sectors where they are more efficient, and how less wasteful the government is.

Krueger (1990b) has argued that government failure results from failure of government to focus on producing or providing those goods and services such as infrastructures in which it has large comparative advantage over providing "poorly things" in which it does not have a comparative advantage such as manufacturing, regulating credit and foreign exchange markets, investment licensing and import quotas.

The problem with government intervention is that it creates a situation where people spend resources to obtain property rights from the government.The role of government in development is still a very controversial one.As Datta-Chandhuri (1990) notes, "the success of Keynesian activism in fighting the great depressions in the western countries, the success of the Marshall Plan in engineering the quick reconstruction of the war-damaged economies of western Europe, and the achievements of the Soviet industrialization drive in the 1930s had created a virtual intellectual consensus in the world on the power of the "visible hand."There is no doubt that the state has a role to play in the economic development of a country. What seems to be the case is what role will the state play that will not interfere with the ability of the market to function properly. Early development economists like Rosenstein-Rodan (1943), and Scitovsky (1954) argue that the market was capable of handling the production aspects of the economy while the states for the developing countries should guide in the investment allocation in the economy.

Datta-Chandhuri (1990) notes that the growth theorists were able to demonstrate that reproducible physical capital and employment of larger workers accounted for only a

small part of economic growth, while the larger bulk came from technical progress. It has been argued that the governments of East Asian countries of Korea, Singapore and others have mastered this role very well by providing the institutions that process this information and act as catalysts for learning.

3. Structure of the Model

The production function employed in this study is a CobbDouglas type. However, it has some modifications, in the sense that exports (XG) and government expenditures (GOVT) have been included as inputs. Ogbu (1988) concludes that the usual two variable production function of the Neoclassical growth theory is suited for micro application at the firm level. The theory is based on the assumption that capital is generated by savings from current production and labor by demographic factors, and it is usually assumed to grow exogenously at a natural rate. This restrictive assumption of the model is very unrealistic.

Today, there is a general consensus that at the macro level, more inputs of macro aggregates are needed for the production function to be representative of the actual economy. The main reason for including the exports and government expenditures in the production function is that the production process in Nigeria depends heavily on government expenditures and revenues from exports. Barro (1990) and Aschauer (1988) used government expenditures as inputs in their production functions. Balassa (1978, 1985) and Tyler (1981) used exports as inputs of production function.

The most valid test to determine the permissibility of a set of factor to serve as valid inputs in a production function lies in ensuring that the inputs are functionally separable from each other. It is in this light that the following section examines the soundness of the production function in terms of whether the test of functional separability among the variables representing the various inputs holds or not.

4. Input Separability in Production Functions

Separability of functions was first introduced in the context of demand analysis and utility functions. Leontief (1947) argues on the functional separability condition for disaggregation of inputs in production. Goldman and Uzawa (1964) show that a utility function of the form U(x) is weakly separable.with respect to a partition (N1,..,Ns) if, and only if, U(x) is of the form:

$$U(x) = q\ (u^1\ (x^{(1)}), \ldots, u^S\ (x^{(S)})),$$

where q (u^1,..,u^S) is a function of S variables and, for each s, u^S ($x^{(S)}$) is a function subvector $X^{(S)}$ alone.

The condition of weak separability is satisfied if the marginal rate of substitution U_I (x)/U_J (x) between two commodities i and j from N_S is independent of the quantities of commodities outside of Ns, namely if ∂U_I (x) /U_j (x) /∂ x_k =0, for all i, j N_s and K N_s. The condition for strong separability requires that the marginal rate of substitution U, (x)/U, (x) between two commodities i and j from different subsets Ns and N_t ; namely if ∂U_i (x)/Uj (x) /∂x_k =0, for all i N_s, j N_t, and K N_s U N_t (s≠ t) .

Berndt and Christensen (1973), show that in the context of production theory, theorems which establish separability restrictions on a function are equivalent to certain equality restrictions on the Allen partial elasticities of substitution. They also show the existence of sub-aggregate indexes for a production function that is twice-differentiable, and strictly quasi-concave and homothetic with a finite number of inputs, each having a strictly positive marginal product, such that

Q=F (Y) =F (Y_1,..,Y_n).

The set of n inputs is denoted by N= [1,..,n], and is partitioned into r mutually exclusive and exhaustive subsets [N1, . . ,Nr] , a partition R where first and second partial derivatives of F (Y) by F_j, and F_{ij}. F_j = ∂F/∂Y_j, all input levels other than Y_i held constant, i=l,..,n

Fij = ∂_2F/∂Y_i,∂Y_j, all input levels other than Y_i, and Yj held constant, i,j,=l,..,n. The production function F(Y) is weakly separable with respect to the partition R if the marginal rate of substitution (MRS) between any two inputs Yi and Y, from any subset N_s , s=1,..,r, is independent of the quantities of inputs outside of N_s, i.e. $\partial/\partial Y_k$(Fj/Fj)=0, for all i,j N_s and k N_s.

For the purpose of this study, separability refers to the property of the production function where value added and intermediate inputs are separable from the composition of value added (as between exports and government expenditures). The World economic and financial surveys (IMF, 1986) shows that the separability of a production function in intermediate inputs and value added will be one in which the production function is separable in value added and or in intermediate inputs if the capital-labor ratio (and hence the composition of value added) can, in general, be considered independently of the intermediate inputs. First, the separability test for the aggregate inputs is undertaken.

5. Separability Test for Aggregate Inputs

In this section, the assumption of separability among the inputs in the production function was made. The fulfillment of this condition is highly pertinent to the study in the context of whether the two intermediate inputs of exports and government expenditures used in the production function are separable aggregates.

Unless exports and government expenditures are established to meet the test of functional separability their incorporation in the production function for Nigeria would be impermissible. Following the work of Denny and Fuss (1977), Berndt and Christensen (1973), Blackorby, Primont and Russell (1977), Ogbu (1988), and Entessari (1990), a test for separability that is appropriate for the condition that exports constitute a separable input from government expenditures will be satisfied if the weak linear separability constraint is met.

This is equivalent to the linear restriction that partial elasticities of substitution between exports and capital and partial elasticities between government expenditures and capital be equal. Or that the partial elasticities of substitution between exports and labor and partial elasticities between government expenditures and labor be equal. The null hypothesis that $\beta_1 = \beta_2 = 0$, is not rejected. β_1, is the coefficient of exports and β_2 is the government expenditures coefficient. The computed F-statistics is 3.86 and the critical F(2,25) at 1 percent level is 5.57. This shows that the intermediate inputs of exports and government expenditures are weakly separable.

The usual method for imposing a set of restrictions such as $\beta_i = 0$, for one or more coefficients, entails omitting the variables from the regression and base the test on the sums of squared residuals from the restricted and unrestricted regressions.

$$F(R, N-K) = \frac{(SSR\,Unrestricted - SSR\,Restricted)R}{SSR\,Restricted / N-K}$$

where SSR=sums of squared residuals, R=number of restrictions, N=number of observations, K=number of parameters to be estimated.

Based on this test the null hypothesis is not rejected. This shows that the sub-aggregates of exports and government expenditures can be taken as separable sub-aggregates for this study. The model that emerged from the specification is a flexible price dynamic variant of the Mundell-Fleming model with Nigerian development

characteristics. Specifically, petroleum is assumed to be produced locally and can be sold in Nigeria or to other countries. To some degree, Nigeria has monopoly power over the price of petroleum in the world markets. However, Nigeria is a price-taker in terms of her imports in the world market. The imports and quantitative restrictions policies of the country arise from the scarcity of foreign exchange reserves that makes it difficult for private agents to achieve their optimal demand for imports.

The dynamics of the model comes from the lagged elements in the behavioral relationships, and stock accumulation. The endogenization of investment and exchange rate, assures the plausibility that the model may be able to explain both short and medium-term growth. These outcomes will be dependent both on present as well as past values of the policy and exogenous variables. The importance of this to the present study is that it provides for the influence of the Structural Adjustment Program to be accounted for partially. Thus, this study will complement the available tools in designing and formulating economic policies for development.

6. Model Estimation

The obvious problem that is constantly encountered in a time series study is the question of serial correlation. The use of Two-Stage Least Squares (2SLS) assures that the system of equations is solved to allow each endogenous variable to be expressed in terms of the predetermined variables and the exogenous variables. The standard method of correcting for serial correlation in a study like this one is to employ the method of Durbin-Watson statistics.

As Klein (1988) has emphasized, a significant part of econometric analysis in practice is the search for regularity in economic relationships. The most important statistical tool for this kind of analysis is the method of multiple regression. The model for this study can be econometrically represented as:

$$q_i = \sum_{j=1}^{n} \beta_j X_{ji} + e_i, \quad I=1, 2, \ldots, N \qquad (1.1)$$

In the context of this study, the primary interest is to estimate the β coefficients. Since the number of observations in the study is 30, i, e, . N=30. The $X_{j,i}$ stands for the independent variables, and the small n represents the number of such independent variables. It is assumed here that the probability distributions of the $X_{j,i}$ does not contain the parameters of the distribution of e_i, the error term. Instead, the ei, error terms are assumed to have probability distribution that are normal with constant variances and covariances signifying that they are mutually independent. It is in this background that

the results of the model estimation with 6Two-Stage Least Squares (2SLS) procedure are obtained and interpreted.

Given this background, the production function is specified as follows:

$$Q_t \leq F[A_t, K_t, L_t, (XG)_t, (GOV)_t] \quad (1.2)$$

Where:

A_t = the level of technological progress, this is approximated by the time trend.
Q_t = output in real gross domestic product is limited by the state of At
K_t = capital stock as derived in this study.
L_t = active labor force.
XG_L = exports.
GOV_t = government expenditures.

The production function in (1.2) provides the supply side of the medium type macroeconomic model used in this study. For the analysis of the Nigerian economy for the period under study. The aggregate demand side of the model is developed in what follows.

7. Aggregate Demand

Aggregate demand is defined as the sum of consumption (CONS), investment (INV), government expenditures (GOV), and trade balance. Trade balance is taken here as the difference between exports and imports exports (XG) and imports (XM). It may be written as:

$$Q_t = F[Cons_t + Inv_t + Govt_t + XG_t - (ex_t Pf_t XM_t)/P_t] \quad (1.3)$$

In equation (1.3), Q_t is the real gross domestic product (GDP), Const is real private consumption expenditures, Inv_t is real gross domestic investment expenditures, $Govt_t$ is real Government expenditures, XG_t represents the real exports, ext is nominal exchange rate (the price of U.S. dollar $ in terms of the Nigerian naira N). XM_t represents the real imports measured in units of the foreign goods: Pf_t is the foreign currency ($) price of imports; and P_t is the domestic currency price of domestic output.

Production is a function of capital, labor, exports, and government expenditures. The equation to be estimated can be written in the log-linear form as follows:

$$\log Q_t = \log A_t + \beta_1 \log K_t + \beta_2 \log L_t + \beta_3 \log XG_t + \beta_4 \log GOVT_t + w_t \qquad (1.4)$$

Where wt is a stochastic error term of normal distribution and constant variance and zero mean.

8. Econometric Results

All the estimated coefficients of the production function, except that for the labor input, have the expected signs. In particular, the coefficients of the inputs of capital, export, and government expenditures came out as was hypothesized. Although the government expenditure coefficient is not significant at 5 percent, the parameter is significant at the 10 percent level. The magnitude of the coefficient seems to be in line with the realities and characteristics of the Nigerian economy.

The results indicate the relative importance of different inputs in the production function. For instance, the gross domestic product will increase by 1 percent if exports increased by 20.2 percent. The government expenditures will need to increase by 11.1 percent for the gross domestic product to increase by one percent. Similarly, it will take an increase of 14.8 percent from the capital stock to effect an increase of one percent to the level of gross domestic product.

The time trend that has been introduced into this model appears to indicate strong support for the argument of outward oriented trade policies**.** It is clear from the coefficient of the time trend that only 17.2 percent of new technique is utilized in producing a one percent output. The other way to look at this is that by applying 17 percent of the accumulated skill into the production process, output is increased by one percent. Another way of interpreting this is that if the country applies 17 percent of the experience it acquired from producing a product, the output can be increased by one percent.

The coefficient of the labor input turned out to be inconsistent with the hypothesized sign. The estimate for the labor coefficient shows that a one percent increase in output will require labor to fall or decline by 5 percent. Stated differently, for every 5 percent increase in population, output drops by 1 percent. One possible explanation for this is to be found in the proxy used to represent the labor input. Population has been growing

faster than the gross domestic product of the country. During the period from 1980 to 1988, the population grew at an annual rate of 3.3 percent. Over the same period, the gross domestic product declined at an annual rate of -1.1 percent. Clearly, the coefficient of the population in part shows that the model was able to pick up the latent characteristics of the Nigerian economy.

The Export Equation

The export function in the model had a variable representing world income. In keeping with the basic philosophy of this study to construct a model that is more practical, the world income was excluded and the lagged output a more realistic variable introduced. The results show that the variables came out both in magnitude and signs as hypothesized and were all found to be very significant. The results provide interesting implications. For instance, as for the response of exports to changes in prices it was found that a one percent increase in the volume of exports will require an increase of 19.5 percent in relative prices. However, the lagged output variable has an elasticity of only 53.5 percent when measured at the mean of the estimates. This result is not surprising given the fact that the price of petroleum is basically set by the OPEC countries. Theoretically, one would expect the relative prices to be elastic to exports, but other studies on exports of developing countries have found similar results.

Employment Equation

The estimation results of the employment equation provide no surprises. For instance, the estimated coefficient of output shows that for employment to increase by one percent output will have to increase by 13.5 percent. Also, as expected, the coefficient of export is positive as well as significant at the 5 percent level. It shows that a 21.6 percent increase in export will bring about a one percent increase in employment. Further, the estimated coefficient of the wage rate shows that a decline of 48 percent in the wage rate is required for employment to increase by one percent.

Output Productivity Growth Equation

As stated before, this study has attempted to integrate the output growth equation in a system of simultaneous equations to resolve the problem of simultaneity that arises from single equation estimation of such functions as acknowledged by other authors on this problem. The estimated output growth equation is as follows:

$$\underset{}{LnQ_t} = \underset{(4.20)}{1.363} + \underset{(0.53)}{0.0641 \ln K_t / L_t} + \underset{(2.41)}{0.296 \ln XG_t / L_t} + \underset{(2.40)}{0.191 LnGov_t / L_t} - \underset{(-7.79)}{0.013 YR}$$

$R^2 = 0.91$ F Value 67
$R_c^2 = 0.90$

The results show that the coefficients of the productivity equation are significant in magnitude. The equation shows that only 0.064 percent of growth in productivity comes from capital. Again, this underscores the point that capital is minimally used in the economy.

Exports account for 0.296 percent of growth in productivity. The government expenditures account for 0.191 percent of the growth in productivity. 1.363 percent of growth in productivity, the largest by far is not explained by any particular factor. The decline in average productivity which is attributed to time in this study has a negative sign. From the equation, the autonomous growth productivity is indicated by the coefficient of YR, the time, which is negative here being -0.013. What this really means is that there has been an autonomous decline in the average product that is not attributed to capital, exports, and government expenditures. Normally, this coefficient of the time trend is supposed to be positive because it generally is attributed to technical change. Although the magnitude is insignificant, yet it is an unusual result. The only conjecture that one can offer for this is that capital-goods imports have been declining over the last ten years. Furthermore, the upward pressure of the population over the existing resources may partially have contributed to the decline.

Table 1
Two-Stage Least-Squares
Estimates of Structural Parameters

Parameter		t-ratio	Variable
Production function			
α_0 =	25.277	3.57*	Intercept
α_1 =	0.149	1.60**	Kt
α_2 =	0.202	2.06*	XGt
α_3 =	-4.916	-2.88*	Lt
α_4 =	0 .111	1.74 * *	GOVt
α_5 =	0.172	2.82*	T
	R^2_c=0.85		
Exports			
π_0 =	-1.57	-1.09	Intercept
π_1 =	0.205	2.99*	EXt
(Pft/Pt)			
π_2 =	0.521	2.32*	lnqt_,
π_3 =	0.554	3.56*	lnxgt.,
	R^2_C = 0.85		
Employment			
μ_0 =	1.972	1.80*	
Intercept			
μ_1 =	0.193	1.36	Q_t
μ_2 =	0.165	1.73**	XG_t
μ_3 =	0.480	-4.15*	WR_t
	R^2_c = 0.68		

Table 2
Two-Stage Least-Squares
Estimates of Structural Parameters

Parameter	t-ratio	Variable
Output Growth		
a_o= 1.364	4.20*	Intercept
a_l= 0.295	2.40*	$lnxg_t/lnl_t$
a_2= 0.066	0.54	lnk_t/lnl_t
a_3= 0.190	2.39*	$lngov_t/lnl_t$
a_4= 0.013	-7.77*	YR
	R^2_c = 0.90	

Note: one asterisk (*) indicates parameter significant at the 5 percent level: two asterisks (**) indicate that parameter is only significant at the 10 percent level: R2C denotes the coefficient of determination corrected for degrees of freedom.

9. Findings

The following are the major findings of the study. (i) The results show that both exports and government expenditures are positive and significant determinants of aggregate output: (ii) export growth and government expenditures growth are positive and significant determinants of output growth: (iii) the results for the manufacturing sector shows that a given growth in manufacturing results in output growing by almost 4 times. This finding is quite interesting in view of the fact that the manufacturing sector is dominated by firms that are engaged in "assembly type" production characterized by low value added. All these underlines the benefits that will accrue to the nation if a policy to expand the manufacturing base and capacity of the economy is pursued. (iv) The estimation results about the relationship between output and labor showed that population has a negative and significant effect on the level of output in the Nigerian economy.

Appendix
Data Sources

Sources

The primary sources of data for this study are the International Financial Statistics, (IMF). Various issues of the World Bank Development Reports and Annual report of the central bank of Nigeria. Economic and functional analyses of Government Accounts, Federal office of statistics, Lagos Nigeria.

Construation of Data

All the data used in this study is in constant 1985 naira value. The dollar value was deflated to 1985 constant dollar for those variables expressed in dollar and applied the appropriate exchange rate of naira for the dollar.The relative price of exports is given by the formula EXt (Pft/PL) . Where EX, is the exchange rate of naira to dollar, Pft is the world price index for total exports, and Pt is the domestic price index.

Constraints

There are limitations on data in Nigeria like many other developing countries.when annual data is available, its authenticity is often questionable. Part of the data are either projections or estimated averages. Hardly can one put together a sectoral data that will enable a complete study of the various sectors of the economy.Thus, most studies that were designed to disaggregate the economy ended up being an aggregated model of the economy. Enough effort has been made to bring the data for this study in to a uniform data, that meets the standard for both consistency and reliability.

Appendix B
Definition of Terms

GDP= Gross Domestic Product/ Gross Output
SAP= Structural Adjustment Program
IMF= International Monetary Fund
OPEC= Organization of Petroleum Exporting Countries
CBN= Central Bank of Nigeria
MRS= Marginal Rate of Substitution
K= Capital Stock Services
Q= Output
XG= Exports
L= Population
GOV= Government Expenditures
w= Error Term
CONS= Private Consumption
INV= Private Investment
XM= Imports
P= Domestic Price Level
Pf= Foreign Price Level
r= Real Interest Rate
i= Nominal Interest Rate
Qd= Disposable Income
t-1= One Period Lag
BF= Net Bonds Issue
DF= Net Money Created
TRV= Tax Revenue
ITRV= Indirect Tax Revenue
CITRV= Company Income Tax Revenue
TR= Tax Rate
Q^m= Output Manufacturing Sector
Q^c= Output Service Sector
Q^n= Output Non-Agricultural Sector
PTRV= Petroleum Tax Revenue
OP= Oil Price Level
PQ= Petroleum Output
L^d= Demand for Labor
L^S= Supply of Labor
U= Unemployment
WPI= Wholesale Price Index
CPI= Consumer Price Index
UPXM= Unit Price of Imports
UPXG= Unit Price of Exports
EX= Exchange Rate
MS= Money Supply
MD= Money Demand
DC= Domestic Credit
NFA= Net Foreign Assets
WP°= World Inflation Rate

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