RELATIONSHIP BETWEEN PUBLIC DEBT AND EXPORTS IN NIGERIA: A GRANGER CAUSALITY AND THRESHOLD ANALYSIS APPROACH

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ABSTRACT: *This paper examines the relationship between public debt and exports of Nigeria, ranging from the period 1981 to 2017. It analyses the trend of public debt and its measure of sustainability and how it relates to the export earnings of Nigeria. Granger causality was used to test the causality effect of public debts on Nigeria's exports (oil and non-oil exports). Also, threshold regression analysis was used to investigate the relationship between public debt and exports of Nigeria. Granger causality results show that the export of goods and services of Nigeria granger causes external debt while external debt does not granger cause the export of goods and services. Domestic debt has a statistically significant influence on exports of Nigeria, but a threshold exists for this to avoid the crowding-out effect and higher interest rate, which will influence exports negatively. Hence, for Nigeria as a nation to maintain the sustainability of its domestic debt in relation to exports, there is an existence of a maximum threshold limit of ₦6,538 billion, while external debt should be below ₦3,178 billion.*

KEYWORDS: Domestic debt, External debt, Oil export, Non-oil export, Threshold regression.

INTRODUCTION

Nigeria's economic performance as a nation since 1960, when she earned independence, has been uninspiring. Even though the country has delighted in a huge amount of foreign exchange resulting primarily from its oil and gas natural resources, economic growth has been weak. In contrast, the poverty incidence level has increased over the years (Omotor, 2021). Because of the trend of poverty, the scarce resources and the law of comparative advantage, nations depend on one another to foster their respective economies to accomplish sustainable economic development. The natural endowment that is meant to bring about the best level of development in most of the less developed countries is inadequate in supply, which results from their economies associated with problems of low domestic savings, stumpy tax revenue, low productivity and restricted foreign exchange earnings (Onafowora & Owoye, 2019). Therefore, less developed countries unavoidably route to public debt finance to tie the breach between the resources available to them and what is needed for economic development.

The assertion has prompted the necessary involvement of the government to rescue the nation through the provision of the needed huge capital flow necessary for large-scale production in substantial industries and for the delivery of other infrastructure (Imimole et al., 2014; Fagbemi & Adeosun, 2020). The need to borrow by the government, from external or domestic forces, could be traced to neoclassical growth model, which states that capital scarce countries, which are usually developing nations, need borrowing to overcome the capital accumulation problem, thereby increasing their capital to achieve a steady level of state and reasonable GDP per capita income (Abubakar, 2010; Babatunde et al., 2016). In other words, it can result in the improvement of people's welfare when it is utilised judiciously and moderately. On the other hand, it can also be catastrophic when utilised carelessly. It means that borrowing needs a lot of caution when the government is exercising it and should only arise in an appropriate economic situation. In the present and the past, some economists believe that during a recession, it is necessary for a nation to borrow in order to stabilise its economic activities since the government needs to maintain its income and expenditure, which have been affected by a decline in tax revenue (Cecchetti et al., 2011).

The rest of the paper is organised as follows: Section two covers the empirical literature review of Nigeria. Section three justifies the methodological considerations of the study. Section four discusses the empirical results, while the last section presents some concluding remarks, policy implications and further research directions on the subject under study.

LITERATURE REVIEW

Obadan (2004) clarifies the need for debtor countries to actively engage in export. He stated that in order to earn the needed currency for repayment and service of the borrowed fund, it is then necessary that the debtor country gets involved in export to the creditor country. However, Udoka and Anyingang (2012) view debt as both productive debt and deadweight debt. It is said that whenever a loan is obtained for the purpose of obtaining some sort of assets, such debt is categorised as underproductive, for instance, any fund borrowed for the purpose of acquiring machinery, electricity and power, refineries, etc. while, on the other hand, debt could be borrowed in other to finance combats or war and expenses on current expenditures which are categorised under deadweight debts.

Therefore, a country that obtains a foreign loan can import goods and services from abroad worth the value of the loan without necessarily having to export in exchange. But because it is necessary for the debt and the accrued interest to be repaid, it is now necessary for such a country to get involved in exporting goods and services without interchanging any form of imports (Omotor, 2021). Domestic loans might not put so much pressure on exchanging goods and services among countries. It is then important for the borrowing country to ensure that future savings should cover both the debt and interest (debt servicing) of domestic and foreign debt. Exports are the goods and services that are produced by one country and sold to other countries for foreign exchange that are utilised to purchase goods and services from another country; this leverages on specialisation (Jafiya, 2004).

Amadio (2018) explained that exports determine the amount of foreign reserve that is held in the nation's central bank since foreigners pay for exports in their currency or dollar. It then becomes useful for large foreign reserves in order to manage their own currency. Consequently, it makes foreign currency available for the market with its own currency. Therefore, it leads to a low cost of exports in other countries. Countries often make use of reserve currency to manage liquidity in order to use it for better control of inflation; this means more money chasing fewer goods. To control inflation, foreign countries purchase their own currency, leading to decreases in the money supply; consequently, it makes the local currency worth more (Fagbemi & Adeosun, 2020).

According to Ncube and Brixiova (2015), Africa's public debt is lower than in decades, and the overall fiscal policies look to be sustainable. The large decline in debt to GDP level when compared to other developing countries and some advanced countries could be traced to favourable real interest rate and growth differential, especially fiscal policy, which have contributed immensely to debt decline only in exporting oil countries. It has shown that African bonds' high subscriptions have favoured the continent, which has gained attention from international investors and hence, more borrowing to the African countries, which has raised the debt-to-GDP ratio and has created risk in relation to international sovereign bonds.

Even with thorough fiscal policies, there is still a need to strategize on effective debt management that will enhance growth. Though Africa's growth looks promising, the real interest looks to rise in the future while the difference in interest to growth could witness future shocks (Megersa, 2015; Adeosun, Gbadamosi & Odior, 2022). Despite this future challenge, Africa's access to international capital markets creates room for general growth through sustainable borrowing only if the funds are effectively and efficiently used for growth-enhancing expenditure (Ncube & Brixiova, 2015).

Debt is said to be sustainable when a debtor persists in servicing his debt without an abnormality correction to its income and expenditure. An insignificant debt-to-GDP is evidence that the country is on the right way regarding debt management; and thus, the economy's average output is adequate and can generate sufficient revenue that will sustain its debt obligations (Ozigbu 2018; Mustapha & Prizzon 2015). Teica (2012) argues that debt sustainability is all about servicing accumulated public debt at any point in time, and as such, it requires the government to be solvent and liquid enough to sustain such debt responsibilities. Sustainability of debt obligations banks heavily on government solvency ability, and the concepts are challenged by the issue of improper implementation (Wyplosz, 2011; Ozigbu, 2018).

Keynesian economics suggest that increasing government expenditure and tax rates decrease are seen as the best ways to stimulate aggregate demand. Although Keynes argues that this system is best applicable when recession bestows on the economy or low economic activity, it is an essential device for building the framework towards robust economic growth and achieving full employment. On the other hand, the ensuing deficits could be rewarded by an expansionary monetary policy during the boom that would follow the recession (Essien et al., 2016).

According to Eduardo et al. (2009), the exports to growth refer to as focal economic approach employed by most less developed countries to haste the route leading to industrialization, which in turn can prime higher productivity and efficiency Adamgbo et al. (2016) point out the negative consequences regarding servicing of debt in relation to the economic balance of payments, foreign reserves and exports which cannot be neglected while the standard measure of sustainability could be traced to the ratio of debt to exports, as well as debt servicing to exports and this, have served as a fundamental basis of assessments for a country's external debt stock and its servicing obligation. It could be seen that most of our export earnings are used for debt servicing, and this can be supported by the assertion made by Eduardo et al. (2009) that investing more on exports can shoot a nation to growth through the liberation of trade in the economy. They further explain that export-led growth drove developing nations to greater economic growth but resulted in imbalance as such that the current account differences that caused some growth might need to be changed in the near future.

According to Abiad et al. (2011), which studies the effect of the pattern of trade, that seems to be interesting because of the understanding of how trade acts as an important factor or input that can either positively or negatively affect the growth and welfare of an economy. Although, previous studies on the effects of crises were seen as not supporting one common effect that a crisis can have on trade, which means that there is no typical effect on both the exports and imports. This negative effect can explain from the angle that crises lead to a recession in the macroeconomy at large which make the domestic demand fall, affecting consumer consumption of imported goods negatively while the import of such countries can be reduced due to government policies such as increasing tariffs and charges, among others. This could stimulate domestic production. Furthermore, the crises give rise to a rate of exchange which could be costlier for the country from importing from another country. Consequently, the exchange rate reduces, which makes the crisis economy more attractive for countries to import at low prices .hence, and there is a need for an increase in the exports and structural change of the nation (Lund, 2014).

The above review indicates the debate around the relationship between public debt and export in various economies. The current study includes the threshold impact of public debt, which has not been examined in most of the existing literature. The research questions that this study focuses on are: (i) Is there a Granger causality between public debt and exports in Nigeria? (ii) Is there a threshold effect in the relationship between public debt and exports in Nigeria?

METHODOLOGY

This section entails the research methodology used to determine the relationship between public debts and exports of Nigeria from the year 1981 to 2017. It comprises the model specification, prior expectation, evaluation techniques, source of data, data analysis and contribution to knowledge.

To achieve the core objective of this project of analyzing the public debt impact in Nigeria exports and to ascertain the sustainability of the Nigeria debt relating to its oil and non-oil exports, this section adopted both the granger causality test and threshold regression analysis to investigate the relationship between public debt and exports of Nigeria. Granger causality was used to test the causality effect of public debts on Nigeria's exports (oil and non-oil exports). The adoption of the granger causality framework was informed by the main objective of the study.

In other to examine the causality relationship between public debt and exports, we disaggregate public debt into external debt and domestic debt. This will assist in recommending whether the domestic debt or the external debt helps to promote and enhance export activities in Nigeria. In order to test the causal relationships between exports and public debt, the Granger causality test was employed with the following model is specified:

For the joint hypothesis:

$$\beta 1 = \beta 2 = \ldots.. \beta n = 0$$

The dependent variable is the export earnings of Nigeria which could either be oil or non-oil, while explanatory variables are, Total public debt which can be either domestic debt or external debt in Nigeria.

The discrete Threshold Regression (TR) model is also adopted to estimate the relationship between public debt and export in Nigeria.

We begin with a standard multiple line regression models with T observations and m potential thresholds producing (m+1 regimes). For the observation regime j=0,1….. m have the linear regression specification.

$$Yt = Xt'\beta + Zt\beta j + \varepsilon t$$

Then X variables are those whose parameters do not vary across regimes, while the Z variables have coefficients that are regime specific

Suppose that there is an observable threshold variable qt and strictly increasing threshold values (y1<y2<….<ym) such that we are in regime j if and only if:

$$yj \le qt < yj+1.$$

Single threshold, two regime model becomes:

$$Yt = Xt'\beta + Zt\beta 1 + \varepsilon t \qquad if \infty < qt < Y1$$

$$Yt = Xt'\beta + Zt\beta 2 + \varepsilon t \qquad if\ y1 \le qt < \infty$$

In other to measure the relationship of public debt and export of goods and services of Nigeria, exports would be used, which can then be broken down into oil and Non-oil exports and public debt that can then be broken down into domestic and external debt was also used.

This work adopts empirical analysis, and the empirical entails the use of the Granger Causality test on Eviews to ascertain whether variables granger cause in one way or two way or does not granger cause in any way. Discrete Threshold regression was employed for analysis of the relationship of the variables, while threshold specification was used to test the existence of the threshold of the variables. Studies that have used threshold regression methods for public debt include Chudik, Mohaddes, Pesaran and Raissi (2017); Sanusi, Hassan, and Meyer (2019) and Nzeh (2020). However, none of these studies focuses on the impact on export. The data used are secondary from the Central Bank of Nigeria (CBN) statistical bulletin, various issues for 1981 to 2017.

ANALYSIS AND INTERPRETATION OF RESULTS

On completion of the introduction to the study, literature review, and research methodology, the next step is presenting and interpreting the empirical results and analysis. The analysis focuses on the relationship between public debt and the export earnings of Nigeria. The granger causality test was carried out to determine the causality effect of public debt and export as well as their determinants, such as domestic debt, external debt, and oil and non-oil exports. Threshold regression was employed to test whether there is a positive or negative relationship between public debt and export earnings of Nigeria, further view of threshold specification was done to determine whether a threshold exists or not.

Granger Causality Test

Based on the result in Table 1, the result of the causality test shows that the first regression "external debt does not granger cause export" prob value is above the level of significant of 0.05 while the second regression that "export does not granger cause external debt" fall below the 0.05 level of significance. Therefore, the first Null hypothesis that external debt does not granger-cause export cannot be rejected, while the second Null hypothesis that export does not granger cause external debt can be rejected. Therefore, it appears that granger causality runs in one way from exports to external debt of Nigeria.

Table 1: Causality between External Debt and Export

Pairwise Granger Causality Tests Date: 01/15/19 Time: 02:21 Sample: 1981 2017 Lags: 2			
Null Hypothesis:	Obs	F-Statistic	Prob.
EXTERNAL_DEBT does not Granger Cause EXPORT	35	1.15310...	0.3292...
EXPORT does not Granger Cause EXTERNAL_DEBT		3.76022...	0.0348...

Source: Author's computation.

The tests above have shown how significant export products are to Nigeria's economy in terms of its external debt payments. It could be traced that earning from exports is significant in debt payment because the fund realized from exports seems the fundamental source for servicing its external borrowing. Thus, the more Nigeria exports its goods, the less the external debt, which could lead to quick servicing of its debt as a nation. On the other hand, the lower the exports, the higher the likely external debt and unnecessary debt servicing burden of Nigeria.

The results of the causality between domestic debt and export are summarised in Table 2. The result shows that the first regression "export does not granger cause domestic debt" prob value falls below the level of significance of 0.05 while the second regression that "domestic debt does not granger cause export" falls above the 0.05 level of significance.

Table 2: Causality between Domestic Debt and Export

Pairwise Granger Causality Tests
Date: 01/15/19   Time: 02:23
Sample: 1981 2017
Lags: 2

Null Hypothesis:	Obs	F-Statistic	Prob.
EXPORT does not Granger Cause DOMESTIC_DEBT	35	3.52098...	0.0423...
DOMESTIC_DEBT does not Granger Cause EXPORT		17.3099...	1.0030...

Source: Author's computation.

Therefore, the first Null hypothesis that export does not granger-cause domestic debt can be rejected, while the second Null hypothesis that domestic debt does not granger cause export cannot be rejected. Therefore, it appears that granger causality runs in one way from exports to domestic debt of Nigeria.

The test above has shown how significant export earnings are to Nigeria's economy as a whole in terms of its domestic debt payments. It could be traced that earnings from exports serve as a major fund in Nigeria available as inflow to the economy, which seems the fundamental source for servicing its domestic borrowing and bridge the effect of crowding effect. Thus, the better exports of goods and services, the less the internal debt and quick servicing of its debt as a nation. On the other hand, the lower the exports, the higher the likely external debt and unnecessary debt servicing burden of Nigeria.

The results of the causality between external debt and export is summarised in Table 3. The result of the causality test shows that the first regression, "external debt does not granger cause oil export" prob value falls above the level of significance of 0.05 while the second

regression that "oil export does not granger cause external debt" falls below the 0.05 level of significance.

Table 3: Causality between External debt and Oil export

Pairwise Granger Causality Tests
Date: 01/15/19   Time: 09:29
Sample: 1981 2017
Lags: 2

Null Hypothesis:	Obs	F-Statistic	Prob.
EXTERNAL_DEBT does not Granger Cause OIL_EXPORT	35	1.85801	0.1735
OIL_EXPORT does not Granger Cause EXTERNAL_DEBT		3.83843	0.0328

Source: Author's computation.

Therefore, the first Null hypothesis that external debt does not granger cause oil export cannot be rejected, while the second Null hypothesis that oil export does not granger cause external debt can be rejected. Therefore, it appears that granger causality runs in one way from oil export to external debt of Nigeria and not on the other way.

The tests above have shown how the significance of oil products to Nigeria's economy as a whole in terms of its external debt payments. It could be traced that oil exports from the highest part of the total export of Nigeria, and as such, it is significant in debt payment because the fund for servicing external debt is derived from the export of oil of Nigeria. Thus, the more Nigeria's oil exports, the less the external debt of Nigeria. On the other hand, the lower the oil exports, the higher the external debt of Nigeria.

The results of the causality between external debt and export are summarized in Table 4

The result of the causality test shows that the first regression "Non-oil exports does not granger cause external debt" prob value is above the level of significant of 0.05 while the second regression that "external debtor does not granger Non-oil exports "above the 0.05 level of significant as well.

Table 4: Causality between and External debt and Non-oil export

Pairwise Granger Causality Tests
Date: 01/15/19   Time: 09:31
Sample: 1981 2017
Lags: 2

Null Hypothesis:	Obs	F-Statistic	Prob.
NON_OIL_EXPORT does not Granger Cause EXTERNAL_DEBT	35	1.83349	0.1773
EXTERNAL_DEBT does not Granger Cause NON_OIL_EXPORT		0.10819	0.8978

Source: Author's computation.

Therefore, the first Null hypothesis that external debt does not granger cause oil export cannot be rejected, while the second Null hypothesis that oil export does not granger cause export cannot be rejected as well. Therefore, it appears that granger causality does not run in any way from both sides of the non-oil and external debt of Nigeria.

It can then be concluded that non-oil export does not in any way granger cause external debt, and on the other hand, external debt does not granger cause non-oil export.

The tests above have shown how insignificance of non-oil products to Nigeria's economy as a whole in terms of its external debt payments. It could be traced that non-oil exports form a smaller portion of the total export of Nigeria, and as such, it is insignificant in debt payment because the fund for servicing external debt is derived majorly derived from the export of oil, not non-oil products.

The results of the causality between domestic debt and oil export is summarised in Table 5. The result of the causality test shows that the first regression "oil exports do not granger cause domestic debt" prob value is below the level of significance of 0.05 while the second regression that "domestic debt does not granger oil exports "is below the 0.05 level of significance.

Table 5: Causality between and domestic debt and oil export

Pairwise Granger Causality Tests
Date: 01/15/19   Time: 09:33
Sample: 1981 2017
Lags: 2

Null Hypothesis:	Obs	F-Statistic	Prob.
OIL_EXPORT does not Granger Cause DOMESTIC_DEBT	35	3.93224	0.0304
DOMESTIC_DEBT does not Granger Cause OIL_EXPORT		21.7223	1.E-06

Source: Author's computation.

Therefore, the first Null hypothesis that "oil export does not granger cause domestic debt" can be rejected, while the second Null hypothesis that "domestic debt does not granger cause export" can be rejected as well. Therefore, it appears that granger causality does run in two ways from both sides of oil export and domestic debt of Nigeria.

It can then be deduced that oil export do granger cause domestic debt while on the other hand, domestic debt do granger cause oil export as well.

The results of the causality between domestic debt and non-oil export is summarised in

Table 6. The result of the causality test shows that the first regression "Non-oil exports does not granger cause domestic debt" prob value is above the level of significance of 0.05 while the second regression that "domestic debt does not granger cause Non-oil exports is "below the 0.05 level of significance.

Table 6: Causality between Domestic debt and Non-Oil export

Pairwise Granger Causality Tests
Date: 01/15/19   Time: 09:37
Sample: 1981 2017
Lags: 2

Null Hypothesis:	Obs	F-Statistic	Prob.
NON_OIL_EXPORT does not Granger Cause DOMESTIC_DEBT	35	0.44725	0.6436
DOMESTIC_DEBT does not Granger Cause NON_OIL_EXPORT		24.3776	5.E-07

Source: Author's computation.

Therefore, the first Null hypothesis that Non-oil export does not granger cause domestic debt cannot be rejected while the second Null hypothesis that domestic debt does not granger cause non-oil can be rejected. Therefore, it appears that granger causality do run in one way of domestic debt and Non-oil export of Nigeria.

It can then be concluded that domestic debt do granger cause domestic debt, and on the other hand, non-oil export do not granger cause domestic debt.

The results of the causality between Total public debt and total export is summarised in

Table 7. The result of the causality test shows that the first regression "Total debt does not granger cause total export" prob value is above the level of significance of 0.05 while the second regression that "total export does not granger cause total debt" falls below the 0.05 level of significance.

Therefore, the first Null hypothesis that total debt does not granger cause export cannot be rejected, while the second Null hypothesis that total export does not granger cause total debt can be rejected. Therefore, it appears that granger causality runs in one way from exports to total debt of Nigeria and not on the other way.

Table 7: Causality between Total Public Debt and Total export

Pairwise Granger Causality Tests
Date: 01/15/19   Time: 09:44
Sample: 1981 2017
Lags: 2

Null Hypothesis:	Obs	F-Statistic	Prob.
TOTAL_DEBT does not Granger Cause EXPORT	35	2.07580	0.1431
EXPORT does not Granger Cause TOTAL_DEBT		6.50617	0.0045

Source: Author's computation.

It can then be deduced that export of Nigeria does granger cause total debt of Nigeria, whereas total debt does not granger cause exports. Exports can be used to predict total public debt.

The results of the causality between Total public debt and oil export is summarised in

Table 8. The result of the causality test shows that the first regression " Total debt does not granger cause oil export" prob value is less than the level of significance of 0.05 while the second regression that "oil export does not granger cause total debt" fall below the 0.05 level of significant.

Table 8: **Causality between Total Public Debt and Oil export**

Pairwise Granger Causality Tests
Date: 01/15/19   Time: 09:46
Sample: 1981 2017
Lags: 2

Null Hypothesis:	Obs	F-Statistic	Prob.
TOTAL_DEBT does not Granger Cause OIL_EXPORT	35	4.48600	0.0197
OIL_EXPORT does not Granger Cause TOTAL_DEBT		6.94564	0.0033

Source: Author's computation.

Therefore, the first Null hypothesis that public debt does not granger cause export can be rejected, while the second Null hypothesis that oil export does not granger cause total debt can be rejected as well. Therefore, it appears that granger causality runs in two ways from public debt to oil export of Nigeria and on the other way from oil exports to the public debt of Nigeria.

It can then be deduced that the public debt of Nigeria do cause oil exports of Nigeria on the other hand, oil export do have a cause-effect on total debt.

Discrete Threshold regression and specification

The results of threshold estimation of external debt on export is summarised in Table 9, the threshold value is categorized into three regimes.

The first regime shows 26 observations that agreed to external debt threshold limit is less than approximately ₦1,632 billion with a negative coefficient and not significant at 0.05 level.

The second regime with 5 observations shows that the external debt threshold is between ₦1,632 billion and ₦3,176 billion with a negative coefficient but significant at 0.05 level. While the third regime with 6 observations shows that the external debt threshold is equal to or greater than ₦3,176 billion with a positive coefficient which is statistically significant at 0.05.

Table 9: Threshold regression estimation of External debt on exports

Dependent Variable: EXPORT
Method: Discrete Threshold Regression
Date: 01/20/19   Time: 13:36
Sample: 1981 2017
Included observations: 37
Selection: Trimming 0.15, , Sig. level 0.05
Threshold variable: EXT_DEBT

Variable	Coefficient	Std. Error	t-Statistic	Prob.
EXT_DEBT < 1631.521 -- 26 obs				
DM_DEBT	0.537546	0.112817	4.764762	0.0001
EXT_DEBT	-0.248510	0.345928	-0.718386	0.4789
C	1.544779	129.4547	0.011933	0.9906
1631.521 <= EXT_DEBT < 3176.2909 -- 5 obs				
DM_DEBT	-0.052779	0.096123	-0.549083	0.5876
EXT_DEBT	-2.024176	0.730584	-2.770628	0.0102
C	5249.442	2097.520	2.502690	0.0189
3176.2909 <= EXT_DEBT -- 6 obs				
DM_DEBT	0.328861	0.037708	8.721268	0.0000
EXT_DEBT	0.986917	0.186270	5.298311	0.0000
C	-4938.276	765.5314	-6.450782	0.0000
Non-Threshold Variables				
CAPEX	1.504284	0.410060	3.668449	0.0011
REVENUE	1.028144	0.059226	17.35972	0.0000

R-squared	0.996535	Mean dependent var	4429.269
Adjusted R-squared	0.995202	S.D. dependent var	5367.485
S.E. of regression	371.7867	Akaike info criterion	14.91629
Sum squared resid	3593858.	Schwarz criterion	15.39521
Log likelihood	-264.9514	Hannan-Quinn criter.	15.08513
F-statistic	747.7375	Durbin-Watson stat	2.315138
Prob(F-statistic)	0.000000		

Source: Author's computation.

The results of the threshold specification of external debt on export are summarised in Table 10. The specific threshold value for external debt is stated.

The threshold test specification is based on sequential F- statistic and therefore, Nigeria's external debt is significantly positive with exports of goods and services but ₦3,176 billion threshold limit exists for this positive relationship. Hence, Nigeria must not exceed such external debt limit to remain sustainable. It then means, anytime external debt gets beyond ₦3,176 it will have a negative effect on exports and economic growth as a whole.

It can be deduced that the external debt threshold falls within the third regime as a result of 100% positive significance and positive coefficient, but this is subject to confirmation from the threshold.

Specification. The threshold for external debt to the export exists at a value limit of ₦3,176 billion.

Table 10: Threshold regression specification of External debt on exports

Sequential F-statistic determined thresholds:			2
Threshold Test	F-statistic	Scaled F-statistic	Critical Value**
0 vs. 1 *	15.33969	46.01907	13.98
1 vs. 2 *	9.377240	28.13172	15.72
2 vs. 3	0.764846	2.294538	16.83

* Significant at the 0.05 level.
** Bai-Perron (Econometric Journal, 2003) critical values.

Threshold values:

	Sequential	Repartition
1	1631.521	1631.521
2	3176.2909	3176.2909

Source: Author's computation.

Therefore, there is a positive relationship between external debt and exports of Nigeria, i.e., if external debt increases, ceteris paribus export of Nigeria increases because external debt impacted on exports positively within the limit threshold specification of ₦3,176.

The results of the threshold estimation of internal debt on export are summarised in Table 11. The threshold value is categorized into two regimes.

The first regime shows 31 observations agreed to an internal debt threshold limit is more than approximately ₦6,538 billion with a positive coefficient and significant at 0.05 level. The second regime with 6 observations shows that the domestic debt threshold is less or equal to ₦6,537 with a negative coefficient and significant at 0.05.

The first regime means that if the domestic debt is less than ₦6,538 billion, there will be a positive impact on exports of Nigeria. The second regime means that if the domestic debt is greater or equal to ₦6,538 billion, there will be a negative impact on exports of Nigeria. Specific domestic debt threshold regarding exports as dependent variable is subjected to confirmation of threshold specification view below.

Table 11: Threshold regression estimation of Domestic debt on exports

Dependent Variable: EXPORT
Method: Discrete Threshold Regression
Date: 01/20/19   Time: 13:43
Sample: 1981 2017
Included observations: 37
Selection: Trimming 0.15, , Sig. level 0.05
Threshold variable: DM_DEBT

Variable	Coefficient	Std. Error	t-Statistic	Prob.
DM_DEBT < 6537.536 -- 31 obs				
EXT_DEBT	-0.251214	0.067707	-3.710335	0.0009
DM_DEBT	0.796341	0.192232	4.142606	0.0003
C	2.111899	131.3840	0.016074	0.9873
6537.536 <= DM_DEBT -- 6 obs				
EXT_DEBT	3.285231	0.559550	5.871205	0.0000
DM_DEBT	-2.210883	0.444598	-4.972772	0.0000
C	14890.27	3092.699	4.814652	0.0000
Non-Threshold Variables				
CAPEX	0.745676	0.472975	1.576564	0.1257
REVENUE	1.004236	0.085996	11.67776	0.0000

R-squared	0.992908	Mean dependent var		4429.269
Adjusted R-squared	0.991196	S.D. dependent var		5367.485
S.E. of regression	503.6411	Akaike info criterion		15.47042
Sum squared resid	7355976.	Schwarz criterion		15.81872
Log likelihood	-278.2027	Hannan-Quinn criter.		15.59321
F-statistic	579.9796	Durbin-Watson stat		1.951047
Prob(F-statistic)	0.000000			

Source: Author's computation.

The results of the threshold specification of domestic debt on export are summarised in Table 12. Threshold test specification is based on sequential F- statistic, and therefore, Nigeria domestic debt is significantly positive with exports of goods and services but ₦6,538 billion threshold limit exists for this positive relationship. Hence, Nigeria must not exceed such an internal debt limit to remain sustainable. It then means, that anytime internal debt gets beyond ₦6,538 billion, it will have a negative effect on exports and economic growth as a whole.

It can be deduced that the domestic debt threshold falls within the first regime as a result of 100% positive significant and positive coefficient. The threshold for internal debt to the export exists at a value limit of exactly ₦6,538 billion.

Table 12: Threshold regression specification of Domestic debt on exports

Sequential F-statistic determined thresholds:			1
Threshold Test	F-statistic	Scaled F-statistic	Critical Value**
0 vs. 1 *	15.76938	47.30813	13.98
1 vs. 2	4.977773	14.93332	15.72

* Significant at the 0.05 level.
** Bai-Perron (Econometric Journal, 2003) critical values.

Threshold values:

	Sequential	Repartition
1	6537.536	6537.536

Source: Author's computation.

Therefore, there is a positive relationship between domestic debt and exports of Nigeria, i.e., if internal debt increases ceteris paribus, export of Nigeria increases because external debt impacted on exports positively within the limit threshold specification of ₦6,538 billion.

CONCLUSIONS AND RECOMMENDATIONS

This study investigates the causal relationship between export and external debt and export and domestic debt, including the threshold existence of the domestic and public debt. On the main two variables of public debt and export, causality reflected that public debt does not granger cause total exports while total export granger cause public debt of Nigeria. The data analysis shows that exports help in the prediction of public debt in general. It clearly shows that the export of goods and services has a positive significant relationship with total public debt, and as such, a percentage change in exports will influence to another change in public debt of Nigeria. It is exports that can predict public debt of Nigeria as it runs in one way but public debt cannot predict exports of Nigeria.

This study contributes methodologically to the threshold regression that was used for this study, which revealed that Nigeria's public debt is positively signed and statistically significant to the value of export of goods and services that lead to economic growth. Although external debt follows the same trend as it is positively signed and statistically significant to the value of exports earning in Nigeria that lead to economic growth, however, it shows that for Nigeria debt to remain sustainable there is existence of maximum external debt threshold that should be maintained in relation to exports. Furthermore, threshold specification in this research has suggested that limit exist for the positive relationship between public debt and export of goods and services in Nigeria. Also, although there is a significant positive relationship between external debt and export of Nigeria but limits exist for sustainability of its external debt. Therefore, limit of ₦3,178 billion must not be exceeded for external debt in relation to Nigeria

exports. Breaching the threshold will lead to unnecessary burden of accumulated external debt of Nigeria and will be unsustainable looking at external debt to export.

The study concluded that the rate at which public debt influence export of goods and services is very high and significant to economic growth. Also, the contribution made so far by external debt to export of goods and services cannot be overemphasized and as such there is need to properly manage Nigeria public debt within the threshold of export to debt so as not to create unnecessary burden on the nation. Because breaching the threshold limit might lead to burden that will have negative effect on private investments because of crowding effect that might lead to higher interest rate, high tax rate to citizen and discouragement it might give to foreign direct investors.

The research work concluded that export of goods and services of Nigeria have a causal relationship with public debt as a whole hence it serves as a basis of predicting public debt but public debt do not have a causal relationship with public debt. Exports of goods and services have a causal relationship with external debt, but external debt does not have a causal relationship with exports of goods and services, while exports of goods and services do not have a causal relationship with domestic debt, but domestic debt has a causal relationship with external debt. The current debt of Nigeria is not sustainable in relation to its current exports of Nigeria.

The external debt of Nigeria as at 2017 is ₦5,787.51 billion while the econometrics result using threshold regression is ₦3,176 billion and such Nigeria external debt is currently not sustainable. Also, the domestic debt of Nigeria is not sustainable as well in relation to its Nigeria export earnings because the current domestic debt of Nigeria as at 2017 is ₦12,578.80 billion while the econometrics result from threshold regression is ₦6,538 billion and as such Nigeria domestic debt is currently not sustainable.

Therefore, this study recommends that the government through its fiscal policy should ensure those borrowed funds are expended on productive activities rather than unproductive activities. There should be a goal to achieve before borrowing and the money must should be invested on long term projects that will bring future revenue to the government in servicing the loan. Furthermore, government borrowed funds should be invested in diversifying the economy such as Agriculture, mining, manufacturing, power etc. that will boost economy exports and led economic growth. There is need to invest borrowed fund to non-oil export trade because larger portion of Nigeria export is from oil export, hence danger loom for the country if non-oil export trade is not quickly addressed. The need to expended borrowed fund on non-oil products is solution that could defend the nation during any oil shock and this would be backbone during oil shock and means of generating more revenue to the government.

Practically, since export earning predicts what the total debt of Nigeria could be, it is then essential for government to boost its exports of goods and services as well as ensuring external and domestic debt are reduced to ₦3,176 and ₦6,538 respectively. There is a need for further research on the sustainability of public debt as it relates to government expenditure, both the capital expenditure and recurrent expenditure of Nigeria and how government can lead its economy to grow through internal generated revenue and still sustain its public debt (both domestic and external debt).

Future studies can examine the effect of exchange rate on public debt most especially external debt and the relationship it has with export.

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