An Empirical Analysis of Public Debt and the General Price Level in Nigeria

Charles Ibebi PhD[1]&Benson Emmanuel PhD[2]
[1,2,]Department of Banking and Finance,
Federal University Otuoke, Bayelsa State
ibebicharles@gmail.com, besonemmanuel2014@gmail.com

DOI: 10.56201/jbae.v9.no2.2023.pg50.68

Abstract

This study examines the determinants of manufacturing sector performance in the Nigerian economy. This was aimed at ascertaining how aggregate public debt (PD) and aggregate debt servicing (DS) affected general price level (PRL) as dependent variable in Nigeria. Historical data was collated and estimated employing the ARDL-based Ordinary Least Squares (OLS) technique. The empirical results indicate that aggregate public debt increased inflation while debt servicing reduced in Nigeria. On the basis of the findings of this study, the following recommendations are made.Policies that promote more employment and economic stimulus should be pursued to with public debt to enhance the performance of the economy.

1.1 Background to the Study

Recently in Nigeria, one of the most controversial economic issues has been the public debt,as in most emerging and developing economies since the onset of the 2008-09 global financial and Covid-19 induced economic crises. At least from reading the newspapers, one would think that the economy suffers greatly when the public debt increases. Both the politicians and policy analysts alike have been at each other's throat on this issue in recent times, especially on what is causing the increase in the public debt and also the effects it might have on the economy.

The debates and controversies about the public debt is due to the fact that Nigeria's external debt stock could have reached the critical 60% mark set by the IMF and World Bank benchmark for classifying a country's debt stock as dangerously high, and the consequences thereof. Nigeria's total public debt rose by 20.2 percent to N39.56 trillion ($95.77 billion) as at December 31, 2021, up from N32.92 trillion ($86.392 billion) in 2020 (https://www.vanguardngr.com/2022/03/nigerias-public-debt) Moreover, it is important to note that Nigeria's general threshold of public debt is yet to be set while having the a more stringent threshold of 60 percent in mind. According to some experts, this is a frightening rate of accumulation of debt by any standard, and that this debt trend might be unsustainable in the near future. It is not surprising that the Omotosho, Bawa and Doguwa (2016)sets Nigeria's public debt as high as 73.70% of GDP.

These concerns are being raised because aside inflation, a rising publicdebt has fiscal, monetary and other consequences on an economy. According to Nautet&Meensel (2011), high and rising public debt levels pose solvency risk which increases the riskpremium on public debt and hence makes it more expensive for countries to borrow andservice their debts (Gill & Pinto, 2005). The risk premium which increases the interest rateand interest payments on government borrowings then leaves little room for the governmentto see to its fiscal and social responsibilities as seen in these days, especially for developingcountries.

Many years ago, the Nigerian economy has been faced with inflationary pressure which has retarded her growth process. Gbadebo and Muhammed (2015) stated that this could be traced to 1970s when inflation increased to a double digit. The trends of inflation in the economy indicated that inflation rate rose in 1990s from 63.6% to 72.8%. However, the economy experienced stability in 2003 through economic reforms programs which was later followed by inflationary pressure with rises in inflation rate at 12.9%, and 14% in 2000 and 2001 respectively. Headline inflation rate remained at double digits between 2002 and 2005 as it recorded of 15%, and 17.9% respectively. However, it decreased dramatically to 8.24% and 5.38% in 2006 and 2007 before increasing immensely to 11.60% and 12.00% in 2008 and 2009 respectively in that order, although dropped slightly to 11.8% and 12.3% in 2010 and 2013 respectively (Gbadebo& Muhammed, 2015). There is drop in the rate to 8.1% in 2014 but rises to 9.1% in 2015 with a sharp rise in 2016 to 15.7%.

The problem of inflation has always been a problem as a result of its effect on economic activities. Rise in general price of goods and services which leads to the drop in the value of money, this leads to fall in unit a currency can buy. Inflation can as well result to rise in the cost of production, excess demand over supply.

Inflation has been an economic problem in Nigeria due to continuous spike in prices of goods and services in the country which results to panic and uncertainty in the economy resulting to citizens not willing to spend too much for a little in return or invest so as to not make losses when prices fall. Inflation decreases the standard of living of the citizens in an economy. This has imposed the need for this study due to the unceasing increase in the prices of goods and services in the nation due to the outbreak of COVID-19 (Coronavirus).

From the above, the work has the following as specific objectives;

i. To ascertain the relationship between aggregate public debt and general price level in Nigeria.
ii. To determine the degree of relationship between aggregate public debt servicing and general price levelin Nigeria.

Based on the objective the hypotheses of the study are stated thus;

Ho1: Aggregate public debts does not have significant relationship on general price level in Nigeria.

H02: Aggregate public debts servicing does not have significant relationship on general price level in Nigeria.

2.0 LITERATURE REVIEW

2.1 Conceptual Review

Concept of Inflation

Before we delve into the core of what inflation means, it is important that we give a fundamental view of what makes up inflation. Inflation is fundamentally derived from price indices. Depending upon the selected set of goods and services used, multiple types of baskets of goods are calculated and tracked as price indexes. Most commonly used price indexes are the Consumer Price Index (CPI) and the Wholesale Price Index (WPI).

i. The Consumer Price Index

The CPI is a measure that examines the weighted average of prices of a basket of goods and services which are of primary consumer needs. They include transportation, food, and medical care. CPI is calculated by taking price changes for each item in the predetermined basket of goods and averaging them based on their relative weight in the whole basket. The prices in consideration are the retail prices of each item, as available for purchase by the individual citizens. Changes in the CPI are used to assess price changes associated with the cost of living, making it one of the most frequently used statistics for identifying periods of inflation or deflation. In Nigeria, the National Bureau of Statistics (NBS) reports the CPI on a monthly basis and has calculated it for inflation.

ii. The Wholesale Price Index

The WPI is another popular measure of inflation, which measures and tracks the changes in the price of goods in the stages before the retail level. While WPI items vary from one country to other, they mostly include items at the producer or wholesale level. For example, it includes cotton prices for raw cotton, cotton yarn, cotton gray goods, and cotton clothing. Although many countries and organizations use WPI, many other countries, including the U.S., use a similar variant called the producer price index (PPI).

iii. The Producer Price Index

The producer price index is a family of indexes that measures the average change in selling prices received by domestic producers of intermediate goods and services over time. The PPI measures price changes from the perspective of the seller and differs from the CPI which measures price changes from the perspective of the buyer.

In all such variants, it is possible that the rise in the price of one component (say oil) cancels out the price decline in another (say wheat) to a certain extent. Overall, each index represents the average weighted price change for the given constituents which may apply at the overall economy,

sector, or commodity level.Inflation is the decline of purchasing power of a given currency over time. A quantitative estimate of the rate at which the decline in purchasing power occurs can be reflected in the increase of an average price level of a basket of selected goods and services in an economy over some period of time. The rise in the general level of prices, often expressed aa percentage means that a unit of currency effectively buys less than it did in prior periods. Inflation can be contrasted with deflation, which occurs when the purchasing power of money increases and prices decline. Inflation as measured by the consumer price index reflects the annual percentage change in the cost to the average consumer of acquiring a basket of goods and services that may be fixed or changed at specified intervals, such as yearly. The Laspeyres formula is generally used.

An increase in the supply of money is the root of inflation, though this can play out through different mechanisms in the economy. Money supply can be increased by the monetary authorities either by printing and giving away more money to the individuals, by legally devaluing (reducing the value of) the legal tender currency, more (most commonly) by loaning new money into existence as reserve account credits through the banking system by purchasing government bonds from banks on the secondary market. In all such cases of money supply increase, the money loses its purchasing power. The mechanisms of how this drives inflation can be classified into three types: demand-pull, cost-push, and Built-In inflation.

a) Demand-Pull Effect

Demand-pull inflation occurs when an increase in the supply of money and credit stimulates overall demand for goods and services in an economy to increase more rapidly than the economy's production capacity. This increases demand and leads to price rises.With more money available to individuals, positive consumer sentiment leads to higher spending, and this increased demand pulls prices higher. It creates a demand-supply gap with higher demand and less flexible supply, which results in higher prices.

b) Cost-Push Effect

Cost-push inflation is a result of the increase in prices working through the production process inputs. When additions to the supply of money and credit are channeled into commodity or other asset markets and especially when this is accompanied by a negative economic shock to the supply of key commodity, costs for all kind of intermediate goods rise. These developments lead to higher cost for the finished product or service and work their way into rising consumer prices. For instance, when the an expansion of the money supply creates a speculative boom in oil prices the cost of energy of all sorts of uses can rise and contribute rising consumer prices, which is reflected in various measures of inflation.

c) Built-In Inflation

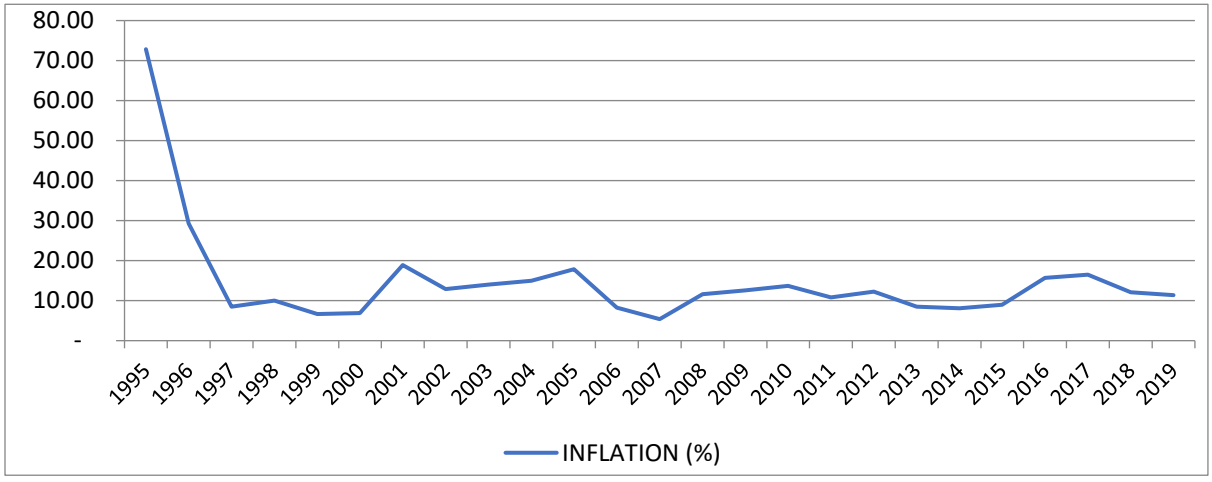
Built-in inflation is related to adaptive expectations, the idea that people expect current inflation rates to continue in the future. As the price of goods and services rises, workers and others come to expect that they will continue to rise in the future at a similar rate and demand more costs/wages to maintain their standard of living. Their increased wages result in higher cost of goods and services, and this wage-price spiral continues as one factor induces the other and vice-versa.

Inflation in the Nigerian Economy

The inflationary trend in Nigeria can broadly be categorized into four periods of our national life. The first of these periods is the oil boom era of the 1970s which was characterized by fiscal dominance and considerable macroeconomic imbalances occasioned by the sudden rise in government revenue obtained from crude oil exports. These earnings were invested in gigantic capital projects embarked upon by the government under the Third National Development Plan (1975-1980) (Masha, 2001). Consequently, the period witnessed a sharp increase in money supply with the economy having to contend with serious liquidity challenges. With increased money in circulation and a fragile productive base, the classic case of too much money chasing too few goods ensued. This inevitably led to increase in prices of goods and services.

The doubling of the minimum wage in 1975 as recommended by the Udoji Committee further fuelled the rise in the overall level of prices in the economy as the increased income and consequent increased aggregate demand was not matched by increased output. In an attempt to curb the high inflationary trend in the economy which averaged 33.7% in 1975, the government liberalized imports which resulted to the huge inflow of goods and in105 A Predictive Model for Inflation in Nigeria Udoh and Isaiah termediate inputs into the country. In addition, banks were encouraged to extend more credit to the productive sectors of the economy in a bid to increase output and create jobs. These government policies helped to push down the inflation rate to 11.8% in 1979.

The second period was in the 1980s which was dominated by continued overvaluation of the naira even in the face of dwindling oil revenue leading to significant distortion in the macroeconomic environment in an economy that was import dependent and with balance of payment challenges. Thus, by 1984, the inflation rate had risen to 41.2% due to devaluation of the naira and expansion in money supply. Responding to the high inflation rate, the government embarked on price control measures, which saw inflation rates falling to 5.5% in 1985 and 5.4% in 1986. Again, signs of rising inflation were observed in 1988 and 1989 due to fiscal expansion which was financed by credit from the CBN (Adenekan&Nwanna, 2004). Increased agricultural output helped to reduce the rate of inflation to 8.2% in 1990.



Due to high monetary growth and fiscal expansion in the 1990s, Nigeria was confronted with severe inflationary pressures. The inflation rate reached its peak of about 79.9% in 1995 (Bawa & Abdullahi, 2012). In an effort to reduce the surging inflation rate, the government implemented measures to ensure effective monetary policy, fiscal prudence and stabilization of the exchange rate. These measures resulted in a reduction in the inflation rate from its peak in 1995 to 6.6% in 1999.

Nigeria witnessed a sharp increase in inflation from 6.9% in 2000 to about 17.8% in 2005. This was attributed to government budget deficit over the years. The inflation rate declined to 5.4% in 2007 due to the implementation of sound monetary and fiscal policies. Inflation rate moderated substantially from 11.6% in 2008 to 9.7% in 2015 due to increased agricultural output and sound macroeconomic policies. From the forgoing analysis, it is obvious that inflation remains a serious macroeconomic challenge in Nigeria, hence the need for continuous empirical analysis of the inflation trend in Nigeria, in order to support sound macroeconomic policy formulation and management.

Public Debt

Public debt otherwise ‘called government borrowings has over the yearsreceived much attention as a crucial component of any country’s macroeconomic policy framework. Debt management is also argued as animportant factor that underpins the credibility and reputation of nations andensures the stability of debt capital markets as well as the financial institutions that hold public debt (Audu, 2004, Udaibir, Michael, Guilherme, Faisal & Jay, 2010). There is already a widespread recognition however in the international community that excessive foreign indebtedness of many developing countries remains a major impediment to their growth and stability.

External Debt

Public or Government debt as the name implies are debt owed by thegovernment within its economy or externally. According to CBN (2010),foreign debts or external borrowings are debt obligations the government, oweto multilateral bodies, London club, Paris club, foreign promissory notes andother unclassified external borrowings. External debt therefore refers to the resources of money in use ‘in a country that is not generated internally anddoes not in any way come from local citizens whether corporate or individual.

Nigeria external debt is therefore defined as, debt owned by the public andprivate sectors, of the Nigeria’ economy to non- residents and payable inforeign currency, goods and services (Ogbeifun, 2007). The Guide ‘definesgross domestic debt as follows: Gross external debt at any given time, is theoutstanding amount of those actual current and not contingent liabilities that require payment(s) of principal and/or interest by ‘the debtor at some point(s)in the future and ‘that are owed at non-residents by residents of an economy.

External debts in international economics relations described it as financialobligation that ties one party (debtor country) to other (lender country) It is thedebt incurred that is payable in currencies

other than that of the debtor countryExternal debts precisely are the financial obligations that are due to financialcreditors who are not residents of the borrowing country They include shortterm debt such as trade debts which mature between one or two years or whosepayment would be settled within a fiscal year in which transaction isconducted..

Foreign debts can be incurred through a number of transactionssuch as trade, contractor-finance, supplies credit, private investment and publicborrowing. The sources of foreign debts include Banks, International Financialmarkets, (Euro-money and capital markets), International organizations such asIMF, World Bank international loans, Multilateral and bilateral organizations.These foreign debts are usually incurred as foreign loans that are gottenthrough negotiations between countries on terms applicable to them. Theseforeign loan are to facilitate Growth purpose.

Domestic Debt

Domestic Debt is debt that originates from within a country (James, Magaji, Ayo &Musa, 2016). Domestic debt refers to debt owed to holders of government securitiessuch as treasury bills and treasury bonds which represent government borrowingthrough issuance of securities, government bonds and bills (Babu, Kiprop, Kalio&Gisore, 2015). Domestic debt in Nigeria is usually acquired through debt instrumentssuch as treasury bills, treasury certificates, treasury bonds, development stocks, FGNbonds, Promissory notes. The other debt instruments introduced in Nigeria witheffect from 2017 include: FGN Sukuk, FGN Green Bond and FGN Savings Bond.According to Babu *et al.* (2015), the two major reasons why governments choose toborrow domestically include: when there is excess projected expenditure overprojected revenue and urgent need to pay off maturing loans or to meet up with animmediate external debt servicing obligation.

Overview of Nigeria's Public Debt

Nigeria's indebtedness dates back to pre-independence era. The debts incurred before 1978 were relatively small and mainly long-term loans from multilateral and official sources such as the World Bank and Nigeria's major trading partners. The loans were majorly obtained on soft terms and therefore did not constitute a burden to the economy. However, due to the fall in oil prices and oil receipts, the country in 1977/78 raised the first jumbo loan to the tune of US$1.0 billion from the international capital market. The loan was used to finance various medium to long-term infrastructural projects. Domestic debt management in Nigeria had hitherto been carried out by the CBN through the issuance of government instruments, such as the Nigerian Treasury Bills (NTBs); Nigerian Treasury Certificates; Federal Government Development Stocks; and Treasury Bonds.

The debt management strategy adopted at that time led to inefficiencies resulting in fundamental challenges. In consideration of these numerous difficulties, the government established an autonomous debt management office in order to achieve efficient debt management practices. The Debt Management Office (DMO) was thus established on October 4, 2000 to centrally co-ordinate the management of Nigeria's debt for all the tiers of government. While the state governments' external borrowing is guaranteed by the Federal Government (FG), their domestic borrowings required analysis and confirmation by the FG based on clear criteria and guidelines that the states

can repay based on their monthly allocations from the Federation Account Allocation Committee (FAAC) and internally generated revenue (IGR).

The past couple of decades have witnessed rising concern on the increase in Nigeria's public debt. The first most significant rise in Nigeria's public debt occurred in 1987 when the total debt rose by 96.9 per cent to N137.58 billion. From then, the rise in Nigeria's public debt continued unabated such that as at 2004, total public debt stood at N6,188.03 million. In 1986, total debt which was hitherto driven largely by the domestic debt witnessed a reversal and was being driven by the external debt. Thus, the dominance of the external debt as well as the steady rise in total debt remained till 2005 when the country was granted debt pardon by the Paris Club. The debt forgiveness saw Nigeria's total debt and external debt plummeting by 59.0 per cent and 90.8 per cent, respectively between 2004 and 2006 to N2,533.47 billion and N451.5 billion. Incidentally, as external debt shrunk, domestic debt continued to grow unabated such that by 2011, total debt which was being driven by the domestic debt had exceeded the 2004 level and stood at N6,519.65 billion. By 2012, Nigeria's total debt had hit an all-time high of N7,564.4 billion. Between 2006 and 2012, the domestic debt had accounted for 82.2 to 87.2 per cent of the total debt.

"Current debates on fiscal consolidation emphasized the crucial role of prudential limits on public debt-to-GDP ratios. A debt-to-GDP ratio of 60 per cent is quite often noted as a prudential limit for developed countries, while for developing and emerging economies, a ratio of 30.0 per cent was maintained before 2008 and 40 per cent was being applied since 2009" (DMO, 2013). "However, these ratios are not sacrosanct as countries are encouraged to adapt different strategies to achieve fiscal consolidation" (IMF, 2011).

Nigeria's public debt was unsustainable between the periods of 1985-1995 and 1998-2004. While brief sustainability was enjoyed in 1996-1998, Nigeria's debt had been below the threshold since 2005. The sustainability of the former was due to astronomical increase in Gross Domestic Product (GDP) whereas that of the later could be attributable to both GDP growth and debt forgiveness. Though Nigeria's debt had remained sustainable since 2005, it is however noteworthy that both public debt and GDP had been on continuous rise. At 62.41 per cent, by end-2012 the bulk of Nigerian domestic debt was made up of Federal Government of Nigeria (FGN) bonds. This was followed by the treasury bills at 32.47 per cent.

Most of Nigeria's domestic debt which was mostly long-term in 2010 became more of short-term, that is, they had maturity of less than one year. This led to increased debt service burden. As at end-2012, the Nigerian total public debt service / GDP ratio stood at 0.5 per cent. With the debt forgiveness in 2005, Nigerian foreign debt which was hitherto being driven by Paris Club was being dominated by the multilateral debt. The holding of the domestic debt which was mostly taken up by the CBN from 1981 to 2003 changed such that the Deposit Money Banks (DMBs) and the Non-Bank Public surpassed the CBN and became major players in the domestic debt market with the DMBs taking the lead.

2.2 Theoretical Review

The Monetisation theory

According to Niemann, Pichler &Sorger (2010), a rise in the public debt increases theinflation level and this is usually through the domestic debt when it is backed with moneyThe risk of inflation, however, may depend on a number of factors as postulated by Nautet&Meensel (2011). One of such factors is the activeness of fiscal policy (specifically, the response of taxes to debt). Bhattarai, Lee & Park (2012) states that a weaker response of taxes to debt will magnify the increase in inflation as the public debt rises. Ahmad, Tariq & Sheikh (2012) shares this view with their argument that, if the government fails to collect enough revenues through taxes or non-tax sources, current revenues cannot service the debt which will lead to inflationary issuing of money by the government to finance the debt.

In the case where the public debt is monetized by the government, the government usuallyissues debts which are mandatorily bought by the central bank. The money which thegovernment thus receives from the central bank is used to finance the budget deficit whichsubstantially expands money supply as a result. The increase in money supply then generatesinflationary pressures which may even lead to hyperinflation (Ahmad, Sheikh &Tariq, 2012).This incentive to monetise the debt, however, depends strongly on the level of the debt aspredicted by Sargent and Wallace's (1981) in their paper, "some unpleasant monetarist arithmetic". They argue that an increase in public debt is typically inflationary in countrieswith large public debts and non-inflationary in countries with smaller public debts.

Nevertheless, Niemann, Pichler &Sorger (2010) posit that inflation is generally increasing in the level of debt, irrespective of the size. According to Tahir & Tahir (2012), one of thereasons why the government would monetize its debt is that any increase in government debtmoves the demand for loanable funds upwards, which tends to push up interest rates. To keepinterest rates unchanged, the government must then "monetize" the debt by expanding themoney supply, usually through printing money to buy government debt from the public.

From the discussion above, we can see that the central bank plays a significant role in thisprocess. However, Ahmad, Sheikh & Tariq (2012) posit that even if the government borrows from non-bank financial institutions (NBFIs) instead of the central bank, the result could still be inflationary. That is, if these NBFIs invest hugely by purchasing government securities and then face a shortage of liquidity, they will have no option but to turn to the central bank for help. So, in this case, the central bank then again indirectly provides the link between government borrowing and inflation.

To reduce the monetization of the public debt, Kwon, McFarlane & Robinson (2006)suggests that the central Bank needs to be independent. According to Nuatet&Meensel(2011), this has helped to prevent higher inflation in the European Union. Also Kwon,McFarlane& Robinson (2006) and Nuatet&Meensel (2011), shares a common view thatfiscal policy rules could limit the size of the public debt and hence help in safeguarding pricestability. The European Union is one example where the law prohibits monetary financing ofthe public debt or the budget deficit.

Aside the direct transmission channels already described, it is also believed by many that agreater likelihood of monetisation of the debt could increase inflation expectations, and hence also current inflation — without the actual monetisation even taking place. Such inflation expectations areformed if people are convinced that the government will print money to cover its

intractabledebt. Hence, holders of government debt who would normally buy a new debt will insteadbuy real assets (like commodities). But there are only a few of these real assets around, whichthen generate inflation.

Lastly, another obvious and mere reason stems from the fact that, as public debt increases, the government may be tempted to reduce it by generating inflation (Nautet&Meensel, 2011). This is often the case when fiscal policy does not adjust to theincreasing debt, and hence seignior age revenue must rise to match the increase in the value ofthe public debt outstanding. Such an attempt to increase seigniorage revenue will thengenerate inflation. Moreover, this effect of the public debt on inflation will also be so strongif most of the debts issued by the government are short-term debts, since the government thenwould have to inflate more aggressively. It should be realized that this channel rather generates a positive relationship between publicdebt and inflation, which is different from the one discussed under the debt dynamics theory(where inflation negatively affected the public-debt ratio).

2.3 Empirical Review

Using the autoregressive distributedlag (ARDL) framework, Aimola and Odhiambo(2021)attempts to investigate the impact of total publicdebt on inflation in Nigeria for the period 1983–2018. The cointegrating regressionresults reveal evidence of a stable long-run relationship among inflation, total publicdebt, money supply, interest rate, economic growth, trade openness, and privateinvestment in the presence of structural breaks. Empirical results show that theimpact of public debt on inflation is statistically insignificant, irrespective of whetherthe regression was in the short or the long run. Hence, the study concludes thatinflation in Nigeria could be driven by other factors other than public debt.

Essien, Agboegbulem, Mba and Onumonu (2016) investigated theimpact of public sector borrowings on prices, interest rates and output in Nigeria over the periodof 1970 to 2014. The study used the VAR framework estimation technique to test for a causalrelationship among these variables. The paper found that the level of external and domestic debtdid not significantly impact general price level and output. The study concluded on the noninflationary effects of external and domestic debt in Nigeria for the study period.

Taghavi (2000) empirically examines the hypothesis that public debt has potential adverse effects oninvestment, inflation and growth in large European economies in the period of 1970 - 1997. Usingthe hybrid co-integration and vector autoregressive models, the paper suggests that debt causessignificant negative effects on investment but these effects on growth are not clear-cut. Furthermore,debt seems to be inflationary in long run, though its impact on inflation in short run is not clear.

Kwon, McFarlane and Robinson (2006) advocate the view of Sargent and Wallace (1981) that an increase in public debttypically leads to inflation in highly indebted countries. Authors empirically investigate therelationship between public debt and inflation in form of panel data for 71 countries from 1963 to2004 using OLS regression estimation and VAR model. Estimated results indicate that therelationship holds strongly in indebted developing countries, weakly in other developing countries,but generally not in developed economies. However, this relationship becomes weak in

inflexibleexchange rate regimes. Furthermore, the study also finds the importance of institutional andstructural factors in the link between fiscal policy and inflation.

Bildirici&Ersin (2007) empirically studies the economic relationship between inflation and domestic debt for nine countries in the period of 1980 – 2004 using FMOLS (Fully Modified OLS estimation) and VEC model. The results show that in countries that experience high inflation, the inflationary process fed on increasing costs of domestic debt. As a result, the increasing debt to GDPratios led these countries to borrow at higher interest rates and with lower maturity rates.

Ahmad, Sheikh and Tariq (2012) confirm that inflation is a critical problem in many countries, especially in theless developed countries. Using the OLS regression estimation, their paper empirically studies theeffect of domestic debt on inflation in Pakistan for the period 1972 to 2009. The research observesdomestic debt and domestic debt servicing enhance the price level in Pakistan. The estimated resultsshow the volume of domestic debt and domestic debt servicing have significantly positive effects onprice level. Authors argue the floating debt, i.e. treasury bills make up a large proportion of totaldomestic debt, and the interest rate, i.e. the cost of domestic borrowing or debt servicing are mainreasons to enhance price level.

Harmon (2012) studies the impact of public debt on three major economic indicators (inflation, GDPgrowth and interest rates) in Kenya on the period 1996 to 2011. Adopting a descriptive researchdesign and simple linear regression models, the research finds out there is a weak positive relationship between the public debt and inflation while links between public debt – GDP growth aswell as public debt – interest rates are negative.

Akitoby, Komatsuzaki and Binder (2014) study the influence of low or high inflation on the public debt in the G-7countries. The results of stimulation indicate that if inflation were to fall to zero for five years, theaverage net debt would increase by about 5 percentage points over the next five years. In contrast,raising inflation to 6 percent for the next five years would decrease the average net debt by about 11percentage points under the full Fisher effect and about 14 percentage points under the partial Fishereffect. It implies that higher inflation could help reduce the public debt somewhat in advancedeconomies.

According to Hilscher, Raviv and Reis(2014), theoretically higher inflation will lower the real value ofoutstanding government debt. In order to demonstrate this argues, these authors propose a methodbased on an ex-ante perspective of the government budget constraint, detailed information on debt,and a set of plausible counterfactuals. By applying this method to the United States in 2012, theauthors estimate that the impacts of higher inflation on the fiscal burden are modest. Moreover, theseauthors also suggest a more promising route to inflate away the public debt is to use financialrepression. Their estimation result indicates a decade of repression combined with high inflationcould wipe out almost half of the debt.

Lopesda Veiga,Ferreira-Lopes and Sequeira (2014) analysed the implications of public debt on economic growth and inflation in agroup of 52 African economies between 1950 and 2012. Using a time series of historical data from1950 until 2012, the results indicate public debt has a positive impact on inflation. It means that thehigh public debt leads high inflation.

Nastansky, Mehnert and Strohe(2014) use quarterly data for Germany over period of 1991 – 2010 to empiricallyinvestigate the interaction between public debt and inflation including mutual impulse response.Authors analysis the transmission from public debt to inflation through money supply and long-term interest rate within a vector error correction model estimated by Johansen approach. The estimatedresults show that the public debt level has a significantly positive effect on consumer prices. Thatmeans public debt statistically causes inflation vice versa.

Martin (2015) theoretically analyses the independence of central bank under relationship between debt and inflation. According to the author, although this reform would bring benefit to the society and initially reduce inflation, it would not lower inflation permanently. The smaller anticipated policy distortions implemented by a more independent central bank would make the fiscal authoritytrade-off higher current deficits for lower future deficits. As a result, in the long run, a higher level ofpublic debt will lead to an increase in inflation. The author suggests that imposing a strict inflationtarget would lower inflation permanently and prevent the primary deficit from political distortions.

3.0 RESEARCH METHODOLOGY

3.1 Research Design

The research design adopted in this study falls within the paradigm of an Ex-post facto design type. The reason is that the events observed, in this case the effects of public debt and the general price level in Nigeria. Hence, the study is intended to review and evaluate aggregate public debt and aggregate debt servicing on inflation rate in Nigeria, with the view to ascertaining their effectiveness, and making possible recommendations for improvement to make the economy of the country more effective. This study also used the explanatory research design. This is because the study will also seek to establish the effects aggregate public debt and aggregate debt servicing on inflation rate in Nigeria. To this end, regression models which seeks to explain these relationships will be formulated through foundational theories and empirical studies to cover for the period 1990 to 2021.

This study relies primarily on secondary data. The secondary data involves are carefully collected from Central Bank of Nigeria (CBN) statistical bulletin and world bank data base. Again, to achieve the stated objectives of this study, annual time series data for the period 1990-2021 were sourced and will be used. Other available sources of data used include Journals, Books and Magazines etc. which are relevant to this study.

3.2 Analytical Framework and Model Specification

This study is guided by the theoretical framework of Aimola and Odhiambo (2021) discussed in the previous section of this study with special reference to aggregate public debt and aggregate debt servicing input and output model thus:

$$PRL = f(PD, DS).$$

Where general price level was expressed as a function of aggregate public debt and aggregate debt servicing. These two being included in our model, our model is specified thus:

$$PRL = f(PD, DS). \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (3.1).$$

Equation 3.1 shows a single-equation regression model (SERM) which seek to explain the relationship between aggregate public debt and aggregate debt servicing and general price level for this study.

Where,

PRL - general price level

PD - aggregate public debt,

DS - aggregate debt servicing

3.3 Method of Data Analysis

The simple ordinary least squares based on the ARDL framework to examine the relationship between aggregate public debt and aggregate debt servicing and general price level. The model is autoregressive because the dependent variable is explained in part by the lagged values of itself. The approach involves estimating the following equation:

$$PRL_t = \alpha_0 + \alpha_1 PRL_{t-i} + \alpha_2 PD + \alpha_3 DS + \mu_t \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (3.2)$$

Equations 3.5 are the derived from the derived model earlier adopted for this study.

Where,

t	=	time
α_0	=	constant term
α_1 - α_4	=	long-run coefficients
μ_t	=	white noise error term

3.4 Hypothesis Testing and Decision Rule Criteria

The decision rule was employed to test the hypothesis of the study and to make comparison between the probability value and the critical value. The study adopted 5% as its level of significance. The following decision rules were adopted for rejecting or accepting the null hypotheses: If,

i. Probability value (p-value) > 0.05 critical value; do not reject the null hypothesis (H_{0i}).
ii. Probability value (p-value) < 0.05 critical value; reject the null hypothesis (H_{0i}).

4.0 DATA PRESENTATION AND ANALYSIS

4.1 Descriptive Statistics

The study conducted the descriptive statistics of the relevant variables involved. Table 4.1 vividly shows these statistics. It shows total number of observations, mean, median, maximum, minimum, standard deviation and the sum of mean deviation. This study's dependent variable is and general price level (PRL), while the independent variables are aggregate public debt (PD) and aggregate debt servicing (DS). However, PRLhas a minimum of 5.3880% and a maximum value of 73.8255%. In the same measure, the maximum and minimum values for PD are 79.71% and 7.12% of Nigeria's GDP; and DS are 6.45% and 0.56% of Nigeria's GDP.

Table 4.1: Descriptive Statistics

	PRL	PD	DS
Mean	18.0608	30.6619	1.8138
Median	12.7158	19.4255	1.5693
Maximum	72.8355	79.7133	6.4495
Minimum	5.3880	7.1171	0.5626
Std. Dev.	16.3651	23.8204	1.2970
Skewness	2.1701	0.8423	2.0346
Kurtosis	6.6334	2.2964	7.1496
Jarque-Bera	42.7188	4.4437	45.0363
Probability	0.0000	0.1084	0.0000
Sum	577.9467	981.1809	58.0419
Sum Sq. Dev.	8302.2630	17589.7100	52.1483
Observations	32	32	32

Source: Researcher

For the degree of volatility, the standard deviation in table 4.1 showed that PD in Nigeria was more volatile having a standard deviation value of 23.8204. This is clearly so because the standard deviation value is the highest among all the data included in the model.

4.2 Model Estimation

The estimated lagged ARDL model from the coefficients is stated below:

$$PRL = 1.043 + 0.54PRL(-1) - 0.01PRL(-2) + 0.31PRL(-3) - 0.528PRL(-4) + 0.308PD - 0.89DS$$

From the model estimation above, aggregate public debt had positive relationship with general price level, DS had negative relationship. However, the contribution of PD to general price level is seen to be the highest with a coefficient value of 0.308.

4.3 Hypotheses Testing

To test the hypotheses, we will use probability criteria, if:

$p > 0.05$: Accept H_O.

$p < 0.05$: Reject H_O.

Testing of Hypothesis One (1)

Hypothesis one is restated below:

$H0_1$: Aggregate public debtdoes not have significant impact on the general price level in Nigeria.

Table 4.2: Extraction for Testing Hypotheses One

Variable	Coefficient	t-Statistic	Prob.*	Decision
PD	0.3084	2.2139	0.0380	Reject H01

Source: Researcher

First of all, the result shows that there is a positive and significant relationship between PD and PRL (representative of general price level) in Nigeria. The result means that a single unit increase in PD leads to an increase of 0.3084 units in general price level in Nigeria. Since the computed probability value of PD (0.0380) is less than the critical test level of 0.05 (i.e. $P < 0.05$), we reject the null hypothesis and conclude that aggregate public debt has significant impact on the general price levelin Nigeria.

Testing of Hypothesis two (2)

Hypothesis two is restated below:

$H0_2$: Aggregate public debtservicing does not have significant impact on the general price level in Nigeria.

Table 4.3: Extraction for Testing Hypotheses Two

Variable	Coefficient	t-Statistic	Prob.*	Decision
DS	-0.8904	-0.2446	0.8091	Accept H02

Source: Researcher

The result in table 4.3 as issued in regression revealed that there is a negative and insignificant relationship between DS and PRL (representative of general price level) in Nigeria. The result means that a single unit increase in DS leads to a decrease of 0.8904 units in general price level in Nigeria. Since the computed probability value of PD (0.8091) is more than the critical test level of 0.05 (i.e. $P < 0.05$), we accept the null hypothesis and conclude that aggregate public debt servicing has no significant impact on the general price level in Nigeria.

4.5 Discussion of Results

This study employed regression analysis to examine the effects of public debt on general price level in Nigeria. The rest of this section discusses the findings of the study.

Effect of aggregate public debt on general price level in Nigeria

The first objective of this study was to determine the effect of aggregate public debt on general price level in Nigeria. The regression analysis shows that there is a positive and significant relationship between PD and PRL (representative of general price level) in Nigeria. As the computed probability value of PD (0.0380) is less than the critical test level of 0.05 (i.e. $P < 0.05$), we reject the null hypothesis and conclude that aggregate public debt has significant impact on the general price level in Nigeria. This finding agree with Afonso and Ibraimo (2018) who also found a positive relationship between public debt and inflation in Mozambique, meaning that an increase in public debt level is inflationary, and Lopes Da Veiga et al. (2016) who also concluded that a positiverelationship is prominent in developing countries with high levels of public debt

Effect of aggregate public debt servicing on general price level in Nigeria

Another objective of this study was to determine the effect of aggregate public debt servicing on general price level in Nigeria. The regression analysis shows that there is a negative and insignificant relationship between DS and PRL (representative of general price level) in Nigeria. As the computed probability value of PD (0.8091) is more than the critical test level of 0.05 (i.e. $P < 0.05$), we accept the null hypothesis and conclude that aggregate public debt servicing has no significant impact on the general price level in Nigeria. This finding agrees with Taghavi (2000), and Karakaplan (2009) who found that economies with well-developedfinancial market, advanced countries, and developing countries with low levels of public debt haveshown negative relationship between public debt and inflation.

5.0 CONCLUSION AND RECOMMENDATION

5.1 Conclusion

This study examines an empirical analysis of public debt and the general price level in Nigeria

. This was aimed at ascertaining how aggregate public debt (PD) and aggregate debt servicing (DS) affected general price level (PRL) as dependent variablein Nigeria. Historical data was collated and estimated employing the ARDL-based Ordinary Least Squares (OLS) technique. The empirical results indicate that aggregate public debt increased inflation while debt servicing reduced in Nigeria.

5.2 Recommendations

On the basis of the findings of this study, the following recommendations are made.

a) Policies that promote more employment and economic stimulus should be pursued to with public debt to enhance the performance of the economy.

References

Ahmad, M.J., Sheikh, M.R. & Tariq, K. (2012). Domestic debt and Inflationary effects: An Evidencefrom Pakistan. International Journal of Humanities and Social Science, 2(18), 256-263.

Aimola, A. U.& Odhiambo, N. M. (2021). Public debt andinflation nexus in Nigeria: An ARDL bounds test approach, Cogent Economics & Finance, 9:1,1921905, DOI: 10.1080/23322039.2021.1921905

Akitoby, M. B., Komatsuzaki, M. T., & Binder, M. A. J. (2014). *Inflation and public debt reversalsin the G7 Countries* (No. 14-96). International Monetary Fund.

Audu, I. (2004). The impact of External Debt on Economic Growth and Public Investment: The case of Nigeria (Abstract). African institute for Economic Development and Planning (IDEP).

Babu, J.O., Kiprop, S., Kalio, A.M. &Gisore, M. (2015). Effect of domestic Debt on Economic Growth
in the East African Community. American Journal of Research Communication, 3(9), 73-95.

Bawa. S. and Abdullahi, I. S. and Ibrahim, A. (2016) Analysis of inflation dynamics in Nigeria (1981 – 2015). CBN Journal of Applied Statistics, 7(1), 43-63.

Bhattarai, S., Lee, J., W., & Park, W., Y. (2012). Inflation Dynamics: The Role of Public Debt and Policy Regimes. CAMA Working Papers 2013-75, Centre for Applied Macroeconomic Analysis, Crawford School of Public Policy, Australian National University.

Bildirici, M., &Ersin, O. O. (2007). Domestic debt, inflation and economic crises: A panel cointegration application to emerging and developed economies. *Applied Econometrics and*
International Development, 7(1), 31-47.

Essien, S.N., Agboegbulem, N.T.I., Mba, M.K., Onumonu, O.G. (2016). An Empirical Analysis of the Macroeconomic Impact of Public Debt in Nigeria. *CBN Journal of Applied Statistics*, *7* (1a), 125–145.

Gill, I. & Pinto, B. (2005). Public Debt in Developing Countries: Has the Market Based Model Worked? World Bank Policy Research Working Paper 3674.

Harmon, E.Y. (2012). *The impact of public debt on inflation, GDP growth and interest rates in Kenya* (Doctoral dissertation).

Hilscher, J., Raviv, A., & Reis, R. (2014). Inflating Away the Public Debt? An Empirical Assessment. *NBER Working Paper*, (w20339).

James, A.A., Magaji, S., Ayo, A.A. & Musa, I. (2016). The impacts of Domestic debt on Economic
Performance in Nigeria (1970-2013). Journal of Economics and Sustainable Development, 7(8), 54-64.

Kwon, G., McFarlane, L., & Robinson, W. (2006). *Public debt, money supply, and inflation: A cross-country study and its application to Jamaica*. International Monetary Fund.

Lopes da Veiga, J., Ferreira-Lopes, A., & Sequeira, T. (2014). Public debt, economic growth, and
inflation in African economies. *MPRA Paper* No. 57377.

Martin, F. M. (2015). Debt, inflation and central bank independence. *European Economic Review*, 7,
129-150.

Masha, I. (2000). New perspectives on inflation in Nigeria. CBN Economic and Financial Review , Volume 38, No. 2, June.

Nastansky, A., Mehnert, A., &Strohe, H. G. (2014). *A vector error correction model for the relationship between public debt and inflation in Germany* (No. 51), University of Potsdam,
Economic and Social Sciences.

Nautet, M., & Van Meensel, L. (2011). Economic impact of the public debt. Economic Review, 2, 7-19.

Niemann, S., Pichler, P., &Sorger, G. (2010). Public debt, discretionary policy, and inflation dynamics. mimeo.

Ogbeifun, M.I. (2007). The Politics of External Debt Relief: Nigeria's Unique Experience. African Journal of Stability and Development, 4(1),

Omotosho, B. S., Bawa, S., &Doguwa, S. I. (2016). Determining the optimal public debt threshold for Nigeria. *CBN Journal of Applied Statistics*, *7*(2), 1-25.

Taghavi, M. (2000). Debt, growth and inflation in large European economies: A vector autoregression analysis. *Journal of Evolutionary Economics*, 10(1-2), 159-173.

Tahir, N., & Tahir, P. (2012). Public Debt and Fiscal Responsibility in a Federal Structure: The Case of Pakistan. Romanian Journal of Fiscal Policy, 3(2), 27-47.

Udaibir; S.D., Michael, P., Guilherme, P., Faisal, A. & Jay, S. (2010). Managing Public Debt and its Frn4nclal stability Implications. IMF Working Paper December.