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External Debt and Economic Growth in West Africa

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Abstract— This study examines the impact of external debt on economic growth in West Africa, focusing on Côte d'Ivoire, Ghana, and Nigeria from 1990 to 2023. Using the Autoregressive Distributed Lag (ARDL) model, the analysis reveals that while external debt supports short-term growth, it hinders long-term economic performance when debt servicing becomes substantial. Specifically, a 1% increase in external debt initially boosts GDP by 0.73%, but sustained debt servicing reduces this benefit, as shown by a negative ARDL coefficient of -1.313 ($p < 0.0000$) for debt servicing, with average costs of $1,120.28 million limiting resources for development. Gross fixed capital formation positively impacts growth, with a coefficient of 0.483 ($p < 0.0000$) and an average value of $25,206.97 million, underscoring the role of infrastructure investment. Inflation, which fluctuated widely from -1.11% to 72.84%, generally constrains growth at high levels, indicated by an ARDL coefficient of -8.641 ($p < 0.0000$), though it can foster economic activity at moderate rates. These findings suggest that while external debt can drive growth, sustainable economic stability in West Africa requires prudent debt management, balanced debt servicing, and continued investments in productive assets. Effective debt and capital investment policies can transform external debt into a development catalyst, ensuring long-term economic resilience in West Africa.

***Index Terms*— Debt Service, Economic Growth, Exchange Rate, External Debt, Gross Fixed Capital Formation, Inflation.**

1. Introduction

A. Background to the Study

External debt, also known as foreign debt, refers to the financial obligations that a country owes to external creditors, including international financial institutions, foreign governments, and multinational organizations (John, 2021). In many developing regions, particularly in West Africa, external debt has played a pivotal role in financing critical development projects and bridging fiscal deficits. However, the relationship between external debt and economic growth is complex and requires careful examination, especially in countries such as Cote d'Ivoire, Ghana, and Nigeria.

The economies of Cote d'Ivoire, Ghana, and Nigeria are among the largest in West Africa, and their reliance on external debt is significant. These countries have utilized external borrowing to finance infrastructure projects, industrial expansion, and other growth-promoting activities. However, the sustainability of this debt and its impact on economic growth remain subjects of intense debate. When managed effectively, external debt can stimulate economic growth by providing the necessary capital for development. Conversely, if debt levels become unsustainable, the associated debt servicing can crowd out public investment and hinder economic progress (Soludo, 2003).

The extent to which external debt impacts economic growth in West Africa is influenced by several factors, including the structure of the debt, the effectiveness of debt management strategies, and broader economic policies. For instance, the ability of a country to service its debt without compromising growth-oriented investments is critical. Excessive debt servicing obligations can lead to reduced public spending on essential services, currency depreciation, inflation, and other economic challenges (Mamun & Kabir, 2023).

Cote d'Ivoire, Ghana, and Nigeria have faced significant challenges in managing their external debt. For example, Nigeria's external debt reached $98.3 billion in 2022, representing a substantial burden on its economy. Similarly, Ghana and Cote d'Ivoire have also experienced rising debt levels, highlighting the importance of effective debt management strategies to mitigate adverse economic impacts (World Bank 2023). These challenges underscore the need to assess the broader implications of external debt on economic growth in West Africa.

Moreover, other macroeconomic factors such as gross fixed capital formation, exchange rate fluctuations, and inflation rates also play crucial roles in shaping economic outcomes. Gross fixed capital formation, which includes investments in infrastructure and other long-term assets, is essential for sustained economic growth. Additionally, exchange rates and inflation can significantly influence the economic stability of a country, affecting its growth trajectory.

This study aims to explore the impact of external debt on economic growth in West Africa from 1990 to 2023, with a particular focus on Cote d'Ivoire, Ghana, and Nigeria. By analyzing the effects of external debt, debt servicing, gross fixed capital formation, exchange rates, and inflation on economic growth, the study seeks to provide valuable insights into the dynamics of debt and growth in these key West African

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economies.

B. Statement of Research Problem

External debt poses a significant challenge for many West African countries. Despite its potential benefits, excessive external debt can hinder economic growth, leading to a vicious cycle of borrowing and debt servicing that diverts resources away from essential development projects. In Cote d'Ivoire, Ghana and Nigeria, the accumulation of external debt has reached critical levels, necessitating a comprehensive analysis of its impact on economic growth and development.

These countries face unique challenges in managing their external debts. High debt service payments have strained public finances, limiting their ability to invest in infrastructure, education, healthcare, and other critical sectors. Additionally, fluctuations in global financial markets and changes in lending conditions have further complicated their debt management efforts.

Understanding the relationship between external debt and economic growth in these countries is essential for developing effective policies and strategies to manage debt sustainably and promote economic development. This study aims to address these issues by analyzing the debt trends, economic impacts, and debt management strategies of Cote d'Ivoire, Ghana and Nigeria over the period from 1990 to 2023.

C. Objective of the Study

The broad objective of the study is to investigate the impact of external debt on economic growth in West Africa from 1990 to 2023, with a particular focus on Cote d'Ivoire, Ghana, and Nigeria. The specific objectives of the study include:

1. To assess the extent to which external debt has impacted economic growth in West Africa.
2. To examine the effect of external debt service payments on economic growth in West Africa.
3. To verify the impact of exchange rate on economic growth in West Africa.
4. To investigate the impact of gross fixed capital formation on economic growth in West Africa.
5. To examine the impact of inflation rate on economic growth in West Africa.

D. Research Questions

Based on the objectives above, the study seeks to answer the following research questions:

1. Does external debt exert any significant impact on economic growth in West Africa?
2. To what extent has external debt service payment impacted economic growth in West Africa?
3. Does exchange rate have any significant impact on economic growth in West Africa?
4. Has gross fixed capital formation had any significant impact on economic growth in West Africa?
5. To what extent has inflation rate variable induced economic growth in West Africa?

E. Statement of Hypotheses

In line with the research questions and objectives, the following hypotheses have been formulated:

H_{01}: External debt did not exert any significant impact on economic growth in West Africa.

H_{02}: External debt service payments did not impact economic growth significantly in West Africa.

H_{03}: There is no significant impact of exchange rate on economic growth in West Africa.

H_{04}: Gross fixed capital formation did not exert any significant impact on economic growth in West Africa.

H_{05}: Inflation rate did not exert any significant impact on economic growth in West Africa.

2. Literature Review

A. Conceptual Review

1) Economic Growth

Economic growth refers to the increase in the production and consumption of goods and services over time, typically measured by the rise in a country's Gross Domestic Product (GDP). It is closely linked to improvements in living standards and overall economic development (Todaro & Smith, 2015). Economic growth theories have evolved considerably. Classical economists like Adam Smith emphasized market forces and the division of labor as drivers of prosperity. Neoclassical growth theory, developed by Robert Solow, introduced the production function, connecting output to inputs such as labor, capital, and technology. Solow's model suggests that economic growth is driven by capital accumulation, labor force growth, and technological progress, with long-term growth primarily fueled by technological innovation (Solow, 1956).

In contrast, endogenous growth theory, pioneered by Paul Romer and Robert Lucas, posits that growth results from factors within the economy, such as human capital accumulation, innovation, and knowledge spillovers. This theory highlights the significance of policies and institutions in fostering environments conducive to innovation and education (Romer, 1990; Lucas, 1988).

2) External Debt Stock

External debt stock is a critical economic indicator that represents the total amount of debt a country owes to foreign creditors. This debt encompasses various forms, including sovereign bonds, bilateral and multilateral loans, private sector debt, and trade credits. The accumulation and management of external debt have profound implications for a country's economic stability, growth, and development.

B. Theoretical Review

1) Theory of Debt Overhang

The Debt Overhang Theory, introduced by Krugman (1988) and further refined by Sachs (1989), posits that excessive external debt can stifle investment and economic growth. The core argument is that high levels of debt create a situation where the returns on new investments are primarily used to service existing debt, thereby reducing the incentive for further investment. This theory is particularly relevant for developing economies, where high external debt burdens can lead to a self-reinforcing cycle of low investment and stagnant growth.

The relationship between investment (I), income (Y), and debt service payments (D) can be described by the following function:

$$I = f(Y - D)$$

where I represents investment, Y is income, and D denotes debt service payments. High debt service obligations reduce the disposable income available for productive investment, thereby suppressing economic growth. This phenomenon is particularly pronounced in countries with large external debt burdens, where the debt overhang effect dissuades both domestic and foreign investors, who fear that the returns on their investments will be diverted to service the existing debt (Claessens et al., 2016).

C. Empirical Review

Chukwujekwu and Umemezilem (2018) examine the impact of external debt on Nigeria's economic growth using data from 1981 to 2017. The study employs econometric methods, including the Augmented Dickey-Fuller test for data stationarity, Granger Causality tests for causal relationships, and the Error Correction Mechanism (ECM) to explore both short-run and long-run effects. The findings reveal that external debt stock and government capital expenditure positively and significantly influence GDP growth, indicating that increased external debt, when effectively allocated to capital projects, can stimulate economic activity. Conversely, external debt service costs do not significantly affect economic growth. The study recommends that Nigeria focus on the efficient use of foreign loans for capital expenditure to enhance economic growth, suggesting that while managing debt service costs is important, their direct impact on GDP growth may be less significant. This research underscores the importance of strategically channeling external debt into productive investments to maximize its positive impact on the economy.

Aguwamba and Raph's (2019) study delves into the external debt crisis and its impact on Nigeria's economic growth over a 30-year period from 1979 to 2008. The study employs GDP as the dependent variable and external debt and external debt service payments as the independent variables. Using a co-integration econometric model, the researchers conducted a Unit root test to determine the stationarity of the variables. The findings reveal a positive relationship between GDP and external debt, suggesting that increased external debt can be associated with higher economic growth. Conversely, there is a negative relationship between GDP and external debt service payments, indicating that high debt servicing costs can hinder economic growth. The study underscores the significance of the Paris Club's cancellation of Nigeria's external debt, which provided substantial relief to the country. It recommends that Nigeria should strategically allocate borrowed funds to profitable and designated activities to maximize economic benefits. Additionally, it suggests that external debt should finance export-generating projects to bolster the country's economic growth. The study also emphasizes the need for rigorous measures against corruption and embezzlement to ensure that borrowed funds are used effectively. These findings provide valuable insights for policymakers aiming to optimize the benefits of external debt while mitigating its drawbacks.

Both Didia and Ayokunle (2020) and Ajayi and Edewusi (2020) examine the impact of public debt on Nigeria's economic growth, highlighting the differential effects of external and domestic debt. Didia and Ayokunle (2020), analyzing data from 1980 to 2016 using the Vector Error Correction Model (VECM), find that domestic debt positively and significantly influences economic growth in the long run, while external debt shows a negative, though not statistically significant, relationship. Ajayi and Edewusi (2020) extend this analysis to the period 1982 to 2018, using descriptive statistics, unit root tests, Johansen co-integration tests, and VECM, and their findings align with those of Didia and Ayokunle. They conclude that external debt negatively affects economic growth in both the long and short run, while domestic debt has a positive impact over both time horizons. Both studies recommend focusing on the effective management of domestic debt and ensuring that national debts are used for investments promoting economic growth, with Ajayi and Edewusi emphasizing the need for government oversight to ensure borrowed funds are utilized for essential services and infrastructure, benefiting communities and society at large (Ajayi & Edewusi, 2020; Didia & Ayokunle, 2020). Dey and Tareque (2020) add to this discourse by examining the broader macroeconomic context in Bangladesh, finding that while external debt negatively impacts GDP growth, sound macroeconomic policies and appropriate human resource strategies can mitigate these adverse effects (Dey & Tareque, 2020).

Ughulu, Edogiawerie, and Billyaminu (2023) investigate the relationship between deficit financing and economic growth in Nigeria, presenting empirical evidence based on an extensive analysis. Utilizing a range of econometric models, the study explores the dynamics between government borrowing and economic performance. By analyzing data over a significant period, the authors ensure robustness in their findings. The analysis reveals that while deficit financing can provide necessary funds for developmental projects and stimulate short-term economic growth, it can also lead to long-term fiscal instability if not managed properly. The study emphasizes the importance of effective fiscal policy and prudent borrowing practices to harness the benefits of deficit financing while mitigating potential adverse effects on the economy. The authors recommend that the Nigerian government focus on improving the efficiency of public spending and enhancing revenue generation to reduce reliance on borrowing. Additionally, they highlight the need for structural reforms to create a more sustainable economic environment. This study provides valuable insights for policymakers, suggesting that while deficit financing can be a tool for economic growth, it requires careful management to avoid fiscal crises and ensure long-term economic stability.

D. Literature Gap

Despite extensive research on external debt and economic growth in West African countries like Côte d'Ivoire, Ghana,

and Nigeria, significant gaps remain. Existing studies often overlook comparative analyses across these nations, missing unique economic structures and debt management practices. Moreover, research typically isolates external debt from other key macroeconomic variables such as inflation, exchange rates, and gross fixed capital formation, which influence its impact on GDP growth. Additionally, most studies rely on outdated data, lacking insights into recent trends. Addressing these gaps with comparative, integrated, and updated analyses will enhance our understanding of external debt's role in economic growth.

3. Methodology

This study employs a quantitative research design to investigate how external debt, debt service costs, inflation rates, exchange rates, and gross fixed capital formation collectively influence GDP growth from 1990 to 2023. By utilizing econometric models, including the Autoregressive Distributed Lag (ARDL) model, the research aims to address identified gaps in existing literature

A. Theoretical Framework

This research investigates the impact of external debt on economic growth in Cote d'Ivoire, Ghana, and Nigeria from 1990 to 2023 using both static and dynamic models. The static model evaluates the immediate effects of external debt and related variables on GDP, while the dynamic ARDL (Autoregressive Distributed Lag) model examines both short-run and long-run dynamics.

The theoretical form of the model for the study is given thus:

$$RGDP = f(ED, DS, EXR, GFCF, INF) \quad (1)$$

The functional form of equation (1) is presented as follows:

$$\text{RGDP}_{it} = \alpha + \beta_1 ED_{it} + \beta_2 DS_{it} + \beta_3 EXR_{it} + \beta_4 GFCF_{it} + \beta_5 INF_{it} + \epsilon_{it} \quad (2)$$

This model captures the direct impact of external debt, debt servicing, exchange rate, gross fixed capital formation and inflation on RGDP. The static model is employed for its simplicity in determining the direct effects of external debt and other factors on economic growth. It provides a clear view of how each variable influences RGDP at a given point in time.

Using ARDL approach equation (2) is transformed as follows

$$RGDP_{it} = \alpha + \sum_{j=0}^{p} \beta_j RGDP_{it-j} + \sum_{k=0}^{q} \delta_k ED_{it-k} + \sum_{l=0}^{r} \varphi_l DS_{it-l} + \sum_{m=0}^{s} \gamma_m EXR_{it-m} + \sum_{n=0}^{t} \theta_n GFCF_{it-n} + \sum_{o=0}^{u} \lambda_o INF_{it-o} + \epsilon_{it} \quad (3)$$

The ARDL approach is chosen for its ability to handle variables integrated at different orders and to estimate both short-run and long-run dynamics. By including lagged values, it accounts for endogeneity issues and temporal effects, offering a comprehensive analysis of how external debt influences economic growth over time.

4. Data Presentation Analyses and Discussion

A. Descriptive Statistics West Africa

The average real GDP during this period stands at approximately $131,468.9 million, reflecting the overall economic output of these nations. However, there is a striking disparity within this figure, with real GDP values ranging from a minimum of $13,167.34 million to a maximum of $550,647.7 million. This considerable range indicates that while some countries experience substantial economic growth, others lag significantly, contributing to a positively skewed distribution. The median GDP, at $48,740.6 million, underscores this inequality, suggesting that a few high GDP outliers are inflating the average.

In terms of external debt, the average across the sampled countries is approximately $14,374.84 million. This figure encapsulates the varying levels of indebtedness, with a standard deviation indicating that some countries have significantly higher debt levels than others. The minimum external debt recorded is $2,272.89 million, while the maximum reaches $42,495.16 million, showcasing substantial variability in how countries manage their external financial obligations.

Debt servicing, which averages $1,120.28 million, also reflects a similar pattern of variability. The substantial standard

Table 1
Descriptive statistics Nigeria. EViews output

Date: 09/21/24 Time: 18:52 Sample: 1990 2023						
RGDP		**ED**	**DS**	**EXR**	**GFCF**	**INF**
Mean	131468.9	14374.84	1120.284	229.8057	25206.97	14.01797
Median	48740.6	10797.22	609.7061	130.2483	11326.64	10.73383
Maximum	550647.7	42495.16	8800.307	732.3977	153122.8	72.8355
Minimum	13167.34	2272.892	16.29916	0.032616	817.1546	-1.10686
Std. Dev.	160224.4	10023.43	1282.292	244.0486	34018.61	14.27052
Skewness	1.445231	0.839041	3.132505	0.556281	1.853138	1.88052
Kurtosis	3.668522	2.571929	16.97575	1.707646	6.013752	6.698889
Jarque-Bera	37.40717	12.74661	996.9309	12.35889	96.98153	118.2656
Probability	0	0.001707	0	0.002072	0	0
Sum	13409828	1466234	114269	23440.18	2571111	1429.833
Sum Sq. Dev.	2.59E+12	1.01E+10	1.66E+08	6015534	1.17E+11	20568.42
Observations	102	102	102	102	102	102

deviation implies that while many countries manage their debt servicing efficiently, a few face considerable challenges, as evident from the maximum value of $8,800.31 million.

The exchange rate, presented in local currencies per U.S. dollar, reveals notable fluctuations, with an average of $229.81. The range spans from a low of $0.03 to a peak of $732.40, suggesting that some economies have experienced both stability and extreme volatility, which could be influenced by factors such as economic policy changes, inflation rates, and global market conditions.

Gross Fixed Capital Formation (GFCF) averages $25,206.97 million, indicating investment in physical assets across the region. The substantial variability, highlighted by a maximum of $153,122.8 million, points to significant differences in capital investment strategies among these countries, which could impact overall economic growth.

Inflation rates, expressed as a percentage, average 14.02% over the sampled years, reflecting moderate inflation within the region. However, the wide range, from -1.11% (indicating deflation) to a peak of 72.84%, underscores the economic volatility faced by these countries. Such fluctuations in inflation can arise from various factors, including changes in commodity prices, fiscal policies, and external economic pressures.

Overall, the dataset illustrates the economic diversity and instability prevalent in the West African region. The presence of significant outliers in real GDP, external debt, and inflation rates indicates disparities in economic management and growth potential among the countries studied. This variability suggests that while some nations are on a path toward robust economic development, others may require strategic interventions to address their economic challenges effectively.

From 1990 to 2023, the economic profiles of Cote d'Ivoire, Ghana, and Nigeria reveal distinct patterns. Cote d'Ivoire has a mean RGDP of $37,062.76 million, with notable variability in external debt and inflation. Ghana's average RGDP stands at $34,559.02 million, characterized by significant fluctuations in external debt and capital formation, and a relatively higher skewness in debt servicing. Nigeria, with a mean RGDP of $322,784.90 million, shows considerable variability in external debt, debt servicing, and inflation, reflecting its larger economic scale and higher volatility. Overall, Nigeria's economy is more expansive and volatile compared to Cote d'Ivoire and Ghana, which have smaller but still variable economic indicators.

B. Panel Unit Root Test

Real GDP (RGDP): At the level, RGDP is identified as non-stationary, with the Levin, Lin & Chu t-statistic at 3.30996 (p-value = 0.9995) and the Im, Pesaran, and Shin W-stat at 5.68064 (p-value = 1). The ADF - Fisher Chi-square and PP - Fisher Chi-square tests also confirm this non-stationarity. In contrast, when differenced, RGDP shows significant improvement in stationarity. The Levin, Lin & Chu t- statistic at -2.03552 (p-value = 0.0209) indicates stationarity, supported by the PP - Fisher Chi-square test statistic of 16.3351 (p-value = 0.0121).

Table 2
Panel unit root test (Cote d'Ivoire, Ghana and Nigeria)

Series	Test	Statistic	Probability (p-value)	Cross-sections	Observations	Stationarity Conclusion
RGDP (Level)	Levin, Lin & Chu t	3.30996	0.9995	3	96	Non-stationary
RGDP (Level)	Im, Pesaran and Shin W-stat	5.68064	1	3	96	Non-stationary
RGDP (Level)	ADF - Fisher Chi-square	0.07966	1	3	96	Non-stationary
RGDP (Level)	PP - Fisher Chi-square	0.03213	1	3	99	Non-stationary
RGDP (1st Difference)	Levin, Lin & Chu t	-2.03552	0.0209	3	93	Stationary
RGDP (1st Difference)	Im, Pesaran and Shin W-stat	-0.9172	0.1795	3	93	Non-stationary
RGDP (1st Difference)	ADF - Fisher Chi-square	7.9878	0.239	3	93	Non-stationary
RGDP (1st Difference)	PP - Fisher Chi-square	16.3351	0.0121	3	96	Stationary
D_RGDP (Level)	Levin, Lin & Chu t	-5.93934	0	3	90	Stationary
D_RGDP (Level)	Im, Pesaran and Shin W-stat	-6.39454	0	3	90	Stationary
D_RGDP (Level)	ADF - Fisher Chi-square	46.2517	0	3	90	Stationary
D_RGDP (Level)	PP - Fisher Chi-square	87.8467	0	3	93	Stationary
INF (1st Diff)	Levin, Lin & Chu t	-4.53204	0	3	93	Stationary
INF (1st Diff)	Im, Pesaran and Shin W-stat	-7.10512	0	3	93	Stationary
INF (1st Diff)	ADF - Fisher Chi-square	53.1328	0	3	93	Stationary
INF (1st Diff)	PP - Fisher Chi-square	89.5571	0	3	96	Stationary
GFCF	Levin, Lin & Chu t	-1.11463	0.1325	3	93	Non-stationary
GFCF	Im, Pesaran and Shin W-stat	-3.99659	0	3	93	Stationary
GFCF	ADF - Fisher Chi-square	27.0462	0.0001	3	93	Stationary
GFCF	PP - Fisher Chi-square	45.5944	0	3	96	Stationary
DS (1st Diff)	Levin, Lin & Chu t	-3.97157	0	3	93	Stationary
DS (1st Diff)	Im, Pesaran and Shin W-stat	-5.99998	0	3	93	Stationary
DS (1st Diff)	ADF - Fisher Chi-square	44.1569	0	3	93	Stationary
DS (1st Diff)	PP - Fisher Chi-square	93.4086	0	3	96	Stationary
EXR	Levin, Lin & Chu t	4.85345	1	3	93	Non-stationary
EXR	Im, Pesaran and Shin W-stat	-0.11403	0.4546	3	93	Non-stationary
EXR	ADF - Fisher Chi-square	12.6444	0.049	3	93	Stationary
EXR	PP - Fisher Chi-square	20.3938	0.0024	3	96	Stationary
ED	Levin, Lin & Chu t	4.42817	1	3	96	Non-stationary
ED	Im, Pesaran and Shin W-stat	4.05287	1	3	96	Non-stationary
ED	ADF - Fisher Chi-square	1.36892	0.9677	3	96	Non-stationary
ED	PP - Fisher Chi-square	0.75652	0.9932	3	99	Non-stationary
ED (1st Diff)	Levin, Lin & Chu t	-2.14961	0.0158	3	93	Stationary
ED (1st Diff)	Im, Pesaran and Shin W-stat	-1.28916	0.0987	3	93	Non-stationary
ED (1st Diff)	ADF - Fisher Chi-square	11.4643	0.075	3	93	Stationary
ED (1st Diff)	PP - Fisher Chi-square	26.6053	0.0002	3	96	Stationary

Table 3
Fixed effect model output. Eviews12

Dependent Variable: D_RGDP Method: Panel Least Squares Date: 09/29/24 Time: 18:21 Sample (adjusted): 1991 2023
Periods included: 33
Cross-sections included: 3
Total panel (balanced) observations: 99

Variable	Coefficient	Std. Error t-Statistic	Prob.
C	7638.118	1815.953 4.206122	0.0001
ED	-0.218596	0.081918 -2.668458	0.0090
DS	0.768046	0.560164 1.371109	0.1737
EXR	3.879870	7.353867 0.527596	0.5991
GFCF	0.031742	0.036925 0.859621	0.3923
INF	-141.7771	51.44286 -2.756010	0.0071
Effects Specification			
Cross-section fixed (dummy variables)			
R-squared	0.501742	Mean dependent var	5091.484
Adjusted R-squared	0.463415	S.D. dependent var	8000.653
S.E. of regression	5860.638	Akaike info criterion	20.26726
Sum squared resid	3.13E+09	Schwarz criterion	20.47697
Log likelihood	-995.2294	Hannan-Quinn criter.	20.35211
F-statistic	13.09091	Durbin-Watson stat	1.119893
Prob(F-statistic)	0.000000		

This suggests that differencing RGDP, which involves calculating the change in RGDP values from one period to the next, effectively removes trends and makes the series more stable for econometric analysis.

C. Fixed Effect Model

The panel least squares analysis of the change in real GDP (D_RGDP) using data from 1991 to 2023 across three countries yielded a constant coefficient of 7638.118 ($p < 0.0001$). External debt (ED) was found to significantly decrease GDP by 0.218596 ($p = 0.0090$), while debt servicing (DS) showed a positive coefficient of 0.768046, but was not statistically significant ($p = 0.1737$). The exchange rate (EXR) had a coefficient of 3.879870 ($p = 0.5991$), and gross fixed capital formation (GFCF) was insignificant with a coefficient of 0.031742 ($p = 0.3923$). In contrast, inflation (INF) significantly reduced GDP by 141.7771 ($p = 0.0071$). The model explained approximately 50.17% of the variation in D_RGDP ($R^2 = 0.501742$) and was statistically significant (F-statistic = 13.09091, $p < 0.000000$), although the Durbin-Watson statistic indicated potential positive autocorrelation in the residuals (DW = 1.119893).

The findings suggest several important implications for economic policy and planning in the context of the three countries studied. The significant negative coefficient for external debt indicates that increasing external debt levels may hinder economic growth, prompting policymakers to be cautious about accumulating further debt and consider strategies for debt management and reduction. Additionally, the significant negative relationship between inflation and real GDP growth underscores the importance of maintaining stable inflation rates. Effective monetary policy aimed at controlling inflation can foster a more conducive environment for economic growth. The non-significant effects of debt servicing, exchange rates, and gross fixed capital formation suggest that these factors may not play a crucial role in driving GDP changes in this context, indicating a potential need for structural reforms and economic diversification to improve overall resilience and performance

1. *Inflation (INF):* The first difference of INF consistently indicates stationarity, with a Levin, Lin & Chu t-statistic of -4.53204 (p-value = 0) and an ADF - Fisher Chi-square statistic of 53.1328 (p-value = 0).
2. *Gross Fixed Capital Formation (GFCF):* GFCF shows mixed results; it is non-stationary in the Levin, Lin & Chu t-test (-1.11463, p-value = 0.1325) but becomes stationary in the ADF and PP tests, with statistics of 27.0462 (p-value = 0.0001) and 45.5944 (p-value = 0), respectively.
3. *Debt Servicing (DS):* DS shows stationarity across all tests in the first difference, with the Levin, Lin & Chu t-statistic at -3.97157 (p-value = 0) and the PP - Fisher Chi-square at 93.4086 (p-value = 0).
4. *Exchange Rate (EXR):* EXR is non-stationary at the level (Levin, Lin & Chu t = 4.85345, p-value = 1) but is stationary in the PP - Fisher Chi-square test (20.3938, p-value = 0.0024).

D. ARDL Analysis for West Africa

The long-run results from the ARDL model reveal a significant and positive impact of external debt (ED) on economic growth (RGDP) in West Africa, with a coefficient of 0.0073. This suggests that a 1% increase in external debt is associated with a 0.73% increase in economic growth in the long run. However, external debt servicing (DS) exhibits a strong negative relationship with growth, with a coefficient of -1.313. This indicates that the burden of servicing debt significantly hinders economic performance, potentially outweighing the benefits of external borrowing. Exchange rate (EXR) also negatively affects growth, as reflected in its coefficient of -9.255, implying that currency depreciation leads to a decline in economic growth. Gross fixed capital formation (GFCF) positively influences growth with a coefficient of 0.483, highlighting the role of investments in physical capital in boosting the region's economic output, while inflation (INF) negatively affects growth with a coefficient of -8.641.

In the short-run dynamics, external debt (ED) shows mixed results across different lags. While current ED shows a positive but insignificant impact on growth, lagged values of ED begin to show a negative impact on economic growth. Specifically,

Table 4
ARDL Analysis result West Africa

Dependent Variable: D(D_RGDP) Method: ARDL
Date: 09/24/24, Time: 04:4 Sample1995 2023:
Included observations: 87 Dependent lags: 4 (Fixed)
Dynamic regressors (4 lags, fixed): ED DS EXR GFCF INF Fixed regressors: C

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
Long Run Equation				
ED	0.007275	0.000279	26.12182	0.0000
DS	-1.313168	7.12E-05	-18452.38	0.0000
EXR	-9.255431	0.954621	-9.695394	0.0000
GFCF	0.483184	0.000477	1012.656	0.0000
INF	-8.641328	0.027347	-315.9937	0.0000
Short Run Equation				
COINTEQ01	0.787786	1.753908	0.449160	0.6584
D(D_RGDP(-1))	-0.647428	0.925909	-0.699234	0.4929
D(D_RGDP(-2))	-0.730095	0.980293	-0.744772	0.4655
D(D_RGDP(-3))	-0.103911	0.426815	-0.243457	0.8103
D(ED)	0.648103	0.919132	0.705125	0.4893
D(ED(-1))	-0.589196	0.682081	-0.863822	0.3985
D(ED(-2))	-1.340011	0.979621	-1.367887	0.1873
D(ED(-3))	-0.908403	0.405367	-2.240942	0.0372
D(DS)	7.638767	3.744993	2.039728	0.0555
D(DS(-1))	10.84801	6.723573	1.613429	0.1231
D(DS(-2))	-2.147184	3.264396	-0.657758	0.5186
D(DS(-3))	-2.413641	2.058583	-1.172477	0.2555
D(EXR)	2349.658	2238.511	1.049652	0.3070
D(EXR(-1))	1113.130	1101.760	1.010320	0.3250
D(EXR(-2))	6453.806	6470.013	0.997495	0.3311
D(EXR(-3))	-5009.772	4712.276	-1.063132	0.3010
D(GFCF)	0.724395	0.497366	1.456463	0.1616
D(GFCF(-1))	-0.306896	0.495360	-0.619541	0.5429
D(GFCF(-2))	0.104279	0.661201	0.157712	0.8763
D(GFCF(-3))	-0.960530	0.192620	-4.986644	0.0001
D(INF)	-245.4349	114.5300	-2.142974	0.0453
D(INF(-1))	-10.03066	113.7164	-0.088208	0.9306
D(INF(-2))	-149.0535	110.8976	-1.344065	0.1948
D(INF(-3))	-262.3684	251.8421	-1.041797	0.3106
C	-610.7465	3395.516	-0.179869	0.8592
Root MSE	2693.792	Mean dependent var		274.9799
S.D. dependent var	5978.968	S.E. of regression		6149.005
Akaike info criterion	6.555411	Sum squared resid		7.18E+08
Schwarz criterion	8.652477	Log likelihood		-244.4928
Hannan-Quinn criter.	7.403887			

*Note: p-values and any subsequent tests do not account for model selection.

ED(-3) has a statistically significant negative effect, suggesting that the accumulation of debt over time may lead to adverse effects on growth. Debt servicing (DS) in the short run has a significant positive impact in the current period, though this effect diminishes across lags. The positive effect of DS in the short run may reflect the temporary relief provided by managing debt obligations, though this does not hold consistently over time. Exchange rate dynamics also demonstrate volatile effects, with alternating positive and negative coefficients, reflecting fluctuations in currency values affecting trade and investment decisions.

Despite these observations, the lack of a significant error correction term (ECM) indicates no cointegration among the variables. This implies that there is no evidence of a long-term equilibrium relationship, and any short-term deviations from economic growth trends are not corrected over time. Consequently, while there are notable short-run effects of external debt, debt servicing, and exchange rate changes on growth, these effects do not suggest a stable long-term relationship. Therefore, policy measures aimed at sustainable growth should focus on managing debt responsibly and stabilizing exchange rates to minimize short-run volatility, while encouraging capital formation to boost long-term growth prospects

E. Test of Hypotheses

H_{01}: External debt stock does not exert any significant impact on economic growth in West Africa.

A-priori Expectation: Negative impact (higher external debt could constrain economic growth).

Result: The ARDL long-run coefficient for external debt (ED) is positive and statistically significant (0.0073, $p < 0.0000$). This means that external debt has a significant positive impact on economic growth in the long run. Therefore, we reject H01, as external debt exerts a significant positive impact on economic growth in West Africa.

H_{02}: External debt service payments have no significant impact on economic growth in West Africa.

A-priori Expectation: Negative impact (debt servicing reduces resources available for growth).

Result: The ARDL long-run coefficient for external debt servicing (DS) is negative and statistically significant (-1.313, $p < 0.0000$), indicating a significant negative impact of debt service payments on economic growth. Hence, we reject H02,

as external debt service payments have a significant negative impact on economic growth in West Africa.

H_{03}: Gross fixed capital formation does not exert any significant impact on economic growth in West Africa.

A-priori Expectation: Positive impact (investment in capital formation boosts economic growth).

Result: The coefficient for gross fixed capital formation (GFCF) is positive and statistically significant (0.483, $p < 0.0000$), indicating that GFCF has a significant positive impact on economic growth. Therefore, we reject H03, as GFCF significantly contributes to economic growth in West Africa.

H_{04}: Exchange rate has no significant impact on economic growth in West Africa.

A-priori Expectation: Mixed impact (the relationship may vary).

Result: The coefficient for the exchange rate (EXR) is negative and statistically significant (-9.255, $p < 0.0000$), suggesting that exchange rate fluctuations have a significant negative impact on economic growth. As a result, we reject H04, indicating a significant relationship between the exchange rate and economic growth in West Africa

H_{05}: Inflation rate does not exert any significant impact on economic growth in West Africa.

A-priori Expectation: Negative impact (high inflation may deter economic growth).

Result: The coefficient for inflation (INF) is negative and statistically significant (-8.641, $p < 0.0000$), indicating a significant negative impact of inflation on economic growth. Thus, we reject H05, as inflation significantly hinders economic growth in West Africa.

F. Discussion of Findings and Results

The findings of this study on the impact of external debt on economic growth in West Africa, specifically focusing on Cote d'Ivoire, Ghana, and Nigeria, align with some aspects of existing literature, while also providing new insights.

1) External Debt and Economic Growth

The study revealed that external debt generally exerts a negative impact on economic growth, particularly in the long run, with significant effects observed in Cote d'Ivoire and Ghana. This finding supports the conclusions drawn by Omodero and Alpheaus (2019), who found that foreign debt had a significant negative influence on Nigeria's economic growth, suggesting that high levels of debt can hinder growth due to the financial burden of repayment. Similarly, Fofana N'Zue (2020) identified a threshold beyond which additional external debt negatively affects economic performance in the ECOWAS region, highlighting the risks associated with excessive debt accumulation. The negative long-term effects observed in this study emphasize the need for cautious borrowing practices, echoing the recommendations of Akinola and Ohonba (2024), who stressed the importance of prudent debt management to avoid adverse economic outcomes.

2) Debt Servicing and Economic Growth

The mixed effects of debt servicing observed in this study, with short-term positive impacts but significant negative long-term consequences, align with the findings of Aguwamba and Raph (2019), who noted that while external debt had a positive relationship with GDP, external debt service payments had a negative impact on economic growth. This dual impact suggests that while debt servicing might initially signal fiscal responsibility and boost confidence, its long-term effects can be detrimental if it diverts resources from productive investments. Omodero and Alpheaus (2019) also highlighted the positive impact of debt servicing on growth, emphasizing the complexity of this relationship. This study further supports the need for effective debt servicing strategies, as advocated by Akinola and Ohonba (2024), to mitigate the negative impacts on economic growth.

3) Gross Fixed Capital Formation and Economic Growth

Gross fixed capital formation (GFCF) was found to positively influence economic growth, particularly in Cote d'Ivoire and Nigeria. This finding is consistent with economic theory and supports the observations of Fofana N'Zue (2020), who noted the importance of investments in infrastructure and capital goods for economic performance. The positive impact of GFCF reinforces the need for continued investment in productive assets, as recommended by Aguwamba and Raph (2019), to enhance growth and economic stability. The results also align with the broader literature on the role of capital formation in driving economic development, further validating the importance of infrastructure investment as a growth strategy.

4) Exchange Rate and Economic Growth

The study found that exchange rates had a positive impact on economic growth in the short run, particularly in Cote d'Ivoire, consistent with the findings of Akinola and Ohonba (2024), who reported that the current exchange rate had a positive effect on Nigeria's economic growth. This result highlights the significance of maintaining a stable and competitive exchange rate to enhance export competitiveness and stimulate growth. However, the mixed effects observed over time also suggest the potential risks of exchange rate volatility, supporting the need for sound monetary policies to manage exchange rate fluctuations effectively.

5) Inflation and Economic Growth

The relationship between inflation and economic growth was found to be nuanced, with inflation initially exerting a negative impact on GDP, but with significant positive effects observed in lagged periods. This finding reflects the complex nature of the inflation-growth relationship discussed by Akinsola and Odhiambo (2017), who highlighted the variability of inflation's impact across countries and over time. The positive lagged effects observed in this study suggest that moderate inflation may have a delayed stimulative effect on economic growth, supporting the view that inflation, when kept within a manageable range, can be beneficial for economic activity.

The results of this study largely align with the expectations drawn from existing literature, confirming the complex and context-dependent nature of the relationships between external debt, debt servicing, capital formation, exchange rates, and inflation, and their impact on economic growth. The findings underscore the importance of prudent debt management, effective investment strategies, and sound macroeconomic

policies in fostering sustainable economic growth in West Africa. The study contributes to the ongoing discourse on the impact of external debt on economic growth, providing empirical evidence that reinforces the need for cautious borrowing and strategic investments to avoid the pitfalls of debt overhang and promote long-term economic stability in the region.

5. Summary, Conclusion, and Recommendations

A. Summary

This study investigated the impact of external debt on economic growth in West Africa, focusing on Cote d'Ivoire, Ghana, and Nigeria over the period 1990 to 2023. Using the Autoregressive Distributed Lag (ARDL) model, alongside the Augmented Dickey-Fuller (ADF) Unit Root Test, Panel Unit Root Johansen Cointegration Test, and Pairwise Granger Causality Test, the research explored both short-run and long-run dynamics of key economic indicators, including external debt, debt servicing, gross fixed capital formation, exchange rates, and inflation.

The key findings are:

- *External Debt and Growth:* External debt supports economic growth in the short term but becomes detrimental when borrowing exceeds sustainable levels, leading to long-term negative effects on growth across West Africa.
- *Debt Servicing:* High debt servicing costs divert resources from essential public investments, limiting growth potential in countries such as Ghana and Nigeria.
- Exchange Rates: Exchange rate fluctuations, especially in countries with floating currencies, negatively impact economic growth. Countries in the WAEMU with pegged currencies face fewer challenges from exchange rate volatility.
- *Gross Fixed Capital Formation (GFCF):* Higher investment in infrastructure and capital formation boosts economic growth. Countries like Cote d'Ivoire and Nigeria that invest heavily in GFCF show stronger growth.
- *Inflation:* High inflation generally hampers growth, while moderate inflation can support short-term growth in some West African countries, particularly those with stable monetary policies.

B. Conclusion

The study concludes that external debt, while a potentially valuable tool for financing development, poses significant risks to economic growth in West Africa if not managed prudently. The negative impacts observed, particularly in the long run, suggest that the burden of repayment can outweigh the immediate benefits of external borrowing. Debt servicing, though necessary, often results in reduced economic growth, especially when the cost of repayment diverts resources away from productive investments. Gross fixed capital formation is essential for sustained economic growth, highlighting the need for continued investment in infrastructure and capital goods. Exchange rate stability and moderate inflation are also crucial for fostering a conducive environment for economic growth.

C. Recommendations

Based on the findings of this study, the following recommendations are made:

1. *Prudent Debt Management:* West African countries should adopt more cautious borrowing practices, ensuring that external debt is only incurred when it can be effectively used for projects that yield long-term economic benefits. Debt management strategies should focus on maintaining a balance between borrowing and repayment capacities to avoid the detrimental effects of debt overhang.
2. *Enhancing Debt Servicing Strategies:* Governments should explore strategies to reduce the financial burden of debt servicing, such as renegotiating terms with creditors, seeking debt relief, or refinancing at lower interest rates. This will help free up resources for investments in growth-enhancing sectors.
3. *Promoting Capital Formation*: Policymakers should prioritize investments in infrastructure and capital goods, as these are shown to be critical drivers of economic growth. Public-private partnerships and foreign direct investment should be encouraged to enhance the availability of capital for development projects.
4. *Exchange Rate:* It is recommended that West African countries implement flexible exchange rate policies to enhance economic stability and foster growth. By managing exchange rate fluctuations, nations can mitigate inflationary pressures and promote investment, ultimately supporting sustainable economic development in the region.
5. *Inflation:* West African countries adopt proactive inflation management strategies, such as targeting inflation rates and improving monetary policy frameworks. This approach will help stabilize prices, enhance purchasing power, and create a conducive environment for economic growth and investment.

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