



External Debt, Debt Service and Economic Growth: Empirical Evidence from the ECOWAS Sub-Region

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ABSTRACT

The paper investigated the impact of external debt, and debt service on economic growth in the ECOWAS sub-region during the period 1990-2022. The study analyzed a panel data set using the fixed and random effect models. The results of the panel data unit root test confirmed that the variables in the specified model were integrated in different orders. The panel co-integration tests indicated that a long-run relationship existed among the variables in the specified debt-growth model. The results of the model estimation revealed that external debt negatively and significantly impacted economic growth at the 1% level during the period of the study. The results further revealed that debt service negatively impacted economic growth, but failed the significance test at the 5% level. The paper recommended that countries in the ECOWAS sub-region should reduce external debt accumulation, and efficiently use revenue generated from external debt to boost economic growth.

Keywords: Debt Servicing, Economic Growth, ECOWAS, External Debt, Panel Data

JEL Classifications: E60, B22, C33, F34, H63

1. INTRODUCTION

The inflow of external debt to African countries has been a major source of funds for investment, infrastructural development and growth enabling expenditures due to the low level of income and savings that characterize the continent. Since the 1990s, high external debt from developed countries has received increasing attention from academics, policymakers, and the general public (Anifowose, 2016; Lawanson, 2014). External debt accumulation constitutes a burden on the country's resources in foreign exchange through debt service and principal repayment (Iyoha, 1999). Some of these countries have received huge sums in foreign credits at very high concessional interest rates, and have over the past decades accumulated huge external debt that they are now being classified as highly indebted poor countries (HIPC) of the world. In some

Sub-Saharan African (SSA) countries, the stock of external debt has so much piled up to a level widely considered unsustainable. It has been acknowledged that the obligation of repaying the accumulated value of external debt may not be feasible and fear has been expressed that it is expected to compound the economic problems of poor countries (Elkhalfi, et al., 2024; Ismael et al., 2024; Anifowose, 2016).

In ECOWAS countries, the accumulation of external debt has been motivated by several common factors. Conspicuous among these factors are the attraction of additional resources to bridge the resource gap required for development, resource demands to combat civil war, financing of balance of payments deficits, as well as corruption (Iyoha, 1999). Like most developing countries, ECOWAS countries are characterized by inadequate internal

capital formation due to the vicious cycle of low productivity, low income, and low savings. To bridge the identified resource gap, most ECOWAS countries rely substantively on external funding, usually in the form of external loans, to finance their development projects (Lawanson, 2014). The question of great interest that emanates not only from an academic point of view but also from an economic policy perspective relates to the impact of external debt and debt service on economic growth in the ECOWAS sub-region. It becomes imperative to investigate whether the levels of the ECOWAS sub-region's external debt accumulation and debt service significantly and negatively affect economic growth. This is to empirically establish the predictions of the debt overhang hypothesis in the ECOWAS sub-region (Dawood et al., 2024).

Over the years, some empirical studies established the effects of external debt and debt service on economic growth (Anifowose, 2016; Iyoha, 1999; Kasidi and Said, 2013; Lawanson, 2014; Paul, 2017), but the number of studies focusing on the ECOWAS sub-region appears rather small. To effectively bring to bear and disseminate the same for policy-making purposes, there is a need to investigate whether external debt and debt service contribute to the growth problems in the ECOWAS sub-region. Thus, this study contributes to the understanding of the effects of external debt and debt service on economic growth in the ECOWAS sub-region.

The current study addressed the gaps in the previous study (Anifowose, 2016) that analyzed times series data on few selected ECOWAS countries. The current study analyzed a panel data set on the entire countries in the ECOWAS sub-region using the fixed effect and random effect models. As far as the authors are aware, this study is among the few studies that investigated the impact of external debt and debt service on economic growth in the ECOWAS sub-region. The findings of this study may guide the authorities in the ECOWAS sub-region in terms of drafting proper external debt policies that enhance economic growth.

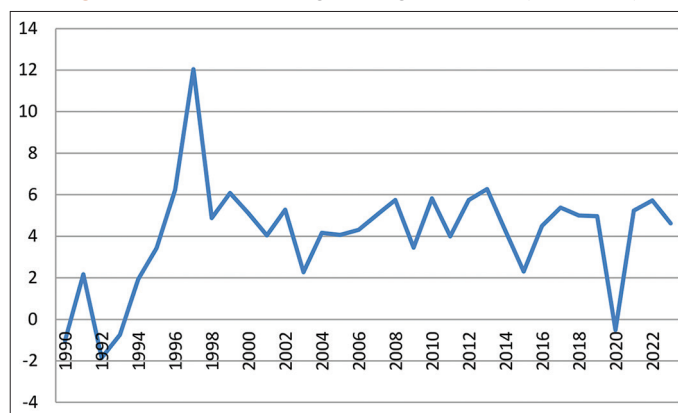
The remaining portion of the paper is organized as follows: Section 2 presents some stylized facts on external debt, debt service and economic growth in the ECOWAS sub-region. Section 3 displays literature on external debt, debt service and economic growth. Section 4 indicates the methods of analysis and data sources. Section 5 shows empirical results of data analysis and section 6 presents the conclusion and recommendations.

2. SOME STYLIZED FACTS

The ECOWAS sub-region's economic growth rates have been low compared with other sub-regions in developed and emerging countries, and it has become an issue of discussion among academics, policymakers, and researchers (Iyoha and Okim 2017). Figure 1 shows a clear trend of ECOWAS growth rates from 1990 to 2022.

The average growth rate of ECOWAS sub-region was about -1.02824% in 1990. It rose to about 1.93243% in 1994. It dropped to about 2.267907 in 2003 and rose again to 5.744731 in 2008, 6.269861 in 2013 and 5.719806 in 2022. ECOWAS sub-region growth rates kept fluctuating from 1990 to 2022. The highest

Figure 1: ECOWAS average GDP growth rates (1990-2022)



Source: Author's computation (2024)

average growth rate was about 12.06774% in 1997 due to a very high growth rate of about 106 posted by Liberia in 1997. The lowest growth rate of ECOWAS sub-region was about -1.85555% in 1992 (World Bank, 2024).

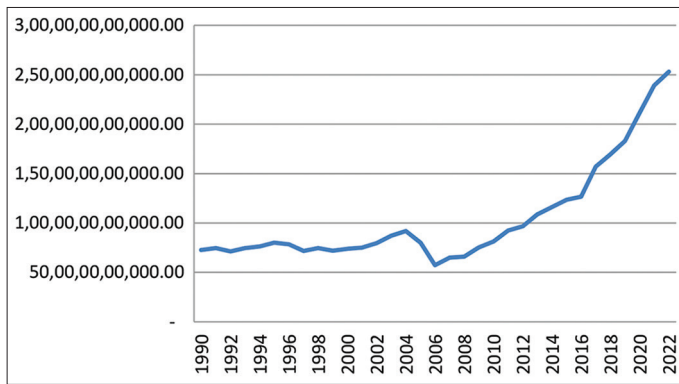
Figure 2 shows the trend of ECOWAS sub-region external debt accumulation from 1990 to 2022. As of 1990, ECOWAS sub-region external debt accumulated to about 73 billion US dollars. It rose to about 86 billion US dollars in 2003 and fell drastically to about 57 billion in 2006. ECOWAS's accumulated external debt rose from about 81 billion dollars in 2010 to about 3.5 trillion US dollars in 2022. Different countries in the ECOWAS sub-region have different external debt levels, which account for the region's high debt accumulation. The high debt accumulation in the ECOWAS sub-region calls for an empirical investigation to determine the impact of external debt on economic growth.

Figure 3 shows ECOWAS's debt service from 1990 to 2022 (WDI, 2024). The cost of external debt service was unstable over the period under review. In 1991, it was about 5.4 billion US dollars. It fell to 3.5 and 3.9 billion US dollars in 1993 and 1997 respectively. It rose to about 10.2 billion US dollars in 2005, 12 billion US dollars in 2018 and 17 billion US dollars in 2022. ECOWAS spent about 2.4 trillion US dollars on debt service from 1990 to 2022. On average, the ECOWAS sub-region spent about 7.4 billion US dollars annually on debt service (World Bank, 2024). This sum could have been channelled into more productive economic activities to boost economic growth and development in the region.

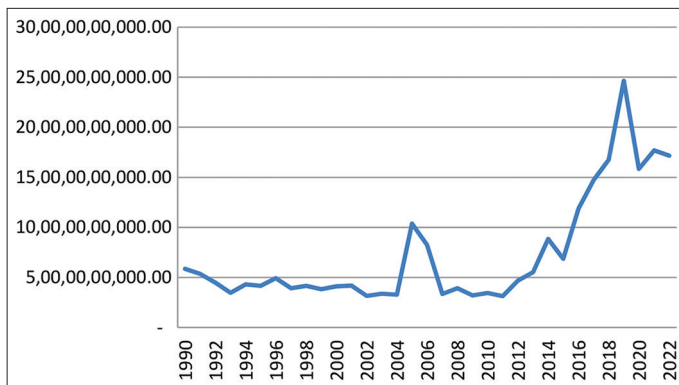
3. REVIEW OF EMPIRICAL LITERATURE

A review of the literature examining the impact of external debt and debt service on economic growth reveals that the influence of external debt on economic growth can either be positive, negative or non-linear. This revelation indicates that there are three groups of theoretical models describing this interaction.

The first group offers evidence of a positive relationship between economic growth and external debt. The views are based on the provisions of the Keynesian and Neoclassical theory of growth, where external debt contributes positively to economic growth,

Figure 2: External debt trend of ECOWAS sub-region

Source: Author's computation (2024)

Figure 3: External debt service of ECOWAS sub-region

Source: Author's computation (2024)

provided the borrowed funds are engaged in productive activities which yield returns for the payment of the loan and accrued interest. This approach was observed by Anifowose (2016), Kasidi and Said (2013) and Paul (2017).

Anifowose (2016) studied the impact of external debt and debt serving on economic growth in some selected ECOWAS countries. He analyzed time series data stretching from 1970 to 2008 using an error correction model. He found that external debt positively impacts economic growth in Benin and Niger. The study recommended that external debt contracted should be engaged in productive economic ventures which would generate profits for debt repayment.

Kasidi and Said (2013) investigated the impact of external debt on economic growth in Tanzania for the period of 1990-2010. Annual time series data on external debt and economic performance were analyzed using Ordinary Least Squares (OLS) estimation method. The study revealed a significant impact of external debt and debt service on GDP growth and that external debt stock and debt servicing had different impacts on economic growth in Tanzania. It recommended that future external debt should be engaged in productive use and efforts be made to have higher rate of return on debt-financed investment than the service payment rate.

Paul (2017) studied the impact of external debt on economic growth in Nigeria from 1985 to 2015 using error correction

mechanism. The study revealed that debt service payment had negative and insignificant impact on Nigeria's economic growth while external debt stock had positive and significant effect on Nigeria's growth index. The study recommended that government should spend external debt on infrastructural development to improve business environment for investment to thrive in Nigeria.

The second strand provides evidence of negative impact of a high level of external debt on economic growth. This group of model is based on the theory of "debt overhang" developed by Krugman (1988). A debt overhang occurs when the accumulated external debt of a country is so high that the indebted country finds it difficult to repay the loan and its interest. Debt overhang theory hypothesises that if debt exceeds a country's repayment ability with some probability in the future; expected debt service is likely to be an increasing function of the country's domestic output level. Some of the returns from investment in the domestic economy are effectively taxed away by the government and this has clear potentials of discouraging both domestic and foreign investors (Claessens et al., 1996; Krugman, 1988; Sachs, 1988). Low investment expenditure will be the result of large debt stocks and its consequence is low economic growth in the domestic economy. Another channel large debt stock affects the domestic economy is through poor macroeconomic policy environment. This is likely to affect the efficiency of investment, as governments will eventually have less incentive to undertake difficult policy reforms such as trade liberalization or fiscal adjustment (Pattillo et al., 2011). Ali and Mustapha (2012), Anifowose (2016), Iyoha (1999), Jarju et al. (2016), Khariru and Mbah (2018), Odejimi and Ozor (2018), Shabbir (2009), and Siddique et al. (2015) found a negative relationship between external debt and economic growth.

Ali and Mustapha (2012) examined the long-run and short-run impact of external debt on economic growth in Pakistan from 1970 to 2010. They found that external debt had a significant negative impact on economic growth. It recommended the encouragement of increased domestic savings and export earnings, attracting more foreign direct investment and a reduction in external debt stock.

Anifowose (2016) studied the impact of external debt and debt serving on economic growth in some selected ECOWAS countries from 1970 to 2008 using Error Correction Models. The study found a negative impact of external debt on economic growth in Burkina Faso, Cote d'Ivoire, Gambia, Guinea-Bissau, Nigeria, Sierra-Leone and Togo. The study recommended that external loans inflows should be engaged in productive economic activities which would generate profits for loan repayment.

Iyoha (1999) examined the effects of external debt on the economic growth of sub-Saharan African countries and concluded that both external debt stock and debt service obligations tended to lower economic growth rates in the countries. It recommended that sub-Saharan African countries should endeavour to reduce external debt inflows to have a substantial investment recovery.

Khariru (2018) investigated the relationship between government external debt and economic growth in Oman using annual time series data for the period 1990-2015. The data were analysed using

an error correction mechanism to ascertain the short-run dynamic nature of external debt and economic growth. The study revealed a negative and significant influence of external debt on economic growth in Oman and recommended a more productive use of external debt funds to affect growth positively.

Odejimi and Ozor (2018) studied the effects of debts on the economic growth of countries in West Africa using panel data for the period 1970-2011. Employing the fixed and random effects, and GMM estimation techniques, the study found a significant and negative relationship between debt stock and economic growth. The study recommended that the governments of West African countries should reduce their reliance on debt as a strategy to grow their economies.

Shabbir (2009) investigated the impact of external debt on economic growth in 24 developing countries from 1976 to 2003. The study applied random effect and fixed effect estimation. The results show that the debt servicing to GDP ratio negatively affects economic growth and may leave less funds available to finance private investment in these countries leading to a crowding out effect. The study recommended that external loans contracted should be invested in productive economic activities with higher rates of return to offset the effect of loan repayment service.

Siddique et al. (2015) analyzed the extent to which external debt burden impacted a country's gross domestic product (GDP) using data from highly indebted poor countries (HIPC) over the period 1970-2007. The findings revealed a negative relationship between external debt and economic growth both in the short run and in the long run. The study recommended a reduction in external debt stocks of the highly indebted poor countries to boost economic performance.

The third group of theoretical model in the literature is derived from a combination of the preceding two models; it argues that the nature of the effect of debt on growth is non-linear. The non-linear approach allows for the determination of growth maximization debt thresholds. At the early stages, when a country borrows and invests, high growth is generated. Subsequently, when the debt is being repaid, growth tends to fall. Lawanson (2014), Emerenini and Nnanna (2015), Shkolnyk and Koilo (2018), Elkhalfi, et al. (2024) and Dawood et al. (2024) provide empirical evidence of a non-linear effects of external debt on economic growth.

Elkhalfi, et al. (2024) empirically examined the impact of external debt on economic growth in emerging economies from 1990 to 2022, considering the effects of globalization using the fixed-effects panel model. The results revealed a nonlinear relationship between external debt and economic growth. Although an increase in the stock of external debt initially stimulated growth, excessive debt accumulation led to diminishing returns and negative effects on growth. These results underscored the importance of prudent debt management, especially in the context of globalization, where emerging economies are more exposed to external shocks.

Dawood et al. (2024) investigated the intricate relationship between external debt, debt service, and economic growth by using

the panel data of 32 Asian Developing Economies (ADE) spanning 1995 to 2020. Employing a two-step system generalized method of moments (GMM) and a dynamic common correlated estimate (DCCE) model. The finding revealed a non-linear relationship between external debt and economic growth. The study advised a reduced dependence on foreign debt, facilitating both debt repayment and economic self-sufficiency.

Lawanson (2014) investigated the impact of external debt and capital flight on economic growth of ECOWAS countries using fixed effects and GMM estimation techniques to analyze panel data set running from 1970 to 2008. The study revealed a non-linear relationship between external debt and economic growth. In particular, the study suggested that external debt propelled economic growth but there was a threshold beyond which external debt began to negatively impact on economic growth of a nation. The study suggested that ECOWAS countries must put in place efficient measures to control the size of their external debt stock.

In the same vein, Shkolnyk and Koilo (2018) investigated the impact of external debt on economic growth in Ukraine and other emerging countries using the ARDL model and correlation analysis to analyze data covering 2006 and 2016. The regression results showed that external debt had a non-linear type of influence on economic growth. The study recommended that an effective public debt management model should be engaged to avert the negative effects of external loans on the economic growth of Ukraine and other emerging countries.

Emerenini and Nnanna (2015) examined the effects of external debt on economic growth in Nigeria. The study analyzed data spanning from 1981 to 2012 using the ordinary least squares (OLS) estimation technique and the results showed the presence of non-linear effect of debt on economic growth in Nigeria. The study recommended that Nigeria should increase its export base by investing borrowed funds in productive ventures and she should also contract external loans with fixed interest payments, varying amortization schemes and multi-year rescheduling.

4. METHODS AND MODEL SPECIFICATION

This section presents model specification, methods of data analysis and data used for the study.

4.1. Model Specification

The model for the study is premised on the standard neoclassical growth model first formulated by Solow and Swan in 1956. The neoclassical growth model outlines how an economy can achieve growth using a combination of three main factors, capital, labour and technology. The production function is specified as:

$$Y = AF(K, L) \quad (1)$$

Where Y represents an economy's gross domestic product (GDP)
K denotes capital
L stands for labour and
A represents the level of technology

As a result of the relationship between technology and labour, the production function can be written as:

$$Y = F(K, AL) \quad (2)$$

Capital in the model is represented by gross fixed capital formation (GFCF), in addition to external debt (EXTDEBT) which constitutes a source of additional capital for investment due to the shortage of domestic savings in most developing and emerging economies of the world. Labour is proxied by the level of employment in ECOWAS. Other factors that propels economic growth in the economics literature are included in the model as a control variable and to avoid the likely problem of omitted variables. The control variables are foreign domestic investment (FDI) and trade (TOPN). Thus, the functional relationship specified for the model is:

$$GDPGR = F(EXTDEBT, EXT DSEV, LAB, GFCF, FDI, TOPN) \quad (3)$$

The econometric form of model (1) takes a dynamic panel regression form which assumes cross-sectional heterogeneity (cross-section effect) and period heterogeneity (time effect), and the inclusion of a one-period lagged variable of the dependent variable as an explanatory variable. The dynamic panel multiple regression model with an error term (ϵ) is specified in econometric form as:

$$GDPGR_{it} = \beta_0 + \beta_1 GDPGR(-1)_{it} + \beta_2 EXTDEBT_{it} + \beta_3 EXT DSEV_{it} + \beta_4 LAB_{it} + \beta_5 GFCF_{it} + \beta_6 FDI_{it} + \beta_7 TOPN + \alpha_i + \epsilon_{it} \quad (4)$$

The β s are parameters, α_i is the unobserved country effect, ϵ_{it} denotes the disturbances; 1 and t denote cross-section and time indicators, respectively.

Where:

$GDPGR_{it}$ = current gross domestic product growth rate of country i at time t

$GDPGR(-1)_{it}$ = one-period lagged of gross domestic product growth rate

$EXTDEBT_{it}$ = current level of external debt of country i at time t

$EXT DSEV_{it}$ = current external debt service of country i at time t

LAB_{it} = Employment as a percent of the population of country i at time t

$GFCF_{it}$ = current gross fixed capital formation to GDP ratio of country i at time t

FDI_{it} = current foreign direct investment to GDP ratio of country i at time t

α_i = unobserved individual (country-specific) effects and

ϵ_{it} = error term over the cross-section at time t

i = individual country

t = time

The *a priori* expectations for the explanatory variables are 0 β_1 , β_4 , β_5 , β_6 , β_7 while β_2 , and β_3 may be < 0 or > 0 .

4.2. Methods of Data Analysis

The method of data analysis adopted in the study is the panel data analysis. This is because the panel data analysis method

takes into consideration the cross-sectional and time-series features of the sample data. The data being analysed are from 15 different countries of the ECOWAS which often possess many differences that may be policy, institutional or the macroeconomic environment. Thus, any empirical analysis that do not take into cognizance these peculiar characteristics may produce biased results. In essence, the panel data analysis accommodates 'time as well as the heterogeneity effects of the countries. The panel data analysis captures the aforementioned characteristics by including the individual country's specific effects which may be random or fixed.

The regression methods employed are the fixed and random effects models, to analyse the effect of external debt, and debt service on economic growth in the ECOWAS sub-region. The fixed effect model could be costly in degrees of freedom because it is equivalent to the use of a dummy variable for every country. The random effects model, on the other hand, assumes the independence between the error term and the independent variables. The Hausman test is used to select the best-fit model between the fixed and random effect models.

Preliminary checks on the series were carried out to ascertain the stationarity status and long-run co-integration of the series. For the stationarity check, a summary of the major panel unit root tests methods of Levin, Lin and Chu (LLC), Im, Pesaran and Shin (IPS), ADF Fisher Chi-Square and PP Fisher Chi-Square was applied while the Kao and Pedroni Residual co-integration tests were adopted to ascertain the existence of cointegration.

4.3. The Data

The data used in this study are annual panel data (a combination of time series and cross-sectional data). The sample data covered the period 1990-2022 for 15 countries-Benin, Burkina Faso, Cabo Verde, Cote D'Ivoire, Gambia, Ghana, Guinea, Guinea-Bissau, Liberia, Mali, Niger, Nigeria, Senegal, Sierra Leone, and Togo. The data on gross domestic product growth rate (GDPGR), external debt (EXTDEBT), debt service (EXT DSEV), ratio of gross fixed capital formation to GDP (GFCF/GDP), ratio of foreign direct investment to GDP (FDI/GDP), trade and employment were obtained from the World Bank database-WDI (2024).

5. RESULTS AND DISCUSSION

This section presents the descriptive statistics, correlation chart, panel unit root tests, panel co-integration tests, and model estimation results.

5.1. Descriptive Statistics

The mean value of the GDP growth series is 4.100053 indicating that on average, the economies of ECOWAS grew at the rate of 4% for the period under review. The average external debt and debt service figures for the ECOWAS during the period were 72 billion and 2.874564 billion US dollars respectively. Similarly, the average ratios of GFCF/GDP and FDI/GDP stand at 8.7750141 and 1.366217 respectively (Table 1).

The J-B values for all the series are significant at the 1% level thereby rejecting the null hypothesis that the variables are normally distributed. The series was normalized after the first differencing. This outcome clearly shows that the use of the panel data analysis procedure for the estimation of the relationships in this study is appropriate considering the heterogeneity in all the data series.

The skewness of the dependent variable GDPGR is positive at 3.020720, indicating that most GDPGR values are on the right side of the mean. The skewness of the other variables is positive showing that for most of the countries, the variables lie to the right side of the mean as well. The kurtosis for the GDPGR value is high at 68.14 and indicates the presence of extreme values. The data set is highly leptokurtic and shows that extreme outliers in the GDPGR values may generate heterogeneity issues in the analysis. This feature is dealt with by the choice of regression techniques used in the study.

5.2. Correlation Chart

The correlation chart in Table 2 shows that there is a negative association/relationship between economic growth and the main variables of interest in the study; external debt and debt service. The relationships with other variables in the model are positive. The relationships are expected to be validated with the outcome of the regression results.

5.3. Panel Stationarity Test

In this section, it was imperative to ascertain the unit roots (stationarity) status of all the individual variables. To do this, a summary of the major panel unit root test methods of Levin, Lin & Chu (2002), Im, Pesaran & Shin (1997), Lin and

Chu (LLC), Im, Pesaran and Shin (IPS), ADF Fisher Chi-Square and PP Fisher Chi-Square was applied. The summary of the tests is presented in Table 3.

The outcomes of the unit root tests showed that gross domestic growth rate (GDPGR), trade openness (TOPN) and foreign direct investment (FDI) were stationary at the level. In contrast, gross fixed capital formation (GFCF), employment (EMP), external debt (EXTDEBT) and debt service (DEBTSEV) were stationary at first difference.

5.4. Results Panel Co-integration Test

To verify the existence of co-integration among the series, panel co-integration tests were carried out using the Pedroni (1999) and Kao (1999) Residual co-integration tests. For the Pedroni test, three different tests were conducted under the trend assumptions of no deterministic trend, deterministic intercept and trend, and no deterministic intercept and trend. 21 out of the 33 within-dimension and between-dimension tests, as in Table 4, confirmed the existence of a long-run relationship among the variables.

The result of the Kao co-integration test in Table 5 indicated the rejection of the null hypothesis of no cointegration at 1%. When this result was combined with the outcome of the Pedroni Residual co-integration test, it was safe to conclude that there existed cointegration among the variables.

5.5. Model Estimation Results

The panel data estimation procedure adopted assumed that the biases in the pooled data could either come from cross-sectional heterogeneity or time series (periodic) variations, hence the fixed

Table 1: Results of descriptive statistics

	GDPGR	GFCF	EMP	EXTDEBT	EXTBSEV	TOPN	FDI
Mean	4.10005	8.775014	1.741731	72.44728	2.874564	50.00925	1.366217
Median	4.39264	0.000000	1.178652	51.19240	1.860951	41.96416	0.027443
Maximum	106.27	2357.67	6.14474	610.4519	59.67140	986.646	167.329
Minimum	-51.0308	-294.161	0.00000	0.00000	0.00000	8.72920	-202.823
Std. Dev.	7.8613	108.818	1.42231	81.75575	4.463708	70.2681	15.4139
Skewness	3.02072	20.4443	1.42131	3.173523	7.693597	9.03912	-0.39900
Kurtosis	68.1439	442.338	4.10424	15.31639	87.10810	97.9607	99.7880
Jarque-Bera	87923.1	3999266.	191.034	3943.556	150178.9	191948.	192446
Probability	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Sum	2021.32	4326.08	858.673	35716.51	1417.160	24654.5	673.544
Sum Sq. Dev.	30406.1	5826009.	995.302	3288530.	9802.948	2429306.	116894
Observations	493	493	493	493	493	493	493

Source: Authors' compilation (2024)

Table 2: Correlation chart

Variable	GDPGR	GFCF	EMP	EXTDEBT	DEBTSEV	TOPN	FDI
GDPGR	1						
GFCFGR	0.03997	1					
EMP	0.11119	0.008326	1				
EXTDEBT	-0.098896	0.044218	-0.040743	1			
DEBTSEV	-0.041571	0.043893	0.064808	0.228508	1		
TOPN	0.083231	-0.013868	0.043890	-0.122702	0.0167412	1	
FDI	0.152028	-0.006294	0.011134	0.108048	0.0141825	0.168133	1

Source: Authors' compilation (2024)

Table 3: Results of panel unit root tests

Variable	Level test results			First difference test results						Remark
	LLC Test/(Prob.)	IPS Test/(Prob.)	ADF/fisher test (Prob.)	PP fisher/(Prob.)	LLC test/(Prob.)	IPS test/(Prob.)	ADF test (Prob.)	PP fisher/(Prob.)		
GDPGR	-6.0217/(0.0000)	-8.2044/(0.0000)	127.79/(0.0000)	251.99/(0.0000)	n/a	n/a	n/a	n/a	I (0)	
GFCF	\1.4631/(0.9283)	0.5603/(0.7124)	30.059/(0.1828)	60.231/(0.0001)	-8.7994/(0.0000)	-11.427/(0.0000)	163.47/(0.0000)	n/a	I (1)	
EMP	156.009/(1.0000)	2.6917/(0.9964)	20.193/(0.9114)	3787.5/(0.0000)	12.0204/(0.0000)	-6.4468/(0.0000)	116.87/(0.0000)	n/a	I (1)	
EXTDEBT	0.5309/(0.702)	1.9177/(0.972)	15.002/(0.9897)	23.228/(0.8058)	-8.5668/(0.0000)	-9.7053/(0.0101)	151.53/(0.0167)	296.92/(0.0000)	I (1)	
DEBTSEV	1.7658/(0.9613)	-1.0595/(0.1447)	28.930/(0.5212)	100.39/(0.0000)	-8.0706/(0.0000)	-14.048/(0.0315)	228.21/(0.0000)	n/a	I (1)	
TOPN	1.61037/(0.0537)	-1.7258/(0.0422)	50.717/(0.0104)	56.950/(0.0021)	n/a	n/a	n/a	n/a	I (0)	
FDI	-8.2623/(0.0000)	-9.2610/(0.0000)	157.86/(0.0000)	222.66/(0.0000)	n/a	n/a	n/a	n/a	I (0)	

Source: Authors' compilation (2024)

effect and random effects models were estimated. The Hausman test of heterogeneity was used to determine the best effects model to be employed in the analysis. Table 6 showed the summary of the estimation results of the fixed effect model, random effect model, and the Hausman test.

The estimated models (the fixed and random effects models) were assessed for appropriateness using the Hausman test. The result showed that the Chi-square statistic was highly significant with a probability of 0.3467. From the result, the null hypothesis that the random effect model is more appropriate could not be rejected. Hence, the results obtained from the random effect model were analysed in the study.

The individual effects of the explanatory variables on the dependent variable were determined based on the coefficients and p-values of the series. From the results, the one period lagged GDPGR was positively and significantly correlated with economic growth. This showed that GDP growth in one period has the potential to increase growth in the next year in the ECOWAS sub-region.

The estimated model showed that an increase in external debt decreased the economic growth rate in the ECOWAS sub-region. This conformed to a priori expectations. The effect was highly significant at the 1% level. A unit rise in the external debt was associated with about 0.011233 unit fall in the economic growth rate. This was an indication that external debt was one of the major causes of the low economic growth in the ECOWAS sub-region during the period of the study. The implication is that a reduction in external debt accumulation will help to increase economic growth in the ECOWAS sub-region, *ceteris paribus*. This could result from the high likelihood that external debt reduction will enhance economic growth which will in turn engender job creation or employment generation and poverty reduction. This evidence is in sync with the evidence from Iyoha (1999), Anifowose (2016) and Odejimi and Ozor (2018). Iyoha (1999) found that external debt and debt services hindered growth in sub-Saharan African countries. Anifowose (2016) and Odejimi and Ozor (2018) found a negative impact of external debt on economic growth in ECOWAS countries.

The estimated model further revealed that debt service had a negative relationship with economic growth in ECOWAS sub-region, but its impact on growth was insignificant during the period of the study. The finding implies that an increase in debt services may likely hinder economic growth, but its hindrance may not be significant. This result corroborates the findings of Rahmon (2018).

The value of the coefficient of determination (R squared) of the random effects model was 0.27, indicating that about 27% of the systematic variations in GDP growth in ECOWAS were captured by the variables taken together in the model. The R square value was low. However, the low R square is not a problem as noted by Iyoha (1999). The F-statistic (25.6966) and corresponding P-value (0.0000) also showed that a significant relationship existed between the GDP growth rate and all the independent variables

Table 4: Pedroni Co-integration tests results

Outcome	No deterministic trend	Deterministic intercept and trend	No deterministic intercept and trend
Within-dimension			
Panel v-statistic	-2.605231 (0.9954)	-4.048680 (1.0000)	-1.919099 (0.9725)
Panel v-statistic (weighted)	-2.967202 (0.9985)	-4.399536 (1.0000)	-2.267184 (0.9883)
Panel rho-statistic	-2.009061 (0.0223)*	-1.196174 (0.1158)	-2.774977 (0.0028)*
Panel rho-statistic (weighted)	-0.934686 (0.1750)	0.140263(0.5558)	-2.271541(0.0116)*
Panel PP-statistic	-13.48991 (0.0000)*	-13.05328 (0.0000)*	-12.59677 (0.0000)*
Panel PP-statistic (weighted)	-12.93550 (0.0000)*	-13.68212 (0.0000)*	-11.27947 (0.0000)*
Panel ADF-statistic	-5.224995 (0.0000)*	-4.345391(0.0000)*	-5.473424 (0.0000)*
Panel ADF-statistic (weighted)	-5.804095 (0.0000)*	-5.607428 (0.0000)*	-5.521669(0.0000)*
Between-dimension			
Group rho-statistic	-0.256627 (0.3987)	0.745990 (0.7722)	-1.632541 (0.0513)
Group PP-statistic	-18.62099 (0.0000)*	-19.28928 (0.0000)*	-19.89514 (0.0808)*
Group ADF-statistic	-4.799275 (0.0000)*	-4.153702 (0.0000)*	-5.183990 (0.0000)*

*Passes significance test by at least 5%. Source: Authors' compilation (2024)

Table 5: Kao co-integration test

Series: GDPGR GFCF EMP EXTDEBT DEBTSEV TOPN FDI	
Sample: 1990 2022	
Included observations: 495	
Null Hypothesis: No cointegration	
Trend assumption: No deterministic trend	
Automatic lag length selection based on SIC with a max lag of 1	
Newey-West automatic bandwidth selection and Bartlett kernel	
ADF	
t-Statistic	-5.032193
Prob.	0.0000
Residual variance	57.09177
HAC variance	26.15716

Source: Authors' compilation (2024)

Table 6: The estimation results-fixed effects and random effects

Variable	Fixed effects model	Random effects model
	Coefficient (P-value)	Coefficient (P-value)
C	2.055427 (0.0633)	2.395685 (0.00020)***
GDPGR(-1)	0.524676 (0.0000)***	0.506362 (0.0000)***
GFCF	0.004344 (0.1122)	0.004212 (0.1192)
EMP	0.136409 (0.7862)	0.205047 (0.3374)
EXTDEBT	-0.010407 (0.0250)**	-0.011233 (0.0003)***
DEBTSEV	-0.004919 (0.9465)	-0.016242 (0.8131)
TOPN	0.004983(0.3455)	-0.000508 (0.9087)
FDI	0.220254(0.0000)***	0.203482 (0.0000)***
Diagnostics and summary measures		
R-squared	0.289505	0.276786
Adjusted R-squared	0.256785	0.266014
F-statistic	8.847926	25.69664
Prob(F-statistic)	0.000000	0.000000
Durbin-Watson stat	2.144266	2.089113
Hausman test statistic/(P-value)	7.842196/(0.3467)	

Three asterisks indicate a 1% level, and two asterisks indicate a 5% level of significance. Source: Authors compilation (2024)

combined. The Durbin-Watson statistic of 2.089 was close to 2.0 and suggested there was no likelihood of autocorrelation in the estimated model.

6. CONCLUSION

This study investigated the impact of external debt, and debt

service on economic growth in the ECOWAS sub-region. The study is important because it revealed the impact of external debt and debt service on economic growth in the sub-region. To the best of our knowledge, this is one of the few empirical studies on external debt, debt service and economic growth focusing on the ECOWAS sub-region. The study therefore contributes to the existing literature. In an attempt to estimate the specified debt-growth model, the fixed and random effect models were employed in analyzing data covering the period 1990-2022.

The results of the study indicated that external debt exerted a significant and negative impact on economic growth. Debt service also exerted a negative but insignificant impact on economic growth in the ECOWAS sub-region during the period of the study. The findings imply that an increase in external debt and debt service has the potency to hinder economic growth in the ECOWAS sub-region. Considering the negative impact of external debt on economic growth in the sub-region, the study recommended that ECOWAS countries should reduce external debt accumulation to grow their economies. The study further recommended that ECOWAS governments should channel the revenues generated from external debt in productive expenditures to boost the economic growth rate.

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