

The Role of External Debt on Economic Growth: Evidence from Mauritania

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Abstract

This study investigates the role of external debt on the economic growth of Mauritania. It applies various econometrics techniques such as unit root test, Ordinary Least Square (OLS), Johansen Co-Integration Test. The study used Gross Domestic Product (GDP) as dependent variables, and External Debt (ED) and Debt Servicing (DS) as independent variables. The result showed that all variables are stationary at the 1st difference level. OLS test indicates a positive relationship between the GDP and ED and negative relationship between GDP and DS. The Johansen Co-Integration Test revealed a negative relationship between GDP and ED and positive relationship between GDP and DS. The findings support the recommendation that the Mauritanian government should reduce its dependence on external debt by stepping up efforts to boost internal revenue sources.

Keywords: Gross domestic product; External debt; Debt servicing

Introduction

In 2010 the combined stock of developing countries' external debt increased by 12 percent from \$3,640 billion to \$4,076 billion [1]. Whether or not rising external debt stocks is translated into increased debt burden for a country depends on the extent to which with the rate of growth of income and export earnings outpaces the accumulation of new external obligations. External debt is usually measured in terms of gross national income (GNI) and export earnings. For developing countries, export earnings depend largely on its volume and world market prices for its export commodities (both of which are not within the control of the country). On the other hand, growth of income can be achieved through the right set of strategies and institutions to ensure that the international capital flows from debt is effectively converted to equity. In the case of low-income countries, large scale forgiveness of external debt obligations in the context of the HIPIC and MDRI are also important factors in its external debt management.

Mauritania as a low-income country has relied greatly on external debt to finance its balance of payment deficit and savings-investment gap. Figure 1 shows the extent of current account deficit via separate export and import trends as percentage of GDP over the past four decades. Import had been consistently greater than export, the largest differences can be observed in the early 1970's up to 1984 and more recently during the 2004-2005 period. The accumulated debt grew at high rates such that by 1985 Mauritania had total accumulated medium and long external public debt of US \$1.8, equivalent to nearly 250 percent of its GDP. The World Bank study on Mauritania's debt concluded that the country was clearly unable to meet its debt servicing obligations, and consequently convened a special donor conference to address the issue. In 1986 the Paris club also held several meetings to address the issue of Mauritania external debt. These conferences and meetings resulted in the formulation of a debt recovery package which includes the elimination of all arrears on debt services. In 1987, Mauritania signed a comprehensive Structural Adjustment Program with the World Bank in order to manage and ease its debt burden [1]. Table 1 show how Mauritania continued to benefit from interest or debt forgiveness or reduction notably in 2002, 2003 and the largest being in 2006. Despite them, the external debt stock rose to USD\$3.3 billion in 2012, in a 16.7% increase from the previous year.¹

External debts are typically undertaken to finance public investments needed to unlock growth opportunities for the country. In

¹World Bank's definition of total external debt is debt owed to nonresidents repayable in currency, goods, or services. Total external debt is the sum of public, publicly guaranteed, and private non-guaranteed long-term debt, use of IMF credit, and short-term debt. Short-term debt includes all debt having an original maturity of one year or less and interest in arrears on long-term debt. Data are in current U.S. dollars.

essence, there should a positive growth impact, both through a direct impact on economic activity and through spillover effects on private investments.

A number of empirical studies find a positive impact of public investment on growth. Gupta et al. [2] find that the unadjusted output elasticity of public capital is only 0.25. Buffie and Atolia [3] find that a sustained increase in debt-financed investment by 1 percent of GDP can raise real GDP growth in developing countries with good policy implementation capacity by about 0.5 percentage points.

These findings are consistent with the results reported by Perotti [4], who finds that fiscal multipliers for investment spending are higher than for other types of public spending and tax cuts. Also, a study by the World Bank [1] concludes that there are positive growth effects of public spending in general, and that of infrastructure, education, and health spending in particular.

However, for Mauritania, the rate of capital formation (as a percentage of GDP) does not appear to correspond to the net flow of its external debt. Net flow of external debts are disbursements on long-term external debt and IMF loans minus principal repayments on long-term external debt and IMF repayments (Note: beginning in 1985 the data includes the change in stock of short-term debt, including interest arrears for long-term debt). Figure 2 shows a rather flat trend in investment spending all through the period except of brief surges in 1994 and 2005, whereas strong positive net flows of external debt particularly between 1980-1983 and 2008-2012 were not followed by any substantial change in investment expenditure. The presence of weak structural and policy conditions may have lead to this circumstances and much research is indeed necessary in this area. Nonetheless, few would disagree that Mauritania's debt sustainability depends on the implementation of forceful fiscal and private sector adjustments in which one expects to see public expenditures and investments responding inversely to the stock of its outstanding public debt. Ideally, public investment should increase at a rate higher than real GDP growth. For this to happen government must produce a fiscal surplus in order to restore debt and ultimately, economic sustainability

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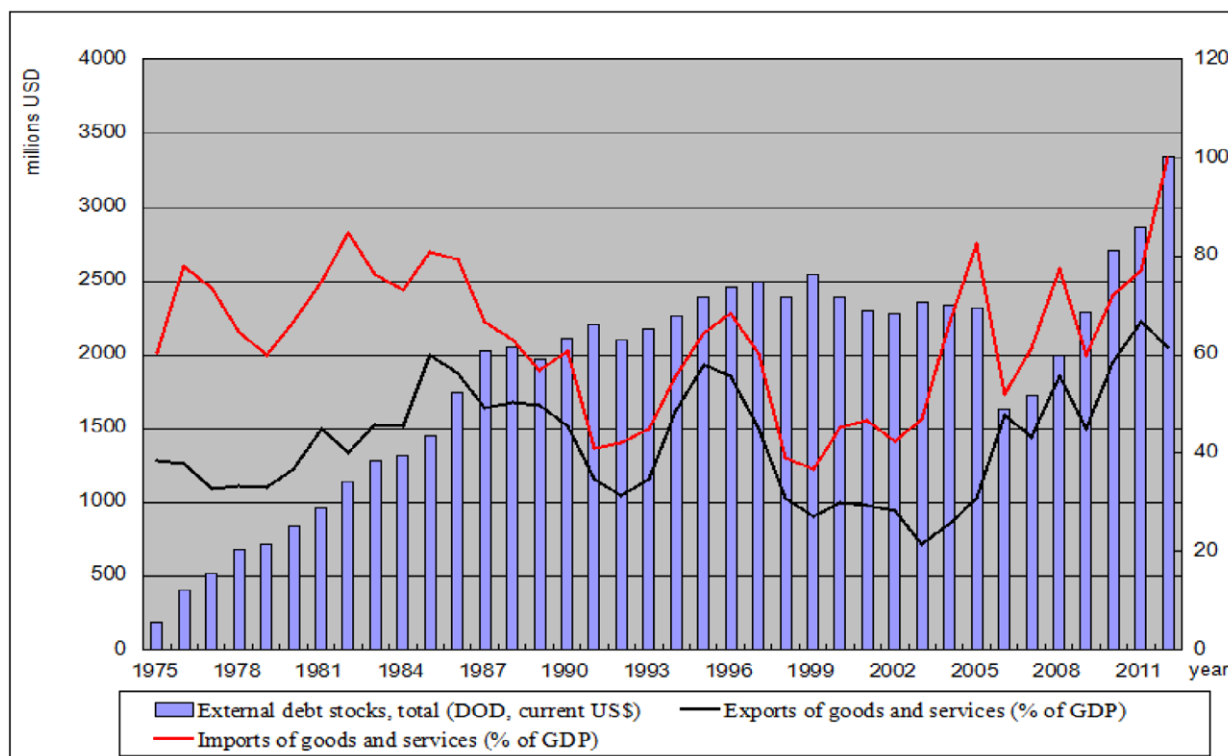


Figure 1: Mauritania's External debt stock in US Dollars and Export and Import values as percentage of GDP.

Year	Interest forgiven (in millions current US\$)	Debt forgiveness or reduction (in millions current US\$)	Debt forgiveness grants (in millions current US\$)
1989	3.561	88.708	56.12
1990	1.098	70.158	3.03
1991	0.038	0	4.54
1992	0.223	3.708	4.67
1993	7.945	23.053	6.29
1994	1.051	5.454	7.86
1995	1.813	13.174	9.47
1996	1.484	1.445	8.3
1997	2.258	9.204	3.23
1998	0	0	7.63
1999	0	0	10.02
2000	17.264	35.819	29.9
2001	6.537	26.566	33.53
2002	4.817	179.779	110.55
2003	4.771	155.161	65.51
2004	2.383	91.34	102.19
2005	1.539	18.536	22.79
2006	0.607	904.075	980.84
2007	0.499	66.728	8.94
2008	0.399	33.137	23.64
2009	0.389	1.466	6.33
2010	60.328	114.962	3.95
2011	0.37	1.498	5.78
2012	0	0	2.58

Source: World Bank

Table 1: Mauritania's Interest and debt forgiven amounts since 1989.

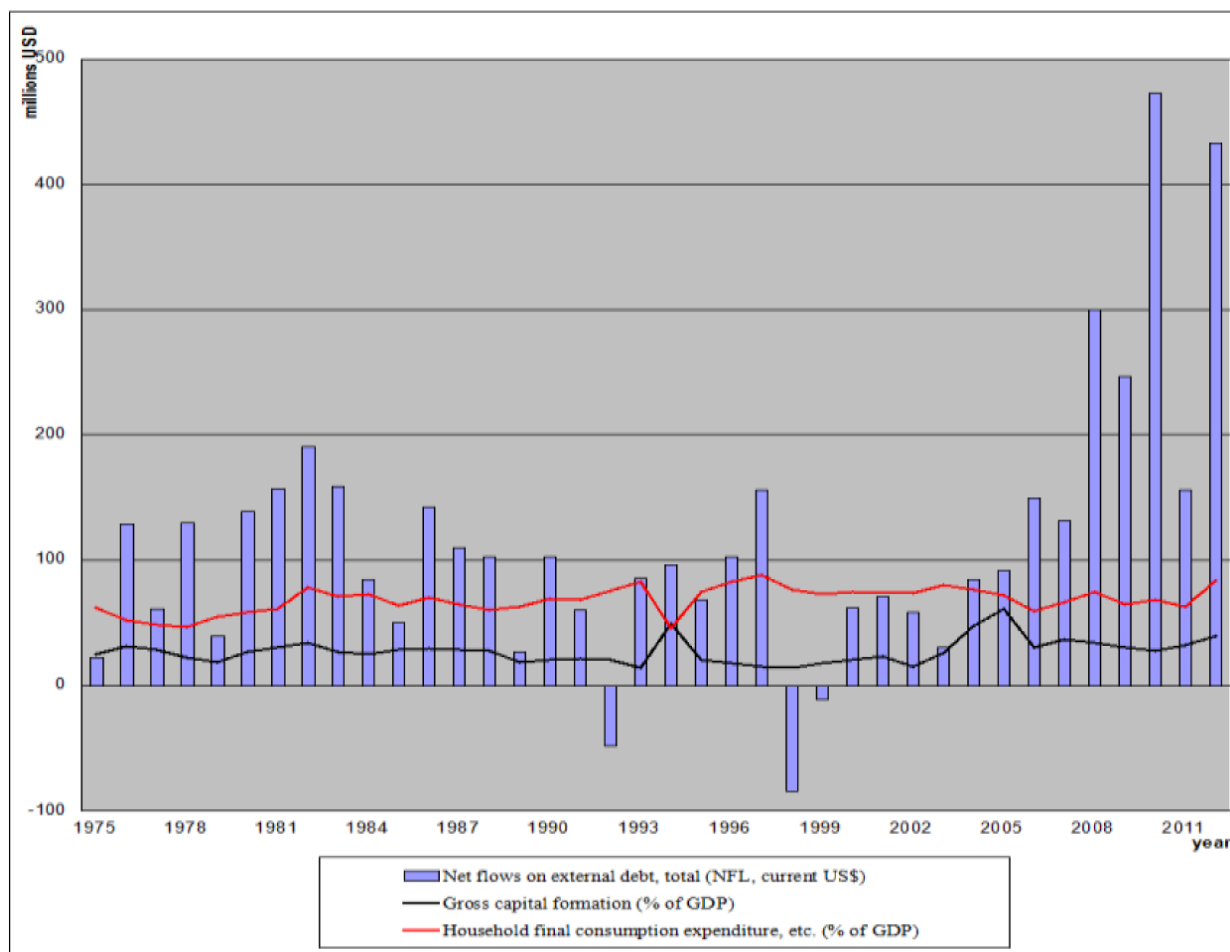
and growth (Figures 2-5). Mauritania's Net Flow of External Debt as compared to Gross Capital Formation and Household Consumption demand (as percentage of GDP).

This study aims to contribute to the sparse literature on Mauritanian economy, particularly with respect to the relationship between Mauritania's external debt and its economic growth. As a preliminary study, the focus is on establishing long-term correlations using time-series data for the period 1975-2005. The impact of debt service amounts on economic growth is also examined. The paper is organized as follows. Section 2 briefly presents previous studies on the role of external debt on economic growth. Section 3 describes the methodology and data collection. Section 4 discusses the results while Section 5 concludes.

Literature Review

Numerous of empirical works have been carried out on the role of external debt on economic growth in developed and developing countries using different econometrics models and statistical tools. Conversely, these studies indicate some contradictory results in their conclusions on the role of external debt on economic growth. For instance, a study by the World Bank [1] argues that the large debt service payments made by indebted Less Developed Countries (LDCs) hold back their growth and adjustment.

According to Edelman [5] there are a range of factors affecting debt servicing. These factors including, returns on investment, the cost of borrowing, and the rate of savings [5]. Fosu [6] investigate the relationship between economic growth and external debt for model of Sub-Saharan countries for the period 1970-1986. The finding indicates that a high debt country faces about one percent reduction in the annual GDP [6].



Source: World Bank

Figure 2: Mauritania's Net Flow of External Debt as compared to Gross Capital Formation and Household Consumption demand (as percentage of GDP).

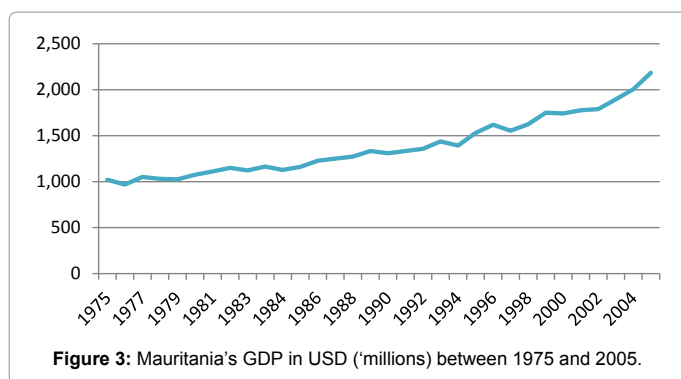


Figure 3: Mauritania's GDP in USD ('millions) between 1975 and 2005.

An empirical study conducted to investigate the role of external debt and on economic growth for Sub-Saharan countries using data from 1970 to 1994. The findings indicate that external debt has huge effect on the investment, and pointed out that reduction on the debt stock lead to improvement on the investment and economic growth of these countries [7].

Ahmed used three macroeconomic models to investigate the role

of external debt on economic growth of Pakistan. The findings showed that if the arrangement of external debt continues then the Pakistan's foreign debt will be deteriorated further in the future.

Edo [8] analyzed the African external debt problem in Morocco and Nigeria. The findings showed that external debt is negatively related to investment. Result also revealed that fiscal expenditure, balance of payments, and global interest rates are the main factors that to explain the debt accumulation in countries under investigation [8]. Another study revealed that foreign borrowing has a positive impact on investment and growth of a country up to a threshold level but external debt service can potentially affect the growth as most of the funds will go in the repayment of the debt rather at the investments [9]. As a matter of fact, although external debt is supposedly to contribute positively to economic growth, but the debt servicing payment causes challenges for the country in the future.

A comparative study examined the role of the huge external debt, with its servicing requirements on economic growth of the Nigerian and South African economies. Their model includes external debt, debt servicing and other macroeconomic variables. The study applied both Ordinary Least Square (OLS) and Generalized Least Square (GLS)

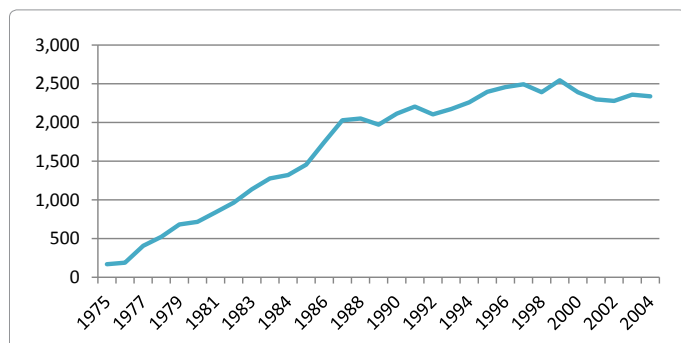


Figure 4: Mauritania's External Debt in USD ('millions) between 1975 and 2005.

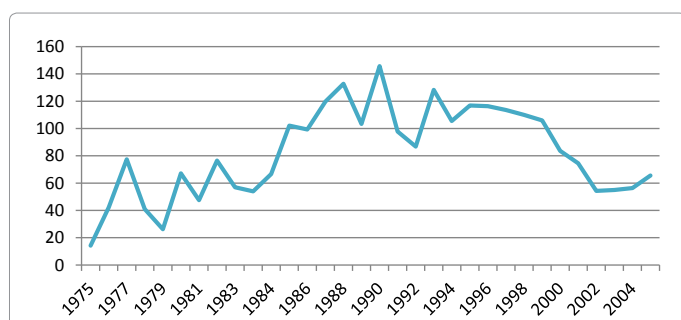


Figure 5: Mauritania's Debt Services in USD ('millions) between 1975 and 2005.

methods. Result indicates a negative relationship between external debt and economic growth of Nigeria and South Africa [10].

The influence of external debt on economic growth and public investment in Nigeria was a purpose of empirical study conducted by Audu [11]. The study covers the period from 1970 to 2002 and using Co-integration test and Vector Error Correction Method (VECM). The findings indicate that there is no causality between external debt and economic growth in Nigeria [11].

Adam [12] argues that many LDC's huge debt accumulation causes a debt overhang. The debt overhang creates a serious problem for the economy. It discourages investment and affects the outcome of economy negatively. In case of Sub-Saharan countries the main reason beyond the low growth and economic trouble is the huge debt service payment [12].

An empirical study conducted in Malaysia to investigate the role of different types of debt on the economic growth of Malaysia during the period 1970 - 2006. The study applied Co-integration test. Result showed that all types of debt have a negative effect on the economy growth of Malaysia in long run. Finding also revealed short run causality between all types of debt and economic growth in Malaysia [13]. A study from Sudan investigates the role of external debt and debt servicing on the economic growth of Sudan for the period 1978 - 2001. The author uses different macroeconomic variable such as export, inflation, debt, and GDP. The findings indicate a significant positive effect of export on the external debt, and negative effect of the inflation on the Sudan's economy growth [14]. Sulaiman and Azeez [15] examine the effect of external debt in economic growth of Nigeria. The study covers the period from 1970 to 2010. The econometric techniques of Ordinary Least Square (OLS), Augmented Dickey-Fuller (ADF) Unit Root test, Johansen Co-integration test and are employed in the empirical analysis. The finding indicates that there is a negative

effect of external debt on economic growth [15].

Methodology and Data Collection

The entire of economic theory can be observed as a pool of relation among variables. The purpose of this section is to test theoretical propositions regarding to economic growth and external debt and debt services burden specifically for the case of Mauritania. The methodology is described as the following:

Data collection

This study used the secondary source of data. For this purpose, a time series data of 30 observations have been used. The data has been obtained from World Development Indicators (WDI) and International Monetary Fund (IMF).

Sample size and sampling techniques

In the context of this paper, the sample data will cover the period of thirty years, from 1975 to 2005. There is no sampling method techniques used in the process of selecting the years of this study. The reason for choosing the 30 years of data is to follow the criterion that the sample of data should not be less than thirty years to create the normality purpose.

Variables measurement

- i. Gross Domestic Product (GDP) is used as dependent variable of this study. The GDP will be measured as GDP per capita Chowdhury [16].
- ii. External Debt is expressed as total external debt as ratio of export of goods and services. It is used by Iyoha [6] and Kasidi and Said [17].
- iii. Debt servicing has been used by various literatures such as Malik Hayat and Hayat [18].

Model specification

In order to identify the role of external debt on economic growth of Mauritania the study assume an equation estimated growth model as suggested by the Malik et al. [18]. In the context of this study, the following model was used to evaluate the role of external debt on the economic growth of Mauritania. The model constructed as following:

$$GDP = f(ED, DS) \tag{1}$$

$$GDP = \alpha + \beta ED + \epsilon \tag{2}$$

$$GDP = \alpha + \beta DS + \epsilon \tag{3}$$

$$GDP = \alpha + 1 \beta ED + 2 \beta DS + \epsilon \tag{4}$$

Where: α =Constant term; β =coefficient of the independent variable to the dependent variable; GDP=Gross Domestic Product; ED=External Debt; DS=Debt Servicing; ϵ_i =random error term.

Method of Data Analysis

This study is aimed at investigating the role of external debt on economic growth of Mauritania. First of all, we have to ensure that all the variables included in the model are stationary. Hence, each variable has constant mean and constant variation. The unit root test has been employed in order to solve the problem of stationary as well as to control the heterogeneity problem. This test performed at

level and at first difference as well. If the all variables are integrated of same order, then test for co-integration can be applied and if the series are not integrated at same order. Then, the relationship can be demonstrated by employing Ordinary Least Square method. However, the co-integration test shows a long run relationship.

Data Analysis and Discussion

Descriptive analysis

The findings indicated that over the period under investigation the Mauritania GDP has been increasing. The Table 2 showed a summary of the descriptive statistic for the three variables included in this study GDP, ED, and DS. The table contains the mean, standard deviation, minimum and maximum for 30 observations covering the period 1975-2005.

In the period 1975-2005, the average of Mauritania's GDP was \$1,387 million. The minimum value of GDP was \$968 million, while the maximum was 2,184 million. In term of external debt, the average value recorded \$1,706 million, the minimum value stood at \$168 million, and the maximum value reached \$2,546 million. In terms of debt services payments, the average value was \$83 million, while the minimum value was \$14 million while the maximum value mounted \$146 million.

Augmented Dickey-Fuller (ADF) unit root test

The Unit Root Test has been applied to check whether the variables are stationary or not. The test carried out through Augmented Ducky Fuller (ADF) method as suggested by Engel and Granger. The (ADF) analysis carried at both level and difference. The null hypothesis in ADF test is that there is presence of unit root. The result of (ADF) test is indicating in the following Table 3.

The result of Unit root test indicating that all the variables included in the model were not stationary at level. That can be seen through comparing the critical value with the ADF value, when the critical value is greater that ADF value meaning that the variable is not stationary. However, when the critical value of the variables is less than the ADF value the variable is stationary. Another criterion for the stationary test is that the p-value of the variables under investigation should be less than 5%.

The result showed that all the variables GDP, ED, DS are not stationary at level, but these entire variables are stationary at first

	GDP	ED	DS
Mean	1387.34	1706.29	82.59
Median	1321.13	2077.96	80.53
Maximum	2184.44	2545.60	145.69
Minimum	968.308	167.76	14.19
Std. Dev.	322.498	770.09	32.87

Source: Author's own

Table 2: Descriptive Statistics (in millions USD).

Variables	Level Data	1st diff.	5% cri . Value	P-value at level	P- value at 1st	Status
GDP	-3.457102	-6.659899	-3.568379	0.0627	0.0000	I(1)
ED	-3.177641	-5.601415	-3.568379	0.1079	0.0005	I(1)
DS	-3.515495	-4.595691	-3.568379	0.0557	0.0073	I(1)

Source: Author's own

Table 3: Augmented Dickey Fuller Test.

differences I (1) meaning that the critical value of the variables is less that ADF value. This implies that the ADF test suggested that all variables are integrated at first difference.

Ordinary Least Square (OLS)

The summary of the test indicated that the model of the study is well fitted. All the variables in the model are statistically significant. The coefficient of the constant variable recorded 17.65 which indicate a positive relationship between the constant parameter and the Gross Domestic Product. The constant parameter has no significant effect on the model rather than reflecting the value of GDP when other independent variables are held constant. The summary of OLS result showed in the following Table 4.

The coefficient of the external debt (ED) shows a positive relationship with the GDP. This result refers to that when the external debt increase by 1 unit the Gross Domestic Product will rise by 30.2%. The coefficient of debt servicing (DS) exerts a significant negative effect on the dependent variable GDP, which means 1% rise in debt servicing, will bring 16% decreases in GDP. The overall coefficient of determination (R²) displays that the equation has a good fit with 0.681020 meaning that 68 % change in the dependent variable (GDP) is caused by the independent variable (ED and DS). Finally, the finding revealed that prob (F-statistic) is 0.000000 meaning that model is significant.

Johansen co-Integration test

Since all the variables are integrated at I (1) then there is a possibility of co-integration among the variables. The co-integration test establishes to define whether a long run relationship exists among the variables.

In co-integration test to define whether there is co-integration among variables or not, the trace statistic value and Maximum Eigen value should be greater that Mackinnon critical value at 5% levels of significant. The following Table 5 shows the co-integration test result. The findings of Co-integration test revealed that the trace values are greater than Mackinnon critical value at 5%, where trace value recorded 53.93955 while the Mackinnon critical value recorded only 29.79707. Result also showed that Maximum Eigen value recorded 41.05741 which is greater that Mackinnon critical value 29.79707. These findings imply that a long relationship exists among variables, rejecting the null hypothesis that there is no co-integration. The co-integrating equation chosen from the Normalized co-integrating coefficients is:

$$GDP = -1.439770 ED + 0.685389 DS$$

From the Co-integration equation, ED has negative effect on the GDP in the long run. In the long run, a unit increase in ED will lead to decrease in GDP by 1.43. On the other hand, Co-integration equation revealed that DS has positivity influence the GDP in long run meaning that a unit increase in DS will lead to rise in GDP by 0.68. The findings of this research are in the same line with Ayadi and Ayadi [10], Sulaiman and Azeez [15] both studies find out that external debt

Dependent Variable	Independent Variables			R2	Adj.R2	F-stat
	C	ED	DS			
GDP	17.65299	0.302175	-0.165757	0.681020	0.658235	29.88985
	(0.0000)	(0.0000)	(0.0166)			

Source: Author's own

Table 4: Summary of OLS Results

Maximum Eigen Value	Trace Statistics	5% Critical Value	Hypothesized No. CE(S)
41.05741	53.93955	29.79707	None *
11.82654	12.88214	15.49471	At most 1
1.055602	1.055602	3.841466	At most 2

Source: Author's own

Table 5: Result of Johansen Co-integration Test.

has a significant negative effect on the economic growth. In the context of debt servicing the finding of this study supported by Boboye and Ojo [19] they find out that debt servicing has a positive effect on the economic growth of Nigeria.

Conclusion and Policy Implications

The main objective of this study is to investigate the role of external debt on economic growth of Mauritania. External debt is assumed to help developing countries to finance its deficit balance and stimulate the economy. Mauritania has relied much on the external debt to finance its balance deficit and to stimulate the economic, so much so that this deep dependence on the external debt as source of financing becomes out of control for example what happened in the end of 1985. In case of Mauritania, the external debt does not contribute to encourage the economic growth of Mauritania. This is often blamed on mismanagement of external debt and lack of transparency as well as the high level of corruption. Bureau of Economic and Business Affairs [20] report stated corruption as main growth obstacle for Mauritania. The country ranked 123 out of 174 based on the TI Corruption Index [20].

At least one basic policy implications can be drawn from this study on the long-run contribution of external debt to the level or growth rate of aggregate income and productivity. Improvements must be made to improve the degree to which external debt inflow can be effectively translated into capital formation essential for long term growth. By improving the quality of project proposals, appraisals and budgeting and overall institutional quality, the government can do plenty to increase the returns on external debt. The presence of weak structural and policy conditions, as well as unexpected exogenous shocks, will continue to bring risk of even greater dependence on external debt and debt defaults in the future.

The government should step up efforts to boost sources of internal revenue to finance its development plans until all debt servicing is finally settled. In addition, the government should diversify the economy which will give more opportunity to newer sectors to develop and generate revenue to contribute in economic development of the country. The government must ensure political stability in order to maximize returns to its external debt. It must seek a reasonable degree of fiscal adjustment to either reduce its external debt stock to historical average levels or stabilize it around a certain fiscally sustainable target.

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