ISSN: 0975-833X

Available online at http://www.journalcra.com

International Journal of Current Research
Vol. 8, Issue, 03, pp.28779-28784, March, 2016

INTERNATIONAL JOURNAL OF CURRENT RESEARCH

RESEARCH ARTICLE

THE IMPACTS OF THE EXTERNAL DEBT ON ECONOMIC GROWTH IN TUNISIA

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ARTICLE INFO

Article History:
Received 30th December, 2015
Received in revised form
05th January, 2016
Accepted 27th February, 2016
Published online 31st March, 2016

Key words:

Debt, Economic growth, Debt service.

ABSTRACT

The dynamics of the external debt is still a phenomenon little discussed in the literature for the Tunisian context and the previous work on this theme does not give to the Researchers of the techniques sufficient to deal with it. The objective of this research is to explain the effects of the external public debt on economic growth for Tunisia on the period 2000-2015. To analyze this impact, we issued a hypothesis that the public debt outside negatively affects economic growth. As a result of this finding, the question to which we will try to provide a response to the end of this research is: What is the impact of level of indebtedness on economic growth in Tunisia. It is clear from the results of this research that the rate of total investment affects positively and significantly the economic growth for the horizon of the long-term. In contrast, the rate of inflation, the service of the debt and the rate of population growth act negatively and significantly on economic growth in the short term.

Citation: Samout Ammar, 2016. "The Impacts of the External Debt on Economic Growth in Tunisia", *International Journal of Current Research,* 8, (03), 28779-28784.

INTRODUCTION

The relationship between external debt on economic growth can differ from one country to the other, taking into account its specificity. In effect, as shown by the results of the empirical work already cited, they remain contradictory as to the nature of the relationship between external debt and growth, according to the panel of selected countries and the period of the study. The purpose of this research is to highlight, through an empirical analysis, the impact of the public debt outside on the economic growth of the Tunisia. The indebtedness therefore allows a country to invest capital beyond its own financial availabilities by borrowing of capital surpluses (Klein, 1994). The debt thus created is supposed to generate growth and development. But to generate resources and be able to repay the loan, the debt must be used wisely and in productive sectors. It seems that the debt and their impact on economic growth is at the center of the debates of the literature in economics and finance. In this context, the question to which we will try to provide a response to the end of this research is: ***"What is the impact of the external debt on economic growth in Tunisia?***

Framework of analysis and assumptions

Theoretically, the public debt is the result of a macroeconomic imbalance internally between the resources available and the commitments to honor in terms of the necessary expenditure. The public debt can be defined as the set of borrowings and guaranteed by a State. In the area of public finance, the public debt represents the whole of the financial commitments in the form of borrowing by the State, public communities and the organizations which depend directly on (PIRIOU, 2003). According Dembinski (1989), the external debt is defined as a debt incurred by a country with foreign creditors when the latter wants to finance a policy of productive investment and economic and social infrastructures in order to accelerate the economic development.

Evolution of the level of debt in Tunisia

Tunisia, as most of the countries, should not only be concerned to ensure the progress and the sovereignty but also to create a favorable environment to increase the economic growth in order to meet the well-being of the population. Due to the lack of own resources and the national savings, the State may resort to foreign capital in the form of borrowing. The borrowed capital allow the financing of the investments and to cover the deficits of the current account balance and budget deficits .The external debt represents a vicious circle for the Tunisian economy and the service of the debt is today the first budgetary position with nearly 50% of the budget of the State. Of this fact, it is important for a country to borrow abroad in order to adjust its revenue and expenditures. This possibility of borrowing provides broad prospects, but this may also expose the country to serious dangers.

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Today, Tunisia is in debt to consume, to replenish its stock in currency", however, the net assets in foreign currencies remain at an acceptable level through the mobilization of external resources, to 11.475 BAT or the equivalent of 103 days of import. "(Source news release of the BCT in date 26 March 2014) and cover the deficit of the trade balance. In addition, Tunisia is in debt to fill the budget deficit seen that we spend more than we produce. The Tunisia request the assistance to fill the holes of the poor management of a government, of almost 100 ministers amateurs and their 600,000 employees of the public administration. In another context, the public debt of the Tunisia in this year of 2014 is 41 754 million dinars. According to the website of the Department of Finance This amount corresponds to 48.9% of GDP. In 2010, this sum amounted to 25 639.9 million Dinars According to the Finance Act of 2015 the whole of the Tunisian debt will reach the record Sum 47 306 MDT is 52.9% of GDP. The public debt of the Tunisia, whose economy has been severely affected by the instability that has followed the revolution of 2011, has increased 58% in four years.

Table 1. Public Debt of the TUNISIA 2015 (MDT)

Nature	Public debt 2014	Public debt 2015	Evolution
Internal debt	15 812,80	18 006,00	12.18%
External debt	24 808,50	29 300,00	15.33%
Public Debt	40 621,30	47 306,00	14.13%
% of GDP	49,20%	52,90%	

Source: Ministry of Finance of Tunisia

Theoretical justified

The relationship between external debt and economic growth has been the subject of several empirical work. It is in this sense that the empirical studies including those of Krugman (1988), Sachs (1989) and of Calvo (1989) have shown that the accumulation of debt and debt service constitutes a tax on the future production and discourage investment by effect of eviction. Indeed, the debt seems to have a global impact on the negative growth when the debt represents between 160 and 170% of exports, and 35% to 40% of GDP (VAN) or 50% of GDP (Nominal Value) according to the Bretton Woods institutions. Krugman (1988) and Sachs (1989) predict that a high debt is harmful to economic growth when it discourages investment. For these authors, when the debt exceeds the internal resources of a country, that country may no longer be able to repay the loans of the past, which will have a deterrent effect on creditors and potential investors. The work of K.O.Ojo (1980) have analyzed the relationship between the degree of indebtedness and certain macroeconomic variables by an econometric approach. The model has as variables the stock of the debt in relation to GDP, the ratio service of the debt in relation to exports, the terms of the exchange, the ratio of imports to GDP ratio, the rate of growth of GDP, the population. The result obtained from the regressions is that the rate of growth of GDP evolves in the opposite direction of the debt of the country.

In addition, Borensztein(1990) concluded by an econometric study on the data of the debt of the Philippines that the stock and the ratio of debt service/exports have overall a reverse effect on the training of private capital and encourage the debt of the country. In addition, Rougier (1994) found contrasting results within the African countries, the stock of outstanding debt to GDP has a depressive effect on the growth in Côte d'Ivoire, Mali and Chad on the period 1970-1991. In contrast, the effect is positive for the Niger, Madagascar and Kenya.
In the same Register of analysis, Adedeji (1991) has shown that the continuous increase of the external debt and debt service payments constitute a threat to the economic recovery of the countries of the sub-Saharan Africa. Payments to the title of the service of the debt has increased faster than the actual disbursements. This is reflected in the immediate future by a sharp drop of financial transfers to the Black Africa. Indeed, the sharp fall of financial transfers to Africa and the inadequacy of domestic savings, at the continental level, are effects contrary to the growth and economic development. Yapo (2001) located in an empirical study that the rate of growth of GDP evolves in the opposite direction of the indebtedness in the Ivory Coast. Therefore, an economic growth rate high enough reduces the opportunities of indebtedness that leads to the conclusion that the macroeconomic performance tend to limit to a certain proportion of the constraints related to the needs in external capital.

Ojo and Oshikoya (1995) have found that African growth is explained positively by the investment rate, negatively by the rate of growth of the population, positively by exports, positively by the real exchange rate. This specificity has been analyzed in detail by Collier and Gunning (1997). They concluded that four factors play an important role in the low performance in Africa in terms of growth: Low opening of the market of goods (the fact of numerous distortions), lack of social capital (splitting ethnic socio, respect of contracts), high risks (especially at the level of the inflation) and low performance of public services. The weakness of the financial sector also plays a role but less important.

The assumptions that we will test in this regard is the following:

H1. There is a positive effect of the rate of investment on the economic growth of the Tunisia.
H2.There is a negative effect of debt service on the economic growth of the Tunisia.
H3.There is a negative effect of the general index of prices on the economic growth of the Tunisia.
H4.There is a negative effect of the rate of population growth on the economic growth of the Tunisia.

Research Methodology

To analyze the impact of external debt on economic growth in Tunisia, we proceed via three tests. The first is to test the significant increase of the correlations between the variables studied. However that the second test concerns the cointegration which is developed by Johansen (1991.1995), from this test we will try to know the degree of cointegration between the variables studied. The third test relates to the analysis by pure regressions know the significance of the variable and the link between external debt and economic

growth. The objective of this research is to explain the effects of the external public debt on economic growth for Tunisia on the period 2000-2015. Our study therefore is based on the determination of the relationship between the debt and the economic growth, the variable used in this study is other than variables macro economic. To this effect, the data that will serve as the basis for the analysis are annual data.

Model and measuring variables

The main objective of this study is to analyze the impact of external debt on per capita economic growth in Tunisia. In a specific way, the study is to analyze the external debt of the Tunisia and to establish a link between the external debt and the economic growth in Tunisia by an econometric approach. We consider the following model:

$$Y_i = a_o + a_1 X_{i1} + a_2 X_{i2} + \ldots + a_p X_{ip} + \varepsilon_i, \qquad i = 1, \ldots, n$$

With: $\varepsilon_i$is the error of the model which expresses, or summarizes, the missing information in the linear explanation of the values of Yi from X_{i1},…. ;X_{ip} (problem of specifications, variables not taken into account, etc.).

A_0, A_1,….,A_p are the parameters to estimate.

In effect, all the variables of the model with the exception of variables DPIB and SDX, have been transformed in logarithmic form

We believe the coefficients using the following model:

PIBRH= a_0 +B_1INV+ b_2SED+ + B_3 IPC+ b_4 TCD + ε_i

It is necessary at this level of our work to clarify our approach given that there are several conceptual models explaining the relationship between the public debt and the economic growth. As well, we will analyze the relationship which exists the debt and the economic growth in Tunisia. To this effect, in order to be able to respond to our research questions, we will detail the research variables in defining the practical indicators capable of measuring these variables. We have chosen the model developed by Patillo *et al*. (2002) that we have adapted to the context of Tunisia. To show the relationship between the debt and the economic growth, these authors have specified a model in which the rate of growth of real GDP per capita is the endogenous variable. In a complementary study conducted in 2004, these authors were able to identify the channels through which the external debt affects the income per head. These are notably the investment rate, the ratio of public debt to GDP, the rate of population growth and inflation.

Dependent variable

We studied as the dependent variable the income per head (PIBRH) which represents e Gross Domestic Product or GDP is defined as the sum of the Values Added carried out inside a country by all branches of activity (which adds the VAT and customs duties), for a given period, regardless of the nationality of the companies that are there. The income per head (or GNI per capita, or per capita income), is defined as the gross national income (GNI) for a year, divided by the total number of inhabitants, this for a given country or region).

Independent variables

In this study, we are going to retain 4 independent variables:

The rate investment (INV): The rate of investment is the share of investment in relation to the wealth produced.

The total of the service of the public debt as a percentage of exports (SED): The ratio of debt service to export is considered as one of the criteria the privileged to evaluation of economic policies

The Consumer Price Index (CPI): the Consumer Price Index (CPI) is the instrument for measuring inflation. It allows to estimate, between two periods data, the average variation of prices of products consumed by the households. It is a synthetic measure of the evolution of the prices of products, to constant quality.

The rate of population growth: the rate of population growth is a demographic indicator which allows you to know the increase of the population at a given time. The demographic growth corresponds to the sum of the natural balance and the balance of migration, calculated in general for a year. The size of a population increases when there is a surplus of births over deaths (natural balance) and of entries of migrants on the outputs (migration balance). The annual growth rate is the ratio between the variation of the population during the course of a year and its workforce in the middle of the year. The whole of these factors involved in the explanation of the relationship between external debt and economic growth in Tunisia, can be presented in the following Figure:

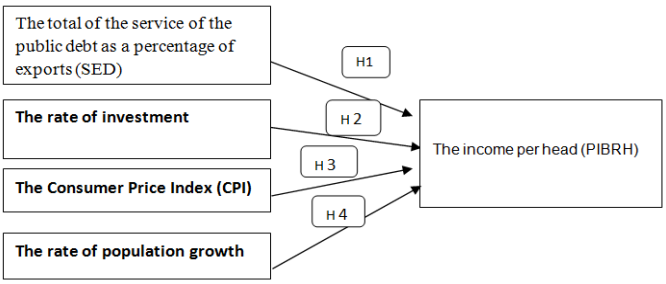

Figure 1. Search Model

The Figure (1) summarizes the assumptions made. The model established includes the various determinants of the indebtedness that we have been able to identify in the literature. The empirical study will test the whole of these assumptions to determine, by the explanatory variables, those who are non-discriminatory for the dynamics of the debt.

Econometric analysis of the determinants of debt

After having presented our model of research, our assumptions, our sample, the techniques selected as well as the preferred tests, we are going to proceed to the actual analysis of the data, their interpretation and the audit of our assumptions.

Table 2. Stationarity in level

Stationarity in level: emerging countries					
The variables	PIBRH	SED	INV	IPC	TCD
Model	With constant And Trend	With constant And Trend	With constant And Trend	With constant And Trend	With constant And Trend
Likelihood	0.3256	0.425	0.223	0.06	0.43
Stationarity	No	No	No	No	No

Table 3. Stationarity of differentiated series

Stationarity in level: emerging countries					
The variables	PIBRH	SED	INV	IPC	TCD
Model	Without constant Or trend	Without constant Or trend	Without constant Or trend	Without constant Or trend	Without constant Or trend
Likelihood	0.000	0.0021	0. 0002	0.0017	0.004
Stationarity I(1)	Yes	Yes	Yes	Yes	Yes

Table 4. Test table of Johansen

No. of cointegrating relationship	Clean value	Trace statistics	Critical value 5%
No	0,74256	95.6521	80.625
At most 1*	0,58256	63.2652	60.452
More than 2	0,36254	31.6995	41.259
At most 3	0,28562	18,3265	23,192

* indicates that we must reject H^1 and go to the second iteration.

Table 5. Matrix of correlations

	PIBRH	SED	INV	IPC	TCD
PIBRH	1.000000	-0.295056	0.26589	-0.65325	-0.236523
SED		1.000000	-0.103630	0.5326350	0.3682627
INV			1.000000	-0.094352	-0.102680
IPC				1.000000	0.0012365
TCD					1.000000

Study of the stationarity

Stationarity of the series in level

We test Here the assumptions:
H^0: the series in level is non-stationary
H^1: the series in level is stationary
The application of the test of unit root test series in level allows us to draw the following table:

The Table (2) relating to the ADF test shows a value of t statistics lower in absolute value the critical values at the threshold of (5%). The variables studied are therefore non-stationary. Accordingly to this non stationarity, we turn the test level to the first differentiation (variation of the index).

Stationarity of differentiated series

We test here the hypothesis:
H^0: the series in first difference is non-stationary
H^1: the series in first difference is stationary
The application of the test of unit root test of differentiated series allows us to draw the following table:
The Table (3) relative to the ADF test indicates to us that the t statistics of the variables studied are widely higher in absolute value to the threshold of (5%). We conclude that the indices relating to these countries are integrated of order (1) or I(1).

Test of Johansen

The assumptions of the test are:

H^0: the presence of at least one cointegrating relationship
H^1: absence of cointegration relationship between the variables
The application of the test of Johansen allows us to draw the table below

The results of the test of the trace for the three countries, we show that the variables studied in the model are cointegrated at the threshold of 5%. The null hypothesis of the absence of cointegration, is rejected on the fact that the test of the Trace indicates a cointegrating relationship. The disadvantage of this model is that it does not allow us to detect the direction of causality between the variables.

Correlation Test

The results of the correlation analysis per capita gross domestic product, rate of investment, debt service, rates of population growth and price index of consumption are represented in the Table (5).

The PIBRH is negatively correlated with the service of the debt. Also, the PIBRH variable is negatively correlated with the price index of consumption. This means q' a high rate of

inflation reflects an internal environment unfavorable to private investment and is therefore negatively on the growth rate of GDP. In addition, PIBRH is negatively correlated with the rate of population growth. This means that any increase in population is so to reduce the growth of Tunisia. On the other side, the dependent variable (PIBRH) is positively correlated with the rate of investment. Any increase in the level of investment allows to support the economic growth of the Tunisia. However, the correlations do not highlight that an association without mean that there is between the variables concerned a causal relationship. In addition, it presents a major inconvenience to never reasoning on more than two variables at a time (TSAPI, 1997). Using the test of multiple regression we will try to answer this question.

Regression analysis

Table 6. Analysis by regression

The variables	C	SED	INV	IPC	TCD
The coefficients	8.42	-0.031	0.020	-0.116	-0.043
Difference- type	0.2026	0.002	0.0036	0.0135	0.00563
T-Statistic	32.025	-1.223	1.635	-9.574	3.832
Likelihood	0.000	0.066	0.0125	0.000	0.001
Prob (F-statistic)			0.000		
F-statistic			45.23		
R^2			0.965		
Adjusted R^2			0.926		

Based on the Table (6), we note that the explanatory power of this model is acceptable (R adjusts=0.965) and their overall significance can reject the null hypothesis which stipulates that the coefficients are all zero (F=45.23, p<0.05). The result of the model shows that the sign of connection between the variables studied and the dependent variable (real GDP per capita) are statically significant. As it is anticipated the level of innovation, the population growth and the debt to GDP ratio are negatively linked with the success of SMES respectively (B=-0.116 P<0.05; B=-0.043 P<0.05; B=-0.031 P<0.05). The analysis of the overall quality of the model can be performed through the coefficient of determination of the model (R2). Indeed, the coefficient of determination explains the part of the variability of the dependent variable which is explained by the exogenous variables considered at the level of the model. Of this fact, this coefficient is equal to 0.965 for the relationship of LT C is to say that the fluctuations in the rate of growth of real GDP per head are explained to 91.3 to Lt, by the variables selected. In another context in referring to individual quality of exogenous variables assessed by the test of student (T-STAT). The critical probabilities associated with different coefficients we indicate that some variables reflecting this relationship and the Confidence Threshold of 5% are statistically significant (INV, IPC, TCD).

The coefficient of the consumer price index is negative and statistically significant. It indicates that an increase of the rate of inflation of 10% results in a decrease of the GDP of 1.16%. A high rate of inflation reflects an internal environment unfavorable to private investment and is therefore negatively on the growth rate of GDP. According to the literature the investment has a positive impact with economic growth. In accordance with the economic literature, it is clear from our regression that the investment has a positive and significant impact on real GDP per head. In effect, an increase of 10% of the latter leads to an increase in the economic growth of 0.20% always on the long term. In contrast, this influence remains very low as a result of the low level of investments in Tunisia. This situation is explained by the adverse effects of the Tunisian revolution on employment and on the investment.

For the variable rate of population growth, the sign of the coefficient is negative and statistically non significant. The demographic growth negatively affects economic growth. Therefore any increase in population is so to decrease the economic growth. Any increase in this variable 10% causes a decrease in the economic growth of 0.43%. The increase in the service of the debt has negative effects on the economic growth of the Tunisia. Its coefficient indicates that an increase of 10% of the debt service, leads to a decrease of 0.31% of the PIBRH.

Conclusion

The purpose of this research is thus to develop, through an empirical analysis, the impact of the public debt outside on economic growth. We have tried to establish a link between the level of debt and the economic growth in Tunisia. We studied as the dependent variable the income per head (PIBRH). Theoretically, we found that the growth is explained positively by the investment rate, negatively by the rate of growth of the population, by te service the debt and by the consumer price index. Empirically, the results found are, in majority, consistent with what we find in the literature. We can make certain recommendations to consider policies that militate in favor of a debt sustainability and a sustained growth:

- The rate of investment is significant with the expected sign although it is considered only that the rate of public investment.
- The coefficient of the index price to the consumer, as to him, has a negative sign and is significant
- The coefficient of population growth rate is significant and its expected sign confirms the literature on the growth that it negatively influence;
- The service of the debt to a negative impact on the growth of Tunisia and its coefficient is significant.

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