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## **A Panel Causality Evidence on Domestic Debt, Inflation and Economic Growth in Selected Sub- Saharan African Countries**

*by*

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### **Abstract**

*This study investigated the causal relations between domestic debt, inflation and economic growth in selected sub-Saharan African countries using annual data spanning the period of 1995-2023. Specifically, the study analyses the causal relations between domestic debt, inflation and economic growth in Nigeria, South Africa, Ghana, Angola and Kenya. Apart from the use of some pre-analysis test statistics like the Levin, Lin and Chu  $t^*$  and Im, Pesaran and Shin W-stat tests to assess the panel series properties of the variables, the study employs the Dumitrescu-Hurlin panel causality technique. The study reveals that: there is unidirectional causality between domestic debt and economic growth with causality running from domestic debt to economic growth; there exists no causality between domestic debt and inflation; and also, there exists no causality between economic growth and inflation in the selected sub-Saharan African countries. The study recommends that governments should deploy the approach of strategically channeling domestic borrowing to productive sectors of the economy and also take into account the potential growth and inflationary effects of expanding domestic debt when designing fiscal policies, especially in economies where inflation control is a priority (especially Nigeria).*

**Key words:** Domestic Debt, Inflation, Economic Growth, Sub-Saharan Africa and Causality

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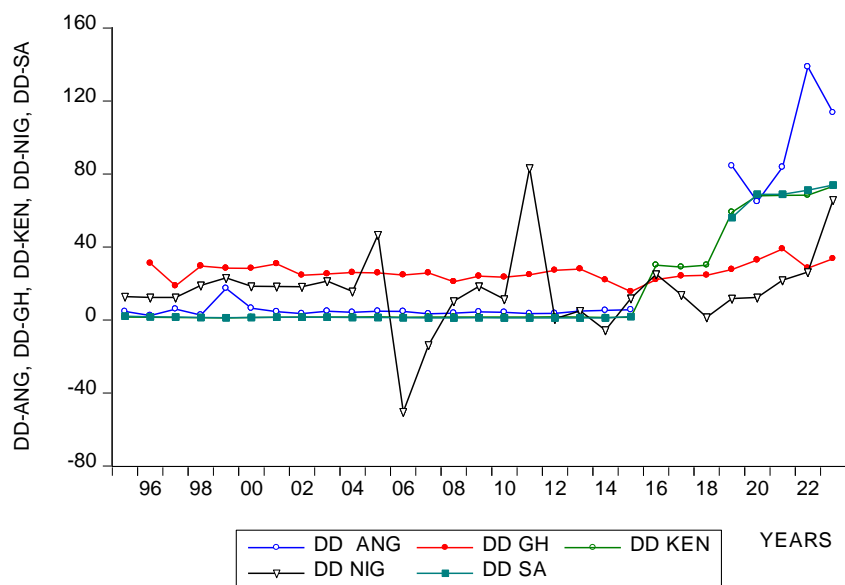
### **1. Introduction**

Sub-Saharan Africa faces several development challenges. According to the International Monetary Fund (2023), growth in Sub-Saharan Africa was projected to slow to 2.5% in 2023, from 3.6% in 2022. Rising conflict and violence across the region exerts a dampening effect on economic activity, with climate shocks poised to exacerbate this fragility. About 462 million people in the region are still living in extreme poverty in 2023.

The recent poly-crisis – climate-related issues, the COVID-19 pandemic, and mounting conflicts – has expedited this debt surge.

The rising level of debt and the demand to raise funds for development have led many countries in Sub-Saharan Africa to resort to borrowing from the domestic market. Hence, the need to understand the causal relations between domestic debt, economic growth and price stability since the global financial crisis in 2008 has become more pertinent now than before following recent increases in government borrowings for the funding of budget deficits owing to revenue shortfalls and the worldwide Coronavirus disease (COVID-19) macroeconomic fallout.

Although, many developing countries continue to depend on borrowing for development, but borrowing domestically is based on its effect on capital outflow reversal, reduction in currency mismatch, reduction in accumulation of foreign-denominated debt (Viziniuc, 2021; Sunder- Plassmann, 2020). According to Cordella and Ruiz-Arranz (2005), the original cause for debt crisis is the excessive borrowing by government to service their accumulated debt. This happened due to the inverse correlation between the real interest rate in the international market and the total real Gross Domestic Product GDP growth rate in the heavily indebted poor African countries (HIPC). During most of the years in the decade of 1970s, the real long –term rate of interest in the developed world fell well short of the real growth rate of GDP by HIPC. This opened a viable decision for the country to service their accumulated debt by making new borrowing, instead of generating resources to service the debt. This has resulted to large fiscal deficits experienced by many countries in SSA.



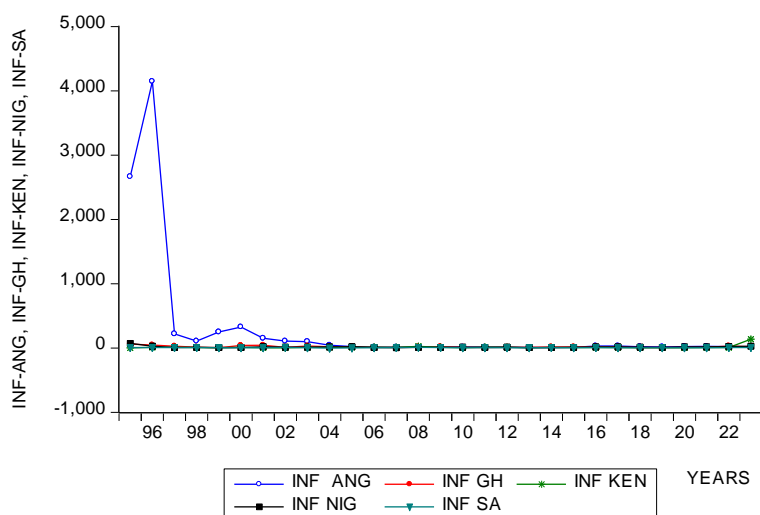
**Figure 1:** Domestic Debt in selected sub-Saharan African countries

**Source:** Author's Computation using Eviews 10

Figure 1 presents the trend of domestic debt in selected sub-saharan African countries (Nigeria, South Africa, Ghana, Angola and Kenya). From figure 1, Nigeria has

experienced a significant increase in domestic debt from 1995 to date. However, between 2010 and 2013, Nigeria experienced a significant increase in its domestic debt levels. Furthermore, in 2020, Nigeria's domestic debt stood at approximately 21.4 trillion naira (\$55.6 billion USD), with the majority of it being federal government debt. This represented a significant increase from previous years, primarily due to the economic impact of the COVID-19 pandemic and a decline in oil prices, which had previously been a major source of government revenue. In 2022, the Nigerian government began exploring options for debt restructuring and management to address the rising levels of domestic debt. This included negotiating with creditors to extend the repayment terms for existing loans and exploring alternative sources of financing, such as international loans and grants. The government also implemented measures to improve its debt management practices and reduce the risk of future debt accumulation. Despite these measures in 2023 domestic debt kept on increasing.

Also, Ghana's domestic debt has exhibited significant volatility since 1995 as revealed in figure 1. The global financial crisis of 2008 also hit Ghana hard. The country saw a decline in export revenues, reduced remittances from abroad, and decreased foreign aid inflows. As a result, there was increased pressure on the local currency and a rise in public debt levels. In 2014, Ghana encountered another economic downturn characterized by fiscal imbalances and external vulnerabilities. The country sought assistance from the IMF through an Extended Credit Facility arrangement to restore macroeconomic stability. In 2020, Ghana's domestic borrowing increased significantly due to various factors, including the COVID-19 pandemic and a decline in international commodity prices, particularly cocoa. In 2022, the Ghanaian government began exploring options for debt restructuring and management to address the rising levels of domestic debt till 2023. Also, as seen in figure 1, Angola experienced a period of relatively low domestic debt from 1995-2013. Historically, oil exports have been a major source of income for the Angolan government. The decline in oil prices since 2014 has led to a substantial reduction in government income, forcing Angola to borrow domestically to finance its budget deficits till 2023. However, Kenya's domestic debt has exhibited significant volatility since 1995. In 2011, the fluctuation in international interest rates influences borrowing costs amongst other effects. In 2017 Kenya heavily relied on domestic borrowing to finance its budget deficit. However, over-reliance on domestic borrowing since 2018-2023 has caused adverse effects in the long run in the economy. This led to crowding out private sector investment, higher interest rates, inflationary pressures, and increased debt servicing costs. These consequences affected the sustainability of her economic growth. Furthermore, South Africa experienced lack of significant volatility in domestic debt from 1995 to 2016 as seen in figure 1. This can be attributed to the country's prudent fiscal management practices. In 2016, the country experienced an economic slowdown and recession that plagued the country, leading to decreased government revenue and increased borrowing requirements. Furthermore, between 2020-2023, the country experienced more increase in domestic debt. Specifically, The COVID-19 pandemic further exacerbated this situation, causing widespread job losses and business closures, which reduced tax revenues while increasing social welfare spending.



**Figure 2:** Inflation rate in Selected Sub-Saharan African Countries

*Source:* Author's Computation using Eviews 10

Figure 2 presents inflation rate in selected sub-saharan African countries (Nigeria, South Africa, Ghana, Angola and Kenya). From Figure 2, Angola's economy was still recovering from the devastating effects of the 27-year civil war that ended in 2002. During this time of 1995- 2000, the country's inflation rate was relatively high, averaging around 30-40% per annum. However, the end of the civil war in 2002 marked the beginning of a period of economic recovery and growth for Angola. The government implemented a range of economic reforms, including monetary and fiscal policies aimed at reducing inflation and promoting investment. Since 2000, Angola's inflation rate has improved significantly, averaging around 10-15% per annum. From 2001-2020, Angola's inflation rate has improved significantly, averaging around 10-15% per annum. This has been achieved through a combination of sound monetary policy and fiscal discipline. From 2020-2023, Angola's inflation rate has remained relatively low, averaging around 10-15% per annum. This has been achieved through a combination of sound monetary policy and fiscal discipline, which has helped to maintain price stability and promote economic growth. During this period, Angola's economy has continued to grow and develop, with a number of key sectors emerging as drivers of growth. These include the services sector, which has become the largest contributor to GDP, as well as the manufacturing and mining sectors, which have also experienced significant growth.

Between 1995 and 2000, South Africa experienced a period of economic growth and stability, which was marked by a relatively low inflation rate. During this time, the country's inflation rate remained under control, averaging around 4-5% per annum. This was achieved through a combination of sound monetary policy and fiscal discipline, which helped to maintain price stability and promote economic growth. prior to 1995, the South African economy underwent several structural changes, including the transition from apartheid to a democratic government in 1994. This transition helped to improve investor confidence and attract foreign direct investment, which fueled economic growth and job

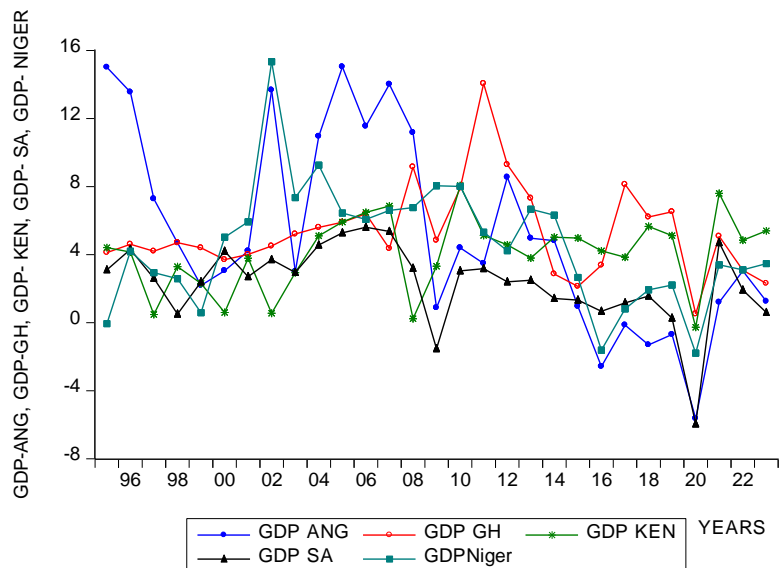
creation. From 2001 to 2023, South Africa's inflation rate has generally remained under control, averaging around 4-6% per annum. This has been achieved through a combination of sound monetary policy and fiscal discipline, which has helped to maintain price stability and promote economic growth. From 1995 to 2000, Kenya's inflation rate was relatively high, averaging around 20-25% per annum. However, the period from 1995 to 2000 also saw some positive developments in the Kenyan economy, including the establishment of a new constitution and the implementation of economic reforms aimed at promoting investment and economic growth.

Since 2000, Kenya's inflation rate has improved significantly, averaging around 5-10% per annum. The country has also experienced rapid economic growth, driven by increased investment in infrastructure and other sectors, as well as a growing services sector. From 2001 to 2020, Kenya's inflation rate has improved significantly, averaging around 5-10% per annum. From 2020 to 2023, Kenya's inflation rate has remained relatively low, averaging around 5-10% per annum. Ghana's inflation rate was relatively high between 1995 and 2000, averaging around 20-25% per annum. This was due to a combination of factors, including high levels of government spending, a decline in the value of the Ghanaian cedi, and increased demand for goods and services. However, the period from 1995 to 2000 also saw some positive developments in the Ghanaian economy, including the establishment of a new constitution and the implementation of economic reforms aimed at promoting investment and economic growth. Since 2000, Ghana's inflation rate has improved significantly, averaging around 5-10% per annum. The country has also experienced rapid economic growth, driven by increased investment in infrastructure and other sectors, as well as a growing services sector. From 2001 to 2020, Ghana's inflation rate improved significantly, averaging around 5-10% per annum. From 2020 to 2023, Ghana's inflation rate has remained relatively low, averaging around 5-10% per annum. This means that the general price level of goods and services in Ghana has increased by a moderate amount during this period, but at a slower rate than in previous years.

Nigeria's inflation rate was relatively high between 1995 and 2000, averaging around 20-25% per annum. However, the period from 1995 to 2000 also saw some positive developments in the Nigerian economy, including the establishment of a new constitution and the implementation of economic reforms aimed at promoting investment and economic growth. Since 2000, Nigeria's inflation rate has improved significantly, averaging around 5-10% per annum. From 2001 to 2020, Nigeria's inflation rate has improved significantly, averaging around 5-10% per annum. This has been achieved through a combination of sound monetary policy and fiscal discipline, which has helped to maintain price stability and promote economic growth. From 2020-2023, Nigeria's inflation rate has been increasing. This means that the general price level of goods and services in Nigeria has increased hence affecting the economy.

The inflationary spirals which had been experienced by many emerging countries could be explained by the cost of domestic debt. Countries experiencing inflationary periods follow interest rate policies resulting from tight money policies, which increase domestic borrowing even further; decreasing maturity and increasing budget deficits.

During the process, further rises in interest payments amplify domestic debt stock. Moreover, as domestic debt rises and maturity rates decline, an inflationary spiral becomes virtually inevitable due to wealth effects. If rational agents anticipate that the government's response to domestic debt through primary surpluses is inefficient, the only equilibrium for the price level entails a trajectory of escalating inflation. This inflationary pressure triggers subsequent hikes in nominal interest rates and diminishes seigniorage. Consequently, the escalation of domestic debt is bound to precipitate economic turmoil through these same channels.



**Figure 3:** Gross Domestic Product in selected sub-Saharan African countries

*Source:* Author's Computation using Eviews 10

Figure 3 presents the economic growth rate in selected sub-Saharan African countries (Nigeria, South Africa, Ghana, Angola and Kenya). From Figure 3, Angola's economic growth rate fell sharply during the period 1992 -1993, plummeting to a negative growth rate averaging 16%. This decline coincided with the country's return to full-blown civil war, which severely impacted the economy. Furthermore, from 2016 to 2020, Angola, like many other countries, experienced periods of negative GDP growth. However, from 2021 to 2023, Angola's economy revived, showing positive GDP growth.

Ghana experienced volatility in its GDP, but there was a significant rise in its Gross Domestic Product (GDP) from 2010 to 2013 showcasing impressive economic growth during this period. In 2014, Ghana faced challenges as global oil prices plummeted due to oversupply and weakening demand. The following year, in 2015, Ghana continued to grapple with volatile oil prices. The uncertainty surrounding market dynamics further strained the country's economy, prompting the government to implement austerity measures to mitigate the effects of reduced oil revenues on public finances. From 2016 to 2023, Ghana did not experience negative economic output. On the contrary, Kenya's economy has shown steady growth over the past few years, with GDP growth averaging around 6% annually from 2015 to 2023. The country has made significant progress in

diversifying its economy, moving away from reliance on traditional agricultural exports towards services, manufacturing, and tourism. In 2015, Kenya's GDP growth was estimated at 4.96%, growing to 5.4% in 2023.

In South Africa, the gross economic product has been generally positive, except in 2009 and 2020. The negative GDP growth in 2009 had several adverse effects on the South African economy, particularly in terms of unemployment. The economic contraction led to a rise in unemployment, especially among young people and those in low-skilled industries. Similarly, in 2020, South Africa experienced negative GDP growth, albeit to a lesser extent than in 2009. The COVID-19 pandemic significantly impacted the country's economy, particularly in the tourism and manufacturing sectors. The lockdown measures implemented to contain the spread of the virus exacerbated the decline in economic activity. However, the economy revived in 2021, and since then, the country has not experienced negative GDP growth.

The GDP volatility in Nigeria from 1995 to the present has been influenced by various factors. In 2004, Nigeria had the highest growth rate at 35%. This year witnessed a windfall of high oil prices, with total revenue rising to an estimated 40.6% of GDP, up from 36.5% in 2003. This increase enabled a rise in gross international reserves to \$13.27 billion from \$7.46 billion at the end of 2003, and the naira appreciated in all segments of the market, among other factors (AFDB/OECD, 2015). Nigeria, a prominent African economy, faced challenges leading to negative GDP growth in both 2016 and 2020. In 2020, Nigeria encountered another economic setback primarily caused by the COVID-19 pandemic which disrupted global trade and led to a sharp decline in oil demand and prices. This had adverse effects on Nigeria's export earnings and fiscal stability. From 2021 to the present, Nigeria's economic growth rate has stabilized to an extent. Therefore, high levels of inflation rate are considered to have a negative effect on economic growth and macroeconomic stability. The macroeconomic objective of most governments mostly developing countries is to maintain a low and stable inflation rate. A stable and reduced inflation rate will help to increase real return on investment enabling economic actors to respond to various investment opportunities and opening up opportunities for new and existing investors in the promotion of economic development (Aimola, and Odhiambo, 2021). However, budget deficit in these countries has been financed largely through borrowing with a view to promoting economic growth; as the pandemic has further increased government indebtedness in the funding of budget deficit.

In light of these considerations, the causal relations between domestic debt, inflation, and economic growth in Sub-Saharan African countries represents a pressing problem that requires empirical analysis and policy scrutiny. Addressing this problem is essential for evidence-based policy decisions, promoting fiscal sustainability, and fostering inclusive economic development within the region. Hence this study tends to elucidate the intricate causal relations between domestic debt, price stability and economic growth in selected sub-Saharan African countries (Nigeria, South Africa, Ghana, Angola and Kenya). Analyzing the causal relations between domestic debt, inflation and economic growth issuance over time, policymakers can develop proactive measures to enhance fiscal

resilience, promote transparency, and strengthen debt management frameworks to mitigate risks of debt distress and financial instability.

## **2. Materials and Methods**

### ***Research Design***

This study is empirical in nature, using mainly secondary data. Therefore, an Ex-Post Facto design. This design was adopted because the study intends to use already established secondary data for the study. According to Salkind (2010), —Ex post facto study or after-the-fact research is a category of research design in which the investigation starts after the fact has occurred without interference from the researcher. Thus, the data for the study were collected from the official publication World Bank – World Development Indicators (WDI). The data were adopted for the estimation using basic mathematical, statistical and econometric tools, while sufficiently relying on relevant economic theories for reliable outcomes.

### ***Population of the Study***

The study focused on time series data for the period of 28 years and 140 observations on selected sub-Saharan Africa. Sub-Saharan Africa is made up of 48 countries, however, due to data unavailability, we were constrained to five countries, two from west Africa and one each from East Africa, Central Africa and the Southern Africa Republic. Furthermore, these countries were selected based on being oil producing countries, and natural resources.

### ***Sample and Sampling Techniques***

A purposive sampling technique was adopted to select two countries from one sub region and one (1) country each from the other three (3) regions of the SSAs. Thus, samples of five countries were used for the study. These are Nigeria, South Africa, Ghana, Angola and Kenya.

### ***Analytical Techniques***

The analytical techniques employed for the purpose of this study is based on the specific objectives of the study. The study adopted the panel causality test.

### ***Panel Causality Test***

Granger (1969) developed a method that analyses the causal relationship between time series. The Granger representation theorem illustrates that if the two-time series are cointegrated, then there must be at least a unidirectional causality between. This framework is extended by Dumitrescu and Hurlin (2012) which allow it to detect causality in panel data. Thus, the Dumitrescu and Hurlin (2012) causality test is employed to determine whether there is bidirectional or unidirectional causality between the two variables. To investigate the direction of causality a two-way Granger test is carried out as follows;

$$Y_{i,t} = a_1 + \sum_{k=1}^k \beta_{ik} Y_{it-k} + \sum_{k=1}^k \gamma_{ik} D_{it-k} + \delta_{it} \quad \text{Equation 2}$$

$$D_{i,t} = a_1 + \sum_{k=1}^k \beta_{ik} D_{it-k} + \sum_{k=1}^k \gamma_{ik} Y_{it-k} + \delta_{it} \quad \text{Equation 3}$$

with  $i = 1, \dots, N$  and  $t = 1, \dots, T$

where  $D_{i,t}$  and  $Y_{i,t}$  are the observations of the dependent variables in the study for country  $i$  in period  $t$ . Basically, equation (2) tests for significant effects of  $D$  on the present values of  $Y$  while (3) tests for the effect of  $Y$  on the present values of  $D$  respectively. Thus, the null hypothesis is:

$$H_0 : \alpha_{i1} = \dots \alpha_{ik} = 0 \forall i = 1, \dots, N$$

Equation 4

which resembles the fact that there is no evidence of causality for all the countries in the panel. Also, an important assumption in this test is that there can be causality for all countries in the panel but not necessarily that there is such causality across all countries. Hence, the alternative hypothesis is:

$$H_1 : \alpha_{i1} = 0 \text{ or } \dots \alpha_{ik} = 0 \forall i = N+1, \dots, N$$

Equation 5

If  $N_1 = 0$  there is causality for all individuals in the panel. On the other hand, if  $N_1$  is not strictly smaller than  $N$  than there is no causality for all countries and  $H_1$  reduces to  $H_0$ .

## Diagnostic Test

### Panel Unit Root Tests

According to Andrews and Monahan (1992), the econometric theory for dealing with panel data was largely developed for data sets where the number of time series observations ( $T$ ) was small (often only four or five observations) but the number of groups or individuals ( $N$ ) was large. In this case, the asymptotic statistical theory was derived by letting  $N \rightarrow \infty$  for fixed  $T$ , in contrast to time series analysis which was done letting  $T \rightarrow \infty$ , for fixed  $N$ . Primarily, one of the necessary requirements in panel data econometrics is to first examine the stationarity properties of the variables to avoid spurious estimation. A series is said to be (weakly or covariance) stationary if the mean and autocovariances of the series do not depend on time (Greene, 2003).

A variety of tools exists for testing a series for the presence of unit root. For our present purpose, we applied the Levin, Lin, and Chu (LLC) and Im, Pesaran and Shin (IPS)

tests. The Levin, Lin, and Chu (2002), is based on the null hypothesis that each individual time series contains a unit root against the alternative that each time series is stationary. Im, Pesaran and Shin Test (IPS, 2003) is based on the null hypothesis that each series in the panel contains a unit root, i.e.,  $H_0: \rho_i = 0$  for all  $i$  and the alternative hypothesis allows for some (but not all) of the individual series to have unit roots. The study employed the two-panel unit root test in order to validate the results of each. Although the baseline framework of these two tests is an ADF regression for panel data and is specified as follows:

$$\Delta y_{it} = \gamma_i y_{i,t-1} + \sum_{i=1}^p \omega_j \Delta y_{i,t-i} + \delta_t \quad \text{Equation 6}$$

Where  $y_{it} = p_i - 1$

Both tests assess the null of unit root  $H_0: \gamma_i = 0$  ( $p_i - 1$ ) against the alternative of stationarity  $H_1: \gamma_i < 0$  ( $p_i - 1$ ). The LLC test assumes that the parameters tested are equal across all the panels and thus:

$\rho_i = \rho_i$  for all  $i$  countries in the panel. Meanwhile, the IPS test is less restrictive than the LLC test and is obtained as an average of the ADF statistic and allows the parameters to vary across panels.

#### 4. Results and Discussion

This study examines the causal relations between domestic debt, inflation and economic growth in selected sub-Saharan countries. We began our empirical assessment with preliminary checks beginning with the unit roots tests. The outcome is reported in the tables below.

##### Panel Unit Root Test Results

**Table 1: Panel Unit Root Test Results**

| Variables | Levin, Lin & Chu $t^*(sta)$ | prob   | Im, Pesaran and Shin W-stat(sta) | Prob   | outcomes |
|-----------|-----------------------------|--------|----------------------------------|--------|----------|
| GDP       | -5.60792                    | 0.0000 | 7.75247                          | 0.0000 | I(0)     |
| INF       | -4.11684                    | 0.0000 | -5.03282                         | 0.0000 | I(1)     |
| (D) DD    | -4.44925                    | 0.0000 | -5.78072                         | 0.0000 | I(1)     |
| (D) UNEMP | -2.93976                    | 0.0016 | -3.89705                         | 0.0000 | I(1)     |
| (D)FD     | -5.67186                    | 0.0000 | -6.53055                         | 0.0000 | I(1)     |
| (D)EXR    | -0.22774                    | 0.0004 | 5.93460                          | 0.0000 | I(1)     |
| (D)MS     | -1.89996                    | 0.0287 | -3.56810                         | 0.0002 | I(0)     |
| INTR      | -1.47806                    | 0.0697 | -5.66650                         | 0.0000 | I(0)     |

**Source:** Author's Computation using Eviews 10

The unit roots analyses were done as reported in the table above, the two test statistics used – Levin, Lin and Chut and Im, Pesaran and Shin W-stat – showed similar outcomes with each other. The Im, Pesaran and Shin W-stat results showed stationarity at

first difference I(1) for these variables: exchange rate, domestic debt, unemployment, fiscal deficit and inflation rate while GDP, money supply and interest rate were stationary at level I(0).

### *Descriptive Statistics for Pooled Countries*

**Table 2: Descriptive Statistics for Pooled Countries**

|                     | GDP     | DD       | EXCH       | FD           | INF         | INTR     | MS       | UEMP    |
|---------------------|---------|----------|------------|--------------|-------------|----------|----------|---------|
| <b>Mean</b>         | 4.27    | 18.82    | 89.54      | 400.13       | 51.77       | 21.42    | 34.82    | 10.32   |
| <b>Median</b>       | 4.20    | 9.50     | 68.25      | 4.24         | 10.96       | 16.45    | 32.45    | 5.73    |
| <b>Maximum</b>      | 15.33   | 138.71   | 638.70     | 6404.70      | 4145.11     | 217.88   | 87.76    | 28.84   |
| <b>Minimum</b>      | -5.96   | 1.10     | 0.13       | -861.40      | -50.35      | 3.71     | -0.79    | 2.17    |
| <b>Std. Dev.</b>    | 3.59    | 24.28    | 128.03     | 1214.63      | 351.19      | 24.15    | 17.42    | 7.73    |
| <b>Skewness</b>     | 0.57    | 2.20     | 2.46       | 3.34         | 11.44       | 5.06     | 0.67     | 0.62    |
| <b>Kurtosis</b>     | 4.58    | 8.57     | 9.40       | 13.81        | 133.74      | 35.39    | 3.17     | 1.95    |
| <b>Jarque-Bera</b>  | 22.33   | 281.35   | 380.80     | 914.64       | 102764.90   | 6714.97  | 10.69    | 15.45   |
| <b>Probability</b>  | 0.00    | 0.00     | 0.00       | 0.00         | 0.00        | 0.00     | 0.00     | 0.00    |
| <b>Sum</b>          | 597.77  | 2522.10  | 12535.81   | 54417.56     | 7247.73     | 2998.75  | 4874.21  | 1444.50 |
| <b>Sum Sq. Dev.</b> | 1787.89 | 78431.90 | 2278505.00 | 199000000.00 | 17143157.00 | 81078.75 | 42165.72 | 8296.65 |
| <b>Observations</b> | 140.00  | 134.00   | 140.00     | 136.00       | 140.00      | 140.00   | 140.00   | 140.00  |

**Source:** Author's Computation using Eviews 10

Table 2 shows the descriptive statistics showed a mean of 4.27 and median 4.20 for gross domestic product. Also, it showed a mean of 18.82 and median of 9.50 for domestic debt and a mean of 51.77 and median of 10.96 for inflation. Moreover, the statistics also showed that the data for exchange rate, fiscal deficit, interest rate and money supply are leptokurtic distribution because the kurtosis value is greater than three indicating a positive kurtosis, though positively and insignificantly skewed. This indicates a flatter than normal distribution and the variable has large tail. That is, it has longer and fatter tail, and its central peak higher and sharper. Moreover, the statistics also showed that the data for unemployment rate was platykurtic relative to normal, since their values for kurtosis is approximately less than 3. This suggests that the variables have short and thin tails, and their central peaks are lower and broader.

### *Pairwise Dumitrescu Hurlin Panel Causality Tests*

The Dumitrescu-Hurlin panel causality test which evaluates whether there is no Granger causality running from the independent variable (X) to the dependent variable (y). In other words, it assesses whether past values of X do not have a significant effect on current values of y after controlling for the lagged values of y. Table 3 revealed that the null hypothesis is rejected based on p-value of 0.05. hence this suggests that the past values of GDP growth significantly influence current domestic debt after accounting for the lagged values of inflation. There exists a unidirectional causality between domestic debt and economic growth with causality running from domestic debt to economic growth. The results in Table 3 also reveal no causality between domestic debt and inflation and there exists no causality between economic growth and inflation.

**Table 3: Pairwise Dumitrescu Hurlin Panel Causality Tests**

| Null Hypothesis:                     | W-Stat. | Zbar-Stat. | Prob.  |
|--------------------------------------|---------|------------|--------|
| INF does not homogeneously cause DD  | 0.85852 | -1.22582   | 0.2203 |
| DD does not homogeneously cause INF  | 3.37810 | 1.03223    | 0.3020 |
| GDP does not homogeneously cause DD  | 1.07259 | -1.03397   | 0.3011 |
| DD does not homogeneously cause GDP  | 5.35267 | 2.80185    | 0.0051 |
| GDP does not homogeneously cause INF | 1.62231 | -0.53535   | 0.5924 |
| INF does not homogeneously cause GDP | 1.52914 | -0.62015   | 0.5352 |

**Source:** Author's Computation using Eviews 10

The absence of a causal relationship between domestic debt and the inflation rate implies that policymakers have greater leeway in managing domestic debt without being directly constrained by inflationary pressures from debt accumulation. This flexibility allows them to address other factors influencing inflation, such as supply shocks, demand-side dynamics, or monetary policy decisions. Additionally, the existence of unidirectional causality running from domestic debts to economic growth reveals the growth effects of domestic borrowing in the economies of the selected sub-Saharan African countries. Governments can therefore prioritize managing domestic debt based on considerations of fiscal sustainability and economic growth, rather than solely focusing on inflationary concerns. This approach might involve strategic borrowing for productive investments or implementing fiscal consolidation measures during periods of economic expansion. By decoupling debt management from immediate inflationary effects, policymakers can better align their strategies with long-term economic objectives and maintain a more balanced approach to fiscal policy.

## 5. Conclusion and Recommendations

This study investigated the causal relations between domestic debt, inflation and economic growth in selected sub-Saharan African countries using annual data spanning the period of 1995-2023. Specifically, the study sought to determine the causal relations between domestic debt, inflation and economic growth in Nigeria, South Africa, Ghana, Angola and Kenya. Apart from the use of some pre-analysis test statistics like the Levin, Lin and Chu  $t^*$  and Im, Pesaran and Shin W-stat tests to assess the panel series properties of the variables, Dumitrescu-Hurlin panel causality test was used to estimate the model as formulated in the work in tandem with the research objective and the related research question the findings from the study were meant to address. The study has revealed that from the pooled result that: there is unidirectional causality between domestic debt and economic growth with causality running from domestic debt to economic growth; there exists no causality between domestic debt and inflation; and also, there exists no causality between economic growth and inflation in the selected sub-Saharan African countries.

This study examined the nature of the causal relations between domestic debt, inflation and economic growth. However, the unidirectional causal relationship between domestic debt and economic growth with causality running from domestic debt to economic

growth provides insights into the dynamics between these two key economic variables. The analysis reveals that domestic debt significantly influences economic growth, suggesting that an increase in government borrowing and debt issuance can lead to higher growth levels in the selected countries. This unidirectional causality implies that while domestic debt may drive economic growth, the reverse effect (economic growth granger-causing debt), does not hold in this context, or at least not in a statistically significant way. Furthermore, despite the potential theoretical expectations of a link- whereby higher domestic debt might create inflationary pressures or higher output performance might create inflationary pressures, no clear causal effect exists in the observed data.

In view of the findings of this study, the recommendations are easily discernible. Firstly, governments can therefore prioritize managing domestic debt based on considerations of fiscal sustainability and economic growth, rather than solely focusing on inflationary concerns. This approach might involve strategically channeling domestic borrowing to productive sectors of the economy. Secondly, Policymakers need to be overly concerned about the direct effects of domestic debt on growth, at least not in a deterministic way. Instead, factors such as the structure of debt, the efficiency of government spending, and the broader macroeconomic environment may play more significant roles in determining economic outcomes. Thirdly, Government should take into account the potential growth and inflationary effects of expanding domestic debt when designing fiscal policies, especially in economies where inflation control is a priority (especially Nigeria).

## References

- Andrew, D.W. K and Monhan , C. (1992). An Imporoved Heteroskedasticity and Autocorrelation consistent Covariance Matrix Estimator, *Econometrican* 60 No 4, 953-966.
- Africa Development Bank, Organization for Economic Co-operation and Development (2015). *African Economic Outlook 2015*. Regional development and Spatial inclusion, Tunisia 1-397.
- Aimola,A.U and Odhiambo, N.M (2021). Public debt and inflation: Empirical evidence from Ghana. Working papers 27063, University of South Africa, Department of Economics.
- Akpan, S.B. (2012). Determinant of Cash Crop Output Volatility in Nigeria. *Journal of Agricultural Science* 4(9): 174-184.
- Cordella, T., Ricci, A., Arranz, R. (2005). “Debt Overhang or Debt Irrelevance? Revisiting the Debt-Growth Link”. *IMF Working Paper No. 05/223*.
- Dumitrescu, E.I and Hurlin, C (2012). Testing for Granger Non-Causality in Heterogeneous Panels. *Economic modelling* 29(4): 1450-1460.
- Esu, G.E. (2017). Assessing the Resource Curse Question: A Case of Crude Oil Production in Nigeria. *Journal f Economic Research* 22 (2017): 153-213.
- Granger, C.W.J (1969). Investigating Causal Relations by Econometric Models and cross-spectral Methods. *Econometrica* 37(3): 424-438
- Greene, W.H. (2003). *Econometric Analysis 5<sup>th</sup> edition*. London: Prentice-Hall International Publisher. London
- International Monetary Fund (IMF), (2023). *Region Economic Update 2023: All regions'*
- Kirchgassner, G. and Wolters, J. (2017). *Introduction to Modern Time Series Analysis*. Springer Publisher, Berlin Heidelberg, New York.

- Levin, A., Lin, C.-F., and Chu, C.-S. J. (2002). Unit Root Tests in Panel Data: Asymptotic and Finite-Sample Properties. *Journal of Econometrics* 108(1); 1-24
- Salkind, N. J. (2010). *Ex post facto study*. Encyclopedia of research design. DOI:<http://dx.doi.org/10.4135/9781412961288>. Retrieved from <https://srmo.sagepub.com/view/encyc-of-research-design/n145.xml>.
- Sunder-Plassmann, L. (2020). Inflation, Default and Sovereign Debt: The role of Denomination and Ownership. *Journal of International Economics*, 127(103393), 1–26.
- Viziniuc, M. (2021). Winners and Losers of Central Bank Foreign Exchange Interventions. *Economic Modelling*, 94, 748–767.