ISSN: 2720-7668 | Diverse Journal of Business and Economic Growth (DJBEG)
Volume 1, Issue 2, April 2020

Does External Debt Stimulate Economic Growth in Mozambique? An Empirical Evidence

Victor Carlos Nuvunga

Department of Research and Community Engagement
Instituto Superior de Ciências e Educação a Distância (ISCED), Beira

Email: vnuvunga@isced.ac.mz

[**Cite as:** Nuvunga, V. C. (2020). Does External Debt Stimulate Economic Growth in Mozambique? An Empirical Evidence. *Diverse Journal of Business and Economic Growth*, Vol. 1, Issue 2, Pages 1-7.]

Abstract *- The present paper investigates the impact of external debt on Mozambique's economic growth for the period from 2001 to 2017. Mozambique is a country with a high external debt as it has reached about 70.8% of GDP in 2017, representing 74% of total public debt. The real GDP decelerated to 3.7% in 2017, far below from the average growth of 7% that the country achieved on between 2011 and 2015. This is an empirical study based on the Johansen cointegration, the unit root test was conducted through the ADF and PP tests and the VAR and VECM models were estimated. Thus consumption, external debt and investment have a long-term relationship with economic growth, but the external debt has a negative effect on economic growth as the results showed that an increase in external debt of 1% may cause an increase in GDP of about 0.9% in short run and a decrease of 8% in long-run. Thus external debt should be well addressed and used for development oriented investments.*

Keywords: *Mozambique, Economic growth, external debt, VAR*

1. INTRODUCTION

Mozambique is a developing country, with around 28 million inhabitants, having registered, in the last few years, a slowdown in its economic growth measured by the Gross Domestic Product (GDP) of about 3.7% in 2017, well below the average of 7% growth achieved between 2011 and 2015, combined with increasing inflation of around 15.1% in 2017 and 19.9% in 2016 in the face of inflationary factors, the devaluation of the metical, the local currency, and the fall in production (Instituto Nacional de Estatística, 2019) e Ministério de Economia e Finanças (2019).

Therefore, having a high external debt is an issue of quite worrying and raising a lot of discussion in Mozambique, since the global public debt went from 40 percent of the Gross Domestic Product (GDP) in 2013 to around 120 percent in 2018, of which 74% is carried by external debt, a fact considered quite scary (Banco de Moçambique, 2019).

The issue of foreign debt as a policy to promote economic growth has created serious debate among economists and politicians. The main question is whether external indebtedness actually leads to possible economic growth in the debtor's country. The Neoclassical and Endogenous growth model argue that there is a positive relationship between external indebtedness and economic growth, since the debt is one of the sources for financing capital formation, which has a direct impact on investment and on economic growth (Munday, 1996; Kenton, 2019). On the other hand, Krugman (1988) contradicts this approach, arguing that the external debt carries a heavy weight on economic growth.

Mozambique continues to suffer from the effects of hidden debt crisis revealed in 2016 as the real GDP growth decelerated to 3.7% in 2017, down from 3.8% in 2016 and below the growth of 7% of achieved on average between 2011 and 2015. The external debt is considered unsustainable, having reached alarming levels by 2017. However, small and medium-sized companies have retreated and their ability to generate jobs has been further restricted (Banco Mundial, 2016). The question that arises is that, does external indebtedness have a significant contribution to the growth of the Mozambican economy?

The present paper attempts to investigate the impact of external debt on Mozambique's economic growth for the period from 2001 to 2017 and check for the existence of a long-term relationship between economic growth and external debt.

2. LITERATURE REVIEW

A number of theories have already been raised to explain the relationship between economic growth and external debt. Some of these theories, relevant to this study, will be discussed in this work, with special attention to the classical and neoclassical approach, the Solow's growth model, dependency theory, in order to bring the existing knowledge and establish a relationship.

According to Popovic (2006, pp. 173-175) and Masoud (2014) the history of economic theories, the idea of economic growth was initiated by Adam Smith in 1776, with his historical work "The wealth of nations", and developed by classics like David Ricardo, Malthus and Marx. These formed the basis and one of the first foundations of economic science, arguing that economic growth was a function of the accumulation of capital and factors such as labor and land played a fundamental role.

According to Sridhar (2016), the dual gap is one that best explains why a country chooses external financing as opposed to domestic financing, for sustainable development. According to this theory in developing parents, in general, the level of savings is quite low to finance the investment necessary to achieve the desired economic growth, since investment is a savings function, often resorting to external indebtedness. However, since the majority of underdeveloped countries are far from their steady state in terms of growth, any injection for investment may lead to an acceleration of economic growth, but if it is excessive, in relation to GDP and misapplied, it can create a negative effect on the economy.

The Harrod-Domar model initiated by Roy Harrod and Domar argues that economic growth depends on the level of investment, that is: the level of savings, with high savings allowing greater investment and the capital / product ratio, a lower capital-product ratio means that the investment is more efficient and the growth rate will be higher (Pettinger, 2017).

When it comes to Mozambique, Castel-Branco & Massarongo (2016) point out that the stock of public debt known until 2015 was around 80% of GDP, having expanded between 2006 and 2015 at an average of 15%, that is, twice that of growth of GDP. They further explain that the economic crisis in Mozambique started to reveal itself brutally with the outbreak of the debt crisis and the consequent withdrawal of investment and direct support to the State Budget, with the discovery of undeclared debts, the economic slowdown, without discouraging, the implications of recent natural disasters in central and northern Mozambique.

This position is supported by Massarongo & Chichava (2018) who explain that the public debt in Mozambique has gone through different stages, having markedly reduced from 150% of GDP in 1998 to around 50% of GDP in 2006 and accelerated from this period, to around 100% in 2015, with the main weight on the debt contracted from the association of the five emerging economies which are Brazil, Russia, India, China and South Africa (BRICS).

In turn, Ibraimo (2018) conducted an empirical investigation in Mozambique, on the macroeconomic effects of public debt and debt service from 2000 to 2016, using quarterly data, using the VAR model, the impulse-response function (FIR) and the decomposition of variance. It was revealed that there was a negative relationship between public debt and GDP in the long run and insignificant positive effects in the short run.

Moreover, the recent Debt Sustainability Assessment (DSA) involving several countries carried out by the World Bank (BM) and the IMF puts Mozambique's external debt and total public debt in a situation of distress and on the way to being unsustainable (International Monetary Fund, 2018).

3. METHODOLOGY

This is an empirical study, based on the Johansen cointegration, since the variables are integrated at first order and it is estimated more than one relationship between the variables, the Vector Autoregression (VAR) was estimated, literature review and the descriptive method were used. The survey made use of secondary and quarterly data from 2001 to 2017. All data were obtained from the Bank of Mozambique (BM), World Bank, National Statistics Institute (INE) and the Mundi index.

Firstly, the stationarity test was applied based on the unit root test, that is, the ADF test (Augmented Dickey-Fuller), the stationarity of the residues was tested, the specification of the long-term model was estimated, the cointegration test and finally the error correction model.

In accordance with the theories, the variables in estimation are: The Gross Domestic Product (GDP), the External Debt Stock (DE), the Consumption (CONS) and Foreign Direct Investment (FDI). Therefore, the following preliminary econometric model was estimated:

$$Y = ß_o + ß_1 CON + ß_2 FDI + ß_3 ED + \mathcal{E}$$

$$L_N GDP = ß_o + ß_1 LNCONs + ß_2 LNFDI + ß_3 LNED$$

Where Y is the Gross Domestic Product (GDP), Consumption (CONS), FDI for Foreign Direct Investment and ED corresponds to the stock of external debt. Economic theory suggests that $ß_1 \rangle 0$, $ß_2 \rangle 0$ while the sign of the coefficient of $ß_3$, can be positive or negative. In accordance with the neoclassical theory and the dual gap model, it is expected that an increase in public debt can create an increase in GDP.

4. RESULTS

Applying the unit roots test to check the stationarity of the series is one of the first actions when dealing with econometric analysis in order to not conduct spurious regression and get unusual regressions and results. Thereby before estimating the econometric model all the variables were subjected to the stationarity test, using the Augmented Dickey Fuller (ADF) and Philips Perron (PP) test, in order to avoid spurious regression and results. However, as it can be seen in Table 1, it is concluded that all variables were not stationary at level, and it appears that all variables are I (1), that is, they are stationary after the first difference.

Table 1: ADF tests for the variables in first differences.

Variable	Order	T Statistic	5% Level of Significance	P-Value
LNGDP	1	-4.617329	-3.029970	0.0019
LNCONS	1	-5.974583	-2.986225	0.0000
LNFDI	1	-4.607601	-2.632604	0.0012
LNED	1	-3.627435	-2.991878	0.0015

Source: Compiled from eview

Application of the Phillips Perron test the variables are all I (1).

Table 2: Philips Perron (PP) test

Variable	Order	T Statistic	T 5%	P-Value
LNGDP	1	-5.944015	-2.986225	0.0000
LNCONS	1	-6.693731	-2.986225	0.0000
LNFDI	1	-4.607601	-2.986225	0.0012
LNED	1	-3.689653	-2.986225	0.0083

Source: Compiled from EViews 10

Therefore, the optimal lag length was determined using the information from the AIC, SC, and HQ as showed in Table 3 (Gujarati, 2004).

Table 3: VAR Lag Order Selection Criteria

Lag	LogL	LR	FPE	AIC	SC	HQ
0	206.6484	NA	7.62e-05	-6.644209	-6.505791	-6.589962
1	276.0821	127.4849	8.09e-06	-8.887939	-8.714917	-8.820130
2	313.8414	68.09051*	2.42e-06*	-10.09316*	-9.885534*	-10.01179*
3	313.9288	0.154752	2.50e-06	-10.06324	-9.821009	-9.968307
4	314.0636	0.234210	2.57e-06	-10.03487	-9.758036	-9.926378

Source: Compiled from EViews 10

Given the unit roots results and taking the optimal lag length of two, a cointegration test according to Johannsen was conducted, as it is accurate for series that are integrated in order one (Shrestha & Bhatta, 2018).

Table 4: Cointegration test according to Johansen

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.585271	89.63139	47.85613	0.0000
At most 1 *	0.229385	35.06334	29.79707	0.0113
At most 2 *	0.160831	18.90825	15.49471	0.0147
At most 3 *	0.121578	8.036970	3.841466	0.0046

Trace test indicates 4 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.585271	54.56805	27.58434	0.0000
At most 1	0.229385	16.15509	21.13162	0.2159
At most 2	0.160831	10.87128	14.26460	0.1608
At most 3 *	0.121578	8.036970	3.841466	0.0046

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

Source: Compiled from EViews 10

From the results given by Johansen Cointegration Test, Table 4, which gives results from the Trace and Max-Eigen Statistics it possible to see that there is at least one cointegration equation among the variables and from both results, rejecting the null hypothesis of no cointegration and thus indicating that there is a long run relationship among the variables. This result forward the study to estimate the Vector autoregressive (VAR) for short-run model and the Vector Error Correction model (VECM) for the long run model (Gujarati, 2004).

Table 5: VAR Granger Causality/Block Exogeneity Wald Tests

Dependent variable: LNGDP			
Excluded	Chi-sq	df	Prob.
LNED	1.691928	2	0.4291
LNFDI	4.703928	2	0.0952
LNCONS	7.621045	2	0.0221
All	13.81480	6	0.0318

Source: Compiled from EViews 10

Table 6: VEC Model

Vector Error Correction Estimates
Date: 03/31/20 Time: 22:34
Sample (adjusted): 2001Q3 2017Q1
Included observations: 63 after adjustments
Standard errors in ( ) & t-statistics in [ ]

Cointegrating Eq:	CointEq1
LNGDP(-1)	1.000000
LNED(-1)	0.081280
	(0.01766)
	[4.60225]
LNFDI(-1)	-0.015690
	(0.00645)
	[2.43151]
LNCONS(-1)	-1.293831
	(0.03188)
	[-40.5796]
C	-1.504552

Error Correction:	D(LNGDP)	D(LNED)	D(LNFDI)	D(LNCONS)
CointEq1	-0.016378	-0.041026	-0.010748	0.210487
	(0.00984)	(0.12590)	(0.77811)	(0.02963)
	[1.96496]	[-0.32586]	[-0.01381]	[7.10387]
D(LNGDP(-1))	0.987932	-0.735707	0.907178	0.075922
	(0.05909)	(0.75634)	(4.67436)	(0.17800)
	[16.7179]	[-0.97273]	[0.19408]	[0.42653]
D(LNED(-1))	0.009951	0.771043	-0.347857	0.028588

	(0.00650)	(0.08324)	(0.51443)	(0.01959)
	[1.53007]	[9.26318]	[-0.67620]	[1.45937]
D(LNFDI(-1))	0.001831	0.035009	0.638640	-0.000393
	(0.00132)	(0.01690)	(0.10446)	(0.00398)
	[-1.98617]	[2.07134]	[6.11395]	[-0.09875]
D(LNCONS(-1))	0.045100	0.123710	0.143206	0.403689
	(0.02090)	(0.26755)	(1.65350)	(0.06296)
	[2.15746]	[0.46239]	[0.08661]	[6.41139]
C	0.000707	0.013091	-0.001054	0.007951
	(0.00102)	(0.01300)	(0.08033)	(0.00306)
	[0.69662]	[1.00714]	[-0.01313]	[2.59938]
R-squared	0.856648	0.673419	0.415673	0.890144
Adj. R-squared	0.844073	0.644772	0.364417	0.880508
Sum sq. resids	0.000116	0.019029	0.726831	0.001054
S.E. equation	0.001428	0.018271	0.112922	0.004300
F-statistic	68.12430	23.50715	8.109637	92.37241
Log likelihood	326.5209	165.9119	51.16604	257.0554
Akaike AIC	-10.17527	-5.076567	-1.433842	-7.970012
Schwarz SC	-9.971159	-4.872459	-1.229734	-7.765904
Mean dependent	0.016814	0.018651	0.033649	0.017152
S.D. dependent	0.003615	0.030656	0.141642	0.012439
Determinant resids covariance (dof adj.)		1.08E-16		
Determinant resids covariance		7.20E-17		
Log likelihood		813.2600		
Akaike information criterion		-24.92889		
Schwarz criterion		-23.97638		
Number of coefficients		28		

Source: Compiled from EViews 10

In order to see the robustness of the results the model was tested for autocorrelation, normality and heteroscedasticity and it was found that the model is normally distributed, is not heteroskedastic and does not suffer from autocorrelation.

Table 7: VEC Residual Serial Correlation LM Tests

Null hypothesis: No serial correlation at lag h						
Lag	LRE* stat	df	Prob.	Rao F-stat	df	Prob.
1	7.877584	16	0.9524	0.482616	(16, 153.4)	0.9526
2	3.865604	16	0.9991	0.233863	(16, 153.4)	0.9991

Source: Compiled from EViews 10

Thus the model was estimates as follow:

D(LNGDP) = -0.0163783456132*(LNGDP(-1) - 0.0812801518487*LNED(-1) + 0.0156903080449*LNFDI(-1) + 1.29383097135*LNCONS(-1) - 1.50455221305) + 0.987932097096*D(LNGDP(-1)) + 0.00995085976679*D(LNED(-1)) + 0.00183052306233*D(LNFDI(-1)) + 0.0450995268161*D(LNCONS(-1)) + 0.000707445543737

5. DISCUSSION

As can be seen in Table 6, the parameters are statistically significate and go according to the theory

presented in this study, since consumption and investment have a positive relationship with the national GDP, and the stock of external debt has a negative although not significant effect on the economy, and an increase in external debt of 1% may cause an increase in GDP of about 0.9% in short run and a decrease of 8% in long-run.

The variables were statistically significant, the R^2 of 0.856648 was strong, showing that the independent variables largely explain the variation in the dependent variable, as it is in line with the theory, as it is very close to 1, better explaining the correlation between the variables. Similarly, the F-Statistic probability was also extremely strong reinforcing the previous trend and showing robustness of the model. From the residual diagnosis the autocorrelation was checked and the null hypotheses of serial correlation was rejected as the probability are greater than 5% level of confidence.

Thus Looking at the VAR model which gives the short-run information, it possible to infer that the previous year deviation from long run equilibrium is corrected in the current period as an adjustment speed of 1.6%, the consumption is associated with 4.5% increase in GDP in average, *ceteris paribus*, in the short-run while the FDI and consumption have no significant impact in the short run. On the other hand, in the long run it is possible to note a positive relationship of consumption and foreign direct investment and negative relationship of external debt on GDP.

Contrary to what was predicted in this study, it has already taken care of and explained its dual effect throughout the theories exposed in this study. Analyzing the individual significance of the parameters, using the t test or the p-value, it is noted that each of the parameters is statistically significant and explains the variation in economic growth, that is, GDP, as the theory mentions that the statistical t is greater than the critical t ($t > tc$), Ho is rejected, that the parameter is not significant.

6. CONCLUSIONS

The present study investigated the relationship between external debt and economic growth for the period of 2001 to 2017 by applying the Johansen cointegration analysis and VAR and VECM methods. The variables consumption, external debt and foreign direct investment have a long-term relationship with economic growth, measured by GDP, although in the case of Mozambique, external debt has a positive effect in short run and negative one on long run economic growth.

Thus from VAR model it possible to infer that the previous year deviation from long run equilibrium is corrected in the current period as an adjustment speed of 1.6%, the consumption is associated with 4.5% increase in GDP in average, *ceteris paribus*, in the short-run while the FDI and consumption have no significant impact in the short run. On the other hand, in the long run it is possible to note a positive relationship of consumption and foreign direct investment and negative relationship of external debt on GDP as an increase in external debt of 1% may cause an increase in GDP of about 0.9% in short run and a decrease of 8% in long-run.

Thus external debt should be well addressed and used for development oriented investments, which can generate incomes and significant gains for the country.

7. REFERENCES

Banco de Moçambique. (2019). *Relatório Anual 2018: Situação Macroeconómica.* Banco de Moçambique (BM). Maputo: Banco de Moçambique. Obtido em 01 de Novembro de 2019, de http://www.bancomoc.mz/fm_pgtab1.aspx?id=106

Banco Mundial. (2016). *ActualidadeEconómica de Moçambique: Enfrentando Escolhas Difícies.* Maputo: Banco Mundial. Obtido em 22 de Março de 2020, de http://documents.worldbank.org/curated/pt/652821482490346542/pdf/110817-PORTUGUESE-PUBLIC-MozambiqueEconomicUpdateDecPT.pdf

Castel-Branco, C., & Massarongo, F. (2016). Introdução a problemática da dívida pública: contextualização e questões imediatas. *Boletim nº 85.* Obtido em 08 de Setembro de 2019, de https://www.researchgate.net/publication/303672732_Introducao_a_problematica_da_divida_publica_contextualizacao_e_questoes_imediatas/link/574c501908ae4cada7ea7a65/download

Gujarati, D. N. (2004). *Basic Econometrics* (Vol. 4). The McGraw−Hill Companies. Obtido em 13 de Março de 2020, de https://www.academia.edu/10146539/Basic_Econometrics_-_Gujarati

Ibraimo, Y. (2018). *Efeitos Macroeconómicos da dívida pública e do serviço da dívida: uma análise empírica de Moçambique.* IESE, Desafios para Moçambique 2018. Maputo: IESE. Obtido em 05 de Agosto de 2019, de http://www.iese.ac.mz/wp-content/uploads/2019/02/artigo-yi.pdf

Instituto Nacional de Estatística. (2019). *Resultados definitivos do IV Recenseamento Geral da População e Habitação de 2017.* Instituto Nacional de Estatística (INE). Maputo: Instituto Nacional de Estatística (INE). Obtido em 25 de Agosto de 2019, de http://www.ine.gov.mz/iv-rgph-2017/mocambique/censo-2017-brochura-dos-resultados-definitivos-do-iv-rgph-nacional.pdf/view

International Monetary Fund. (2018). *Republic of Mozambique: 2017 Debt Sustainability Analysis.* International Monetary (IMF) and International Development Association (IDA). International Monetary (IMF) and International Development Association (IDA). Obtido em 9 de Março de 2020, de https://www.imf.org/external/pubs/ft/dsa/pdf/2018/dsacr1865.pdf

Kenton, W. (2019). Ricardian Equivalence. Obtido em 11 de Março de 2020, de

https://www.investopedia.com/terms/r/ricardianequivalence.asp

Krugman, P. R. (1988). Financing vs. Forgiving a Debt Overhang. *National Bureau of Economic Research (NBER)*. Obtido em 05 de Janeiro de 2020

Masoud, N. (2014). A contribution to the theory of economic growth: Old and New. *Journal of Economics and International Finance*, *6*, p. 47. doi:DOI: 10.5897/JEIF2013.0518

Massarongo, F., & Chichava, S. (2018). Estrutura, Impacto e Significado da Dívida Pública Moçambicana com os BRICS (2006-2015). *Open Edition Journals*, *36*, 15-34. doi:https://doi.org/10.4000/cea.2964

Ministério de Economia e Finanças. (2017). *Relatório da dívida pública 2016*. Direcção Nacional do Tesouro. Maputo: Direcção Nacional do Tesouro. Obtido em 03 de Janeiro de 2020, de http://www.mef.gov.mz/index.php/documentos/instrumentos-de-gestao-economica-e-social/-30/gdp-2016/670-relatorio-anual-da-divida-2016/file?force_download=1

Munday, S. C. (1996). Economic Growth: Old Theories, New Theories and Government Policy. *Current Developments in Economics*, pp. 250-263. doi:https://doi.org/10.1007/978-1-349-24986-2_14

Pettinger, T. (2019). Harrod-Domar Model of Growth and its Limitations. *economicshelp*. Obtido em 05 de Novembro de 2019, de https://www.economicshelp.org/blog/498/economics/harod-domar-model-of-growth-and-its-limitations/

Popovic, M. (2006). Old and new theories of economic growth. *JEL classification, 41*, pp. 173-177. Obtido em 29 de Outubro de 2019, de http://www.repec.mnje.com/mje/2006/v02-n03/mje_2006_v02-n03-a19.pdf

Shrestha, M. B., & Bhatta, G. (2018). Selecting appropriate methodological framework for time series data analysis. *The Journal of Finance and Data Science*, *4,2*, 71-89. doi:https://doi.org/10.1016/j.jfds.2017.11.001

Sridhar, S. S. (2016). *Two-gap modeling development economics*. *Quora*. Retrieved Setembro 16, 2018, from https://www.quora.com/What-is-the-two-gap-model-in-development-economics.