SAVINGS AND FOREIGN EXCHANGE GAPS AND INDUSTRIALISATION IN NIGERIA

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ABSTRACT

The progress of industrialisation should be influenced by the level of savings and investment and should reflect on trade and influence the level of balance of payments. This paper examines the twin deficits, i.e., savings and foreign exchange gaps and their relationship with manufacturing output between 1981 and 2015. Hinged on the two gap model, the study models the relationship within the vector autoregressive (VAR) model in evaluating the effect of these gaps on industrialisation in Nigeria. Also, exploratory data analysis is used to assess the extent of disparities between savings-investment and exports-imports in Nigeria. The results reveal that both gaps are binding on the Nigerian economy. The effect of the foreign exchange gap is seen to be a stronger constraint on the manufacturing sector than the savings gap. Also it is clear that foreign capital inflows have been high enough in the period to cover for the deficits, but the effect is still not satisfactory on industrial development. The study recommends an improvement on industrial policy for Nigeria in ways that seek to deliberately improve on domestic savings, strengthen the linkages of savings and investments, as well as organise foreign capital flows to deliberately support non-oil industrialisation in Nigeria as a matter of urgency.

JEL Classification: E21, E22, F35, O14, F31

1. Introduction

Economic growth is a fundamental macroeconomic objective of every nation, which is characterized by structural changes in the composition of goods and services to satisfy the maximum wants of the maximum number of people. This structural change is produced by a combination of suitable technology, management techniques and natural resources capable of moving an economy from a traditional low level of production to a more automated and efficient system of mass production of goods and services. Thus, rapid industrialisation has become the main focus of economic development because of its potential benefits. According to Anyawu, Adebusuyi, Okafor, Ireh, Maduagwu and Mba (2010), the enormous contribution of the industrial sector has been a major facilitator in the successes of the fastest growing economies of the world. Therefore, the need for Africa and Nigeria to catch up with the rest of the developed world is clear.

In Nigeria, the contribution of the industrial sector to gross domestic product (GDP) which was 44.71% before rebasing, shrank to 22.03% in 2009 and 16.01% in 2015 (CBN, 2015). This shows that the industrial sector is not the main driver of the nation's economy, against expectations. For an economy which plans to be in the top 20 economies by 2020, the level of industrialisation is still low. Perhaps this is why Oqubay (2015) cautions against the pretence that African economies could become advanced capitalist societies without having to pass through a phase of industrialisation. According to Ajegi and Okwori (2016), Nigeria is the largest economy in Africa and has a CO_2 emission (metric tonnes per capita) of 0.56 compared to South Africa's 9.3, which is ranked second. This indicates a higher level of industrialisation for South Africa. While the use of CO_2 emissions as a measure of the level of industrialisation might be flawed because of the lack of alternatives, we accept it in the meantime. The good news is that the level of CO_2 emissions shows that there is room for improved growth, as the level of productivity is still below capacity. However, the bad news is that the problem of industrialisation in Nigeria may be a reflection of other underlying structural problems and failures of internal economic policy.

The rationale and suitability of industrialisation as the path to development for Nigeria has dominated discussions in recent years. According to Kolawole (2013), Nigeria's problem of industrialisation has, for a long time, been connected to the lack of infrastructural facilities, wrong policy frameworks, hostile environment for investment, backwardness in technology, rising unemployment and over-dependence on imported products, among others. Beneath these highlighted factors is the fact that the inability to industrialise and develop might stem from the 'twin deficit' problem of savings and foreign exchange gaps, which has also proven to be an obstacle to industrialisation in many less developed countries (LDCs). This is because when the country experiences the savings-investment gap and the import-export gap, the potentials to industrialise could be jeopardised. Oqubay (2015) further asserts that it is the responsibility of government to organise the society and resources around its vision and to insulate itself from narrow visions and interests conflicting with its development agenda. Consequently, this paper reviewed the lines of action taken by the government with regards to these twin deficits.

Nigeria has pursued industrial development in several programmes since its independence. The idea of pursuing financial assistance, whether internally or externally, is theoretically acceptable as a nation's response to paucity and/or inadequacy of resources to drive the development process. Countries (like Japan) that are developed nations today channel foreign aid to countries for strong

economic reasons, no matter how politically motivated the aid is made to look. The economic rationale is simply to protect its investments and expand the volume of trade even more.

Savings and Investment are two crucial macroeconomic variables that are desirable for achieving rapid economic growth. According to Afzal (2007), it is difficult to find any country that managed high growth for a long period without experiencing high rates of capital formation and/or high rates of savings. Adeniyi and Egwaikhide (2013) asserted that domestic saving and investment has been low in sub-Saharan Africa (SSA) with a steady decline in investment from about the mid-1990s to 2005. In Nigeria, however, investment has been on the increase, but savings needed for accelerating industrial development have lagged behind investment (discussed in detail in section 4). A cursory look at Nigeria's export and import over the years shows that the country has had a favourable balance of trade (CBN, 2015). However, without oil-exports, Nigeria's trade becomes highly unfavourable, a clear indication that the favourable balance is accounted for by crude oil trade. Similarly, Okwori and Abu (2016) asserted that unlike some other fuel-producing countries, Nigeria has not managed to diversify its economic base and petroleum continues to account for almost all merchandise exports. Other manufacturing activities have been far less significant in this regard.

External finance in the form of loans and grants can play a critical role in supplementing domestic resources in order to relieve savings or foreign exchange bottlenecks. In a bid to probably achieve rapid development and diversification, the government has sought aid and loans over the years. There are three basic reasons advanced by the theory for external financing: (i) to finance a short-term current account deficit, as a result of some temporary imbalance in which import expenditures exceed export earnings; (ii) to provide productive investments that will expand the output of tradable goods and services; and (iii) to supplement domestic savings by boosting the level of domestic investment (Cypher and Dietz, 2004). For the past two decades, Nigeria has borrowed large amounts, often at highly concessional interest rates and accessed significant foreign aid with the hope of putting the country on a faster route to development through higher investment, faster growth and poverty reduction. On the contrary and, as Hassan, Sule and Abu (2016) noted, economic growth, employment and poverty situations have continued to deteriorate amidst a rising debt profile.

This means that government borrowing and foreign aid, for the right reasons, meant to mitigate the current economic imbalance might have been good economics – especially if such borrowing is applied to support its economic

adjustment policies. The progress of industrialisation should reflect on domestic trade and non-oil manufacturing output and should influence the level of balance of payments. However, in Nigeria, the results are not satisfactory. Arising from these, there is a need to interrogate the series of strategies and economic policies that have been employed in Nigeria as they concern foreign aid and savings and foreign exchange gap and examine what they have contributed on the path toward greater industrialisation. This study thus intends to: first, examine the two-gaps, if any, i.e. the savings and foreign exchange gaps; second, analyse the constraints posed by these twin deficits to industrialisation; and three, examine the role of foreign borrowing in addressing these deficits in Nigeria. The rest of the paper is structured as follows: section two reviews related literature and discusses the two-gap model; section three specifies the method of study. Section four discusses the findings of the study, while section five concludes and gives some policy recommendations.

2. **Review of Related Literature**

2.1 **Theoretical framework: The two-gap model**

External finance in the form of loans and grants can play a critical role in supplementing domestic resources in order to relieve savings or foreign exchange bottleneck. This is the story of the two-gap model of economic development enunciated by Chenery and Strout (1956), Bruno (1962) and Adelman (1966), as cited in Jhingan (2007). The two-gap model is built on the original ideas of the Harrod-Domar growth model, whose main contribution is that growth rates are driven by net national savings to income and the net levels of investment in the production process. In this case, the paper views the production process as a function of the level of industrialisation and examines the contribution of foreign capital to driving the process.

The basic argument of the two-gap model is that most developing countries face either a shortage of domestic savings to match investment opportunities or a shortage of foreign exchange to finance needed imports of capital and intermediate goods. The two-gap model is, therefore, a model of foreign aid comparing savings and foreign-exchange gaps to determine which of them the binding constraint on economic growth is. Todaro and Smith (2011) asserted that the savings gap (domestic real resources) and foreign-exchange gap are unequal in magnitude and that they are essentially independent.

The implication is that one of the two gaps will be binding for any developing economy at a given point in time. The savings gap results from an excess of domestic investment opportunities over domestic savings, causing investments to

be limited by the available foreign exchange. Where the savings gap is dominant, the economic growth is constrained by domestic investment. Foreign savings may then be used to supplement domestic savings. The difficulty, however, is that most governments in developing countries with a shortage of savings may be unable to ensure a shift in consumption expenditure to capital goods and/or ensure the consumption of locally produced goods in place of those produced abroad. As a result, excess foreign exchange, including foreign aid, might be spent on the import of luxury and/or consumption goods.

The foreign exchange gap results from a shortfall in the planned trade deficit, vis-à-vis the value of capital inflows. This causes output to be limited by the available foreign exchange for capital goods imported. When the foreign-exchange gap is binding, a developing country has excess productive resources, mostly labour, and all available foreign exchange is being used for imports. The existence of complementary domestic resources would permit them to undertake new investment projects if they have the external finance to import new capital and intermediate goods and associated technical assistance (Todaro and Smith, 2011). From the concept of twin-deficit (assuming that there is no central government deficit) the following relation must hold if there is no external debt accumulation:

$$S - I = X - M = 0 \qquad 1$$

This states that if savings equal investment, there will be no trade gap and no need for external financing. In a country without access to external sources of financing, the overall level of investment will be constrained by domestic savings. Low levels of saving means that the bulk of an economy's production goes to consumption, leaving little for investment. Low levels of investment, including financing for investment in human capital like education, health care and technology result in low levels of income per person in future (Cypher and Dietz, 2004). Thus a vicious cycle of poverty is reinforced, with poor countries remaining poor because they lack sufficient capital of all types for expanding productive investments over the future. However, if domestic savings can be by supplemented foreign savings via external borrowing, then total investment can be pushed above what would be achieved from domestic resources alone. When this occurs via borrowing, equation 1 becomes:

$$S - I = X - M \; < 0 \qquad 2$$

Foreign borrowing can help a country finance this twin deficit by boosting the level of domestic investment and financing the import of investment goods and other inputs to production. This creates a possibility of a virtuous cycle of foreign borrowing, domestic investment and increases in domestic production – with the expectation that such borrowing is channelled towards the production of tradable goods. If this condition holds, external borrowing can contribute to higher economic growth rates and to structural transformation in the production process of the Nigerian industrial sector, permitting the country to supplement domestic resources in short supply with foreign resources. Foreign borrowing can therefore play a critical role in supplementing domestic savings and overcoming the foreign exchange constraint and raising the real rate of economic growth through rapid industrialisation.

2.2 **Empirical review**

Ojiegbe, Duruechi and Makwe (2016) investigated the effect of savings and investment on economic growth in Nigeria. The data on savings, investment and gross domestic product (GDP) were used over the period 1980-2014. The ordinary least square (OLS) method was used for data analysis. The result revealed that there is a positive relationship between savings, investment and economic growth in Nigeria; that investment affects economic growth significantly, while savings do not. The study recommended that measures be put in place to encourage savings from the public. Also, effort should be made to increase the consumption of made in Nigeria goods, including the use of locally sourced raw materials by Nigerian industries in order to increase foreign exchange earnings.

Okwori and Abu (2016) analysed the openness of the Nigerian economy with a view to investigating whether its involvement in international trade has significantly impacted on its growth. The variables used were real GDP, exports, imports, trade openness and real effective exchange rate (trade weighted). Using the vector error correction model, the study found that trade openness has not impacted significantly on economic growth in Nigeria within the study period (1986 – 2014), as a negative relationship was reported. In addition, exports and imports exert positive but not significant effects in stimulating economic growth in Nigeria. The study recommended that: government should encourage domestic production by granting subsidies and tax concessions to industries and farmers for expansion of production capacity to meet increasing demand of commodities in the economy hitherto being imported. They should also make efforts to improve

institutional quality in ensuring standard of products which would encourage domestic wholesalers and retailers to patronise made in Nigeria goods.

Hassan, Sule, and Abu (2015) examined the effect of government debt on economic growth in Nigeria between 1986 and 2013 using the ordinary least square method. The variables used were real GDP, internal debt, external debt, exchange rate, infrastructure and corruption perception index. The study revealed that the impact of government debt on economic growth over the period under review is not significant. Even though external debt has been enormous over the years, it has contributed minimally to real gross domestic product. The study concluded that, if the course of consistent borrowing is not curbed, the economy will slump further: resorting in surplus budgeting, and igniting increases in unemployment, decreases in total investment, falling reserves, increased exchange rate, higher inflation and, consequently, increased poverty. The study recommended, among others, that borrowing should be a last recourse by the government to revitalize the economy, and if necessary, the loans should be sourced within the economy so that when the principal and interest on the loans are repaid, they will serve as a crowd-in effect which will in turn further accelerate economic activities in the country. Also, other alternative sources of government revenue, especially taxation, hitherto neglected should be explored to minimize the dependence on borrowed funds to revamp the economy.

Adelakun (2015) studied the determinants of savings and investment in Nigeria, emphasising on the relationship between savings, investment and economic growth. The error correction model was used to analyse the data collected. Some of the variables used were gross national savings, gross fixed capital formation, interest rate, inflation rate, GDP, aggregate demand, and liquidity ratio. The results showed a positive relationship between savings, investment and economic growth. Of the determinants of savings considered in the study, inflation rate contributes negatively to savings, while interest rate positively affects savings. The study also found that the impact of labour on economic growth far outweighs the contribution of capital to economic growth. It recommended that the federal government should promote investment in both physical and human capital through compulsory savings and adequate investment in schools. Also, the government should emphasise FDI and domestic resource mobilization in the country.

Aremu, Abubakar and Bashorun (2014) studied the impact of the two gaps (savings and foreign exchange) on economic performance in Nigeria based on Hollis Chenery's model. It also explored the efficacy of FDI in bridging the gaps, employing the error correction mechanism using data for the period 1981 to 2008.

The study found that the two gaps retard economic performance, and that FDI is a bridge but not sufficient in the short run and not reliable in the long run, because it promotes importation in both periods, which widens the existing foreign exchange gap. In addition, the results revealed that FDI in Nigeria supports export promotion and not import substitution, thus the foreign exchange gap still persists in the long run while the savings gap has eroded. The study therefore recommended that the government should attract more FDI by providing enabling environment through political and social stability and development of adequate infrastructures, provision of employment opportunity. This is expected to increase output, income, and savings through the multiplier.

Babatunde (2014) examined the long-run relationship between exports and imports– disaggregated into oil and non-oil components for the period 1960 - 2014. The study employed the Bounds test and Toda and Yamamoto granger non-causality tests to examine this relationship. The result revealed that exports and imports at the aggregate and disaggregated level are cointegrated in Nigeria with the cointegrating coefficient very close to unity. This indicated that Nigeria's macroeconomic policies have been effective in the long run and suggested that Nigeria is not in violation of its international budget constraint. The result also revealed a bi-directional causality between aggregate exports and imports, but unidirectional causality from oil exports to oil imports and from non-oil imports to non-oil exports. The study recommended that the Nigerian policy makers should make efforts to diversify the economy from oil exports to non-oil exports since shocks to the price of crude oil in the international market can affect the economy adversely. In addition, the dependence of production on imported input should be reduced in Nigeria. Substantial efforts should be made to produce non-oil export products which have high domestic value added.

Nwanne (2014) evaluated the implications of savings and investment on economic growth in Nigeria using ordinary least square regression. The data utilised covered the period 1981-2014 and the variables used were GDP, gross domestic saving and gross domestic investment. The study revealed that there is long-run relationship between savings, investment and economic growth in Nigeria. The result of the regression indicates that change in gross domestic investment has positive and significant effect on economic growth. Conversely, changes in gross domestic savings have negative and significant effect on economic growth. The study thus recommended that government should set a sound and fertile environment to foster domestic savings that will help stimulate economic growth in the country.

Adeniyi and Egwaikhide (2013) examined the saving-investment nexus in developing countries with emphasis on the role of financial development. The study investigated the linkage between savings and investment in selected SSA countries. A balanced panel covering 20 SSA countries spanning three decades from 1976 to 2005 was used to estimate the data. The variables used were: savings, investment and financial market indicators (M3/GDP, domestic credit to the private sector as a share of GDP and total domestic credit provided by the banking sector as a percentage of GDP). The study found evidence of some role of financial development, especially domestic credit to the private sector, in mobilizing domestic saving for investment. The study recommended that policymakers in sub-Saharan Africa should ponder more on the need for improved mobilization of domestic resources. Also, future research was suggested on the subject by exploring the use of alternative estimators such as dynamic ordinary least squares (DOLS) and fully modified ordinary least squares (FMOLS).

Kolawole (2013) investigated the impact of foreign assistance (official development assistance, ODA and foreign direct investment, FDI) on economic growth in Nigeria within the period 1980–2011. Arising from the theoretical postulation of the two-gap, the variables used were: real income or output, log of domestic investment, FDI, log of export, log of import, and log of ODA. The error correction method (ECM) and Granger causality test were used to estimate the model. The results revealed that domestic investment and exports impact positively on real growth in Nigeria. However, FDI and imports impact negatively on real growth in Nigeria. The results also indicated that there is no causality between any pair of the variables. In addition, ODA exacts no impact on real growth in Nigeria. The study implied that the bulk of foreign assistance meant for infrastructural development in the country are either siphoned or diverted into unproductive use, such that its influence is not felt on real growth.

Tamuno and Edoumiekumo (2012) evaluated the impact of trade globalization on the industrial sector in Nigeria. The OLS was used to estimate the data collected for the period 1970-2008. The study used the index of industrial production as proxy for the industrial sector. On the other hand, external debt, foreign direct investment, nominal exchange rate, and degree of openness were used as proxy for globalization. Gross fixed capital formation was used as a measure of domestic investment. The results showed that gross fixed capital formation and degree of openness are negatively related to the industrial sector performance in Nigeria. The study thus posited that the industrial sector has a weak base and cannot compete favourably with its foreign counterparts. Also, domestic investment is weak and is

not significant in boosting industrial output in Nigeria. The study recommended, among others, that Nigeria should encourage the production of non-primary export commodities and formulate policies that would attract FDI. In addition, external debt should be sourced for productive projects only and also as means of maintaining a stable exchange rate.

Afzal (2007) analysed the savings-investment relationship in developing countries with a view to establishing the extent of capital mobility. Thus, the study provided additional evidence on the subject using OLS, Johansen cointegration and Granger causality. The countries analysed were Pakistan, India, Iran, Philippines, Venezuela, Sri Lanka, South Africa, Malaysia, Thailand and Nigeria. The study found no long-run relationship between savings and investment in seven of the sampled countries. It reported an increase in capital mobility which weakens the savings-investment relationship. However, a bidirectional causality between savings and investment in South Africa and a unidirectional relationship in Pakistan and Sri Lanka were reported. It concluded that there is a strong correlation between savings and investment in all the countries. The study attributed the controversy of high capital mobility and strong correlation to country-specific policies and economic conditions.

Ogunkola, Bankole and Adewuyi (2006) assessed Nigeria's trade and investment policy reforms. They examined the magnitude of impact of output growth, import growth, export growth, investment growth, labour force growth and FDI on GDP, agriculture, manufacturing, services and dummies capturing trade and investment policy regimes. The estimation method used was OLS. It was shown that trade and investment policy reforms do not have significant impact on aggregate output growth. However, the study revealed that the growth of investment, import share, export share, and foreign direct investment ratio are major factors influencing aggregate output growth, while labour force growth is not a significant determinant of aggregate output growth. The simulation experiments showed that GDP was expected to grow on the average by 4.8% in 2005 and by about 5% in 2006 and 2007 and 5.4% in 2008. The effect of investment and trade policy reforms between 2005 and 2008 on the manufacturing sector provided the largest stimulus for economic growth, while for the services sector it provided a moderate stimulus for growth. However, the effect of the reforms on the agricultural sector dampens the economy's growth potentials. Based on the findings, the study suggested that the sectors that have higher potential to generate more positive impact on aggregate growth should be accorded priority in the allocation of resources.

Abiola (2003) examined resource gaps and their effect on economic growth in Nigeria. The study examined the effects of investment-savings, export-import and budgetary gaps on economic growth between 1970 and 1999 using the two-stage least squares (2SLS) technique. The results showed that a unit increase in the investment-savings gap worsened the output gap by 1.5 units, while a unit increase in the export-import gap worsened the output gap by 0.04 units. However, a unit increase in the budgetary gap worsened the output gap by 2.5 units. Thus, the three resource gaps combined to limit economic growth in Nigeria. The study recommended that economic management authorities should pursue policies to reduce output gaps, towards ensuring sustainability of economic growth. This could be pursued through a frequent reassessment of the relationships between potential and actual outputs, as well as the desired resources to fill the gap.

The empirical studies reviewed focused on the behaviour of the savings-investments gap or the exports-imports gap independently on economic growth across the globe and in Nigeria. However, there has not been a unanimous view concerning the nature of the relationship, whether positive or negative, between them in these reviews. Different methodologies and models have been used– emphasizing diverse aspects – and different reports have been presented. This study improves on existing studies by examining both gaps in Nigeria to determine which gap exerts a stronger influence on industrial development. The study contributes to the ongoing discussions by assessing the relationship between savings and investment gaps and the export and import gaps, as well as foreign capital flows on the industrial sector. In addition, the study examines the presence or absence of savings and foreign exchange constraints and, if present, to examine the impact of borrowing requirements in fostering industrialisation in Nigeria.

3. Methodology

This study employs both descriptive and empirical tools to analyse the data. Exploratory data analysis (EDA) is used to examine the data on savings, investment, imports, exports as well as foreign aid. EDA is appropriate for this study because it allows for summary statistics to reveal the important characteristics of the Nigerian economy. The approach also allows the paper to provide evidence in the relationships in a clear and concise manner. Thus, EDA helps analyse the extent of disparity and determine the size of the deficits, vis-à-vis foreign aid and borrowing. The ordinary least square (OLS) method is used to examine the relationship between savings gap, foreign exchange gap and foreign

capital flows on industrialisation in Nigeria proxied by non-oil industrial output. The implicit form of the model is given as:

$$NOI = f(SIG, XMG, FCI, EXL)$$

Where

NOI = Non-oil industrial output (₦'billion)
SIG = Savings-investment gap (₦'billion)
XMG= Export-import gap (₦'billion)
FCI = Foreign capital inflows (FDI + FPI) (₦'billion)
EXL = External loans (₦'billion)

4. Results and Discussion

4.1 Evaluating the twin deficits: An exploratory data analysis

As identified from the theoretical underpinning of this study, the first objective is to examine the two gaps (savings and foreign exchange) as well as foreign capital flows. Table 1 presents the dynamics under study.

Table 1: S-I Gap, XMG and FCI IN Nigeria 1981 to 2015

Year	*S- I Gap*	*X-M Gap*	*X-M Gap ** *	*FCI*	*EXL*
1981-1985	-3.93	-9.06	0.14	0.378	10.78
1986- 1990	-0.36	-22	23.3	5.36	163.06
1991-1995	-13.11	-254.78	77.3	38.60	574.32
1996-2000	-15.38	-792.46	468.92	116.23	1504.2
2001-2005	88.98	-1,860.44	1,762.08	373.24	3834.58
2006-2010	499.8	-4,837.54	4,076.32	1,162.43	538.78
2011- 2015	-2,541.14	-9,455.92	3,125.38	1,137.26	1,410.81

Source: Authors' computation from CBN Blletin
Note: X-M Gap** is the foreign exchange gap when oil exports and imports are included in the computation of XMG.
All units are in billion naira

The data in table 1 show that, in the period under review, the S-I gap fell 90 percentage points between 1986 and 1990 from the N3.93 billion recorded as average between 1981 and 1985. Subsequently, it rose over 1000 and 277 percentage points between 2001 and 2010 before facing a downturn between 2011 and 2015. The X-MG** is positive in the entire period when oil exports and imports are included in the mix. However, when only non-oil components are examined, the gap is negative; the size of the deficit steadily rose from 1981 through to 2015. These results confirm that both gaps are binding on the Nigerian economy. It is also interesting to note that the sizes of FCI and EXL in the period grew steadily and their sizes, put together, were sufficient to cover the deficits

arising from both gaps. As far as an economic explanation within the two-gap model is concerned, foreign capital inflows and external loans are justified and found to be very important. What remains is to examine the effect of these on non-oil industrial output.

4.2 **The relationship between NOI, SIG, XMP, FCI and EXL**

The data on NOI and FCI from 1981 to 2015 were assembled from the CBN statistical bulletin of various years, while data on SIG and XMP were computed by the author. Augmented Dickey Fuller tests were conducted on the data for stationarity and the variables were all stationary at first difference. The result in table 2 sets the stage for employing the cointegration analysis and the OLS technique.

Table 2: Stationarity test

Variable	*ADF Test Statistic*	*1% Critical Value*	*5% Critical Value*	*10% Critical Value*	*Prob.*	*Order of Integration*
NOI	-3.64	-3.66	-2.96	-2.62	0.0106	I(1)
SIG	-6.18	-3.65	-2.95	-2.62	0.0000	I(1)
XMP	-4.22	-3.66	-2.96	-2.62	0.0018	I(1)
FCI	-4.50	-3.67	-2.96	-2.62	0.0029	I(1)
EXL	-3.61	-3.65	-2.95	-2.62	0.0108	I(1)

Source: Eviews9 Output, 2017

The second objective is to examine the relationship modelled by the function stated earlier, NOI = f(SIG, XMP, FCI, EXL). Recall that tests for stationarity had been reported and the variables were all stationary at first difference. To proceed, the Johansen cointegration test was employed to investigate the presence of a long-run relationship and the results are presented in table 3. There is evidence from the data that there is long-run cointegration.

Table 3: Cointegration test

Null Hypothesis	*Trace Statistic*	*0.05 Critical Value*	*Null Hypothesis*	*Max-Eigen Statistic*	*0.05 Critical Value*
r = 0*	241.29	69.82	r = 0*	101.06	33.88
r ≤ 1*	140.23	47.86	r ≤ 1*	74.80	27.58
r ≤ 2*	65.43	29.80	r ≤ 2*	45.54	21.13
r ≤ 3*	19.88	15.49	r ≤ 3*	19.83	14.26
r ≤ 4	0.06	3.84	r ≤ 4	0.06	3.84

Source: Eviews9 Output, 2017

Note: *r* represents number of co integrating vectors. Both Trace statistic and Max-Eigen statistics indicate 4 cointegrating equations each. * denotes rejection of the hypothesis at the 0.05 level.

The lag order is selected using the AIC and SIC criteria. The data in table 2 affirm that the lag length was 2. Having established the relationship, OLS was employed on the data to examine the details in the relationships (table 5).

Table 4: Lag order selection criteria

Lag	*LogL*	*LR*	*FPE*	*AIC*	*SC*	*HQ*
0	-1,339.91	NA	1.73e+29	81.51	81.74	81.59
1	-1,173.20	272.80	3.28e+25	72.91	74.28	73.38
2	-1,054.83	157.82*	1.28e+23*	67.26*	69.76*	68.10*

* indicates lag order selected by the criterion
LR: sequential modified LR test statistic (each test at 5% level)
FPE: Final prediction error
AIC: Akaike information criterion
SC: Schwarz information criterion
HQ: Hannan-Quinn information criterion

Source: Eviews9 Output, 2017.

Table 5: Regression analysis

Variable	*Coefficient*	*Standard Error*	*T Statistic*	*Prob.*
		Regression Estimates		
C	69.90	124.33	0.56	0.5781
SIG	0.69	0.13	5.34	0.0000
XMG	-1.33	0.10	-13.94	0.0000
FCI	-3.48	0.50	-7.02	0.0000
EXL	0.007	0.06	0.11	0.9121
		Diagnostic Statistic		
R^2	0.97	$F_{0.05}$	2.78	
Adj. R^2	0.96	DW	1.46	
F*	214.10	D_L	1.143	
Prob (F Stat)	0.0000	D_U	1.739	

Source: Eviews9 Output, 2016.

The results of the regression show that SIG exerts little, positive and significant influence on industrial output. This does not conform to a priori expectation because the gap should exert a negative influence on investment. One of the possible explanations for this lack of conformity is the fact that the influence of savings on the manufacturing sector is not direct but requires a pass through investments. If other sources of finance are sought for industrial development, output can still increase. Moreover, the savings captured here are dominated by household savings and the reality is that a significant number of households mobilize funds outside the formal financial institutions; the other sources of savings have not been fully explored. The coefficient of XMP is negative and significant, according to theoretical expectations. This shows that the country's dependence on

imports still outweighs non-oil exports and is a clear indication that the manufacturing sector is below capacity, being unable to support exports sufficiently.

FCI exerts negative but significant effect on NOI. This could be due to the result of 'transfer paradox', since most of the foreign capital inflows are attracted by the oil sector and are mostly owned and operated by foreigners. By implication, most of the profits realised are repatriated back to their origin, thereby exerting little influence on the manufacturing sector. EXL exerts positive effect on NOI, but it is, however, not significant. This implies that, while foreign borrowing, if invested properly, has the potential of generating higher output, its impact is yet to be felt in the manufacturing sector. The coefficient of FCI reveals that for every ₦1 billion increase in investment in the sector, manufacturing output will decrease by ₦3.48 billion, while that of EXL shows that manufacturing output will increase by ₦7 million.

Adjusted R^2 indicates that SIG, XMG, FCI and EXL explain 96% of the variations in NOI. This is high, considering that the maximum value of R^2 is 1. Therefore, there is a strong relationship between NOI and the explanatory variables. The F-statistic validates the adjusted R^2 and shows that the explanatory variables together influence the outcome of NOI. From the result in table 5, the estimated *d* value is shown to be 1.46 suggesting that a decision cannot be made about the absence of positive autocorrelation. From the Durbin-Watson tables, the study finds that for 35 observations and 4 explanatory variables, d_L = 1.143 and d_U= 1.739 at the 5% level. Since the computed value of *d* lies between d_L and d_U, one cannot conclude that first order autocorrelation does or does not exist.

5. **Conclusion and Recommendations**

Having examined the savings and foreign exchange gaps in Nigeria, the conclusion is that both gaps are binding on the country's economy. The foreign exchange gap is exerting a strong negative force on industrial development. The effect of the savings gap, though unexpected, is positive. The structure and components of this total savings might need to be interrogated to determine the reasons for this lack of conformity. Foreign capital flows have also not been properly organised to improve the non-oil industrialisation process, in spite of the size of inflows that have been recorded. External loans have not been channelled to uses that would improve contributions of the industrial sector. In the light the reality that crude oil is no longer a sustainable source of wealth, the pursuit of industrialisation in Nigeria is very pertinent. There should be an industrial policy whose programme will deliberately improve non-oil sector production. The policy should:

1. Produce a plan to improve the mobilisation of resources via household savings and other sources of national savings, so they can be converted to investments in the industrial sector.
2. Target strengthening the linkages between domestic savings and investment by improving on stimulus packages for local manufacturing.
3. Discourage the heavy reliance on imported products. There should be domestic production that is geared toward import substitution and export promotion. The government needs to pursue this as a state objective prior to seeking private partnerships.
4. Note that external loans and foreign aid will continue to be sought. The onus is on the fund managers to keep investments viable by deliberately supporting the Nigerian industrialisation process.

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Appendix I: Data for analysis

Year	*NOI*	*SIG*	*XMG*	*EXL*	*FCI*
1981	34.08	-11.66	-12.5	2.33	0.33
1982	33.28	-9.64	-10.6	8.82	0.52
1983	34.84	-3.9	-8.6	10.58	0.28
1984	31.78	1.84	-7	14.81	0.36
1985	44.55	3.72	-6.6	17.3	0.4
1986	45.54	2.58	-5.4	41.5	0.7
1987	50.02	3.45	-15.7	100.8	2.5
1988	68.78	5.69	-18.6	134	1.835
1989	78.4	-3.03	-27.9	240.4	14.075
1990	89.9	-10.47	-42.4	298.6	5.165
1991	119.88	-7.45	-84.8	328.5	7.515
1992	160.3	-15.69	-139	544.3	51.31
1993	225.67	-11.89	-160.6	633.1	30.037
1994	360.65	2.88	-157.5	648.8	22.434
1995	418.22	-33.43	-732	716.9	81.725
1996	482.79	-69.55	-539.3	617.3	123.355
1997	552.13	-65.26	-816.5	595.9	115.186
1998	626.61	-42.2	-803.3	633	81.338
1999	720.85	46.01	-843	2,577.4	93.816
2000	833.84	54.13	-960.2	3,097.4	167.479
2001	998.1	115.91	-1,330.2	3,176.3	225.719
2002	1,136.51	92.41	-1418	3,932.9	251.489
2003	1,314.72	-210.14	-1,985.4	4,478.3	282.956
2004	1,531.73	-65.55	-1,873.7	4,890.3	271.741
2005	1,798.69	512.56	-2,694.9	2,695.1	834.29
2006	2,112.87	193.11	-2,974.9	451.5	819.09
2007	2,436.87	756.59	-3,712.7	438.9	991.24
2008	2,802.49	2,065.16	-5,067.3	523.3	1532.29
2009	3,216.81	2,712.93	-4,979.8	590.4	1395.95
2010	3,630.52	-3,228.8	-7453	689.8	1073.6
2011	4,587.01	-3,365.29	-10,082.4	896.8	1539.5
2012	5,660.31	-2,219.05	-8,887.3	1,026.9	1302.3
2013	7,317.96	-2,821.97	-8,309.2	1,387.3	1074.2
2014	8,785.7	-1,587.63	-9,585.3	1,631.5	948.1
2015	9,083.36	-2,711.77	-10,415.4	2,111.53	822

*Source***:** CBN Statistical Bulletin

Where:
NOI = Non-Oil Industrial Output (N'billion), SIG = Savings-Investment Gap (N'billion)
XMG= Export-Import Gap (N'billion), FCI = Foreign Capital Inflows (FDI + FPI) (N'billion)
EXL = External Loans (N'billion), **Note:* SIG and XMG are the authors' computation