
DEBT BURDEN AND SUSTAINABLE DEVELOPMENT: AN EVALUATION OF THE NIGERIA RAILWAY MODERNIZATION PROJECT

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ABSTRACT: *This work investigated the sustainability or otherwise of the Nigeria public debt as it relates to the Nigeria railway modernization project. We set up two hypotheses: Ho₁: That the current investment effort by the Nigeria government in the Nigeria railway modernization project has led Nigeria into huge external unsustainable public debt. Ho₂: That Nigeria public debt stock is unsustainable. Two measures as found in the literature: debt servicing-to-export ratio and debt servicing to-GDP ratio were tested against data obtained from the CBN Statistical Bulletin to validate or invalidate our hypothesis. The analysis give an inconclusive result– Debt servicing-to-export ratio gave an overwhelmingly negative result, while the debt servicing-to-GDP was positive. We are therefore unable to confirm the sustainability or otherwise of Nigeria public debt as it relates to the railway modernization project. However by conjecture, these authors believe that the Nigeria public debt relative to the Nigeria modernization project is not likely to be sustainable. We recommend that government at all levels increase surveillance over borrowed fund for infrastructural development from being diverted to private use.*

KEY WORDS: sustainable development, public debt, debt service, debt burden, railway modernizations project.

INTRODUCTION

Debt burden and sustainability: An Overview.

In the most recent past decades, in particular those of the 90s and 2000s, there have been huge outcries by Nigerians against the borrowing binge of the Federal and State governments, not excluding the local government authorities though. In an editorial; Debt is sinking the economy (2021, August 6), the Punch Newspaper online edition, stated; “the provision to spend ₦14.6 trillion in debt repayment in three years under the Medium-Term Expenditure Framework and Fiscal Strategy Paper 2022-2024 comes amid raising debt serving obligations that swallowed 97 per cent of oil revenue...” Ajaiyesimi (2021 August 20) “Stop borrowing dollar, borrow sense: Naira on its way to a thousand to a dollar.” The Cable Online newspaper. Ajaiyesimi expressed the fear of the possibility that the naira could slip to an exchange rate of one thousand naira to a dollar. All over the place, the fear of a sinking naira due to Nigeria public debt burden is palpable.

As at December 2020, Nigeria’s public debt profile was in excess of US\$86 billion United State dollar, this being some 38 per cent of Nigeria’s total external debt Ighodalo (2021). By the end of

the first quarter of 2021, the Debt Management Office (DMO) puts Nigeria's total public debt profile at (\$87,237 million US dollar) or ₦33,107,247.23, some 21.13 percent of GDP. <https://qz.com/africa/1958964/> citing the Nigeria Debt Management Office (DMO), Ajaiyesimi stated that as at March 31, 2020, Nigeria is indebted to China alone to the tune of \$3.121 billion US dollar. This represents some 4 per cent of total Nigeria public debt profile, and 11 per cent of her total external debts.

A nation's public debt profile at 21.13% of her annual GDP and perhaps more, definitely justifies all the concerns expressed by her citizens – Nigerians. Much of the worries is built mostly around issues of economic sustainability. The continuous depreciation of the naira against world major currencies (currently at ₦540 to the dollar) and a two-digit inflation are substantial sources of true worry. But as Professor Seymour Harris cited by (Buchanan 1958) rightly pointed out, "Many a citizen will never be able to understand fully the problem of the public debt, for it is too complicated for the average layman."

Background

The continuous worsening macroeconomic indicators in the Nigeria economy: – depreciating naira exchange rate, poor internally generated revenue, poor saving rate, the high operating and other ancillary costs of the Nigeria railway corporation etc. could jeopardies the sustainability of the Nigeria railway modernization projects. Besides the operating deficits, history of the Nigeria railway corporation as cited by Ataguba has it record that the Corporation, during the past 55 years has being unable to meet its operating costs, and worse still, gone burst twice even in the face of huge chunks of public financing. (<https://railbus.com.ng/index.php/firms/nigeria-with-operating-deficit-of-n7-10b-railways-cant-repay-loans-without-reforms-rowland-ataguba/its>).


In a newspaper article, "Economic Sustainability Examples that Inspire Change" (2021, April 4), Population Media Center, defines economics sustainability as "practices that support the long-term economic development of a company or nation while also protecting environmental, social and cultural elements." The official definition though is: "the idea that human societies must meet their current needs without compromising the ability of future generations to meet their own needs."(<https://youmatter.world/en/definition/definitions-sustainable-development-sustainability/>).

Conceptualizing sustainable development as stated here raises two legitimate, yet fundamental issues about the sustainability of recent borrowings and investments in the nation's public transport sector – the railway modernization project. Ataguba, a London-based international strategic railway delivery specialist questioned; the viability of the Nigeria Railway Corporation investments. He noted; "with operating deficit of N7-10bn, the Nigeria Railways Corporation can't repay its loans without reforms." (<https://railbus.com.ng/index>). Much of the Nigeria- China debts incurred in recent decades were channeled into the implementation of the Nigeria railway modernization projects. Against this backdrop we ask: is the project sustainable?

As of the end of May 2018, Nigeria had cumulatively borrowed US\$2,267. 32 (two hundred million, two and sixty-seven thousand North American dollar and thirty-two cent) from China, all

directed towards the financing of her railway modernization projects in various faces (see Table 1.1 below for details). This excludes the US\$ 1.3 billion US dollar that funded the 156-kilometer Lagos– Ibadan standard gauge rails tracks recently completed. As it were, these debts are part of the ₦31.08trn. sovereign debt burden currently weighing down on the country’s fiscal position. Not only has the Nigeria public debt profile approached critical threshold of irrationality, they are a ‘burden’ and a national embarrassment to both present and future generations of Nigerians. They could be in violation of the debt regulations stipulated in the 2007 Fiscal Responsibility Act of the Medium-Term Expenditure Framework (MTEF). Infrastructural loans from China, in particular those for the modernization projects of the Nigeria Railway Corporation appears unsustainable. Of the total US\$3.121 billion, (<https://www.dmo.gov.ng/facts-about-chinese-loans-to-nigeria>), Chinese loans to Nigeria, as at March 31, 2020, the railway modernization projects had consumed some US\$1.760 billion, representing 56.387 per cent of the Nigeria total public debt. The sustainability of these debts constitute substantive fiscal problem to Nigeria economy. The Abuja–Kaduna root alone incurred an average monthly overhead bill of ₦100 million, excluding staff monthly emolument of ₦400m paid by the Federal Ministry of Finance (FMF). This project in turn is only able to generate an absolutely piddling US\$1m a year towards repaying a US\$500m interest bearing loan with a 20year tenor.

Table 1.1 STATUS OF LAONS OBTAINED FORM CHINA EXIM AS AT MARCH 31 2020


DEBT MANAGEMENT OFFICE
NIGERIA

STATUS OF LOANS OBTAINED FROM CHINA EXIM AS AT MARCH 31, 2020
AMOUNTS IN MILLIONS OF USD

S/N	Project Description	Loan Amount	Agreement Date	Terms and Conditions				Amount Disbursed		Payment		Amount Outstanding
				Interest Rate (p.a.)	Grace Period	Maturity Date	Tenor	Amount	Percentage	Principal	Interest	
1	Nigerian National Public Security Communication system Project	399.50	20-Dec-10	2.50%	7 Years	21-Sep-30	20 Years	399.50	100.00%	76.83	84.92	322.67
2	Nigerian Railway Modernization Project (Idu- Kaduna section)	500.00	20-Dec-10	2.50%	7 Years	21-Sep-30	20 Years	500.00	100.00%	96.15	74.52	403.85
3	Abuja Light Rail Project	500.00	7-Nov-12	2.50%	7 years	21-Sep-32	20 years	500.00	100.00%	19.23	60.63	480.77
4	Nigerian ICT Infrastructure Backbone Project	100.00	5-Jan-13	2.50%	7 years	21-Sep-32	20 years	100.00	100.00%	0.00	9.38	100.00
5	Nigerian Four Airport Terminal Expansion Project (Abuja, Kano, Lagos & Port Hacourt)	500.00	10-Jul-13	2.50%	7 years	21-Sep-34	20 years	455.28	91.06%	0.00	40.58	455.28
6	Nigerian Zungeru Hydroelectric Power Project	984.32	28-Sep-13	2.50%	7 years	21-Sep-33	20 years	518.24	52.65%	0.00	19.28	518.24
7	Nigerian 40 Parboiled Rice Processing Plants Project (Fed. Min. of Agric & Rural Dev.)	325.67	26-Apr-16	2.50%	7 years	21-Mar-36	20 years	0.00	0.00%	0.00	0.00	0.00
8	Nigerian Railway Mordernization Project (Lagos - Ibadan section)	1,267.32	18-Aug-17	2.50%	7 years	21-Sep-37	20 years	759.84	59.96%	0.00	19.11	759.84
9	Nigeria Rehabilitation and Upgrading of Abuja - Keffi - Markurdi Road Project	460.82	18-Aug-17	2.50%	7 years	21-Sep-37	20 years	80.64	17.50%	0.00	1.84	80.64
10	Nigeria Supply of Rolling Stocks and Depot Equipment for Abuja Light Rail Project	157.00	29-May-18	2.50%	7 years	21-Mar-38	20 years	0.00	0.00%	0.00	0.00	0.00
11	Nigeria Greater Abuja Water Supply Project	381.09	29-May-18	2.50%	7 years	21-Mar-38	20 years	0.00	0.00%	0.00	0.00	0.00
Total								3,313.50		192.21	269.68	3,121.29

Source: Debt Management Office


18/6/2020

Source: Nigeria Debt Management Office (DMO)

Summarizing Ataguba stated, “In sum, to suggest that each year the NRC could pay N400m to the FMF with the left hand while collecting N5bn or more from the same FMF with the right hand is like gaming the system.” The Nigeria Railway Corporation is older than the present-day modern Nigeria nation State. The first railway was constructed under the British colonial administration

in 1898 before the amalgamation of the modern Nigeria in 1914. Over these years, the corporation has remained the “sick man” of modern-day corporation. With the collapse of the 1955 Railway Corporation Act, its woes depend when it declared bankruptcy in 1988. Other attempts to resuscitate the ailing corporation failed woefully (Adepuju 2021).

Against this backdrop, we have structured this work to examine the sustainability of the Nigeria public debt profile with particular reference to the implementation of the Nigeria Railway modernization project. Section two reviewed current literature, section three, the methodology which includes data construction. section four presents the data and analyses our findings, while section five summarizes and concludes the work.

Conceptualization and general discussion

Concepts applicable in this work: sustainable development, public debts, and debt sustainability etc. are fairly ubiquitous and easily understood amongst economists, yet the need exist to further clarify them. Definitions and contextual applications of these parameters vary largely and depends on context and circumstance. Sustainable development is a trickier concept to clarify following the many variations of its definition. The 1987 Brundtland Commission Report described sustainable development as, “development that meets the needs of the present without compromising the ability of future generations to meet their own needs.” It further added four dimensions to sustainable development: - society, environment, culture and economy. This work conceptualized sustainable development in the same dimension, but emphasized the economic sustainability of the three dimensions.

Debt Burden

Literally, <https://pocketsense.com/debt-burden-7746789.html> defines debt burden “as the amount of money you owe relative to the amount of money it costs you to service your debt”. A second definition provided by <https://financia.dictionary.thefreedictionary.com/burden+of+debt> conceptualizes “debt burden as: “interest charges on debt that arise as a result of borrowing by individuals, firms and governments.” In the case of government, “interest charges on the national debt are paid for out of taxation and other receipts.” Given that such debt are principally domestic. Classical economists, for example Buchanan (1958) cited by Wagner (2013) considers the burden in debt repayment as arising from the actual cross boarder resources transfer involved in it. In this work, debt burden is similarly defined though, with the addition that, public debt burden is a phenomenon that drags down economic performance of a nation following the cross-boarder resource transfer. In financial context, costs associated with a debt includes interest charges, fees for maintaining the debt and occasionally, extra fees such as late payment charges all of which add to a national debt burden.

Public debt

Public debt is “how much a country owes to lenders outside of itself. These can include individuals, businesses, and even other government agencies. The term "public debt" is often used interchangeably with the term sovereign debt. <https://www.thebalance.com/what-is-the-public-debt-3306294>. Public debt usually only refers to the national debt. Some countries also include

the debt owed by states, provinces, and municipalities. Therefore, be careful when comparing public debt between countries to make sure the definitions

Nigeria's public debt profile is variously designated. Ighodalo et al (2021), stated that as at December 2020, Nigeria's total public debt stood at a startling US\$86 billion, some 38 per cent of it being externally owed. The debt management office (DMO) on the other hand has both external and domestic at US\$87,239.12 as at March 31, 2021. Way back 2004, The New Age Editorial of November 3, cited by Babalola SAN (2020), stated "... a country that borrowed US\$11 billion and has so far paid back US\$32 billion is still owing US\$34 billion. That means every dollar borrowed had been repaid almost three times over, yet about three times the initial borrowed amount is still being owed, creditors are having their cake and eating it in a vicious arrangement designed by IMF and its allies, the effect of which stifles economic growth and development..."

Infrastructural loans from China, in particular, those for the modernization project of the Nigeria Railway Corporation appears unsustainable. Of the total US\$3.121billion, (<https://www.dmo.gov.ng/facts-about-chinese-loans-to-nigeria>), Chinese loans to Nigeria, as at March 31, 2020, the project had consumed some US\$1.760 billion, representing 56.387 per cent of the total Nigeria public debt. The sustainability of these debts constitute substantive fiscal strain to the Nigeria economy. The Abuja–Kaduna route incurred an average monthly overhead bill of ₦100 million, excluding staff monthly emolument of ₦400m paid by the Federal Ministry of Finance (FMF). This project in turn is only able to generate an absolutely piddling US\$1m a year towards repaying a US\$500m interest bearing loan with a 20year tenor.

As Ataguba (*ibid*) pointed out, "in the final analysis, the NRC's operating deficit may be as much as ₦7– 10bn per annum..." The revenue accruing to this project is not only suboptimal, but practically unable to service its operational costs, let alone become sustainable. These projects are already in deficit, its unsustainability could be the more palpable as potential consumers of train service offerings see its passenger price as outrageous, unaffordable and restrictive. Given this perception, it connotes that few persons are willing to patronize the railway transport services which adds more woes to the already traumatized corporation and makes the project obviously unsustainable.

Though recent academic literature (Ugunlana undated, Okeowon et al. 2019; Aladejani et al. 2021, Games 2021, Abioye et al 2016) all addressed Nigeria public debt burden and its sustainability under various titles, none is related to the current case of the Nigeria railway modernization project. We examined the hypothesis: is the Nigeria Railway modernization projects truly unsustainable? Why then is the borrowing and investments in a project not likely to produce returns, not even in the unforeseeable future. This is the focus of this work - to investigate the sustainability of the Nigeria external public debt as it relates to the Nigeria railway modernization projects.

Research Hypothesis

Against the backdrop of the various issues raised in the introduction through the problem statement, we generate the following hypothesis to guide us through this study and to further the essence of this research effort.

Hypotheses.

Ho: That the current investment effort by the Nigeria government in the Nigeria railway modernization project has led Nigeria into huge external unsustainable public debt.

Ho : That Nigeria public debt stock is unsustainable

REVIEW OF EXTANT LITERATURE

In this section we reviewed existing literature which also included classical theories of public debt and its implications on national economic growth and development. We also reviewed recent works in area of sustainability of national debt. This enabled us to spot gaps in existing literature which this work hopes to provide the needed closure. We started the review first by an overview of the classical theories of public debt burden as propounded by classical economists, we start with James Buchanan (1958).

Theoretical Review

The New Orthodoxy theory– though lots of theories explain the menace of public debt and its economic consequences, the dominant current theory of public debt is the “new orthodoxy.” theory of debt (Buchanan 1958.) Following Buchanan, the new orthodoxy theory of public debt is based upon three basic propositions and they are:

- ❖ The creation of public debt does not involve any transfer of the primary real burden to future generations.
- ❖ The analogy between individual or private debt and public debt is fallacious in all essential respects.
- ❖ There is a sharp and important distinction between an internal and an external public debt (*ibid*).

Proposition 1 - “We cannot mortgage the future”

Under this proposition, the theory denies the generally assumed position by most economists, that current public debt transfers a burden of whatsoever kind to future generations. It argued; “government borrowings *only* transfer current purchasing power from the hands of individuals or institutions to the government.” The utilization of such purchasing power so acquired by government employs resources in the same general time frame in which the borrowing occurred.” Insofar as these resources are drawn from private employments, the full opportunity cost, the real cost, of the public expenditure is held to be borne by those individuals living in the initial or “current” time period.”

It concludes by comparing public borrowing with income tax. “The financing of a public expenditure by borrowing is little different from financing it by taxation. In either case, the “real” burden is borne currently. Any shifting of the primary real burden of public expenditure over time by changing the method of financing is impossible and fallacious.” By this position, the new orthodoxy theory of public debt effectively denies any shifting of responsibility for current

borrowing to future generations, in which case the wages of any current public debts are bored and sustained by current generation and not transferred to any future generation as claimed.

Proposition 2 - “The False Analogy”

Proposition 2 of the New Orthodoxy theory paraphrased the *false analogy* between private and public finance accounting standards. Buchanan (*ibid*) stated; “This analogy is fundamentally fallacious, especially when problems of internal public debt are considered.” Against the backdrop of proposition two, there exist a conceptual distinction between personal and public accounting standards which must be made clearer and understood properly. It noted, interests which are charged on individual or private institution debts, are necessary to service a private debt and it represents a true burden. According to Buchanan (*ibid*), extending the family and institutional accounting standards to internal public debt accounting is “fallacious”. He argued that interest charged on individual or private institution debt are a real burden because it could either reduce consumption spending or savings of the private institution or the individual, and the purchasing power transferred to the holder of the debt claim.

Private debt conceived in the sense stated above is analogous to an external public debt. “But if the public debt is internal, the holders of the debt claims are from the same group of individuals as the taxpayers. No real net income is transferred outside the budget of the collective entity. ” Buchanan (*ibid*) stated, the individual, in creating a debt, is deliberately placing an obligation on his expected real net income over future time periods. He is effectively transferring or shifting the burden of payment for whatever expenditure undertaken to future time periods. He is changing the time shape of his income flow. This being acknowledged, he should exercise caution and restraint in making expenditures which can only be financed by borrowing. It is entirely possible that excessive borrowing can place such a weight on future income that the individual may be threatened with bankruptcy.” (*ibid*).

In public debt situation though, these conclusions do not hold with equal force when internal public debt is considered. The resources employed in generating the expenditure initially come from within the economy, and are used up immediately in the same time frame, so there is no shifting of the primary real burden forward in time. Given this situation, the borrowing prudence preached to private individuals or institutions is not fully applicable to the national government, though subordinate governmental units (state and local in the case of Nigeria) are acknowledged to have similar vulnerability in all relevant respects to the private individual.”

All of this suggests that “living beyond its income” is not an overriding consideration for the national government. The excess of expenditure over revenues is nothing to cause a special concern, and this condition may be necessary and beneficial during certain phases of the business cycle. The rule of balance budget which properly dictates the behavior of the private family may represent an especially dangerous myth when it is applied to national governments. Deficit financing and, by implication, debt creation, may be a permanent and necessary feature of the modern public economy.” (*ibid*) Public debt places on individuals of “future” generations nothing more than obligations to make some transfers among themselves. There can be no real sacrifice of resources involved in this transfer. This transfer is not comparable with the sacrifice of

resources borne during the period when the debt was originally created and the public expenditure carried out.

Proposition 3: *Internal and External Debt*

Propositions 1 & 2 presented the views of the new orthodoxy public debt theory as it applies to internally held public debt. The analysis changes though when the public debt is foreign or externally owed. In situation of foreign or externally held public debt, Buchanan (*ibid*) stated, “there is the real possibility of shifting the primary real debt burden forward in time since there need be no net domestic sacrifice of resources during the period of debt creation.”

Furthermore, the theory argued that the payment of interest accruing to foreign or externally held public debt represents a true burden because in this instance, “the domestic *income* stream” *accruing to the nation* “is reduced by the necessity of transferring resources abroad.” Secondly future generations will find their incomes streams drastically reduced by such transfers. And finally, when debt repayment is to be made, it will require the transfer of domestic resources to foreign debt claim holders, in which case, this real burden of repayment is also borne by future generations. External public debt may be a signal of fiscal irresponsibility, something which must be avoided when possible. The rule of budget balance should be replaced by one which reads: Taxes plus internal debt should equal public expenditures.

Contemporaries of James Buchanan as: Abba Lerner, Alvin Hansen, James Tobin, Ezra Mishan, Earl Rolph, Richard Musgrave among others, rejected some of the constructs of Buchanan’s new orthodoxy theory (Wagner 2013). These scholars objected to “the claim that public debt in contrast to tax financing transfer the cost of collective activity to future generation” (*ibid*). Critics in unison “claimed that public debt is equivalent to taxation in that the cost of public activity was always borne in the present as illustrated in aphorism”, “we owe to ourselves.” Critics though agreed with Buchanan that public debt reduces capital stocks and lowers real net income accruable in the future.

Smith and Ricardo’s theory of public debt burden

Tsoufidis (2007) opened his review of the classical economic theories of public debt with a confession: “these theories are usually considered inappropriate for modern economies, and as a result they are usually ignored even in books in economic thoughts.” Starting with Smith, Tsoufidis (*ibid*) stated that Smith denounced budget deficits in the strongest of terms, “governments should not run budget deficit because accumulation of debt is considered “pernicious” for the nation even if all of it is owed to domestic investors.” Continuing, Smith contended, “the payment of interest on public debt is like the “right hand which pays the left.” In Smith’s opinion, soon the need to redeem the debt, there will be increased taxation causing the flight of domestic capital and the devaluation of domestic currency with negative effects on the remaining domestic producers (Smith 1937 pp. 927 – 9) cited by (Tsoufidis 2013).

Like Tsoufidis (*ibid*) Bilan (2016), surmised classical economist theorists views on public debt drawing largely on the opinions of well-known classics (A. Smith, R.T Malthus, D. Ricardo, J.S Mill or J.B Say) all whose views, “appear to be unfavourable to public borrowing.” These

scholars, all true faithful of the “laissez fair” economic principles of and market forces mechanism, see the state only being relevant in policy dissimulation that ensures the smooth running of the economic relation (market) and not meddling in the market. Classical economists’ theorists see public expenditure in relation to government traditional functions (public order, national defense, diplomatic relation etc.) as unproductive which should be avoided.

Arguing against state indebtedness (Smith 1904) cited by Bilan (*ibid*) stated, “Indebtedness delays the natural progress of a nation towards wealth and prosperity since, in this way, resources that would have received productive destinations in the private sector are diverted by the state to cover its unproductive expenditures, thus being wasted without any hope of future reproduction.” Thus, in the opinion of classic economists, production of public goods and services as offered by the modern states are a waste and an unnecessary interference in the functioning of the market mechanism and private capital. Therefore, it is unproductive for the state to engage in public borrowings as it crowds out the productiveness of private capital investments.

Thomas Malthus though advocated “an adequate level of public debt because otherwise the generalized overproduction of commodities from a mere possibility will become a harsh reality.” Tsoulfidis 2007) cited by Bilan (2016). David Ricardo, (2005) also cited by Bilan expanded the argument of Adam Smith, “when, for the expenses of a year’s war, twenty million are raised by means of a loan, it is the twenty million which are withdrawn from the productive capital of the nation”

The Keynesian economists view on Public Indebtedness

Still in the classical economists’ tradition, John Maynard Keynes (1883 -1946) was an aberration. His view on public indebtedness which contrasted sharply with those of mainstream classics economists (Smith, Ricardo, Malthus, etc.) is paraphrased by Aspromourgos (undated). “Borrowing by the Government and other public bodies to finance large programmes of work ... were probably the only ways of absorbing current savings and so averting the heavy unemployment... But any such policy was of course utterly incompatible with the ideas and the orthodoxies of the period.” (TM: II, 170; cf. 376), Keynes was at the opposite end of the classics Bilan (2016) stated,

The “Keynesian doctrine ... is placed at the opposite side of the classical doctrine.... The new doctrine *Keynes thoughts (emphasis mine)* attaches great importance to the state whose intervention in the economy and society not only are no longer blamed but are called to supplement the actions of the market to correct its imperfections.” Keynes disagreed with limited government spending advocated by classic economists, but rather championed deficit spending to spur growth of the market economy and curb unemployment. But several billions of dollar owed in debt by the Nigeria government through borrowing has not anyway significant improved the unemployment in Nigeria that is now appalling.

Regarding the impacts of public indebtedness on the national economy, Keynes believed that public indebtedness smoothens the functioning of the market economy. Bilan (2016), following Keynesian economists, stated that two strands of thoughts support the change of perspectives from

those of classical economists. First, Keynesian economists agree to the extension of the scope of the state, rejecting the 'narrow' "laissez fair" economic principles and market forces mechanism of the classic economists. Public indebtedness contributes to national wealth creation and thus ceased to be an "unrecoverable consumption of resources, negatively destroying national wealth and the property of the national as a whole." (*ibid*). Secondly Keynesian economists assigned roles to public authorities that assumed the task of countering disturbing (*example market failure*) economic and social phenomena which give meaning to public borrowing "as ways of intervention to correct imbalance and ensure upward evolution of the economy."

2.2 Conceptual review

Besides Keynesian and classic the economists views on public indebtedness, recent scholars (J. Irons & Bivens J. 2010, U. Panizza, 2008) have also contributed immensely in expanding the knowledge frontiers of national indebtedness and its impacts on the nation. Iron and Bivens (2010) differentiated the concept of "deficit" from "debt" in the fiscal policy. They stated: - "To be clear, the federal budget deficit is simply the gap between flows of government revenues and outlays in a given year". While "... federal debt is the outstanding stock of government securities that were issued to finance past budget deficits. This conceptual clarification is profoundly necessary to straighten the ranging confusion in the layman public opinion concerning government indebtedness and deficits.

Irons and Bivens (*ibid*) noted that the distorting effects of borrowing as it impacts economic growth is best explained by deficits, not debt. According them, "an increase in the federal budget deficit means that the government increases its demand for "loanable" funds from the private sector, looking to borrow money from its own citizens as well as from international investors." In effect, increased government borrowings generate competition for a fixed supply of savings, thus crowding out the private sector as government borrowings drive up nominal interest rate. The resulting effect of this is decreased investments (drive down capital formation) by the private sector. Overall the economy has smaller capital stock based with which to work, and this smaller capital stock base decreases future investments and growth rates of an economy.

This arguments sounds plausible though, but Irons and Bevin's theory dwell heavily only on domestic borrowings which classic scholars such as (Buchanan, J. 1958, R. T. Malthus, J. M. Keynes etc.) construed as having little impacts on domestic economic growth, as such debts only a transfer of resources amongst citizens of a country.

Panizza (2008), contends the age long held classic economists view that exclusively holds external indebtedness as the only culprit to the domestic economy problem emanating from public debt. "Hence only external debt generates a transfer problem" (Keynes 1929). In disputing this, Panizza postulates: "I point out that in the current environment of increasing financial integration and open capital accounts, the traditional distinction between external and domestic debt may make less sense." Panizza noted that countries are unable to determine who holds their debt claims, "hence, they classify as external debt all debts issued on the international market". This connotes that, "external" debt data may be a poor proxy of the actual transfer of resources across countries.

Panizza, by all account made a brilliant theoretical argument but failed to realize that any long term public debt that is issued on the international capital market, there must be a transfer of resources either in respect of interest payment or when the debt fall due for redemption irrespective where the debt claim holder resides. For instance a Nigeria investor residing either in Abuja, Calabar or Lagos could purchase a Nigeria Eurobond and would be entitled to payment in dollar or euro depending on the currency denomination of the debt in interest and installment payment. Again this will require transfer of resource residences notwithstanding.

Following Aybarc (2019, public debt is variously classified using criteria as: debt tenor, source of the debt and investment efficiency of the debt – productive or unproductive of the debt. Aybarc’s public debt typology includes:

- Public debt classification according to tenor (maturities): short term, medium and long term public debts. He noted that short term public debts (*which he also called “floating debts”*) are those that have tenors of up to one year or less. Acquisition of such public debts occur through instrument as: treasury bills and treasury guaranteed bonds.
 - Medium term public debt are debts that are debts from one to five years duration
 - Long term public debt are those that have more 5 year tenor; instrument of borrowing for the long term debts are government guaranteed bonds. These debts are sourced from both domestic and international capital markets.
- The source based classification takes cognizance of the sources of the debts; whether the debt is internally or externally sourced. Aybarc clarified that internal borrowing has “no effects on increasing or decreasing national income.” That internal debts do not impact national income which is common knowledge. (classical economists) has sufficiently made this known to economist of all generations.
- The productivity based typology classifies a debt either as “productive” or “unproductive.” Productive debts are those that governments sourced and employed in productive endeavours such as construction of railways, power stations, irrigations projects, roads etc. Productive here connotes that these debts are judiciously deployed by government in an investment endeavour which in turn generate returns and add value to the productive capacity of a nation’s economy because they continuously generate income flow to the nation’s treasury (*ibid*). Revenue accruing from these investments could eventually pay both the interest and the yearly debt instalments.

Unfortunately, in the majority of developing economies of Africa not excluding Nigeria, hardly is any debt “productive.” Public debts are, over three quarters of the times, expended on frivolities and mismanaged by government (house officers) civil servants. The example of the Ajaokuta steel mills external borrowed funding is a case in point where externally sourced fund intended for investment was stolen and wasted by government house officers. Besides wastage and mismanagement, the instability of the parameters (consumer prices, inflation and even exchange rate), of macro economies of many developing economies could obliterate any projected net return on invested borrowed fund thus rendering it “unproductive.” Returns from public investments in infrastructure, health, education, etc. are large and positive but cannot be captured by direct foreign investments (FDI) particularly the benefits accruing to the poor.”

FitzGerald (2005) gave reasons developing countries go borrowing abroad. He stated, these reasons to include (i) “the economic returns on public investments in developing countries is superior to the cost of borrowed capital, and growth could be accelerated by prudent use of debt without excessively reducing current consumption levels; (ii) domestic firms cannot easily borrow abroad (particularly small and medium *scale* enterprises) and returns are better for sovereign borrowers, so it is efficient to use debt for on-lending to productive sectors, particular exports; and (iii) the externalities from public investments in infrastructure, health, education, etc. are large and positive but cannot be captured by direct foreign investments (FDI) particularly the benefits accruing to the poor.”

FitzGerald (*ibid*) claim appears valid though, but severely limited. Not all foreign sourced public debts by governments of developing nations are efficiently invested as claimed. More than three quarter of the times, these public debts are misappropriated and inefficiently directed by government housekeepers, civil servants and politicians of the borrower nation. Nigeria is a case in point where it has been proven severally true that foreign sourced debts are simply misdirected. This is also true of many more developing African and Asian nations: the Philippines under the late Marcos and his wife, Zimbabwe under late President Mugabe, Kenyan under late President Kenyatta, Mali, Ghana, Niger Republic, Democratic Republic of Congo and many others.

As Ogulana (undated) pointed out, in FitzGerald’s model, “less consideration is given to whether the investment will generate foreign exchange enough to service the debt at maturity” Yes! externalities accrue to government investments in public infrastructure: health, education, roads etc. but they are limited. For instance Nigerians to date has no health insurance to the credit of any externally sourced debt investment.

The dual-gap theory is addressed in an academic paper by Madu et al (2015). These authors citing (Oloyede), stated the arguments of the theory as, “the advancement of any country is an element of speculation and that such venture obliges household investment funds which is not adequate to guarantee that improvement occur.”

IMF working paper (WP/10/174) “Public Debt and Growth”, explores the impact of high public debt on real per capital long-run economic growth. The authors Kumar and Woo (2010), did an extensive analysis based on a panel of advanced and emerging economies over almost four decades taking into account a broad range of determinants of growth. Findings from the study suggested an inverse relationship between initial public debt and subsequent growth, controlling for other determinants of growth. High public debt profile could trigger a banking or currency crisis they concluded.

A former Deputy Governor of the Central Bank of Nigeria, Dr. Obadiah Mailafia expressed similar view in a discussion of Nigeria debt crisis. Okwe (2020) quoted Mailafia as saying; “Revenue crises can easily lead to debt crises. Both can conspire to unleash a downward spiral in terms of capital flight, financial markets’ volatilities, banking crises, financial meltdowns and even economic collapse. Some economists believe that we live in the best of all possible worlds, in which the capitalist system, by its very nature, engenders overproduction, leading to fall in

aggregate demand, debt crises, revenue crunches and “manias, panics and crashes”, to echoed the late Harvard financial historian, Professor Charles Kindleberger.

Empirical literature review

“The political economy of external debt management in Nigeria: Strategies, issues and challenges” is examined in an academic paper by Madu et al (2015). These authors identified a number of external debt management strategies used in Nigeria. “Placing outright embargo on new loans” aimed at checkmating the “acceleration of aggregate debt stock level” as a strategic public debt stock management was adopted in Nigeria in the 1980s. The approach, according to the authors, was complemented by occasional reviews of the debt stock the Federal and State governments are allowed to incur at a time. To buttress the point made, they cited the situation in 1984 when State governments were out rightly bared from contracting external debts. At some other point though, the policy set external borrowing ceiling for the various tiers of governments (*ibid*). At some other point limits was placed on debt service payments was implemented as a debt management strategy. This strategy stipulates setting aside a portion of export earnings with the view of meeting up debt service obligations.

Additional debt management strategies according to these authors include; debt restructuring, debt refinancing, rescheduling and debt conversion. Though these strategies when implemented as stated, the authors could not show any positive outcome from their implementation. Besides, many of the debt management strategies: debt rescheduling, debt refinancing, etc., are “exceptional financing” known to be “costly” and accumulate significant arrears which create further distortions in debt.

Abioye et al (2016) examined the role of railway transport in the growth of the Nigeria economy. The authors analyzed in a table (precisely Table 4 on page 107) various governments’ (Shagari through Babanginda down to Jonathan in 2015) investment tranches in the Nigeria Railway Corporation and total accrued revenue in each of the thirty two (32) years included in the study, 1983 to 2015. Over these years of investment efforts by the Nigeria Government, not only has there been no return on invested capital, the project never broke even. For instance in 2013, a total capital sum of \$41,019,200 was invested with a return on investment of \$8,869. (*ibid*), representing a loss of \$41,010,331.

The impact of external public debt on Nigeria economic growth and development is examined in an empirical paper by Ajayi and Oke (2021). The model adopted in the work appears inappropriate and does not seem to answer the posed research questions. Except for national income (NI), no other parameter(s) as specified in their so called “econometric equations” proxy neither the variables of economic growth nor economic development as dependent on external public debt repayment. Again national income (NI) does not depend on external reserve (EXTR) as wrongly stated by the authors, but a function of domestic production and international trade.

It presents substantial economic challenges to fathom any real tangible relationship between national income (NI) and domestic nominal, even real interest rate, in relation to external public debt burden analysis. Yes! external public debt repayment impact current domestic resources

available in an economy, but domestic nominal interest rate, except for interest due public debt repayment, bears no relationship to economic growth and development relative to external public debt, therefore inappropriately used in this instance. A distorted conclusion as obtained in this paper, adds very little, if any, to the existing body of knowledge in the study of external public debt and domestic economic growth and development. It however provides a good gap for further research interests.

Aladejana et al., (2021) examined Nigeria debt burden in relation to infrastructural development. “The broad objective of this study is to analyze the effects of Nigeria’s debt burden (both external and internal) on infrastructural development”. These authors failed to establish an erudite scholarly findings in their work. The methodology of econometrics employed in the study failed to show any clear relationship between public debt burden and infrastructural development. The econometric methodology employed in the study is convoluted and turgid. What “infrastructural development” is not clarify and thus left opened ended. The so called economic “models” were mere equations that bears very little or no relationship to variable of infrastructure. These authors appeared not to be thoroughly grounded in theories of public debt, thus do not know that domestic and external public could hardly be successfully modelled together in econometric equation.

Ogunlana (undated) a deputy director in the Central Bank of Nigeria (CBN) examined Nigeria’s external public debt and the burden it imposes vis-à-vis the country’s debt service capacity. His work brought substantial insights into economics of public debt. He observed, based on empirical evidence from African and Latin America countries that, “most developing countries take to external borrowings because of low domestic private savings (*low capital formation*) due to low per capital income, and with most governments operating fiscal deficits.” He clarified “public debt burden” to mean, “.....the difficult and *economic strains* arising from servicing of external debt.” He noted that a higher public debt servicing (interest payment) and a heavier deficit on the current account, the heavier the public debt burden of a country. The higher the proportion of current resources (income) devoted to financing past consumptions constitute the public debt burden.

The more current resources earmarked to pay for past consumptions (*debt servicing*), the less the resources available to sustained current economic growth and development (*ibid*). The ability of a country to service its public debt stock (Abrego et al 2001) cited by Ogunlana (*ibid*) is largely a function of her, “existing debt stock and associated debt, prospective path of its deficits and financing mix of the debt and the evolution of its repayment capacity in terms of foreign currency value of GDP, exports and government revenues” (*ibid*).

How much of Nigerian current resources (*oil revenue, taxes of all kinds and revenue accruing from agricultural and allied products exports*) are devoted to servicing public debts sourced from China for the railway modernization project constitute a major burden for future generations of Nigerians. In an editorial; Debt is sinking the economy (2021, August 6), the Punch Newspaper online edition, stated; “the provision to spend ₦14.6 trillion in debt repayment in three years under the Medium-Term Expenditure Framework and Fiscal Strategy Paper 2022-2024, comes amid raising debt servicing obligations that swallowed 97 per cent of oil revenue...” This debts

have fixed contractual obligations which again demand pledging future Nigeria resources as collateral.

In a Nigeria Guardian newspaper article (Okwe, 2020) reviewed Nigeria's public debt burden and its suffocating impacts on economic growth. He pointedly stated, "Nigeria debts have grown more than half from \$12tr in 2015 to a whopping \$33tr in 2020" (Babalola, 2020,11 June). Okwe, quoted the Minister of Finance Mrs. Zainab Shamsuna Ahmed as the saying the Debt Service/GDP ratios for 2018 was 19.09% of GDP and 18.99% of GDP as June 31 2019, both figures though fairly below the 25% debt threshold of GDP stipulated by the fiscal responsibility Act of 2007 and the 50% World Bank threshold for countries in the same category as Nigeria.

The prevalent views of scholars so far drawn from the literature is indicative of a rejection of state indebtedness. Public debt burden is generally conceived in the literature as unproductive and a impediment to state economic growth. Therefore, public external borrowings should be avoided by the state. A strand of thoughts amongst scholars though is that external borrowings could in some instances generate eternities beneficial to the debtor nation. It appears though the detriment of external debt far outweighs it eternities. It will be perilous to deny that by 1958 when Nigeria first obtained the World Bank's railway development loan of US\$28 million, her public debt repayment term was benign and tolerable. Today it has become a difficult bargain, and worsen in 2003 when the Paris Club of creditors, demanded US\$3 billion debt yearly repayment. From the literature reviewed this far, it will be fair to surmise that Nigeria faces a daunting task in debt servicing and repayment. That by 2004, Nigeria resorted to seek an option in debt relief to tackle her debt crises and the resultant macroeconomic disturbances, attest to the worries expressed by Nigerians over her borrowing binge that has landed her in a debt crises.

Gap in the literature necessitating this work

Quite a large volume of empirical literature (Okwe, 2020, Ogunlana undated, Aladejana et al 2021, Abioye et al 2016, Ajayi and Oke 2021) exist in relation to Nigeria's debt burden study. As it were, none of these works discoursed the much vilified Nigeria public debt burden arising due to the financing of the Nigeria railway modernization project. This project had, as at March 31, 2020, (see Table 1.1) consumed a total public debt stock of \$3.121 billion (₦1, 126.68 billion at USD/₦361). The Debt Management Office (DMO), stated these debts, "are concessional loans with interest rate of 2.50% p. a, and a tenor of twenty (20) years and grace period (moratorium) of seven (7) years" <https://www.dmo.gov.ng/facts-about-chines-loans-to-nigeria>.

This amount, DMO claimed, is only 3.9% of Nigeria's total public debt stock and 11.28% of Nigeria's total external debt stock of USD27.67 billion as at March 31, 2020 (*ibid*). Extant empirical literature do not address the specific case of the debt sustainability of this type. This work is designed to fill this yawning gap in the literature; to examine the sustainability of the public debt sourced from Chinese Exim Bank to implement of the railway modernization project.

METHODOLOGY AND DATA CONSTRUCTION

“Debt burden” and “debt sustainability” are conceptual phrases therefore pose quantification problem using econometric methodology as done by Aladejana et al., (2021). Going by Ogunlana (*ibid*), a number of ratios example: (a) Debt Stock/Export, (b) Debt Service/GDP, (c) Debt Service/Export (d) Debt Stock/GDP (e) Reserves/Import and (f) Reserves/Debt Stock could be used to capture debt burden and debt sustainability. Because this work is focused on evaluating the sustainability of the Nigeria railway modernization project debt, we employed the Debt Service/Export and Debt Service/GDP ratios. These ratios, we believed when measured could be used to determine the sustainability or otherwise of the railway modernization project debt.

A country’s Debt Service/Export “is the ratio of its debt service payments (principal + interest) to its export earnings.” <https://corporatefinanceinstitute.com/resources/knowledge/credit/debt-service>. For example, if Nigeria earns an export revenue of ₦100bn and pays ₦15bn interest on its external debt, then its debt service ratio is 15%. A-priori, we believe that if Nigeria’s exports earning is sufficiently large, she would be able to repay her debt incurred in relation to the railway modernization project. Ogunlana (*ibid*) clarify the Debt Service/Export ratio as “a liquidity measure.” A country's international finances are consider good when this ratio is low. On an average the ratio is considered good when it is between 0 and 20%.

Debt Service/GDP ratio is an indicator of how much debt a country owes and how much she is able to produce to pay off its debts. Expressed in percentages, it is alternatively interpreted as the number of years needed to pay back the debt, in case the entire GDP has been allocated for debt repayment. The higher a debt-to-GDP ratio, the higher the chances of public debt default. A country that has problems in paying off her debts is an indication of a high debt-to-GDP ratio, which could mean in the case of Nigeria that the railway modernization project loan is unsustainable. These two ratios we believe could tell the sustainability or otherwise Nigeria railway debt.

Table 3.1: External Debt: Nigeria Rail Modernization Project

Rail Line	Cost (US\$)	Funding Model	Description
Abuja – Kaduna	\$876million	500 million in loans from the Exim Bank of China; balance funded by the Federal Government of Nigeria (FGN).	187km from Abuja to Kaduna (part of the 2,700km Lagos – Kano line).
Lagos – Ibadan	\$2.53 billion	Loan from the Export-Import (Exim) Bank of China.	156 km from Lagos to Ibadan (part of the 2,700km Lagos – Kano line).
Ibadan – Kano	\$5.3 billion	FGN to provide an equity stake of 15% with the remaining 75% funded by from China’s Exim Bank.	Comprised of 4 sections - the 200km Ibadan-Ilorin section, the Ilorin-Minna section a distance of 270km and then the Abuja, Kaduna and finally Kano a distance of 300km. (part of the 2,700km Lagos – Kano line).
Abuja – Warri	\$3.9billion	FGN to provide an equity stake of 15%, China Railway Construction Corporation Limited (CRCC), an equity stake of 10%, and the remaining 75% borrowed from China’s Exim Bank. The CRCC will operate the railway and the port to recover its investment.	Originally commenced as the Itakpe – Ajaokuta cargo line in 1987, it was extended to link the capital Abuja to the port city of Warri, a distance by air of approximately 440km.
Kano-Maradi	\$1.959 billion	To be financed by bilateral loan arrangements.	To link Kano–Danbatta–Kazaure–Daura–Mashi–Katsina–Jibiya–Maradi (Niger Republic) with a branch line from Kano to Dutse.
Lagos-Calabar	The project is valued at \$11bn	Originally intended to be funded from loans from China’s Exim Bank; however following indications that the funding is not available and continuous delays to the commencement of the project (which was expected to be completed in 2018), the FGN is currently exploring other funding options.	1402 km (871 mi) to be developed in two phases. The first phase will run between Calabar and Port Harcourt; while the second phase will run between Port Harcourt and Lagos via Onitsha.
Port Harcourt-Maiduguri	\$3 billion	FGN to provide about 15% of the \$3 billion rehabilitation and reconstruction cost, while the balance will be provided by a syndicate of Chinese financiers.	Rehabilitation and reconstruction of the 1,443-kilometer (897-mile) Eastern Railway line that starts from the southeastern oil hub of Port Harcourt and terminates at the northeastern city of Maiduguri.

Sources: Asue Ighadalo Banwo & Ighodalo

<https://www.expertguides.com/articles/financing-rail-infrastructure-in-nigeria-future-outlook/arpvboqq>

Data construction

There are varying opinion regarding Nigeria’s total external public debt relating to the railway modernization project. While the Nigeria Debt Management Office (DMO)

<https://www.expertguides.com/articles/financing-rail-infrastructure-in-nigeria-future-outlook/arpvboqq>

put it USD3.59 as of September 2021 (Nwite, S. 2021 Dec. 21). Other sources such as Asue et al (2021), puts Nigeria’s total external public debt figure due the Nigeria railway modernization project far above of that of DMO (see table 3.1).

Table 3.2 Nigeria Export Trade (2000 – 2020)

Year	Oil (₦' Million)	Non-Oil (₦' Million)	Total (₦' Millions)
2002	1,649,445.83	94,731.85	1,744,177.68
2003	2,993,109.95	94,776.44	3,087,886.39
2004	4,489,472.19	113,309.35	4,602,781.54
2005	7,140,578.92	105,955.88	7,246,534.80
2006	7,191,085.64	133,594.99	7,324,680.63
2007	8,110,500.38	199,257.94	8,309,758.32
2008	9,913,648.00	527,839.81	10,441,487.81
2009	8,067,332.40	500,264.83	8,567,597.23
2010	11,242,800.21	707,928.57	11,950,728.78
2011	14,255,026.15	909,148.05	15,164,174.20
2012	14,188,611.96	875,273.92	15,063,885.88
2013	14,062,058.41	1,124,585.94	15,186,644.35
2014	11,973,485.26	951,503.82	12,924,989.08
2015	8,140,789.54	660,637.61	8,801,427.15
2016	8,106,309.46	676,985.97	8,783,295.43
2017	15,462,993.73	1,287,080.02	16,750,073.75
2018	20,475,872.07	1,689,167.12	22,165,039.19
2019	19,728,787.44	3,788,036.49	23,516,823.92
2020	12,000,934.27	1,736,149.35	13,737,083.62

Sources: National Bureau of Statistics and Central Bank of Nigeria

Table 3.2 presents Nigeria export trade data from 2002 to 2020. We compute the Debt service/Export ratio using data on table 3.2. Following Corporate Finance Institute <https://corporatefinanceinstitute.com/resources/knowledge/credit/debt-service/> . Debt Service is calculated as follows: **Face value of debt x annualized interest rate + amortized debt installment (1).**

Total face value of the Nigeria external public debt related to the Nigeria railway modernization project, is given by the Nigeria Debt Management Office (DMO) as USD3.59bn earlier stated. The debt tenor is 20 years and the annual interest rate is 2.5 percent (DMO press release (2020, June 30). We used the formula as in (1) above to compute the Debt Servicing/Export ratio. Nigeria external public debt specific to the Nigeria railway modernization project is given as (USD 3.59bn at USD/₦361) = N1, 295.09billion. Therefore the annual Debt service payment based on the formula in (1) = **₦1,295.09 x 0. 025 = 32.37725 interest + the amortized installment payments**

3.4.1 (a) Enabling Assumptions for the computation of Debt service installment payments

To compute the annual Debt Service, interest and installment payments, we make the following these three conjectures:

- That the chines loan is amortized over a twenty (20) years period

- Going by Daily Post (2018, September 5), we assume that the current total sum of ₦1,295.09 outstanding chines loan to Nigeria government all originated from 2002 when the first tranche of chines loans was granted the Nigeria government,
- Following the seven (7) years grace period, first installment payment fell in 2010
- We ignored debt installments paid earlier and assumed the debt lump sum as stated

These assumptions allowed us to use the formula given in the formula in (1) above to compute the annual Debt service installment payments. The computation of the debt service is reported on table 3.3 below. Each year beginning balance determines the interest payments which eventually adds up to reducing installment payments.

Table 3.3 Elaboration of the Computation of Debt Service

Table 3.3 AMORTISED CHINES RAILWAY MODERNISATION (PROJECT LOAN TO NIGERIA (Billions of Naira).						
Year	Beginning Balance	Loan Interest Rate	Annual Debt Servicing	Annual Interest paid	Annual Principal Paid (Amortized)	Remaining Principal
2010	1,259.09	0.03	94.4323	31.477	62.955	1,196.14
2011	1,196.14	0.03	92.8584	29.903	62.955	1,133.18
2012	1,133.18	0.03	91.2845	28.330	62.955	1,070.23
2013	1,070.23	0.03	89.7108	26.756	62.955	1,007.28
2014	1,007.28	0.03	88.1370	25.182	62.955	944.33
2015	944.33	0.03	86.5633	23.608	62.955	881.38
2016	881.38	0.03	84.9895	22.035	62.955	818.43
2017	818.00	0.03	83.4050	20.450	62.955	755.05
2018	755.05	0.03	81.8313	18.876	62.955	692.10
2019	692.10	0.03	80.2575	17.303	62.955	629.15
2020	629.00	0.03	78.6800	15.725	62.955	566.05
2021	566.05	0.03	77.1063	14.151	62.955	503.10
2022	503.10	0.03	75.5325	12.578	62.955	440.15
2023	440.15	0.03	73.9588	11.004	62.955	377.20
2024	377.20	0.03	72.3850	9.430	62.955	314.25
2025	314.25	0.03	70.8113	7.856	62.955	251.30
2026	251.30	0.03	69.2375	6.283	62.955	188.35
2027	188.35	0.03	67.6638	4.709	62.955	125.40
2028	125.40	0.03	66.0900	3.135	62.955	62.45
2029	62.45	0.03	64.5163	1.561	62.955	-0.50
Totals				330.351	1,259.10	

Source. Generated by the Authors based on Chines loan to the railway modernization project

The yearly Debt Servicing/Export ratio can now be computed using data from the yearly debt servicing and export trade as computed and indicated on tables 3.2 and 3.3.

**Table 3.4: Debt Service to Export Ratio
(Billions of Nigeria Naira)**

Table 3.5 (A) GDP At current Basic Price

Year	GDP (current Basic Price)	Year	Annual Debt Service	Total Export	Debt Service/Export Ratio	Debt Service/Export (%)
2010	54,612.26	2010	94.4323	11,950.73	0.007901803	0.790180262
2011	62,980.40	2011	92.8584	15,164.20	0.006123540	0.61235399
2012	71,713.94	2012	91.2845	15,063.89	0.006060000	0.605982419
2013	80,092.56	2013	89.7108	15,186.64	0.005907217	0.590721676
2014	89,043.62	2014	88.1370	12,924.99	0.006819116	0.681911600
2015	94,144.96	2015	86.5633	8,801.42	0.009835152	0.983515160
2016	101,489.49	2016	84.9895	8,783.30	0.009676266	0.967626567
2017	101,489.49	2017	83.4050	16,750.07	0.004979381	0.497938106
2018	127,736.83	2018	81.8313	22,165.04	0.003691909	0.369190865
2019	144,210.49	2019	80.2575	23,516.82	0.003412770	0.341276953
2020	152,324.07	2020	78.6800	13,737.08	0.005727562	0.572756214
		2021	NA	NA	NA	NA

Source: CBN Statistical Bulletin 2020

Source: Generated by the Authors

Computation of Debt service/GDP ratio.

The Debt Service/GDP measures the proportion of national output (GDP) expressed in percentage committed to servicing of public debt incurred in a previous period. We compute this ratio to further test for the sustainability of Nigeria public debt incurred following the railway modernization project. This ratio will help us accept or reject our hypothesis (a) as stated in section 1.6. Table 3.5 (A) below report Nigeria's GDP at current basic price. Using the same method applied in the computation of Debt service/Export ratio we compute the Debt service/GDP reported on table 3.5 below.

Table 3.5 (B) Debt Service/ GDP Ratio (%)

Year	Annual Debt Service	GDP at Current Basic Price	Debt Service/ GDP Ratio	Debt Service/ GDP %
2010	94.4323	54,612.26	0.001729141	0.172914104
2011	92.8584	62,980.40	0.001474402	0.147440156
2012	91.2845	71,713.94	0.001272898	0.127289757
2013	89.7108	80,092.56	0.001120089	0.112008906
2014	88.1370	89,043.62	0.000989818	0.098981825
2015	86.5633	94,144.96	0.000919468	0.091946823
2016	84.9895	101,489.49	0.000837422	0.083742169
2017	83.4050	101,489.49	0.000821809	0.082180923
2018	81.8313	127,736.83	0.000640624	0.064062416
2019	80.2575	144,210.49	0.000556530	0.055653025
2020	78.6800	152,324.07	0.000516530	0.051653032
2021	NA	NA	NA	NA

Source: Generated by the Authors

DATA ANALYSIS AND DISCUSSION OF FINDINGS

The data presented in Tables 3.3, 3.4 and 3.5 (B) elaborates on the computations of Debt Service/Export and Debt Service/GDP expressed in percentages. These two amongst others measures the sustainability or otherwise of a country's external public debt.

Debt Service/Export ratio

From Ogunlana (undated), we understand that Debt service/Export measures the proportion of a country total exports earned revenue committed to the servicing of public debt incurred in the past period. The percentage (Debt Service/Export) measures liquidity. Thus the ability of a debtor nation to services its debt declines as the ratio increases and for most countries the ratio is between 0 and 20% which is considered good enough.

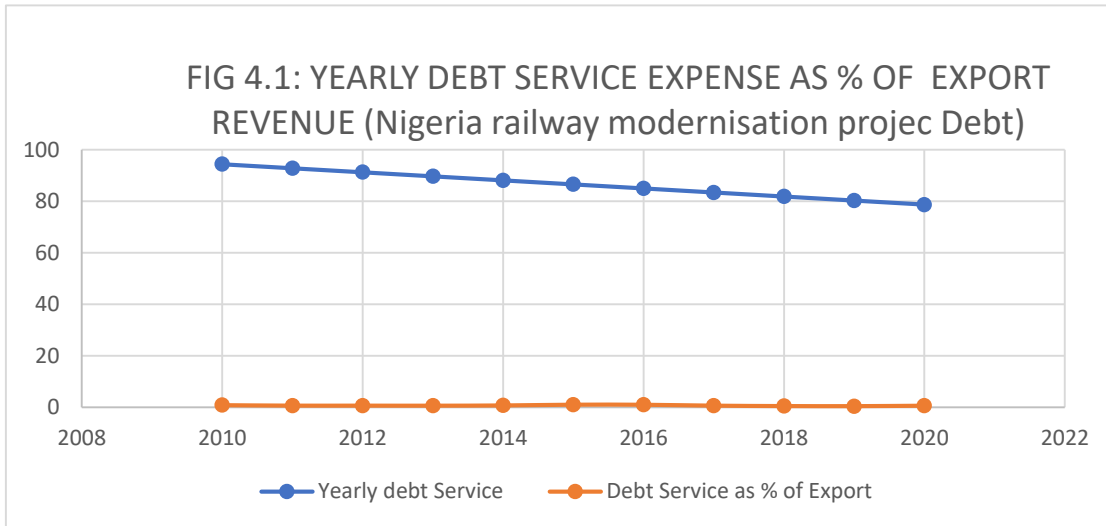
Table 4.1 Debt Service/Export ratio

Year	Annual Debt Service	Total Export	Debt Service/ Export Ratio	Debt Service/ Export (%)
2010	94.4323	11,950.73	0.007901803	0.790180262
2011	92.8584	15,164.20	0.006123540	0.61235399
2012	91.2845	15,063.89	0.006060000	0.605982419
2013	89.7108	15,186.64	0.005907217	0.590721676
2014	88.1370	12,924.99	0.006819116	0.681911600
2015	86.5633	8,801.42	0.009835152	0.983515160
2016	84.9895	8,783.30	0.009676266	0.967626567
2017	83.4050	16,750.07	0.004979381	0.497938106
2018	81.8313	22,165.04	0.003691909	0.369190865
2019	80.2575	23,516.82	0.003412770	0.341276953
2020	78.6800	13,737.08	0.005727562	0.572756214
2021	NA	NA	NA	NA

Source: Generated by the Authors

Table 4.1 above reports the percentage of Nigeria export revenue expended on debt servicing due to Nigeria railway modernization project. Between 2010 and 2016, an average of 60 percent of export revenue was expended on debt servicing. It peaked at 96.7% of total export revenue in 2016. This findings confirmed the opinion expressed by the Punch Online Newspaper editorial (2021, August 6), “the provision to spend ₦14.6 trillion in debt repayment in three years under the Medium-Term Expenditure Framework and Fiscal Strategy Paper 2022-2024 comes amid raising debt serving obligations that swallowed 97 per cent of oil revenue....”

Percentage of export revenues expended to debt servicing debt relating to Nigeria railway modernization project declined though beginning 2017 through 2019 to an average of some 35% but picked slightly in 2020 when it averages 57.2%. The graph in figure 4.1 below presents details of this finding. Both the average of 60% in the earlier period and the 35% in the latter years, are above the 20% world standard as specified in the literature for public debt sustainability. Against the backdrop of theory, we could conclude that the Nigeria railway modernization project debt given the given the debt servicing-export-ratio



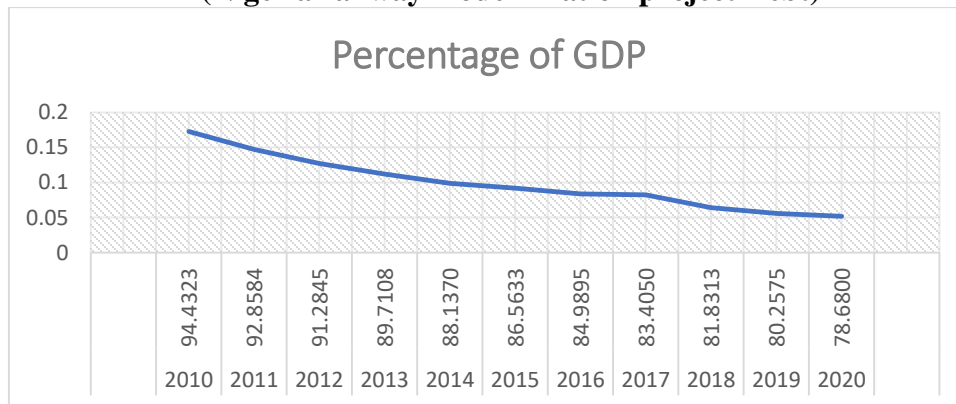
Source: Generated by the Authors based on Debt Service/Export Data

is unsustainable. This findings validate both our hypothesis (a) and (b) as stated on page 1 of this work. But the conclusion differs when the ratio is of the entire country’s public debt where it is as low as 8.2% as against 36% as at 2018 (see <https://www.indexmundi.com>.)

Debt service/GDP

Table 3.5 B reports the computed data for the Debt Service/GDP ratio. Here we noticed an absolutely low Debt Servicing to GDP ratio. The percentage of debt servicing relative to GDP steadily declined from 17.20% in 2010 to a mere 5.2 percent in 2020. The **debt**-to-GDP ratio is the ratio between a country's public debt and its gross domestic product (GDP). In current literature, a low debt-to-GDP ratio is taken to indicate an economy that produces and sells goods and services sufficient enough to pay back her public debts without recourse to further debt. Could this be true of Nigeria?

FIG 4.2 DEBT SERVICING EXPENSE AS A % OF GDP (Nigeria railway modernization project Debt)



Source: Generated by the Authors based on Debt Service/GDP Data.

The graph in Fig 4.2 above depicts Nigeria Debt Service/GDP ratio (percentage). Though the literature is of the opinion, a Debt service/GDP of 77% is within acceptable band, Nigeria's debt service/GDP is as low as 17 percent in 2010 when the Nigeria railway modernization project debt repayment fell due and payment started. In this instance the claims of our hypotheses is invalidated. We however note that the debt service-to-GDP reported here only applies to the Nigeria railway modernization project debt. Generally in the literature, when the ratio is higher (> 80) such a country is said to exhibit a slowdown in economic growth. Often time the debt-to-GDP ratio is misunderstood. A higher debt service-to-GDP ratio, even exceeding 100% does not indicate a bankrupt or insolvent country. For instance Japan is cited as a country with a ratio well over 200% in debt service-to-GDP ratio for over a decade yet the country has no signs of defaulting her public debt. Therefore, the ratio does appear not to offer a strong insights into a country's likelihood of public debt default.

SUMMARY OF FINDINGS, DISCUSSION AND CONCLUSION

With the mixed results obtained, and based on the analyzed available data, we are unable to draw a firm conclusion as to whether Nigeria public debt relative to the Nigeria railway modernization project is sustainable or not. The debt servicing-to-export ratio or percentage is unacceptably high and runs counter to rationality. One possible explanation could be Nigeria's mono economy – export basically crude oil and perhaps gas. In either case, Nigeria does not control the prices of these commodities. That implies low export earnings revenues resulting in the high debt service-to-export ratio. This is also reflected in the unfavourable balance of trade the country has witnessed over the past decades.

The low debt service-to-GDP ratio is explained by assuming that Nigeria's GDP represents the total value of domestic output, many which whose value do not enter international trade data and thus contribute nothing to export trade value, but to GDP only. Therefore the size of Nigeria's GDP, by conjecture is definitely larger than that of her export trade value. This account for the low debt service-to-GDP ratio. Conclusively, in the opinion of these authors, Nigeria public debt as it relates to the Nigeria railway modernization project is not likely to be sustainable.

It is unarguably correct though, to state that most of Nigeria's borrowed fund are stolen and not directed towards productive endeavour as theory postulates. Infrastructural development such as the railway modernization project is agreeably beneficial to the national economy, but the looting of borrowed public fund intended for infrastructural development is unacceptable. Though we accept the argument that, "excess of expenditure over revenues is nothing to cause a special concern, and this condition may be necessary and beneficial during certain phases of the business cycle." We believe borrowed fund should server the purpose for which they were intended. Against this backdrop, we recommend that government at all levels increase surveillance over borrowed fund intended for infrastructural development from being diverted to private use.

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