e-ISSN 3027-0537
p-ISSN 3027-0375

10.5281/zenodo.14251551 Vol. 07 Issue 10 Oct - 2024 Manuscript ID: #1630

Macroeconomic determinants of Nigeria's domestic debt

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Abstract

Motivated by the rising debt profile of Nigeria and the reported economic quagmire the nation is facing, this study empirically investigates the macroeconomic determinant of Nigeria's domestic debt between 1985 to 2021.Population, inflation, government expenditure and gross domestic product constitutes the independent variables, whereas aggregate domestic debt formed the dependent variable. However, these were proxied with their growth rates. It utilized logged variant of secondary data obtained from Central Bank of Nigeria (CBN) Statistical Bulletin and Nigeria Bureau of Statistics (NBS). The studyis based on Keynes general theory and Malthus population theory. E-views 12 was employed for data analysis. Initially, graphical trend of data was used to analyze the data. At first stationarity test was done and the data were stationary at order 1 (first difference) thereby necessitating the Johansen cointegration test from which a long-term relationship was obtained. However, full rank was observed which gave rise to the conversion of the study data to its natural logged form and the beginning of the process all over.In furtherance, stationarity test was engaged in at order zero (levels) and the data were stationary. Hence, ordinary least squares (OLS) test was employed as a tool for analytical purpose.Our OLS test revealed the following: (i) positive and significant relationship between population growth rate (PGR) and aggregate domestic debt growth rate (ADDGR), (ii) negative and significant relationship between inflation rate and aggregate domestic debt growth rate (ADDGR) in Nigeria, (iii) positive and insignificant relationship for both government expenditure growth rate (GEGR), gross domestic product growth rate (GDPGR) and Nigeria's aggregate domestic debt growth rate (ADDGR). The OLS test further showed that 68.72% variation in the study's dependent variable (aggregate domestic debt) was determined by the choice macroeconomic determinants of the study (i.e. population, inflation, government expenditure and gross domestic product).Causality test was conducted and the result obtained tells that non among the choice determinants promoted Nigeria's aggregate domestic debt, instead aggregate domestic debt promoted inflation. Based on our findings we recommended the following; (i) Nigeria's government should encourage population control, (ii) inflation should be targeted the government's monetary policy,(iii) government should reduce its expenditure by ensuring that prudence is exercised in its spending pattern so as to reduce its domestic debt, (iv) further related research should be engaged in while incorporating those macroeconomic variables that were not captured on this study.

Keywords: Liquidity, Financial performance, Current ratio, Quick ratio, Cash conversion Cycle.

How to cite: Emmanuel John, C., Barisua Fortune, N., & Ikechukwu Samuel, N. (2024). Macroeconomic determinants of Nigeria's domestic debt. *GPH-International Journal of Business Management*, *7*(10), 113-133. https://doi.org/10.5281/zenodo.14251551

1.0 Introduction

All over the world, governments of different countries engage in sourcing of funds through borrowings, in an attempt to bridge prevailing gaps in (financial) resources arising from continued increase in government expenditures (Nwinee &Torbira, 2012). The Nigerian government is not an exception. These lenders from which the government borrows might be individuals or corporate bodies (Bahr, Shan, & Lam, 2020). Justifications for government borrowing are partly found in the neoclassical growth models, which state the need for countries with scarce capital to borrow in order to increase the accumulation of capital and the steady-state level of per capita output (Madow, Nimonka, Brigitte & Camarero, 2021).

When government's actual revenue performance falls short of projected estimates, it could resort to internal borrowing to finance projects of social and economic importance to the nation (Ezirim, 2005). Hence, Burhanudin (2017) opined that anytime the government's total revenues fall short of its expenditure, the government borrows. Borrowings could be necessitated by the situation whereby the government's present or expected expenditure is more than its income thereby requiring the gap created by this shortage of funds to be bridged.Also, the government may decide to borrow in order to stimulate growth in a particular sector of the economy. For instance, the financial sector (market) of a country can be developed by supplying more debt instruments in order to influence a situation whereby there are more tradeable financial instruments. In fact, the list of reasons for government borrowing is endless and whenever the government borrows debt is created.

Debts are incurred by the government of Nigeria through foreign and domestic borrowings (John, 2016) hence the public debt incurred by the government can be divided into foreign debt and domestic debt (Yusuf & Mohd, 2021). Foreign debt which is also known as external debt refers to loans collected by the government from other nations or international bodies such as IMF, World Bank, London Club, Paris Club, etc, (Nwinee &Torbira, 2012). According to Nnamdi &Omojefe (2009) it generates threats such as loss of control of monetary and trade policies, capital flights and excessive devaluation of home currency depending on the existing exchange rate regimes. On the other hand, domestic debt which can as well be referred to as internal debt, refers to borrowed funds by the government from lenders residing within the boundaries of the country.

The focus of this study is particularly on domestic debt which Nwinee and Torbira (2012) defined as funds which the government borrows from different sources within the country. Ezirim (2005) refers to it as government borrowings from other economic agents within the economy. It also refers to debt instruments like treasury bills, treasury certificates, development stock, treasury bonds, etc. which are issued by the federal government of Nigeria and are denominated in the local currency (Oshadami, 2006). Thus, Ezirim (2005) asserts that Nigeria's domestic debt is denominated in the local currency (Naira ₦) and dates back to 1946 when the first development stock of ₦600,000 was issued by the government.

In Nigeria, government's domestic debt could be traced to some phenomena or variables within the macro-economy. These include, population, inflation, government expenditure, gross domestic product (GDP), interest rate, unemployment rate, etc. (Nnamdi &Omojefe, 2009). Hence, these macro-economic variables are the determinants, propellants or drivers of domestic debt in Nigeria's economy. Nigeria's government sometimes resort to domestic borrowings when there is a short fall in the funds it requires to achieve its predetermined goals which include; the financing of deficit budget, monetary policy implementation and to develop instruments for the purpose of deepening the country's financial markets (Alison et al., 2003).

From literature, we observed the prevalence of variations in the respective outcomes ofthese choice macroeconomic determinants of government debts. While some studies (Nnamdi &Omojefe, 2009; Sinha et al., 2011; Ademuyiwa & Adetunji, 2019; Pjanic et al., 2020) found population and government expenditure to be significant determinants of government debt, other studies (Swamy, 2015; Khan, Abdullah and Shamsudin, 2016; Bahr, Shan & Lam, 2020) found both population and government expenditure to be insignificant determinants of government debt. It is in the light of this conflicting findings by previous researchers that this study was indulged in,so as to ascertain if these choice macroeconomic variables (population and government expenditure) are significant determinantgovernment debt in Nigeria. Also, in the course ofour literature review,

it was found that many studies (Bandeira, 2008; Khan, Abdullah & Samsudin, 2016; Ademuyiwa & Adetunji, 2019; Asaolu et al., 2020; Semik& Zimmerman, 2021) did not make use of gross domestic product (GDP) as a predictor variable, which is theoretically proven to be a key determinant of government domestic debt. Thus, this research work incorporates this key macroeconomic factor in determining Nigeria's domestic debt. Lastly, it was observed that the following reviewed studies on the subject matter (Sinha et al.,2011; Mba et al.,2013; Sa'ad et al.,2017; Thaun, 2018; Knapkova et al., 2019; Ademuyiwa & Adetunji, 2019) did not employ recent data in their analysis. Hence, this study's point of departure is its resolve to conduct a more recent analysis in predicting Nigeria's domestic debt.in order to ascertain the extent to which the results will agree and/or disagree with other previous studies.

2.0 Literature Review and Theoretical Framework

This part of the study is concerned with the review of relevant research work akin to this study. Also, the observed gap for which this study is engaged in will be stated in this part of this research work. It is divided into the following:

- Conceptual framework
- Theoretical framework
- Empirical review

2.1 Conceptual Framework

Borrowing is one critical mechanism which the government can use to finance projects in order to stimulate economic growth which could culminate into economic development. Nigeria's Domestic debt comprises of treasury bills, development stock, treasury bonds, savings bond of the Federal Government of Nigeria (FGN), promissory note, the green bond of FGN, and the recently introduced FGN Sukuk (CBN, 2019). These are different means through which the government of Nigeria sources funds as debt from economic entities (household and firms) residing within the country. Also, within the macro-economy there abound factors which theoretically may affect the ability and/or capacity of the government to meet up its financial obligations. They could be referred to as macroeconomic variables and they could influence government's domestic debt.

Theoretically, these include population, inflation, exchange rate, government expenditure, interest rate, productivity index, unemployment rate, etc. These concepts are X-rayed in this part of the work.

2.1.1 Concept of domestic debt

Domestic debt is conceived by Nwinee and Torbira (2012) as funds which the government borrows from different sources in the country. It is part of the total debt of the government which is owed to lenders that are residing in the country. Thus, Abbas (2007) sees it as the domestic currency indebtedness of a country's consolidated public sector (government) to its citizens. On the whole, it includes loans which the government collects from financial institutions e.g. banks, as well as liquidity absorbing papers issued to the public by the Central Bank of Nigeria. Liquidity absorbing papers as used in this context are those financial instruments which CBN, on the behalf of the government, issue to members of the public when it wants to reduce the quantity of money in circulation within the economy. These liquidity absorbing papers authenticate the indebtedness of the government to the holder(s). They include treasury bills, treasury certificates, development stock, treasury bonds, savings bond of the Federal Government of Nigeria (FGN), promissory note, the green bond of Federal Government of Nigeria (FGN), and the recently introduced FGN Sukuk (CBN, 2019). Hence, Oshadami (2006) sees domestic debt as those debt instruments that are denominated in the home currency, which are issued by the government of the country. It consists of both securitized and unsecuritized loans (Odozi, 1996) owed by the government to lenders who reside within the country. From the above definitions of domestic debt by different authors, it is glaring that domestic debt is borrowings by the government from lenders in the country, which constitutes a liability incurred by the government payable at an agreed future time period.

2.1.2 History and Structure of Domestic Debt in Nigeria

Domestic debt can be traced back to the period when the Nigerian government floated the first development stock of ₦600,000 in 1946 (Ezirim, 2005). The first treasury bills worth ₦8,000,000 as well as treasury certificates worth ₦20,000,000 were respectively issued in 1960 and 1968. From that time to date, Nigeria's domestic debt has been increasing rapidly. As at December 1998 it got to ₦560.53 billion which accounted for 46.98% of total public debt. Treasury bills constituted the tone of ₦378.53 billion (about 67.5% of the total government domestic debt), while treasury bonds amounted to N179.6 billion (about 32.02% of the total government domestic debt). Development stock was ₦2.7 billion (about 0.48% of the total government domestic debt) (CBN, 2008). According to CBN (2011) as at December 2010 total domestic debt of Nigeria was ₦4551.82 billion. Treasury bills made up ₦1277.10 billion (28.06% of total domestic debt), FGN bonds amounted to ₦2901.60 (63.75% of total domestic debt), treasury bonds amounted to ₦392.07 billions (8.61% of total domestic debt) and development stock amounted to ₦0.22 billion (0.0048% of total domestic debt).

Nigeria's domestic debt has greatly increased both in value as well as servicing cost. As such, the debt which was N3,228.03 billion in 2009 increased to N12,774. 41 billion in 2018. An upward movement also occurred in the interest charges thereby taking it from N271, 540.13 million in 2009 to N1,797.90 billion in 2018 and in 2020 it stood at (CBN, 2020).

Domestic debt value showed rapid expansion in development programs as well as changes which occurred within the country's economy. This debt was majorly raised by floatation of treasury bills and treasury certificates. However, as a result of the conversion of unpaid treasury certificates to treasury bonds in 1996, treasury bills and treasury bonds formed the largest sources of domestic debt (Ezirim, 2005). Little wonder Omedero et al. (2020) states that it is made up of marketable securities whose holders can sell and make use of it as collateral in the financial markets.

2.1.3 Classification of Domestic Debt

Government domestic debt can take different forms and this difference can be in respect of purpose, repayment time, repayment conditions, etc. From Nwinee and Torbira (2012) we deduce that it can be classified into productive debt, unproductive debt, long-term debt, medium term debt, short-term debt, redeemable debt and irredeemable debt.

2.1.3.1 Productive Debt

A productive domestic debt exists when such debt is raised by the government and employed in activities that increase the economy's productive capacity. It produces a flow of income that is continuous for the government from which the interest as well as the principal sum is generally repaid. As such, it suffices to state that it is self-liquidating (Nwinee &Torbira 2012).

2.1.3.2 Unproductive Debt

Domestic debt is said to be unproductive when government obtainsit and the proceeds are not used to increase the economy's productive capacity. Such debt is not self-liquidating because both the interest and principal sum may be required to be repaid from alternative sources of revenue, mostly from taxation. Thus, such debt constitutes a burden to the government. It includes debt sourced domestically which are used for the financing of social services, war, relief, famine, etc. (Nwinee &Torbira, 2012).

2.1.3.3 Long-term Debt

This is a domestic debt whose maturity period is ten (10) years and above. Debts of this nature are raised and utilized for developmental projects and for the purpose of meeting other long-term needs of the government (Nwinee &Torbira, 2012). An example of long-term domestic debt is treasury bonds which are issued by the government. Its interest rate is higher when compared with that of medium-term debt and short-term debt.

2.1.3.4 Medium-Term Debt

This is a class of domestic debt whose tenure ranges from one (1) to five (5) years. Government borrows domestically to satisfy its medium-term needs. Such funds may be utilized for development activities (Nwinee &Torbira, 2012). Example of this type of domestic debt is treasury certificates which tenure is two years. Its interest rate is higher when compared with that of short-term debt.

2.1.3.5 Short-Term Debt

This refers to domestic debt which maturity period ranges from three (3) to nine (9) months. Generally, its interest rate is lower than that of long-term debt and medium-term debt (Nwinee &Torbira, 2012). This type of debt cannot be used for developmental projects since its tenure is too short for such purpose. An example of this type of debt is treasury bills.

2.1.3.6 Redeemable Debt

This refers to a debt sourced domestically of which the government promises to pay back at a certain future period. Here, there exists a specified maturity period of the debt, that is, both the interest as well as the principal amount (Nwinee &Torbira, 2012). Most of government domestic debt are redeemable.

2.1.4. Sources of Government's Domestic Debts

Nigeria's domestic debt is often sourced from its financial markets (Ezirim, 2005). The acquisition of such debt is facilitated by various players in the financial markets through the process of financial intermediation. Hence, these players are referred to as financial intermediaries.

2.1.4.1 Financial Intermediaries

Financial intermediaries are those institutions within an economy whose major activities are the mobilization of idle funds from the surplus economic units and the rendition of such mobilized funds to the needy units of the economy. Financial intermediaries also aggregate the mobilized funds and make them available to the deficit spending units. They include banks, insurance companies, investment trust, savings institutions, etc. According to Ezirim (2005) financial intermediation refers to the mobilization as well as aggregation of scattered monetary resources of the public who belong to the surplus savings economic units and the channeling and/or disaggregation of the pooled financial resources (funds) to the deficit spending units in the economy.

2.1.4.2 Surplus Savings Units

These are those economic units that own funds which exceed their present consumption requirements. As such, they save the excess or surplus funds with those financial institutions listed above. Whenever the funds of economic agents such as households and firms are lent to the government, these economic agents form the surplus savings economic unit.

2.1.4.3 Deficit Spending Units

Deficit spending units of the economy are those economic units whose present consumption requirement is in excess of their available monetary resources (Oji & Christian, 2022). When this situation exist these economic units would have to borrow in order to bridge the gap in their financial resources to ensure that such consumption is made. As such, when the government borrows it falls under the deficit spending unit.

2.1.4.4 Financial Markets

The financial market is an aspect of the financial system of the economy. It is a market for the trading of financial claims created in order to facilitate transactions between deficit economic units and surplus economic units (Ezirim, 2005). Olowe (2011) sees it as that mechanism through which the deficit and surplus units of the economy are brought together. They are centres which provide the facilities for trading financial services and claims (Bhole, 2003). According to Akinsulire (2014) it is the different markets which the financial system

provides for creating, distributing and having custody of financial claims. It provides that channel through which financial assets are exchanged for money (Rose, 1992). It is perceived as a process, medium or mechanism by which sellers of financial instruments are connected with the buyers of such instruments irrespective of where they are physically located. The government easily incurs domestic debt through the existence of the financial market. Meedee (2014)stated that in shallow financial markets, as domestic debt increases the interest payments also increases as a result of holding large amount of short-term debt instruments. This market is mainly divided into capital, money and foreign exchange markets.

Olowe (2011) outlined the functions of the financial markets thus:

- Ease funds flow from surplus savings units of the economy to deficit spending units of the economy.
- Facilitate the issuing of financial securities or instruments of different maturity periods.
- Enhance the transformation of financial assets or securities.
- Facilitate economic growth.
- Afford investors the chance of investing in a range of different enterprises thereby allowing them to spread risk.

2.1.5 Purpose of Domestic Debt

The purpose of a thing is the reason for its existence and Alison et al. (2003) stated three reasons for domestic debt. Hence, the purpose of domestic debt are as follows:

(a) Financing budget deficit.
(b) Implementation of monetary policy.
(c) Developing the financial sector.

2.1.6 Maturity Pattern of Domestic Debt

The maturity pattern of Nigeria's domestic debt varies. According to Asaolu et al. (2020) domestic debt maturities are categorized as short-term, medium-term and long-term. As a way of buttressing the stated, Ezirim (2005) opined that domestic debt can be classified into short, medium and long terms.

Short-term debt instruments, particularly treasury bills, originally have maturity periods which range from ninety (90) days to a year (365 days). Medium-term debt instruments which mostly are treasury certificates, have original pattern of maturity which exceeds a year and long-term debt instrument such as treasury bonds and development stock have maturity pattern that exceeds five (5) years. Treasury bond is used with the intention to decrease the servicing payments of domestic debt by the conversion of debt that are originally short-term in nature (treasury certificates and treasury bills) into long-term debt by way of stretching their pattern of maturity (Ezirim, 2005). Managers of domestic debt however, prefer long-term maturity to short-term maturity due to their concern for the risk of refinancing at a rate that is higher than the expected rate of interest (Missale, Giavazzi& Benigno, 2000).

2.1.7 Domestic Debt Burden and Problems

Debt burden is the servicing cost of a debt. It is that payment other than the principal, which the borrower makes to the lender for making use of his money. Generally, the cost of debt includes the initial fee which the borrower pays in obtaining such debt, periodic interest payments, extra fees charged for late payment of interest, annual membership fees, etc. (Nwinee &Torbira, 2012). Thus, domestic debt burden means the cost of servicing the debt and other payments made with respect to the debt. This cost can negatively affect the public if the government resorts to increasing taxes as a means of sourcing funds to pay the debt. If such occurs that simply means that the government has successfully shifted the debt burden to members of the public. According to Nwinee and Torbira (2012) the level of domestic debt largely depends on the economy's capacity to service the debt. Additionally, the increasing debt burden could restrict the ability of the government to chase more productive investments in public health, education, infrastructure, security, etc. (Johnny &Johnnywalker, 2018).

Also, in Nigeria excessive domestic debt can serve as hindrance to increased level of investment within the economy since it has the capacity to crowd-out private sector investments (Asaolu et al.,2020).

2.1.8 Causes of Domestic Debt Problems

Nigeria's domestic debt problem is encountered when the cost of such debt is greater than the benefits which accrue to its economy from the employment of the debt's proceeds. Therefore, Nwinee and Torbira (2012) argued that the problems of government's debt arise if its debt servicing capacity doesn't increase with the growth of such debt. Many factors contribute to the growth of our domestic debt which as at the end of 1998 was ₦560.83 billion (Ezirim, 2005). In September 2012, Nigeria's domestic borrowings stood at ₦6,537.54 billion (Onyeiwu, 2012). According to CBN (2021) it was ₦19,242.56 billion in 2021.Thus, Ogunbiyi (2015) asserts that the domestic debt of Nigeria continuously increases and Okonjo-Iweala (2011) states that the domestic debt profile of Nigeria has risen astronomically. According to Ezirim (2005) one of the major causes, which constitutes a key factor is the reduction in revenue within the periods of expansionary fiscal operation which started from late 1970's.

2.1.9 Determinants of Domestic Debt

(i) Population

Population is referred to as the total number of people living within a country as at a given period of time e.g. a year. It is a group of persons who live and interbreed within a particular area (Tuff, 2012). Those who belong to a certain population usually depend on the usage of the same available resources. Such persons are subject to the same environmental constraints and mostly depend on existence of other persons to persist over the passage of time. Hence, Wani (2019) said it refers to the collection of a specific group of persons. Linden (2017) opined that growth of the population will always constitute a problem in an economy as more persons inevitably make use of more of the available resources thus reducing long-term growth potential. Whenever the available funds (resources) at the government's disposal is not enough to meet the requirements of the teeming population e.gsecurity, infrastructure, etc. it may decide to source funds through domestic borrowing for the purpose of bridging the gap, and whenever borrowings are made internally by government to meet the needs of the growing population domestic debt has been created.

(ii) Inflation

Osuala (2016) defined inflation as the sustained increase in general price level of goods and services. Whenever the prices of most commodities within an economy keeps rising inflation has occurred. It refers to a measure of that rate of rises in prices of goods and services within an economy (Onoh, 2007). Hence, Okereke et al., (2009) sees inflation as a certain economic phenomenon whereby there is consistent increases in prices. Thus, it is an economic term that refers to an environment of generally rising prices of goods and services within a particular economy (Adaramola and Dada, 2020). Whenever there is increase in general level of prices within an economy, a unit of the home currency will only be able to purchase fewer commodities. Hence, Ouma (2014) opined that when there is a rise in inflation each unit of the naira which the consumer holds purchase fewer units of goods and services. Whenever an economy experiences very high inflation the present value of the financial resources (money) at the government's disposal is reduced. As such, the government would need more funds to finance its consumption requirements within the economy because the worth of its available funds has been eroded. Thus, the government may resort to domestic debt in order to bridge the gap in its requirement for funds to finance its consumption.

(iii) Government Expenditure

Government expenditure also called public expenditure, can be defined as the total government cash spending which includes that of its agencies and financial transfers which it makes to its parastatals (Nwinee &Torbira, 2012). It is referred to as that expenses which the government makes for it to be able to maintain its activities, the economy and the society. It comprises of both long-term and short-term government expenditure. Government spending assist economic growth within a country. Reddy (2020) classifies it as recurrent expenditure and capital expenditure. Anytime the value of the expenditure requirements of the government increases above its available funds, the government as an economic unit whose core function is to provide basic social services, would need to source funds for the actual provision of these basic services for its citizens. As such, the government may decide to borrow from its citizens (those who belong to the surplus economic unit) in order to finance such items of expenditure. When the government borrows from its citizens domestic debt has been created. Hence, the decision of the researcher to pick government expenditure as a macroeconomic determinant of domestic debt theoretically suffices.

(iv) Gross Domestic Product (GDP)

Gross domestic product (GDP) is defined as the total market value of all goods and services which is produced within a country for a certain period of time, e.g. a year. Ali (2018) opined that GDP is the value of income which an economy realizes from its productive activities within a specific time period. It is the monetary measure of all consumables produced within a particular period of time in a country. Thus, it is the key macroeconomic indicator of the overall wealth of the country (Oliinyk&Kozmenko, 2019). Gross domestic product (GDP) shows whether a country's economy is doing well or not, in the sense that whenever gross domestic product (GDP) rises, it signifies rising incomes and that citizens are consuming more. Such situation means that the economy is stronger, since it (GDP) is used to measure an economy (Deng & O'Brien, 2016). GDP is classified into nominal GDP and real GDP (Oliinyk&Kozmenko, 2019). Gross domestic product (GDP) which represents the total output of goods and services produced within the Nigerian economy can be termed as the income of the country from the local economy. The GDP of a country can trigger different economic phenomena in that country. When a country's GDP (output) increases it's a sign that such an economy is growing. On the other hand, whenever the GDP of an economy decreases it is an indication that such economy is not doing well. Anytime due to a reduction in the GDP the government could not provide certain basic social services, it could resort to borrowing domestically for the purpose of financing its obligations.

2.2 Theoretical Framework

According to Monette et al. (2005) a theory is the set of interrelated statements or propositions which explains phenomenon. Hence, this study is explained by the theories stated below.

2.2.1 Keynesian General Theory

This is a macroeconomic theory developed by J.M. Keynes in 1936. It concerns itself with total spending within an economy and how it affects employment, output (GDP) and inflation. This theory advocates for increase in government expenditure and reduction in tax so as to stimulate demand within the economy and get such economy out of turmoil (economic woes). It is also called fiscal stimulus theory.The theory was informed by the deep depression experienced not only in his (Keynes) own country but globally of which he believed the classical theory of economics could not explain. It states that injecting government spending into an economy amounts to increase in the activities of businesses (Jhingan, 2004). During the periods of the great depression Keynes propounded the general theory of employment, interest and money (1936) where he suggests that government (public) expenditure should be increased while tax should be reduced. Thus, in his opinion monetary expansion within the economy brought about by increased government expenditure and reduced taxation could serve as a means to solve the problem of depression experienced in that economy. He (Keynes) advocates counter-cyclical fiscal policy whereby in times of economic downturn, the government should carry out deficit spending so as to cover up the reduction in investment and boost spending of the consumer for the

purpose of stabilizing aggregate demand (Ezu, 2012). However, such increases in government expenditure backed with a reduction in its income (tax) could create the need for government's items of expenditure to be financed with borrowed funds, particularly domestically borrowed funds. When this holds, government domestic debt has been created. This study is largely hinged on this theory.

2.2.2 Malthusian theory

This theory was propounded by an English demographer and political economist, Thomas Malthus in 1936. He investigated the relationship which existed between the growth of the population and available resources and came out with this theory. The theory states that there is exponential growth in human population while the supply of food (resources) experienced arithmetic growth thereby causing shortage (deficit) in the supply of food (resources) for human consumption and that only positive and preventive checks can create a balance between both. He said that the human population grows faster than the supply of food (resources) until famine, disease and/or war reduce the population. From the foregoing, when population grows more than the available resources (which Malthus in his wisdom streamlined to food) of the government, there exist the problem of scarcity which the government may decide to solve by borrowing from its own citizens. Hence, Nnamdi and Omojefe (2009) opined that government incur debt domestically to meet the rising demands of our growing population.

2.2.3 Crowding-out Hypothesis

Crowding-out effect refers to an economic phenomena (occurrence) which happens whenever increased government participation within a particular sector of the economy greatly affects the other economic agents or units in the same economy. It is an economic theory which states that due to government involvement in the financial market which gives rise to rising rate of interest, there would be decreased initial spending for private investment (Hameed, 2021). It is a situation whereby increases in interest rates bring about a reduction in spending within an economy for private investment to the extent that it reduces initial increases in total spending on investment. Hence, a means of crowding-out is a decrease in the investment of the private sector which exist due to the increase of government borrowing of the available loanable funds within the economy. The government sometimes takes up a fiscal policy that is expansionary in nature. Thus, expanding its spending in order to boost economic activities and/or provide basic amenities. Such a case will result in an increase in the rate of interest within the economy when the government source funds for such expenditure requirement by borrowing domestically (Sinha et al, 2011). This is so because the government will now compete with the private sector for the available loanable funds within the economy, thereby increasing the demand for the funds which will result in an increase in the price (interest rate) of the loanable funds.

2.3 Empirical Review

Mulugeta (2021) studied macroeconomic determinants of public debt accumulation for the period of 1981 – 2018 using ARDL bound test method and the required time-series test which were carried out. The estimation result shows that in the long-run growth of GDP per capita has significant and positive effect on the stock of the external debt of Ethiopia. The results further showed that both in the short-run and the long-run political instability and budget deficit infuse significant pressure which increases the growth of Ethiopia's stock of external debt. In agreement with some of the existing empirical studies, this research work shows significant and negative influence of infrastructure development and openness on the growth of the stock of external debt. Hence, it recommends that government should engage in prudent borrowing which would enable her achieve transformation. Semik and Zimmermann (2021) investigated the determinants of substantial public debts in eastern and central European countries where the used different specifications of logistic probability model in examining those key determinants of large public debt reductions in the sampled countries between 1996 to 2020. Their results show fiscal adjustments to be successful in the reduction of public debt if it is based on cuts

in government expenditure rather than increases in revenue. Particularly, cuts in compensation paid to government employees and social benefits proved to be effective. Yusuf and Mohd (2021) studied how government debt is determined by GDP in Nigeria utilizing annual data between 1980 – 2018 and ARDL technique. Empirical results obtained reveal economic growth (GDP) positively and significantly impacted on domestic debt in the long-run while it negatively impacted on the foreign debt within short-run. Both in the short-run and long-run payments for debt service brought about debt retardation. The outcome of the research suggest that Nigerian government should try to direct the funds borrowed to diversifying the economy's productive base since such act will result in economic growth in the long-run, extend the nation's revenue sources and increase the capacity of the government to payback outstanding debt as at when due. It recommends for the government to rely on domestic debt instead of external debt.

Pjanic et al. (2020) investigates public (government) debt predictors in E.U. countries between 2001 – 2018. The study's objective is to ascertain the relationship between 12 different economic factors (FDI inflows, FDI outflows, inflation, gross domestic savings, per capita GDP, real rate of interest, tax revenue, unemployment, imports, domestic advances to government, domestic advances to the private sector, exports) used as independent variables and public (government) debt which represent the dependent variable. IBM SPSS software was used to carry out the study's analysis. Key findings from the analysis showed unemployment statistically and significantly predict government debt. Also, there were difference in the other predictors and their effects were statistically and significantly different in magnitude. Hence, the result obtained shows unemployment as a very vital problem of E.U. countries. Briceno and Porte (2020) did its investigation into the determinants of public debt within Eurozone using interest rate, unemployment rate, economic growth (GDP), government effectiveness and public debt ratio as dependent variable for nineteen European countries. In the work they opined that the sustainability of public debt should consistently be assessed aiming at discussing technical recommendations in order to maintain it at a rate that would permit sustained growth in the economy and better living standards. In their findings they noticed that employment rate, GDP, interest rate and public debt crisis were determinants of public debt. Beyne and Kotosz (2020) examined macroeconomic determinants of Ethiopia's internal debt during 1981 – 2016, making use of ARDL bound test approach. Result of the study reveals that trade deficit, savings and investment gap, debt service and fiscal deficit have significant and positive effect on internal (domestic debt). On the other hand, trade openness, inflation and GDP rate of growth significantly and negatively impact the country's domestic debt. These results do not agree with the postulates of the study's theoretical framework. Conclusively, the study recommends appropriate macroeconomic and supply-side policy to vital concerning decreasing the country's domestic debt.

Sadik-zada and Gatto (2019) examined drivers of public debt and the roles of natural resources for the period 1973 – 2013 (40 years), in which they particularly studied key causants of the growth of public debt in 184 countries. They based the study's cross-country survey on improved data sets compilation of debt of central government for 2013. From the analysis it was found that abundance of oil, the rate of economic growth, payments as interest on foreign debts, mineral rent share in total revenue and being a less developed country have an impact that is statistically significant on public debt growth. On the other hand, spending on defence, inflation rate and unemployment rate have no impact that is statistically significant on public debt. Ademuyiwa and Adetunji (2019) examined the impact of some macroeconomic variables on the domestic debt of Nigeria for the period 1986 – 2015 (30 years). In the study they used government expenditure, interest rate, exchange rate and inflation rate as proxies for the independent variables (economic variables) and domestic debt as proxy for the dependent variable. Employing stepwise regression for their analysis, the result obtained shows that government expenditure and interest rates contributes positively and significantly to Nigeria's domestic debt when compared to the other variables used in the study. Belguith and Omrane (2017) studied the macroeconomic determinants of public debt growth in Tunisia for the period 1986 – 2015 using vector error correction model (VECM). In the work they used public debt percent in percentage of gross domestic product (GDP) as the dependent variable and gross domestic product (GDP) growth rate, gross fixed capital formation in percentage of GDP, inflation, real interest rate and budget deficit in percentage of GDP as the independent variables of the study. The result obtained from the analysis shows that investment and inflation decrease public

debt value. It was also found out that deficit budgeting, real interest rate increased public debt. Their study as well shows that budget deficit constitutes a key determinant of Tunisia's public debt. Nnamdi and Omojefe (2009) in their paper where they gave out a model predicting a type of public debt (external debt) of Nigeria of which they made use of data sourced from CBN Statistical Bulletin (2006), U.S. Census department (2009) and Population Statistics of Nigeria between 1986 – 2006. It as well made use of SPSS software for data analysis. The study made use of inflation rate, population, current account balance of payment, productivity index and foreign reserves as parameters for the explanatory variable while its dependent variable was proxied with external debt. The findings of the study showed that none of the above listed explanatory variables had any significant relationship with government debt. In furtherance, not any of the independent variables were valuable statistically in the prediction of external debt changes in Nigeria. Lastly, the study recommended that the search for Nigeria's external debt relevant predictors should not just be focused within the framework of Nigeria's macroeconomy, but an extension should be made with regards to socio-cultural domains with special focus on the debt psychology of Nigeria.

3.0 Methodology

Methodology means the way a study is carried out (Baridam, 2001). Thus, this aspect of our study reveals the procedures to be engaged in model building, obtaining and analyzingtheemployed data of this study. It is sub-divided into:

3.1 Data and Description of Employed Variables

This study's variables are stratified into predictor and predicted variables. While the predictor variable is the choice macroeconomic variables employed as determinants in our study, the predicted variable is aggregate domestic debt in Nigeria. In thisresearch work, annual data between 1985 to 2021 (37 years) were sourced from Central Bank of Nigeria statistical bulletin (2021).

3.2 Model Building and Specification

Based on previous related studies, our study's model is presented in the understated equations:

The functional form of the model is stated thus;

ADDGR = f (PGR, INFR, GEGR, GDPGR)……..…… ……(1)

Where:

ADDGR = Aggregate Domestic Debt Growth Rate
PGR = Population Growth Rate
INFR = Inflation Rate
GEGR = Government Expenditure Growth Rate
GDPGR = Gross Domestic Product Growth Rate

For estimation purposes, equation (1) is restated as follows;

$LN(ADDGR_t) = \beta_0 + \beta_1 LN(PGR_t) + \beta_2 LN(INFR_t) + \beta_3 LN(GEGR_t) + \beta_3 LN(GDPGR_t) + \mu_t$ ……(2)

Where:

ADDGR = Aggregate Domestic Debt Growth Rate
PGR = Population Growth Rate
INFR = Inflation Rate
GEGR = Government Expenditure Growth Rate
GDPGR = Gross Domestic Product Growth Rate
β_0 = Constant term
$\beta_1, \beta_2, \beta_3, \beta_4,$ = Estimation Parameters
μ_t = Error term
t = time series

3.3 Method of Analysis of UsedData

For the sake of clarity purpose, our studywill make use of different methods of statistical analysis. Therefore, it intends to indulge in the following:

3.3.1 Stationarity Test

Engle and Granger (1987) asserts that in time-series analysis the very first step is the pretesting of individual time-series that is used for the purpose of confirming the stationarity of data. As such, from this study's objectives stationarity test also known as Unit root test will be carried out on its time-series variables so as to obtain if data used in the study is associated with the properties of unit root for the purpose of avoiding spurious estimates. As such, the ADF test will be used for this purpose. Gujarati and Porter (2009) specified the procedure for the modeling of a time-series variable of choice Y_t, as follows:

$$\Delta Y_t = \propto_o + \propto_i Y_{t-1} + \sum_{i=1}^{\rho} \delta_i \Delta Y_{t-1} + \in_i \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots$$

Where:
Y = Variable of choice
$\propto_o$ = Intercept
Δ = First difference operator
$\propto_i$ = (for i = 1and 2) and δ_i(for i = 1, 2 –p) are constant parameters
$\sum_i$ = Stationary stochastic process
p = Number of lagged terms chosen by Akaike Information
Criterion (AIC) to ensure that $\sum_i$ is white noise.

3.3.2 Multiple Regression Test (OLS): This is the method employed for the estimation of parameters within a regression model that is linear, with the aim to minimizing the sum of squares of differences between the observed response in a given variable dataset and those that are predicted by the linear function of a certain set of independent variables.

i. **Probability**:- It is as well termed the P-value or marginal significance level. With a given P-value, by mere looking one can tell if the stated hypothesis is to be rejected or accepted. A P-value higher than 0.05 is seen as strongevidence for accepting the null hypothesis whereas a P-value less than 0.05 is viewed as strong evidence for which the alternative hypothesis is accepted.

ii. **Coefficient of determination (R^2):** This reveals the extent (percentage) to which changes in the independent variables explain or cause changes in the dependent variable. It can be said to explain the extent to which variations in the dependent variable are explained by changes in the independent variables.

3.3.3: Johansen's Cointegration Test

This type of cointegration test will be used to carry out longrun test of how the variables relate. It will be used if the data is stationary at either first or second differencing. When data is stationary after first differencing it is said to be integrated at order one I(1). However, whenever the data attains stationarity at second differencing it is said to be stationary at order two I(2).

3.3.4:Granger Causality Test

This test intends to find the extent to which changes in a particular set of time-series say Y, tend to support or promote growth in some other variable say X and the extent to which the inclusion of lagged values of the variables involved would significantly tend to improve the explanation by the virtue of significance of their

coefficients within a framework of regression. Thus, Maddala (2007) and Brooks (2009) provide standard formulae for the Pair-wise Granger Causality framework as stated below in equation 3.13.

$X_t = \beta_0 + \sum j=1pA11,jX1(t-j)+\sum j=1pA12,jX2(t-j) + \mu_t$ ……4

$Y_t = \alpha_0 + \sum j=1pA21,jX1(t-j)+\sum j=1pA22,jX2(t-j) + v_t$ ……5

Where X_t and Y_t are time-series variables that are under the evaluation, μ_t and v_t forms the idiosyncratic errors.

3.4 A *priori* Expectation

Theoretically, it is expected that when the population of a country increases the demand for public utilities would increase and this would make the government demand more than its available financial resources which could make her resort to borrowing domestically. Thus, an increase in Nigeria's population will give rise to an increase in its domestic debt. As such, the response of domestic debt to population growth is positive. Hence, $\beta_1 > 0$.

Based on theory, it is expected that during inflationary periods the real value of government available funds will reduce. Due to such reduction in the present value of the financial resources of the government, it would demand more funds for the financing of its activities and/or obligations. A situation like this could make the government resort to the act of borrowing domestically. As such, an increase in Nigeria's inflation would bring about an increase in the sum of its domestic debt. Therefore, the response of domestic debt to inflation is positive. Thus, $\beta_2 > 0$.

In line with theory, we expect that when the expenditure of government increases, it would then require more funds to finance such items of expenditure. This can make the government to resort to borrowing domestically for the purpose of financing such expenditure requirements. Hence, increases in Nigeria's government expenditure would result in an increase in its domestic debt. Therefore, the response of government expenditure on domestic debt is positive. Thus, $\beta_3 > 0$.

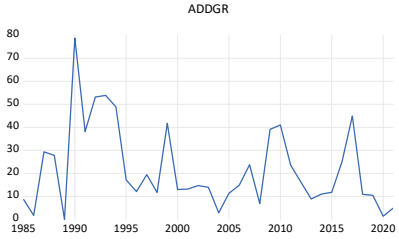
Based on theory, it is expected that when gross domestic product (GDP) increases the economy is growing. But when GDP decreases the economy is not doing well. Whenever Nigeria's GDP reduces there will be the need for the government to borrow domestically because such reduction in GDP would mean that economic units including the government are experiencing decrease in their income. This can make the government borrow within the domestic economy so as to finance its activities and carry out its obligations. This means that a decrease in gross domestic product (GDP) would result in an increase in Nigeria's government domestic debt. Thus, the response of gross domestic product (GDP) on domestic debt is negative. Hence, $\beta_4 < 0$.
From the foregoing, our apriori expectation is $\beta_1 > 0$, $\beta_2 > 0$. $\beta_3 > 0$. $\beta_4 < 0$.

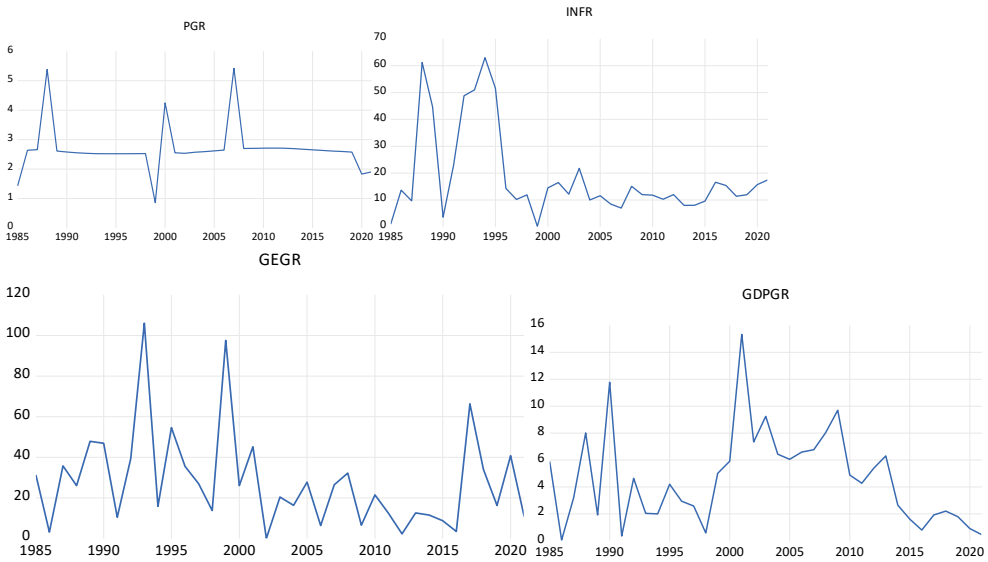
4.0 Presentation of Results

The study's results are presented in the way that permits the easy attainment of its aim and objectives. Therefore, it is against this backdrop that the following results obtain from the process of analyses are presented herein.

4.1: Graphical Representation of Data of the Study's Variables

The usage of graphical/pictorial expression equips the reader to comprehend salient information which the tabulated raw data may not express. It is in this light that this study goes on to present these graphical representation of variables below:





The first graph reveals that the growth rate of Nigeria's domestic debt profile was very high in 1990, 1993, 1998, 2010 and 2018. However, the highest value was experienced in 1990. Also, it shows that growth rate of Nigeria's domestic debt profile was very low in 1987, 1989, 2004, 2008 and 2020. However, it was lowest in 1989.

The second graph shows that the population growth rate in Nigeria was high in the years 1988, 2000 and 2007. The highest growth rate was experienced in 2007. Conversely, low population growth rate was observed in 1985, 1999, 2020 and 2021. The lowest was recorded in the year 1999. However, a steady growth rate was recorded within the study period.

From the third graph it was observed in the study that inflation rate was so high in 1988 and 1995. The observation revealed that it was highest in 1988. However, it was as well observed that within the study's period inflation rate was low in 1985, 1990, 1999 and 2006. The lowest inflation rate was experienced in 1999.

The fourth graph shows that within the period of the study government expenditure growth rate (GEGR) was very high 1993, 1995, 1999 and 2017. However, the highest growth rate for government expenditure was recorded in 1993. Also, the rate of growth for government expenditure was low in 1986, 2002, 2006, 2012 and 2016. The lowest growth rate for this variable was seen 2002.

It was observed from the fifth graph that gross domestic product growth rate (GDPGR) within the study period grew so high in the years 1990, 2001, 2003 and 2009. The most growth was recorded in 2001. The figure also revealed that low growth rates in gross domestic product was seen in 1986, 1998, 2016 and 2021. The least growth rate was experienced in 1986. GDP growth rate is clearly viewed from the above figure to have mostly been greater than its threshold of 2 or 3 percent.

4.2: Stationarity Test

Stationarity test was initially carried out on the data at levels, the data were not integrated (see appendix 1). In furtherance, the same test was conducted at order one and the data were integrated (see appendix2).As such, Johansen cointegration test was carried out and long-run relationship was attained (see appendix 3). However, full rank was observed which tends to suggest that the relationship between the variables might not have been purely linear in nature. Hence, to coax the data into a more linear form the natural logged variant of the data were taken in order to improve the variables' data as shown in appendix 4. It is this logged form of the data that were utilizedin starting the study's analysis all over..

Stationarity Test of the Logged Variants of the Study's Data

Because the variables' data were found not to be normally distributed, we intend to obtain the internal consistency of these data around the respective means by engaging in stationarity test. Webegin with evaluation of the logged variant of the variables' data stationarity at order zero (0) and the data as shown in the appendix. The result of the stationarity test is given below in table 4.1:

Table 4.1: Summary Compilation of Stationarity Test of Employed Variables at Order (0).

Statistics / Variable	ADF t-stat	Test Critical Values			Prob.	Unit Root	Comment
		1% Level	5% Level	10% Level			
LNADDGR	-6.111735	-3.626784	-2.945842	-2.611531	0.0000	Absent	Evidence of Stationarity at Order 0
LNPGR	-6.825228	-3.626784	-2.945842	-2.611531	0.0000	Absent	Evidence of Stationarity at Order 0
LNINFR	-5.396661	-3.626784	-2.945842	-2.611531	0.0001	Absent	Evidence of Stationarity at Order 0
LNGEGR	-6.366975	-3.626784	-2.945842	-2.611531	0.0000	Absent	Evidence of Stationarity at Order 0
LNGDPGR	-3.798695	-3.626784	-2.945842	-2.611531	0.0176	Absent	Evidence of Stationarity at Order 0

Where: **ADF** which means Augmented Dickey Fuller.
Prob. that is, Probability Level
Note: Other notations are referenced to this study's variables as stated in Chapter Three's Model Specification.
Source: Extract from E-Views 12 Output

Stationarity test was carried out on the logged data as summarized in table 4.1 and the result obtained was that all the data were stationary at levels (order zero). This is proven by the fact that the values of ADF t-statistics in absolute terms, were found to be higher than the Test-critical value at 1%, 5% and 10% levels respectively. In addition, the probability values which shows significance, states that no unit root was present in the data of the variables. Therefore, the employed data of the variables possess a reliable trend for the indulgence in further analysis which will produce reliable outputs. Due to our achievement of stationarity at order zero the study furtherexecuted the ordinary least squares (OLS) test because the data has been proven to be dependable, hence there is no need for further employment of long run analyses like Johansen cointegration, ECM, etc.

4.2.Ordinary Least Squares (Multiple Regression) Test

Table 4.2: Ordinary Least Squares (OLS) Result

Dependent Variable: LNADDGR
Method: Least Squares
Date: 04/06/23 Time: 17:47
Sample: 1985 2021
Included observations: 37

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.305154	1.266196	1.030768	0.3104
LNPGR	2.808235	0.913780	3.073208	0.0044
LNINFR	-1.188812	0.304357	-3.905985	0.0005
LNGEGR	0.025989	0.157850	0.164641	0.8703
LNGDPGR	0.474933	0.381619	1.244520	0.2223

R-squared	0.687196	Mean dependent var	2.608080
Adjusted R-squared	0.626905	S.D. dependent var	1.338613
S.E. of regression	1.356501	Akaike info criterion	3.572783
Sum squared resid	58.88305	Schwarz criterion	3.790474
Log likelihood	-61.09648	Hannan-Quinn criter.	3.649529
F-statistic	9.764202	Durbin-Watson stat	2.160312
Prob(F-statistic)	0.006380		

Source: Output Extracted from E-Views12

Table 4.2 presents the result obtained from the multiple regression model whose relationship is stated below as:

$LNADDGR_t = \beta_0 + \beta_1 LNPGR_t + \beta_2 LNINFR_t + \beta_3 LNGEGR_t + \beta_3 LNGDPGR_t + \mu_t$

$LNADDGR_t = 1.305154 + 2.808235 LNPGR_t - 1.188812 LNINFR_t + 0.025989 LNGEGR_t + 0.474933 LNGDPGR_t + \mu_t$

- **Regression Intercept**

Table 4.2(output of OLS test) reveals that the regression intercept is positive having a coefficient of 1.305154 with a prob. value of 0.3104. This tells that there is a positive and insignificant relationship between the study's independent variable (macroeconomic determinants) and the dependent variable (aggregate domestic debt in Nigeria). This positive relationship implies that one (1) unit increase in the value of the independent variable (macroeconomic determinants) when other variables are held constant, will amount to a 1.305154 unit increase in the dependent variable (aggregate domestic debt in Nigeria).

- **Population Growth Rate (PGR)**

The result (table 4.2) above shows that there is a positive and significant relationship between population growth rate (PGR) and aggregate domestic debt growth rate with a coefficient of 2.808235 and a Prob. value of 0.0044within the study period to the extent that one (1) unit increase in population growth rate will tantamount to 2.808235 units increase in aggregate domestic debt growth rate (ADDGR). As such, an increase in population growth rate (PGR) would give rise to a more than proportionate increase in the Nigeria's aggregate domestic debt growth rate (ADDGR).

- **Inflation Rate (INFR)**

Theabove result (table 4.2) revealed a negative relationship that is significant exists between inflation rate (INFR) and aggregate domestic debt growth rate (ADDGR) in Nigeria which have a coefficient of -1.188812 and a prob. value of 0.0005. The implication of the negative relationship is that one (1) unit increase in inflation rate (INFR) would result in a 1.188812 unit decrease in Nigeria's aggregate domestic debt growth rate (ADDGR). Thus, an increase in inflation rate (INFR) would amount to a more than proportionate decrease in Nigeria's aggregate domestic debt growth rate(ADDGR).

- **Government Expenditure Growth Rate (GEGR)**

Table 4.2 (OLS result) tells thatwithin the study period a positive and insignificant relationship exists between government expenditure growth rate (GEGR) and the growth rate of aggregate domestic debt in Nigeria with a coefficient of 0.025989 and a prob. value of 0.8703. The positive relationship simply implies that one (1) unit increase in government expenditure growth rate (GEGR) would bring about a 0.025989 increase in Nigeria's

aggregate domestic debt growth rate, which is less than proportionate. As such, an increase in government expenditure growth rate would result in increases in Nigeria's aggregate domestic debt growth rate(ADDGR).

- **Gross Domestic Product Growth Rate (GDPGR)**

The obtained result from our OLS result (table 4.2 shows that there is a positive and insignificantrelationshipbetween gross domestic product growth rate (GDPGR) and aggregate domestic debt growth rate(ADDGR) in Nigeria with a coefficient of 0.474933 and a prob value of 0.2223. This positive relationship simply tells that a unit increase in gross domestic debt growth rate (GDPGR) would amount to 0.474933 unit increase in aggregate domestic debt in Nigeria. Therefore, increases in gross domestic product growth rate would give rise to a less than proportionate increase in Nigeria's aggregate domestic debt(ADDGR).

- **Analysis of the R-squared (Coefficient of determination)**

From our ordinary least squares (OLS) result, it was noticed that the coefficient of determination (R-squared) is 0.687196. This means that about 68.72% of changes in the study's dependent variable (aggregate domestic debt in Nigeria) is explained by variations in the independent variable (the choice macroeconomic variables). Whereas, about 31.28% of variations in Nigeria's aggregate domestic debt was explained by other economic factors captured by the stochastic term.

4.3: Granger Causality Test

Table 4.3: Pairwise Granger Causality Tests Output

Pairwise Granger Causality Tests
Date: 04/06/23 Time: 17:53
Sample: 1985 2021
Lags: 2

Null Hypothesis:	Obs	F-Statistic	Prob.
LNPGR does not Granger Cause LNADDGR	35	1.94977	0.0599
LNADDGR does not Granger Cause LNPGR		0.69305	0.5079
LNINFR does not Granger Cause LNADDGR	35	0.26228	0.7710
LNADDGR does not Granger Cause LNINFR		3.94482	0.0301
LNGEGR does not Granger Cause LNADDGR	35	0.35867	0.7016
LNADDGR does not Granger Cause LNGEGR		0.34371	0.7119
LNGDPGR does not Granger Cause LNADDGR	35	0.15211	0.8595
LNADDGR does not Granger Cause LNGDPGR		0.48029	0.6233

Source: Output from E-Views 12

From the result above (table 4.3) it is observed that population growth rate (PGR) does not significantly promote the growth rate of Nigeria's aggregate domestic debt (ADDGR) since its probability value is 0.0599. Conversely, it was noticed that aggregate domestic debt growth rate (ADDGR) in Nigeria does not significantly promote population growth rate (PGR) with a probability value of 0.5079. In furtherance, it was found from table 4.9 that with a probability of 0.7710 inflation rate (INFR) does not promote Nigeria's aggregate domestic debt growth rate (ADDGR) significantly. On the other hand, aggregate domestic debt growth rate (ADDGR) in Nigeria was found to be a significant promoter of inflation rate (INFR) with the probability value of 0.0301. Also, the result revealed that the growth rate of government expenditure (GEGR) having probability value of 0.7016 does not significantly promote aggregate domestic debt growth rate (ADDGR) in Nigeria. Conversely, it was as well ascertained that Nigeria's aggregate domestic debt is not a significant promoter of government expenditure growth rate (GEGR) the probability figure of 0.7119. Lastly, from table 4.3 we noticed that gross domestic product growth rate (GDPGR) was not a significant promoter of Nigeria's aggregate domestic debt

growth rate (ADDGR) with a probability value of 0.8595. Conversely, we obtained that Nigeria's aggregate domestic debt growth rate (ADDGR) does not significantly promote gross domestic product growth rate (GDPGR) with probability of 0.6233.

5 Discussion, Conclusions and Recommendations

5.1 Discussion of Findings

This study's independent variable is the macroeconomic determinants such as population, inflation, government expenditure and gross domestic product proxied with their growth rates.However, its dependent variable is domestic debt proxied by Nigeria's aggregate domestic debt growth rates. The stationarity test result confirms that the data of the time-series variables were stationary and integrated of order 0, as such giving rise to multiple regression (OLS) test. From the obtained multiple regression (OLS) result, we observed a positive and significant relationshipbetween population growth rate (PGR) and aggregate domestic debt growth rate (ADDGR). A negative and significant relationship was found between inflation rate (INFR) and aggregate domestic debt growth rate (ADDGR). In furtherance, we found that both government expenditure growth rate (GEGR) and gross domestic product growth rate (GDPGR) have positive and insignificant relationship with aggregate domestic debt growth rate (ADDGR).We also obtained from our result that 68.72% variations in Nigeria's aggregate domestic debt were determined by the choice macroeconomic factors employed in this study and 31.28% variations in aggregate domestic debt of Nigeria were determined by other macroeconomic variables subsumed in the error term. Additionally, the granger causality test result only shows a uni-directional causal relationship running from aggregate domestic debt growth rate (ADDGR) to inflation rate (INFR). Lastly, we noticed that population and government expenditure followed the study's apriori expectation where as inflation and gross domestic product did not agree with the apriori expectation of this study.

5.2 Conclusions

From the study's findings we conclude as follows:

i. Not all the variables employed in this study agreed with its apriori expectations.
ii. Population is a significant determinant of Nigeria's domestic debt which is in line with the findings of Pjanic et al (2020).
iii. Inflation isa significant determinant of domestic debt in Nigeria and this supports the findings of Beyne and Kotosz (2020).
iv. Government expenditure is an insignificant determinant of Nigeria's domestic debt. This negates the findings of Ademuyiwa and Adetunji (2019).
v. Gross domestic product is not a significant determinant of domestic debt in Nigeria.

5.3 Recommendations

In the light of these observed findings and conclusion reached, it suffices to recommend that;

i. Nigeria's government should encourage population control through regular orientation of citizens.
ii. Inflation should be targeted as part of monetary policy and the measures to be taken are to increase cash reserve ratio and decrease liquidity ratio.
iii. Government should curb its expenditure by ensuring that prudence is exercised in its spending patternso as to reduce its domestic debt.
iv. Government should encourage private sector growth by allowing Nigerians easy access to invest in critical areas of the economy like the oil sector (modular refineries) and other critical private sectors such as power, etc. so that the private sectors can now take a higher proportion of GDP in Nigeria which would make the economy turnaround for Good.
v. Further research on this topic should be engaged in, while incorporating those macroeconomic variables that were not particularly captured in this study.

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Appendix 1

Statistics / Variable	ADF t-stat	Test's Critical Values			Prob	Unit Root	Comment
		1% Level	5% Levels	10% Levels			
ADDGR	-4.349992	-3.473278 4	-2.930492	-2.670031	0.0015	Absent	Evidence of Stationarity at Order 0
PGR	-6.507289	-3.626784	-2.945842	-2.611531	0.0000	Absent	Evidence of Stationarity at Order 0
INFR	-1.431650	-3.661661	-2.960411	-2.619160	0.5540	Present	Evidence of Non-stationarity at Order 0
GEGR	-6.117134	-3.626784	-2.945842	-2.611531	0.0000	Absent	Evidence of Stationarity at Order 0
GDPGR	-4.227476	-3.626784	-2.945842	-2.611531	0.0128	Absent	Evidence of Stationarity at Order 0

Where: **ADF** means Augmented Dickey Fuller.
Prob means Probability Level

Appendix 2

Table 4.4: Summarized Compilation of Stationarity Tests of Employed Variables at Order One (1).

Statistics / Variable	ADF t-stat	Test Critical Value			Prob.	Unit Root	Comment
		1% Levels	5% Levels	10% Levels			
ADDGR	-9.796715	-3.589801	-2.802750	-2.903016	0.0000	Absent	Proof of Stationarity at Order 1
PGR	-6.377390	-3.639407	-2.951125	-2.614300	0.0000	Absent	Proof of Stationarity at Order 1
INFR	-5.434842	-3.653730	-2.957110	-2.617434	0.0001	Absent	Proof of Stationarity at Order 1
GEGR	-11.32839	-3.632900	-2.948404	-2.612874	0.0000	Absent	Proof of Stationarity at Order 1
GDPGR	-12.00832	-3.632900	-2.948404	-2.612874	0.0000	Absent	Proof of Stationarity at Order 1

Where: **ADF** meaning Augmented Dickey Fuller.
Prob. meaning Probability Level

Appendix 3

Table 4.5 Johansen's Co-integration Test's Output

Date: 11/09/22 Time: 00:40
Sample (adjusted): 1987 2021
Included observations: 35 after adjustments
Trend assumption: Linear deterministic trend
Series: ADDGR PGR INFR GEGR GDPGR
Lags interval (in first differences): 1 to 1

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.676288	90.90602	69.81889	0.0004
At most 1 *	0.507497	51.42952	47.85613	0.0222
At most 2	0.317158	26.64057	29.79707	0.1107
At most 3	0.176194	13.28836	15.49471	0.1046
At most 4 *	0.169600	6.504656	3.841466	0.0108

Trace tests indicates 2 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.676288	39.47650	33.87687	0.0097
At most 1*	0.507497	24.78895	27.58434	0.0108
At most 2	0.317158	13.35221	21.13162	0.4203
At most 3	0.176194	6.783701	14.26460	0.5150
At most 4*	0.169600	6.504656	3.841466	0.1094

Max-eigenvalue test indicates 1 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Source: Extract from EViews 12

Appendix 4

Natural Logged Variant of the Study's Data

YEAR	LNADDGR	LNGDPGR	LNGEGR	LNINFR	LNPGR
1985	2.174752	1.775071	3.444257	0.029559	0.360468
1986	0.559616	2.81175	1.156881	2.615204	0.969756
1987	3.379633	1.163557	3.57683	2.271094	0.978476
1988	3.326115	2.08094	3.258865	4.114311	1.683283
1989	3.21888	0.652377	3.86828	3.799302	0.960346
1990	4.365897	2.466429	3.847804	1.283708	0.947131
1991	3.642574	1.0186	2.348514	3.133754	0.937465
1992	3.973118	1.53493	3.673258	3.808773	0.929957
1993	3.986759	0.713048	4.664099	3.931826	0.925964
1994	3.88855	0.693797	2.764431	4.143135	0.924537
1995	2.845491	1.435346	4.000430	3.943328	0.924100
1996	2.492379	1.078478	3.570940	2.660959	0.924021
1997	2.968875	0.951928	3.295466	2.323368	0.925052
1998	2.463853	0.52746	2.621039	2.477378	0.927112
1999	3.730981	1.612533	4.580365	1.51413	0.15213
2000	2.565718	1.777948	3.215925	2.674149	1.446236
2001	2.581731	2.729753	3.811318	2.80336	0.937347
2002	2.688528	1.994319	3.910202	2.501436	0.930273
2003	2.637628	2.224688	3.016025	3.081911	0.943633
2004	1.068325	1.862296	2.793004	2.304583	0.952546
2005	2.429526	1.801611	3.323596	2.451005	0.962754
2006	2.700052	1.885720	1.850028	2.140066	0.972595
2007	3.167536	1.911688	3.276012	1.947338	1.690557
2008	1.93795	2.084043	3.472898	2.714695	0.992103
2009	3.666649	2.272198	1.879465	2.485741	0.994991
2010	3.713789	1.586660	3.067122	2.468101	0.997244
2011	3.158268	1.453789	2.512846	2.332144	0.998351
2012	2.789175	1.685361	0.815365	2.484907	0.996543
2013	2.185366	1.842088	2.532903	2.080691	0.991472
2014	2.400401	0.975578	2.444952	2.083185	0.984136
2015	2.468498	0.480511	2.169054	2.261763	0.975917
2016	3.224225	0.215815	1.238374	2.809403	0.968048
2017	3.804549	0.653782	4.195094	2.734368	0.960614
2018	2.391511	0.792268	3.528359	2.433613	0.954742
2019	2.351118	0.584615	2.789937	2.483239	0.946083
2020	0.370321	0.090470	3.709246	2.75684	0.603879
2021	1.618398	0.792751	2.375836	2.862201	0.644009

Source:Extract of Appendix 2 Using E-views 12.