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The impact of Algeria's external debt on economic growth

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Abstract
The external debt problem is one of the most fatal problems facing the Arab states, as well as other developing countries, because of its serious impact on economic and social progress, as well as the fact that these countries suffer from declining domestic savings and export earnings, as well as increasing consumption rates, leading to a lack of domestic investment. Algeria, like many other underdeveloped countries, is significantly reliant on foreign loans to fund defaults and balance of payments issues. The major objectives of this paper, which employs traditional time series analysis, is to determine the link between foreign debt and macroeconomic indicators in Algeria from 1990 to 2010. The study's key finding is that foreign debt has a detrimental influence on Algeria's economic growth over the time period analyzed. For a variety of reasons, including domestic consumption and savings, investment, and the trade deficit.

Keywords:
economic growth;
external debt;
The initial model;
Non-linear relationship;
joint integration.

JEL Classification Codes: F34 ; O47 ; R11.

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1. INTRODUCTION

Developing nations profited from huge lending in the 1970s, which was projected to stimulate investment and economic development if all other factors were equal. However, in the early 1980s, these countries' financial crises placed this premise on hold. As a result, according to Krugman (1988) (Krugman, 1988), indebted countries' evolution may be hampered by unsustainable debt levels. Debt repayment has become a near-impossible task for the majority of developing countries, akin to an impediment to economic development (Sachs, 1989) (Roubini & Jeffrey D, 1989). The concept of debt potential CARGAISON implies the existence of an ideal level of debt to be delogged, from which the effect on investment is exhausted.

As a result, the goal of our research is to find an answer to the following question:

What is the impact of Algeria's external debt on economic growth?

Our study will focus on the period of 1990 to 2010, when Algeria's external debt problems erupted. And it continues to affect economic growth while also causing social and economic concerns.

2. Objectives

The general objective is to arrive into the effects of external debt on economic growth in Algeria.

The specific objectives are

- ✓ confirming the existence of a link between external debt and economic growth;

- ✓ as well as investigating the role of eviction in the Algerian economy.

3. Hypothesis

The following hypotheses have proven to be fundamental for us:

- ✓ Algeria's external debt has a non-linear relationship with GDP growth.
- ✓ The external debt of Algeria is linked to its pace of economic growth.
- ✓ Algeria's external debt has no relationship with GDP growth.

4. Approach and Methodology

If a country's external debt is expected to be higher than its payment patterns, the expected debt servicing burden will deter local and exotic investment and stifle economic growth, according to the debt overhang postulate (Krugman 1988, Sachs 1989, Pattillo et al. 2002) (Sen, M. Kasibhatla, & Stew, 2007).As a result of the high debt servicing burden, the private sector's expected future burden is magnified, reducing private investment. As a result, revenues that could be invested will be used to pay debt service instead.

This relationship appears to have the shape of an inverted U-shaped curve. Debt has a positive effect on growth up to a point, after which it has a negative effect. Furthermore, the potential external debt burden can simulate investment and economic growth through a variety of channels.The theory explains three channels: the direct effect of high debt burden, debt service crowding out, and debt stock disincentive effect.

The empirical Parade, titled Precision of the model, Exposition of Variables, and Sequence Clarification, has three pillars:

- ✓ Epistemology,
- ✓ Variables are double-checked in advance.
- ✓ Johansen cointegration test, causal connection test

˝I. Parade of the experimental literature of the relationship between debt burden and economic growth :

The activities concerning the relationship between debt burden and economic growth are dense experimentally, but they do not make up the majority. The material fund, human labour, and wealth are the main characteristics of this work, which is usually based on neoclassical growth references.The hypothesis that external debt has a linear impact on economic growth leads to the conclusion that it has a fatal effect on the smooth functioning of the economy, regardless of the level of debt. This relationship, however, is not irrational and can only be expressed from a specific vantage point.As a result, other cutting-edge research has looked into whether debt has a non-linear impact on investment and economic growth (Régis & SIMON, 2005).

1.1 Linear arrival

External debt servicing, moderated by the "outstanding debt/GDP" coefficient, does not have a negative effect on investment in middle-income countries, according to Warner (1992) and Savvides (1992) (Barro & Xavier, 2000) .

Oks and Van Wijnbergen (1995) (Oks & Suédois de, 1995) were the first to explain the impact of debt burden regularization's invisibility on economic growth. They came to the conclusion

that, in the case of Mexico, the insecurity of debt burden regularisation affirmatively claims a specific investment and, as a result, economic growth (Bourbonnais R. , 2003).

Under the guise of foreign debt being a burden on the economy, Idlemouden and Raffinot (2005) (Idlemouden, Raffinot, & Marc, 2005) show that regularising foreign debt servicing eliminates public burdens, resulting in a decrease in general investment, and its stock would influence private economic agents' incentives through an increase in the fiscal impulse. Finally, Swapan et al show that external debt servicing is a constant drag on growth in Latin American economies, with a particularly negative impact in Asia (Benedict J, Rina B, & Toan, 2003).

1.2 Non-linear approach

In general, empirical studies that support the non-linearity hypothesis employ quadratic or spline activity in econometric estimation (Bourbonnais R. , 2004) .

1.3 The quadratic approach

This approach explains the square of the debt ratio in the presence of exogenous variables, and generally takes the following form:

$$\mathbf{Y = \alpha + \beta X + \gamma D + \delta D2 + \varepsilon}$$

This is predicated on the premise that external debt does not always have a negative influence on economic growth. In actuality, a measured debt may have an evident effect, but if it crosses a particular threshold (Laffer curve), it becomes damaging to investment and economic growth (Cohen, 1995) .

1.4 The spline specification

The influence of external debt at the top and bottom of the rim is differentiated in this specification. The following formula is often used to compute it:

$$Y = \alpha + \beta X + \gamma D + \delta (D - D^*) Z + \varepsilon$$

D* is the debt threshold, and Z is a reticent variable equal to 1 if the debt is below the threshold and 0 otherwise.

1.5 Some limitations of empirical tasks

The current amount of external debt is commonly used as a proxy for debt burden. Despite the fact that it takes a conditional approach to low-income countries' external debt, it is not a true moderation of the concept of the potential burden of over-indebtedness. Furthermore, none of the private agents assess debt burdens based on the current distinct sum; instead, they all rely on debt reserves (Collier & Dehn J, 2001) .

1.6 The definition of external debt

All political and commercial debt is included in the external debt. Loans from international monetary institutions and advances from foreign governments make up the political debt. Commercial debt refers to the obligations that a government has made to foreign commercial banks (Besancenot, Huynh, & Vranceanu, 2003).

1.7 The definition of economic growth

Economic growth is defined as an increase in the quantity of goods and services produced by an economy over a long period of time. A nation's economy, or another geographical, political,

and social unit such as a region, a city, or a population group, may be included; it may also include a group of nations or the entire world (Nouschi & Bénichi, 1990) .

∏. Accuracy of the model, exposure of the variables and clarification of the sequences :

1. Epistemology

All of these data are log-transformed with the goal of eliminating the inherent fluctuations in macroeconomic variables on the one hand, and capturing the impact of variation in one variable on the other through elasticities on the other (Hurlin, 2003) .

The steps in our method for analysing the causal relationship are as follows: prior verification of the variables' correlations and multi-collinearity, estimation of the initial model using Ordinary Least Squares (OLS), and tests of the (OLS) and (OLS). O),tests of (non)stationarity on level data, the process of series stationarity, tests of stationarity on differentiated data, tests of causality, tests of cointegration, and Error Correction Model estimation (ECM). The results and their interpretation are subject to caution due to the large number of years examined.

2. Preliminary verification of variables

The following phases are included in this section: checking the correlation and multicollinearity of the variables under consideration, as well as estimation of the initial model (Henrik & Tarp, 2000) .

2.1 Preliminary verification of the correlation between the two (2) variables

We first check the correlations between the variables to see which ones will be used in the rest of the study.Let's consider the following hypothesis and its counter-hypothesis:

The H0 hypothesis: $\rho x,y = 0$, no correlation between X and Y;

Hypothesis H0: $\rho x,y \neq 0$, existence of a correlation between X and Y ;

The correlation between two variables will be shown to follow a Student's law with n-2 degrees of freedom. This will be compared to the empirical Student's t statistic:

We reject the null hypothesis H0 and accept the existence of a correlation between the two variables if t*> t/2 with n-2 degrees of freedom, a value read from the Student's table at the threshold of 0.05.

Table 1.below shows the correlations between the variables.

	DLDEX	DLPIB
DLDEX	1.000000	-0.256038
DLPIB	-0.256038	1.000000

Source : The researcher based his findings on Eviews.

At the same threshold, the table value of 1.0000 was used. As a result, the null hypothesis that there is no relationship between Algeria's external debt and economic growth is disproved.

2.2 Estimation of the initial model

The following model can be estimated based on the correlations between these variables: **LPIBt=β0+β1LDEXt+and** With: t=1,...,n and n= 21 and N(0, σ^2)

2.3 Test of the stationarity of the data LREVH, LDENHA, LFORPRI, LDEPEDUC in level

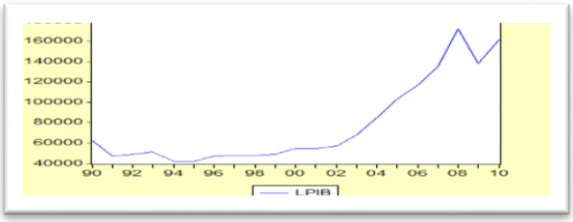
DENUIT M. recommends BOURBONAIS R. (2007) and According to Kwiatkowski-Phillips-Schmidt-Shin (KPSS, 1992), Augmented Dickey-Fuller (ADF, 1981), and Phillips-Perron (PP, 1981), the stationarity test can be carried out in the following steps: observation of the Graphs and Auto Correlation Functions, formal tests such as Kwiatkowski-Phillips-Schmidt-Shin (KPSS, 1992), Augmented Dickey- (1998). If a chronic series has no trend or seasonality, and, more broadly, no causes that vary with time, it is said to be stationary. The mean is constant and time-independent, the variance is finite and time-independent, and the covariance is also time-independent (H.R, K.A, & A.V, 2000) .

2.4 Observation of graphs and level auto correlation functions

The graphs of four series reveal that they are not level-stationary, since they show declining trends followed by minor upturns.

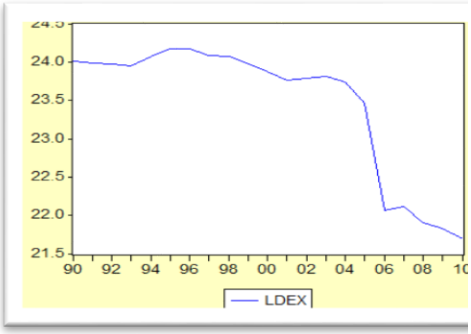
2.4.1 Gross domestic product: GDP

Fig.1. Gross domestic product curve



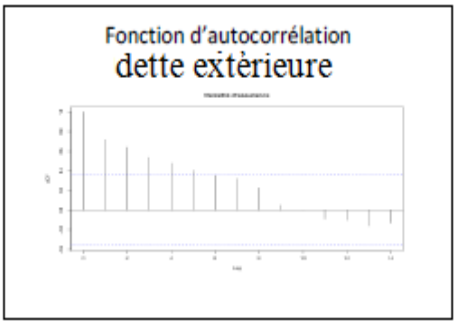
Source : The researcher based his findings on Eviews.

Fig.2. External debt level curv



Source : The researcher based his findings on Eviews.

Fig.3. External debt level auto correlation function



Source : The researcher based his findings on Eviews.

The auto correlation function of LPIB (gross domestic product) shows a sluggish peak rise, confirming the graph level finding.However, the auto correlation function LDEX (external debt) reveals a delayed peak decay, which verifies the graph level finding.

Formal tests, such as Dickey-Fuller and Phillips-Perron at the 0.05 threshold, must be used to verify all of these observations on the graphs and auto-correlation functions.

2.5 Augmented Dickey-Fuller (ADF) level test

The following are the results of the ADF level tests:

Table 2. Table of ADF of variables in level

Variables	Values	Models		
		Constant	Trend Linear	Constant None
LPIB	Calculated	-1.792275	0.582713	1.617375
LDEX	Calculated	-1.304610	0.455471	-1.624354
Mackinnon	5%	-3.658446	-3.020686	-1.959071

Source : The researcher based his findings on Eviews.

The following facts should be noted:

- all the calculated ADF values are higher than the MACKINNON critical values at the 5% $(\text{donc} t_{\hat{\emptyset}_1} \geq t_{tabulée})$ threshold, . The process has a unit root, it is not stationary.

- Due to the lack of importance of the trend, the variables (gross domestic product, (LPIB)), and (external debt, (LDEX) are created using a DS (Difference Stationary) approach.

- The external debt is affected by a trend, which might lead to treating it as a TS (Trend Stationary) process. However, in order to make it stationary, it will be treated as a DS process to check for annoyance in the variance and mean, as indicated by the DS process. As a result, the DS procedure will distinguish the series.

2.6 Difference processes on the variables

same tests are employed on the series as they are on the variables, such as graph observation, auto-correlation function

calculation, ADF test, and Philips-Perron (PP) test. The third test, which is based on a non-parametric version of the Dickey-Fuller statistic to account for heteroscedastic errors, is a complement to the first two (Araujo, Brun, & Com, 2004).

2.6.1 Augmented Dickey-Fuller (ADF, 1981) and Phillips-Perron (PP, 1988) tests

The ADF tests showed results that were identical to the Eviews 5 program's maximum latency of 8. As a result, the lag 0 results are presented in the output variable of the None model in this study (gross domestic product: DLPIB). As shown in Table 03, the ADF and PP tests confirm the series' stationarity in first and second difference:

First difference: Augmented Dickey-Fuller and Phillips-Perron tests

ADF test

Table 3.ADF after first order difference

Variables	Values	Models	
		Constant	None
DLPIB	Calculated	-10.63450	-10.94548
DLDEX	Calculated	-12.55977	-12.62671
Mackinnon	5%	-3.040391	-1.961409

Source : The researcher based his findings on Eviews.

PP test

Table 4.PP after the first order difference

Variables	Values	Models	
		Constant	None
DLPIB	Calculated	-4.561274	-4.740306
DLDEX	Calculated	-6.910629	-7.121063
Mackinnon	5%	-3.052169	-1.962813

Source : The researcher based his findings on Eviews.

From the first-order difference, we see that all variables become stationary by the first-order DS process, I~(1).

3. Testing the causal relationship

The search for the appropriate latency is followed by the actual test of the causal link in this step (Damodar, 2003) .

3.1 Causality test: in the sense of Granger (1969) on differentiated variables, lag 3

When information on the first variable is put into the study, the second one becomes more predictable, indicating that one variable is the source of the other. This graph depicts the relationship between Algeria's external debt and economic development. The study is based on data collected over a period of 21 years.

The following are the study's hypotheses:

- ✓ According to the null hypothesis, one variable has no effect on the other.
- ✓ Another hypothesis is that the variable is the cause of the other variable.

When the computed Fisher's F probability is greater than the probability of 0.05, we may be persuaded to choose the hypothesis supporting the absence of causation in the sense of Granger. If the alternative hypothesis is accepted, the original hypothesis is discarded (MIGNON, 2008) .

The application of the causality test on the First Order Differentiated Variables at lag three (3) of the first differentiation reveals a single hypothesis that Insurance Density influences Primary Education at the fixed 5% threshold, as its probability is less than 0.05, so the null hypothesis is rejected. The causal direction is unidirectional. At the 10% threshold, we also see two causal relationships: one between Gross Domestic Product and External Debt, with a probability of 0.05 *0.00779* 0.10, and the other between External Debt and Gross Domestic Product, with a probability of 0.05 *0.00082* 0.10.

Table 5. Causality table at lag 3 with first order differentiated data

Pairwise Granger Causality Tests
Date: 10/04/13 Time: 17:02
Sample: 1990 2010
Lags: 3

Null Hypothesis:	Obs	F-Statistic	Probability
DLPIB does not Granger Cause DLDEX	17	7.07897	0.00779
DLDEX does not Granger Cause DLPIB		13.1965	0.00082

Source : The researcher based his findings on Eviews.

We performed a second differentiation of these two variables and performed stationarity tests to see if causation could be observed at the 5% level between gross domestic product and foreign debt.The hypothesis that the gross domestic product causes the foreign debt is revealed by applying the causality test to the differentiated second order variables at the 0.05 level. This hypothesis is accepted because, as indicated in Table Tab.05

below, its probability is less than 0.05 (i.e. 0.007790.05). It is self-evident that causation is likewise unidirectional.The external debt has a significant impact on GDP. A considerable reduction in foreign debt will have a considerable influence on household income and, more importantly, societal welfare.

As both a result, the hypothesis that foreign debt has an impact on economic growth in the Granger sense is upheld (probability = 0.030590.05).

Stability test residual series

This phase consists of testing the stability of a residual series all inclusive of the following hypothesis, ⟶ where: H0 : Ut I(0) (Greene, 2003)

We shall examine the stability of a residual series and the following hypothesis using the Eviews 5 program: H0: Ut = 0

The results of the ADF test for the residual series are shown in the table below:

Table 6. Results of residual stability tests

Null Hypothesis: D(E) has a unit root
Exogenous: None
Lag Length: 1 (Automatic based on SIC, MAXLAG=2)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-5.962461	0.0000
Test critical values:	1% level	-2.708094	
	5% level	-1.962813	
	10% level	-1.606129	

Source : The researcher based his findings on Eviews.

Table (6) shows that the estimated value TQJ is equal to (-5.962), which is lower than the crucial table values of (-2.708) (-

1.962) (-1.606) at the significance levels of 1 percent, 5 percent, and 10%, respectively.

The statistic was calculated (ADF) for the regression of the cointegrating residuals, and through the comparison of this statistic with the spreadsheet value that is equal to the statistically significant level at 1%, 5%, 10% in found the impossibility of accepting the null hypothesis that the residuals regression with joint unit root integration, Which means that these residuals are stable zero class I(0), And that the combined integration both variable external debt and economic growth.

The unit root and cointegration tests produce two conclusions, one of which is that the initial rates of the variables external debt and economic growth are inherently unstable.

The second major finding is the presence of a dynamic short-run connection between the model's variables, which we can characterize using the error correction model's process (pirotte, 2004) .

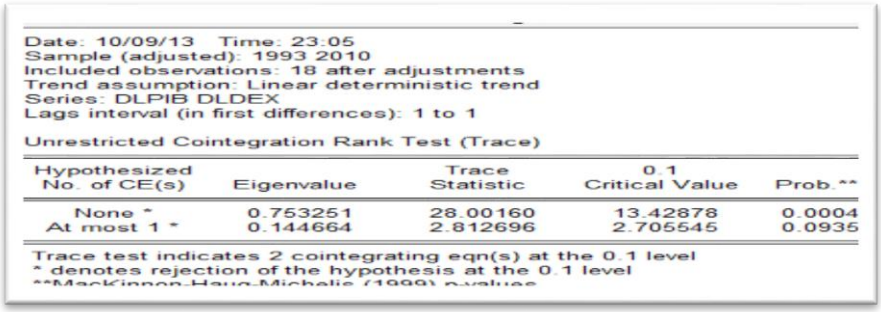
Therefore, we reject the nihilism hypothesis (Ho), which means that there is no unique root or the residual series is stable and integrated zero class Ut $\longrightarrow$ I(0).

As a result, when the significance level is 1%, 5%, or 10%, there will be a joint integration relationship between external debt and economic growth in Algeria, according to the above.

4. Johansen Cointegration Test

As a result, when the significance level is 1%, 5%, or 10%, there will be a joint integration relationship between external debt and economic growth in Algeria, according to the above.

Table 7. The results of the simultaneous integration tests



Date: 10/09/13 Time: 23:05
Sample (adjusted): 1993 2010
Included observations: 18 after adjustments
Trend assumption: Linear deterministic trend
Series: DLPIB DLDEX
Lags interval (in first differences): 1 to 1

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.1 Critical Value	Prob.**
None *	0.753251	28.00160	13.42878	0.0004
At most 1 *	0.144664	2.812696	2.705545	0.0935

Trace test indicates 2 cointegrating eqn(s) at the 0.1 level
* denotes rejection of the hypothesis at the 0.1 level
**MacKinnon-Haug-Michelis (1999) p-values

Source : The researcher based his findings on Eviews.

The null hypothesis of the vector's existence is accepted when the r = 1 test shows that trace (Value estimated for the maximum feasible percentage) is larger than the crucial value at the 10% significance level, (A static linear combination of external debt and economic growth rates is suggested by co-integration). This indicates they didn't move away from each other during the study time as long as they behaved similarly.

We discovered that there is a common relationship with the integration of the long-run relationship between the two variables and the significance level of 10% by the morale and impact test of the large potential value by using the Johannes impact criterion of the methodology and testing the potential value on External debt and economic growth rates, as shown in Table (7), We may go to the error correction model, which is concerned with short-run balancing connections, after running this test and confirming the presence of a stable link between the variables.

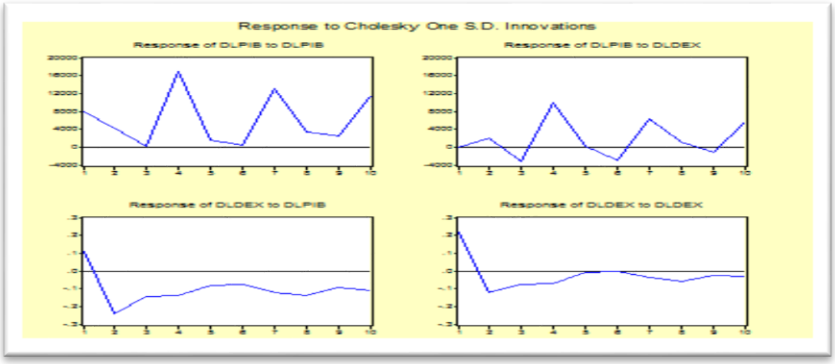
Table 8. The error correction model (ECM),

Vector Error Correction Estimates
Date: 10/11/13 Time: 22:50
Sample (adjusted): 1994 2010
Included observations: 17 after adjustments
Standard errors in ( ) & t-statistics in [ ]

Cointegrating Eq:	CointEq1	
DLPIB(-1)	1.000000	
DLDEX(-1)	52495.01 (3658.65) [14.3482]	
C	1388.243	
Error Correction:	**D(DLPIB)**	**D(DLDEX)**
CointEq1	0.775409 (0.33853) [2.29049]	-5.65E-05 (1.0E-05) [-5.44519]
D(DLPIB(-1))	-1.367763 (0.25778) [-5.30588]	3.44E-05 (7.9E-06) [4.35640]
D(DLPIB(-2))	-1.072196 (0.35850) [-2.99078]	1.75E-05 (1.1E-05) [1.59491]
D(DLDEX(-1))	-31227.27 (13179.3) [-5.14662]	1.402613 (0.40400) [3.56625]
C	1076.661 (2105.26) [0.51142]	0.027912 (0.06454) [0.43250]
R-squared	0.924420	0.814407
Adj. R-squared	0.890065	0.730046
Sum sq. resids	6.95E+08	0.653230
S.E. equation	7949.564	0.243689
F-statistic	26.90815	9.653886
Log likelihood	-173.0966	3.579882
Akaike AIC	21.07019	0.284720
Schwarz SC	21.36426	0.578795
Mean dependent	1294.118	-0.006753
S.D. dependent	23975.94	0.469021
Determinant resid covariance (dof adj.)		2942951.
Determinant resid covariance		1232170.
Log likelihood		-167.4504
Akaike information criterion		21.34710
Schwarz criterion		22.03328

Source : The researcher based his findings on Eviews.

Fig.4. Graphical representation of the error correction model



Source : The researcher based his findings on Eviews.

Figure (4) indicates that the level at the auto map link "Correlogram" remains constant, resulting to the following equation:

DLDEX=C(1)+C(2)*e

Table 9. The revised equation was used to calculate the results of the error correction model for the research variables.

Dependent Variable: DLDEX
Method: Least Squares
Date: 10/12/13 Time: 00:05
Sample (adjusted): 1991 2010
Included observations: 20 after adjustments
DLDEX=C(1)+C(2)*E

	Coefficient	Std. Error	t-Statistic	Prob.
C(1)	-0.116061	0.071397	-1.625562	0.1214
C(2)	-3.82E-06	4.97E-06	-0.767707	0.4526

R-squared	0.031705	Mean dependent var	-0.116061
Adjusted R-squared	-0.022089	S.D. dependent var	0.315830
S.E. of regression	0.319299	Akaike info criterion	0.649262
Sum squared resid	1.835134	Schwarz criterion	0.748836
Log likelihood	-4.492624	Durbin-Watson stat	2.018805

Source : The researcher based his findings on Eviews.

DLPIB=C(1)+C(2)*e(-1)

We can construct the following table using the preceding equation:

Table 10. Error correction model for the GDP variable

Method: Least Squares
Date: 10/12/13 Time: 00:11
Sample (adjusted): 1992 2010
Included observations: 19 after adjustments
DLPIB=C(1)+C(2)*E(-1)

	Coefficient	Std. Error	t-Statistic	Prob.
C(1)	5834.221	3398.842	1.716532	0.1042
C(2)	-0.178581	0.247637	-0.721140	0.4806

R-squared	0.029683	Mean dependent var	6052.632
Adjusted R-squared	-0.027395	S.D. dependent var	14558.21
S.E. of regression	14756.27	Akaike info criterion	22.13602
Sum squared resid	3.70E+09	Schwarz criterion	22.23544
Log likelihood	-208.2922	Durbin-Watson stat	2.109818

Source : The researcher based his findings on Eviews.

DLDEX =C(1)* DLCAA

The residuals of the test results are calculated using the aforementioned equation.

Table 11. Residuals test results error correction model

Null Hypothesis: D(RESID01) has a unit root
Exogenous: None
Lag Length: 0 (Automatic based on SIC, MAXLAG=2)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-4.382234	0.0002
Test critical values:	1% level	-2.699769	
	5% level	-1.961409	
	10% level	-1.606610	

Source : The researcher based his findings on Eviews.

Certainly, the trade-off will restore stability to this time series, but in this instance, we risk losing all information on the long-run behavior of these variables, which is inconvenient if our focus is on the long-run connection.

When estimating the error correction equation (ECV), we add the equation's error, as given in the table below, such that the error correction coefficients are the residuals of the e(-1) error limit operations.

DLPIB C E(-1)

Table 12. Results of the error correction equation when adding a limit to the variable DLPIB

Dependent Variable: DLPIB
Method: Least Squares
Date: 10/12/13 Time: 00:19
Sample (adjusted): 1992 2010
Included observations: 19 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	5834.221	3398.842	1.716532	0.1042
E(-1)	-0.178581	0.247637	-0.721140	0.4806

R-squared	0.029683	Mean dependent var	6052.632
Adjusted R-squared	-0.027395	S.D. dependent var	14558.21
S.E. of regression	14756.27	Akaike info criterion	22.13602
Sum squared resid	3.70E+09	Schwarz criterion	22.23544
Log likelihood	-208.2922	F-statistic	0.520043
Durbin-Watson stat	2.109818	Prob(F-statistic)	0.480624

Method: Least Squares
Date: 10/12/13 Time: 00:11
Sample (adjusted): 1992 2010
Included observations: 19 after adjustments
DLPIB=C(1)+C(2)*E(-1)

	Coefficient	Std. Error	t-Statistic	Prob.
C(1)	5834.221	3398.842	1.716532	0.1042
C(2)	-0.178581	0.247637	-0.721140	0.4806

R-squared	0.029683	Mean dependent var	6052.632
Adjusted R-squared	-0.027395	S.D. dependent var	14558.21
S.E. of regression	14756.27	Akaike info criterion	22.13602
Sum squared resid	3.70E+09	Schwarz criterion	22.23544

Source : The researcher based his findings on Eviews.

Most time series (particularly economic variables that reflect the whole or partial) are clearly unstable.

DLDEX C E(-1)

Table 13. Results of the error correction equation when adding a limit to the variable DLDEX

Dependent Variable: DLDEX
Method: Least Squares
Date: 10/12/13 Time: 00:28
Sample (adjusted): 1992 2010
Included observations: 19 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.129480	0.073391	-1.764250	0.0956
E(-1)	-6.69E-06	5.35E-06	-1.250844	0.2279

R-squared	0.084279	Mean dependent var	-0.121300
Adjusted R-squared	0.030413	S.D. dependent var	0.323590
S.E. of regression	0.318632	Akaike info criterion	0.649738
Sum squared resid	1.725944	Schwarz criterion	0.749153
Log likelihood	-4.172515	F-statistic	1.564611
Durbin-Watson stat	2.080764	Prob(F-statistic)	0.227934

Source : The researcher based his findings on Eviews.

There is a difference in equilibrium distance when the computed value is not equal to zero, or to put it another way, this value is computed to measure the distance between DLPIB and DLDEX from equilibrium, which is called an Imbalance.

And under the assumption of joint integration, the simple regression will suffice to give consistent results for the long-run factor, despite the existence of a link between the explanatory variables and the random errors, When the previous equation are estimated using the least squares method,An ordinary least squares (OLS) and ordinary least so, where joint integration is checked for the stability of the random variable, are also used to estimate the long-run connection.

Debt curve analysis is a novel and unique study that establishes a non-linear link between external debt and economic growth. The objective is to foresee the research's shortcomings and redirect emphasis on the relationship between Algeria's ultimate external debt load and economic growth.

The study's key finding is that external debt has a negative impact on Algerian economic growth throughout the time period studied.

5.CONCLUSION

The objective of this research was to see if there was a relation between Algeria's future external debt burden and economic growth. We wanted to keep to the rough drafts, especially the method that requires us to fold the data across a year's worth of data. Using modified debt indexes and concentrating on yearly data, Then, we'll introduce nominal sum counters to give the time period more weight.

We have solely evaluated the likely cost of reducing external debt using Algeria's economic growth as a baseline.The findings clearly demonstrate the uniqueness of the external debt - economic growth link; nevertheless, more investigation will allow for a better understanding of the dynamics of such a connection, including the debt crises that have afflicted many developing nations.

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