Sosyal Bilimler Dergisi / The Journal of Social Sciences

Akademik Sosyal Arařtırmalar Dergisi, Yıl: 8, Sayı: 52, Haziran 2021, s. 408-424

ISSN: 2149-0821 Doi Number:<http://dx.doi.org/10.29228/SOBIDER.51523>

Mr. Mohamed AIT EL FAKIH

Selçuk Üniversitesi İktisat Bölümü Yüksek Lisans Öğrencisi,
mohamed.aitelfakih@lisansustu.selcuk.edu.tr

THE IMPACT OF PUBLIC DEBT ON MOROCCAN ECONOMIC GROWTH: ARDL APPROACH

Abstract

In this study, we investigate the impact of public debt (External-domestic debts) on Moroccan economic growth in both the short and long-run during the period time of 1998-2018 drawing on The ARDL (Autoregressive Distributed Lag Bound test) model. The ARDL approach aims to test the existence of a long-run relationship among the variables included in a model. The results show that external debt has a negative and statistically significant effect on economic growth in both the long and short run. In addition, domestic debt has a negative and statistically significant impact on economic growth in the short run. Nonetheless, it has a negative and insignificant influence on economic growth in the long run. Moreover, it can be perceived from the Granger causality test that there is only one unidirectional causality running from GDP per capita to External debt. Based on the findings, we concluded that the government should minimize public debt in order to improve economic growth. To put it another way, the Moroccan government should seek techniques or strategies for reducing debt, or the debt borrowed by the government should be utilized properly, such as using debt to encourage and stimulate investments and therefore accelerate economic growth.

Keywords: Public debt, Economic growth, ARDL, Morocco

KAMU BORÇUNUN FAS EKONOMİK BÜYÜMESİ ÜZERİNDEKİ ETKİSİ: ARDL YAKLAŞIMI

Özet

Bu çalışmada, 1998-2018 döneminde kamu borcunun (Dış-iç borçlar) hem kısa hem de uzun vadede Fas ekonomik büyümesine etkisini ARDL (Otoregresif Dağıtılmış Gecikme Sınır testi) modelinden yararlanarak araştırdık. ARDL yaklaşımı, bir modele dahil edilen değişkenler arasında uzun vadeli bir ilişkinin varlığını test etmeyi amaçlamaktadır. Sonuçlar, dış borcun hem uzun hem de kısa vadede ekonomik büyüme üzerinde olumsuz ve istatistiksel olarak anlamlı bir etkiye sahip olduğunu göstermektedir. Ayrıca, iç borcun kısa vadede ekonomik büyüme üzerinde olumsuz ve istatistiksel olarak önemli bir etkisi vardır. Bununla birlikte, uzun vadede ekonomik büyüme üzerinde olumsuz ve önemsiz bir etkiye sahiptir. Dahası, Granger nedensellik testinden kişi başına GSYİH'den Dış borca doğru giden tek yönlü bir nedensellik olduğu anlaşılabılır. Sonuçlara baktığımız zaman, hükümetin ekonomik büyümeyi hızlandırmak için kamu borcunu azaltması gerektiğini, başka bir ifadeyle, Fas hükümetinin borcunu azaltılabileceği veya hükümetin ödünç aldığı borcun akıllıca kullanılabileceği yöntemler veya stratejiler aranması gerektiği görülmektedir. Örneğin; yatırımları teşvik etmek ve canlandırmak için borcun kullanılması, ekonominin daha hızlı büyümesini sağlayacaktır.

Anahtar kelimeler: Kamu borcu, Ekonomik büyüme, ARDL, Fas

INTRODUCTION

Before we get started on the topic of public debt and its relation to economic growth. For the benefit of readers and to establish a shared understanding, it is necessary to provide an overview of public debt. The term "public debt" refers to any financial commitments made by the government, public authorities, and entities directly reliant on them in the form of loans. Furthermore, public debt is continually changing as a result of the government's and public administrations' loan repayments and the new loans they take out to cover their deficits. In truth, government earnings seldom cover all of the government's expenditure. As a result, borrowing is a need for nations. ('Le dico du commerce international')

In reality, the government must preserve its financial resources in order to satisfy its funding requirements. When a negative balance results in a financial imbalance, economic agents turn to either internal or external funding.. ('Le dico du commerce international')

This situation started debates related to the effect of public debt on economic growth, see also the interest was transformed from simple research of the causal effects between economic magnitudes to deep studies which aim the definition of the worrying threshold beyond which public indebtedness could negatively impact the major macroeconomic balances and destroy the possibilities of high and sustainable growth. (Hind Es-Sounboula,2019)

The federal government's debt is a major economic problem. For centuries, the influence of sovereign public debt on the economy has been one of the most significant problems in current macroeconomics. In other words, the issue of the national debt has arisen as one of the

most important challenges in international relations in recent decades, and it is now considered as a key topic in international forums. (Guisse, 2016)

In fact, developing nations' public debt has reached significant levels, making the study of the function of foreign debt in funding development a particularly important and yet relevant academic area. In truth, indebtedness, like all other economic factors, has an irrefutable impact on a country's economic growth.

The concern is, however, how this variable affects the growth rate, particularly in Morocco. Sincerely, in a debt economy, the degree of foreign borrowing threatens the country's bankruptcy. Furthermore, the Moroccan financial market economy's expansion may be hampered by the prevalence of domestic public debt. This worrisome condition has the potential to harm not just Mo, but also the rest of the world. This worrying position is threatening not just Morocco's economic and social stability, but also its vulnerability and sovereignty. (El Bettoui and Ouia, 2018)

Therefore, does the public debt contributes to Moroccan economic growth or the reason that exacerbates it?

Aside from this introduction, this paper contains seven sections. Section 2 gives an overview of public debt and economic growth in Morocco, Section 3 covers theoretical literature, Section 4 discusses the previous studies, section 5 describes data used and methodology, section 6 presents empirical results, section 7 concludes.

OVERVIEW OF PUBLIC DEBT AND ECONOMIC GROWTH IN MOROCCO

FIG 1. Evolution of Moroccan Debt Outstanding (million of DH)¹

¹ <https://www.finances.gov.ma/>

The chart above gives a breakdown of the evolution of Moroccan treasury debt between 1998 and 2018. Overall, it can be seen that general trends show an increase in both domestic and external debts all over the years except 2007 and 2008. Looking at domestic debt, it has been increased dramatically from 130 million DH in 1998 to 575 million DH in 2018, which implies an evolution of 342%. Besides, outstanding domestic debt in 1998 represented 35% of GDP while in 2018 it jumped to peak at over 52% of GDP. Moreover, as it can be viewed that domestic debt kept increasing from 1998 to 2006, then decreased in the two following years (2007, 2008), where it reached 264 and 257 million DH respectively. In 2009 outstanding domestic debt declined a bit and started rising continuously till 2018.

When outstanding domestic debt registered a rise between 1998 and 2006, outstanding external debt has seen a downward trend, it diminished from 126 million DH in 1998 to 65 million DH in 2006. Whereas in the following year began growing to reach approximately 148 million DH in 2018, which means an upsurge of 128% between 2006 and 2018. It worth noting that outstanding external debt became representing 13,4% of GDP in 2018, where, it represented only 10% of GDP in 2006. Related to the Government Debt Outstanding % of GDP, we can observe that, it is almost the same both in 1998 and 2018, 66% and 65% respectively.

As well as, between 1998 and 2000 Government Debt Outstanding remained stable. After that, it started to decrease slightly, where it recorded 56% in 2000 compared to 1998. This diminishes attributable to the dramatic decrease in external debt which decreased by 54% between 2000 and 2004. Furthermore, as shown in the graph Government Debt Outstanding sharply increased in the last ten years from 45% to 65%. That reflects the significant increase in both external and domestic debts.

All in all, the outstanding external debt of the treasury has decreased by 94% between 1998 and 2006, from 126 to 65 million DH, then register an increase of 128%, in other words, an increase from 65 billion DH in 2006 to 148 billion in 2018. The outstanding domestic debt of the treasury had a first upward trend until 2006 to reach 266 million DH, before stabilizing in 2008 to 258 billion DH and then came back to a situation of the uptrend to reach 575 billion DH.

Using the time series ARDL methodology, we explore the effects of public debt on economic growth in both the short and long term. In general, this research will help to improve knowledge of the problem of excessive public debt and its impact on Moroccan economic activity. Furthermore, it will provide the government with information on the debt approach that policymakers should employ.

THEORETICAL LITERATURE

In response to the Harrod-Domar model, Robert Solow published in 1956 a growth model that is being used today. While Domar's Harrod model was pessimistic (reaching balance is unattainable if we "let it happen"), Solow's model is optimistic since he believes growth is sustainable and constant.

Solow's model is predicated on a number of simplifying assumptions, the bulk of which are derived from neoclassical theory. He envisions a world in which there is just one good and one agent (the "community"), and neither unemployment nor disorder exists. In this universe, production is dependent only on two factors: labor and capital. Additional assumptions include

that the factors of production are variable (rather than fixed in the Harrod-Domar model), that falling returns exist, that consistent returns to scale exist, and that all savings are reinvested.

In Solow's model, the rise in factors of production (labor and capital) explains a portion of the increase. As a result, there is expansion owing to population growth (labor component) and investment (capital element). The majority of the increase, on the other hand, is due to a "residual factor" that cannot be explained by these two factors. This is technical progress, the origin of which we do not really know (some say it is a factor "fallen from the sky"). The causes of growth (population increase and technical progress) are therefore exogenous: the model does not explain their origin.

This model is in a stable equilibrium: in the long term, the economy converges towards a "stationary state", where economic activity evolves at the same rate as the population.

The component substitutability hypothesis is important because it shows that growth leads to full employment. When there is a labor shortage, for example, the cost of labor reduces. Entrepreneurs can replace capital with labor and thereby hire, lowering unemployment. As a consequence, growth would provide full employment. Others, however, believe that this interpretation is incorrect since the model is based on exceedingly basic assumptions. (Bénicourt & Guerrien, 2008).

LITERATURE REVIEW

Several studies have been conducted to examine the relationship between public debt and economic growth to determine if the debt has a positive or negative impact on growth. In this context, Panizza and Presbitero (2014) suggest that just because debt has a positive effect on economic growth does not imply that a country is deeply in debt. In other words, each country has a debt ceiling that it cannot surpass; if that debt ceiling is crossed, growth slows. Furthermore, Eberhardt and Presbitero (2015) discovered that public debt hurts economic growth in the long run after studying the link between public debt and economic development using large panel countries.

There are contradictory outcomes throughout Africa. Moki (2012), for example, discovered that an increase in public debt leads to an increase in GDP and vice versa after researching the relationship between public debt and GDP in 53 African countries. To put it another way, he concluded that public debt had a significant positive impact on economic growth. Similarly, OwusuNantwi and Erickson (2016) contend that public debt benefits economic growth in Ghana, meaning that public debt has a substantial, positive, and significant influence on economic growth both in the long run (based on Johansen cointegration analysis) and in the short-run (drawing on Granger Causality). Speaking of Nigeria, Egbetunde (2012) affirms that there's a positive correlation between public debt and economic growth in the long run. However, in east Africa, different results were found, where Babu, Kiprop, Kalio, and Gisore (2014) ended up supporting the idea that the government ought to decrease external debt to have faster economic growth since the external debt harms economic growth. In the same way, Blake (2015), asserts that the Jamaican government must look for methods or strategies whereby debt could be reduced. Because the high level of debt in Jamaica decreases economic growth heavily.

The same may be said for Asia's emerging and developing economies. In this regard, Pakistan's findings indicate a debt overhang effect problem, i.e., the relation between public debt and GDP is negative and large, both in the short and long run (Akram, 2011). Lee and Ng (2015) obtained a similar finding in Malaysia, stating that public debt has a negative influence on Malaysian economic development and that foreign debt has a negative influence on Malaysian economic growth. As a result, the government of Malaysia should discourage the usage of public debt. Furthermore, overall debt has a negative influence on Bangladesh's growth, showing that the country is dealing with a debt overhang. (2012); (2012) (Akhter & Hassan). Nonetheless, Mohanty and Mishra (2016) contend that India's public debt should not be regarded as a burden and that the government may expand it to achieve greater economic growth. This implies that in India, public debt and economic growth have a significant positive relationship. According to Fincke and Greiner (2015), the relationship between public debt and GDP is significantly favorable in rising nations. According to Fincke and Greiner (2015), the positive connection may be attributed to those countries' high growth rates.

In terms of Europe, Baum, Checherita-Westphal, and Rother (2013) contend that, while public debt has a positive influence on economic growth in the short run, seeking to decrease debt harms economic growth in the long run. However, when debt levels are high, reducing them has a beneficial influence on economic growth. In this regard, a study done on the European Union by Mencinger, Aristovnik, and Verbic (2014) reveals that a low level of public debt has a positive influence on economic growth, but a high level of debt has a negative influence on economic growth. It's also worth noting that Balassone, Francese, and Pace (2011) revealed similar findings in Italy, specifically, a negative link between public debt and economic growth.

Concerning Morocco, there are debatable results. For instance, As reported by Nor-Eddine and Chkiriba (In the case of Morocco, the results are debatable. According to Nor-Eddine and Chkiriba (2019), an increase in public debt causes a decline in the Moroccan economic growth rate. External debt, according to Nor-Eddine and Chkiriba (2019), has a detrimental influence on economic growth both in the short and long run. Furthermore, he believes that foreign debt and Moroccan economic growth go in opposite directions (basing on ARDL between 1988-2016). that Moroccan economic growth and foreign debt run in opposing ways (basing on ARDL between 1988-2016). Moroccan public foreign debt, according to Hind Es-Sounboula (2019), has a favorable influence on GDP growth since it does not surpass the critical debt level (basing on the VAR model and causality techniques 1998 to 2017). El Bettoui and Ouia (2018) further confirm that Moroccan government debt has a beneficial influence on GDP growth.

As a consequence, from 1998 to 2018, we employ the ARDL (Autoregressive Distributed Lag Bound Test) model to determine if public debt (both external and domestic debt) helps Morocco's economic progress (21 years). In this approach, we will be able to confirm or refute the previous study on Morocco. In other words, we will show if the public debt has a positive or negative impact on Moroccan economic growth.

METHODOLOGY AND DATA

The main purpose of the study is to examine the relationship between public debt (external and domestic debt) and economic growth in both the long and short run basing on ARDL (Autoregressive Distributed Lag Bound Test) model and that between 1998-2018 in Morocco. It's worth mentioning that the ARDL bound testing approach is used to test long-run equilibrium relationships among economic growth, external and domestic debt.

It's noteworthy that Domestic debt and External debt data were collected from the Ministry of economy, finance, and administration reform however GDP per capita data were gathered from the World development indicator.

Table 1. Data source and variable definition

Variables	The definition	Source
GDPK	GDP per capita(current LCU)	World development indicator
EXD	External debt(% GDP)	MEF
DD	Domestic debt (%GDP)	MEF

RESEARCH MODEL

The ARDL bound test model and Granger causality test will be used in this work. In addition, the LM test, heteroskedasticity test, and stability test will be used to assess the model's perfectness and health. The Dickie Fuller (ADF) test will also be used to determine whether the time series is stationary. We will employ a model in which GDP per capita is the dependent variable and external debt (% GDP) and domestic debt (% GDP) are the independent variables.

The relationship between external-internal debt and economic growth can be assessed by the following function:

$$GDPK = f(EXD, DD)$$

We have chosen a dependent variable "GDPK" as an indicator of economic growth and two independent variables as mentioned above. Thus, the model is designed as follows:

$$GDPK = \alpha_0 + \alpha_1 EXD + \alpha_2 DD + \mu$$

After taking LOG:

$$\ln GDPK = \alpha_0 + \alpha_1 EXD + \alpha_2 DD + \mu$$

- $\ln GDPK$: GDP per capita logarithm
- EXD: External debt (%GDP)
- DD: Domestic debt (%GDP)

EMPIRICAL ANALYSIS

Table 2. Descriptive statistics

	LNGDPK	EXD_	DD_
Mean	9.941738	16.45714	42.63803
Median	9.972559	14.10000	42.29032
Maximum	10.19485	32.70000	51.90000
Minimum	9.657017	9.500000	34.03543
Std. Dev.	0.185841	7.167954	5.643277
Skewness	-0.228861	1.359713	0.132196
Kurtosis	1.644402	3.445222	1.792620
Jarque-Bera	1.791260	6.644310	1.336711
Probability	0.408350	0.036075	0.512551
Sum	208.7765	345.6000	895.3987
Sum Sq. Dev.	0.690736	1027.591	636.9315
Observations	21	21	21

STATIONARY TEST

Before running the ARDL test or any other test a very significant test that ought to be run, that is the unit root test, in this test we head to investigate the stationarity of the model, in other words, this test aims to examine whether the model is stable or unstable. If the model is not stable we admit that the estimated regression model we have in hand is unacceptable, hence we have an incorrect regression. In fact, many tests exist to test the model stationarity; however, the most prominent test is ADF (Augmented Dickey-Fuller Test). Consequently, to test the stationarity of our model we shall use the Augmented Dickey-Fuller Test (ADF), it is worth mentioning that according to this test:

- Null hypotheses: variables has a unit root
- The alternative hypotheses: variables are stationary

Therefore, our objective is to make non-stationary variables stationary by rejecting the null hypothesis and accepting the alternative one.

Table 3. Augmented Dickey-Fuller (ADF) Test

Variables	Augmented Dickey-Fuller (ADF) Test			
	At level		At First Difference	
	Intercept	Intercept & Trend	Intercept	Intercept & Trend
LnGDPK	-3.718109**	-0.129995(no)	-0.789433(no)	-5.999110***
EXD	-6.736129***	-5.551086***	-3.429866(no)	-3.682658(no)
DD	-2.822952(no)	-7.697307***	-3.538236(no)	-5.344845***
Notes: a: (*)Significant at the 10%; (**)Significant at the 5%; (***) Significant at the 1% and (no) Not Significant b: Lag Length based on SIC c: Probability based on MacKinnon (1996) one-sided p-values.				

It can be observed from the table that the LnGDPK is stationary in its level but only in intercept, however, it has unit root in intercept & trend (level). Looking at the LnGDPK's situation at the first difference we can notice that it's stationary only in intercept & trend. Concerning the External debt (EXD) it is obvious that it is stationary in its level in both intercept and intercept & trend. For domestic debt (DD) it is stationary in its level (intercept & trend) and at its first difference (intercept & trend).

Note: for External and domestic debt we used breakpoint unit root.

ARDL TEST

The ARDL approach aims to test the existence of a long-run relationship among the variables included in a model. Besides, ARDL is efficient for small samples also short- and long-term coefficients can be estimated at the same time. For that reason, a bounds testing approach has been developed (Pesaran et al., 2001). Thus, UECM (unrestricted error correction model

$$\Delta \text{LnGDPK}_t = \beta_0 + \sum_{i=1}^m \beta_{1i} \Delta \text{EXD}_{t-i} + \sum_{i=0}^m \beta_{2i} \Delta \text{DD}_{t-i} + \gamma_0 \text{EXD}_{t-1} + \gamma_1 \text{DD}_{t-1} + \gamma_2 + u_t$$

The impact of EXD and DD on the economic growth rate is explained by UECM (unrestricted error correction model). Where " Δ " is the first difference operator; u is error term; m is the lag length; " β_1 and β_2 are short-term coefficients of variables, and γ_0 and γ_1 are long-term parameters. GDPK is used in natural logarithmic form. The null hypothesis of no cointegration among the variables in UECM is $H_0: \gamma_0 = \gamma_1 = \gamma_2 = 0$ and the long-run equilibrium relationship can be confirmed when the null hypothesis is rejected. In the UECM model, we apply the bounds test to estimate the existence of a cointegration relationship among the variables. It is noteworthy that according to Schwarz criterion the most appropriate number of delays to the ARDL model is ARDL (3,4,4)

Table 4. ARDL bound Test

k	F test statistics	Restricted constant and no Trend Bound Test			
		Critical values 10%		Critical values 5%	
		Lower Bound I (0)	Upper Bound I (1)	Lower Bound I(0)	Upper Bound I(1)
2	25.95958	2.63	3.35	3.1	3.87
		Critical values 2.5%		Critical values 1%	
		Lower Bound I (0)	Upper Bound I (1)	Lower Bound I(0)	Upper Bound I(1)
		3.55	4.38	4.13	5

This table shows the bound cointegration test, therefore drawing on F-statistic we aim to find the cointegration and long-run relationship between the dependent variable and independent variables. It's noteworthy that we reject the null hypothesis of no cointegration if the F-Statistic is bigger than the critical bound I(1), and we fail to reject the null hypothesis if the F-Statistic is smaller than the lower bound I(1). Hence, according to the ARDL bound test we can reject the null hypothesis of no cointegration since the F-Statistic (25.95958) is evidently larger than the critical value bound I(1) then we conclude that there is a long-run relationship between our three variables. Which means our variables (domestic debt, external debt, GDP per capita) move together in the long run.

LONG-RUN AND SHORT-RUN ANALYSIS

Table 5. Error Correction Representation for the Selected ARDL Model

ARDL(3,4,4) selected based on SC		Dependent Variable: lnGDPK	
Regression	Coefficient	t-Statistic	Prob
D(LNGDPK(-1))	-1.321120	-10.74656	0.0017
D(LNGDPK(-2))	-1.111085	-8.800232	0.0031
D(EXD_)	-0.006101	-9.681298	0.0023***
D(EXD_(-1))	0.005133	6.213521	0.0084
D(EXD_(-2))	-0.003910	-3.678614	0.0348
D(EXD_(-3))	0.005639	7.313509	0.0053
D(DD_)	-0.000869	-3.678614	0.0569**
D(DD_(-1))	0.000187	0.608240	0.5860
D(DD_(-2))	0.001817	5.934749	0.0096
D(DD_(-3))	0.001132	3.221805	0.0485
CointEq(-1)*	-0.201290	-14.41099	0.0007
Note: ***, **, * denotes significance at the 1%, 5% and 10% levels respectively			
Model Criteria/Goodness of Fit			
R2	0.993618		
R2 Adjusted	0.982981	D-W stat	2.951515
S.E. of regression	0.001945	F-statistic (0000)	3429.327
Schwarz criterion	-8.855265		

The table above demonstrates short-run outcomes estimates. Hence, as mentioned in the table external debt (EXD) has a negative and significant impact on GDP per capita (GDPK) in the short-run since $p\text{-value}=0,1\%<5\%$, thus, it can be said that a 1% increase in External debt leads a decrease of 0.006% in economic growth in the short run. Concerning Domestic debt (DD) is negative and significant since its $p\text{-value}$ equal to 5%, as a consequence, it can be said that a 1% rise in Domestic debt (DD) causes about a 0,0008 % decrease in GDP per capita (GDPK) in the short run. Looking at ECM (-1) we can understand that the equilibrium correction coefficient is negative and highly significant (-0.20) (00). This implies that the whole system is getting adjusted towards long-run equilibrium at the speed of 20%. In other terms, 20% of the disequilibrium of the previous year's shocks adjust back to the long-run equilibrium in the current year, and this means a faster adjustment process. According to model criteria, the R^2 is upper 60%, which means our model explains everything, in other terms the model is nicely fit. Also, if we take a look at F-statistic, it can be seen that its $p\text{-value}$ less than 5%, therefore, thus, F-statistic is significant. Furthermore, our Durbin Watson stat is significant (DW=2,95). For these reasons, it can be said with confidence that External debt (EXD) and Domestic debt (DD) jointly can influence our dependent variable GDPK (this is a good sign for a model)

Table 6. Long Run Coefficients

ARDL(3,4,4) selected based on SC		Dependent Variable: lnGDPK	
Regression	Coefficient	t-Statistic	Prob
Constant	11.29413	33.06314	0.0001
EXD	-0.029236	-4.506362	0.0204
DD	-0.009461	-2.007708	0.1383
EC = LNGDPK - (-0.0292*EXD_ -0.0095*DD_ + 11.2941)			
Note: ***, **, * denotes significance at the 1%, 5% and 10% levels respectively			

As reported above, there is a long-run relationship between External debt (EXD) and GDP per capita, in other words, it can be pointed out that the P-value of the External debt (EXD) variable is less than 5%, and its coefficient is appropriately signed negative, as a result, External debt (EXD) has a negative and statistically significant impact on GDP per capita (economic growth), it worth noticing that this result in line with short-run results. Where an increase of 1% in External debt (EXD) results a decline of 0.029% in economic growth in the long run. Consequently, it can be said that External debt (EXD) and GDP per capita are cointegrated in both the short and long run.

Additionally, it's observable that there is no long-run relationship between Domestic debt (DD) and GDP per capita, Hence, according to the results in the table, DD has a negative and statistically insignificant effect on economic growth (GDP per capita) in which a 1% rise in Domestic debt (DD) implies a diminution of 0,009% in economic growth (GDP per capita), and

this is not consistent with short-run findings. Therefore, there is a relationship between Domestic debt (DD) and GDP per capita is significant only in the short run.

We can deduce from the short and long-run estimates the following:

- External debt (EXD) has a negative and statistically significant effect on GDP per capita (economic growth) in both the long and short run.
- Domestic debt has a negative and statistically significant impact on economic growth in the short run. However, it has a negative and insignificant influence on economic growth in the long run.

Therefore, this result is corresponding to Nor-Eddine and Chkiriba's (2019) findings where they confirm that an increase in public debt leads to a decrease in the Moroccan economic growth rate. besides, they emphasized that external debt has a negative impact on economic growth in the short run as well as in the long run. Nevertheless, our findings in contrast with Hind Es-Sounboula (2019) who claims that Moroccan public external debt has a positive impact on GDP growth. likewise, our results it is not consistent with El Bettoui and Ouia (2018) who confirm also that Moroccan public external debt has a positive impact on GDP growth.

Our findings can be explained returning to Barro (1974) who deepens Ricardo's thesis by combining the themes of evictions and rational expectations, so according to him, if the government finances an increase in public expenditure by resorting to borrowing, or if it lowers the taxes by leaving the public expenditure and the money supply unchanged, the agents will anticipate the tax increases which will be necessary later to pay the interest on the debt and to repay the principal. As a result, agents know a priori that these two methods of financing are tax recourse; they also know that there will be an increase in public debt and the use of the inflationary tax. The accumulation of long-term inflation and the increase in taxes will ultimately make the state less credible. The agents will then prepare for the future tax purge. They will increase their current savings in anticipation of future tax increases and will not consider themselves richer after the implementation of the stimulus policy. The result will be that this policy followed by the government will have no stimulating effect on the economy (adverse effect on economic growth), regardless of how the deficits are financed.

So it can be said that our findings agree with Barro's approach, however, they disagree with the Keynesian model that considers the effect of an increase in public debt on growth is positive (Guisse, 2016)

GRANGER CAUSALITY TEST

After defining the cointegration between the variables, the Granger causality approach is applied to find the causal relationship (causal direction) between economic growth, External and domestic debt. The null hypothesis asserts that the causality between variables does not exist.

Table 7. Granger Causality test

Null Hypothesis:	Lag	F-Statistic	Prob.	Conclusion
DEXD does not Granger Cause DLNGDPK	1	0.99884	0.3325	Fail to reject
DLNGDPK does not Granger Cause DEXD	1	6.24160	0.0238***	Rejected
DDD does not Granger Cause DLNGDPK	1	0.03670	0.8505	Fail to reject
DLNGDPK does not Granger Cause DDD	1	3.8E-05	0.9951	Fail to reject
DDD does not Granger Cause DEXD	1	2.78587	0.1145	Fail to reject
DEXD does not Granger Cause DDD	1	0.07915	0.7821	Fail to reject

So, this table shows that External debt doesn't cause the GDP per capita since we fail to reject the null hypothesis, which means that there is no causality between External Debt (EXD) and GDP per capita (GDPK). Besides, we can observe the existence of a unidirectional causality relationship running from GDP per capita (GDPK) to external debt (EXD) because we reject the null hypothesis at a 5% level of significance. Moreover, it can be seen also that there is no evidence of causality between domestic debt (DD) and GDP per capita in both directions because the alternative hypothesis is rejected. Looking at the relationship between External debt (EXD) and domestic debt (DD) we can recognize the existence of no evidence of a unidirectional or bidirectional causal relationship after accepting the null hypotheses and rejecting the alternative hypotheses. Overall, it can be understood from the Granger causality test we have done, that there is one unidirectional causality running from GDP per capita to External debt (EXD)

DIAGNOSTIC TEST

Table6. Diagnostic

Diagnostic tests	p-value
Breusch-Godfrey Serial Correlation LM Test	0.3983
Heteroskedasticity Test: Breusch-Pagan-Godfrey	0.7196
Normality test: Jarque-Bera	0,7525
Ramsey RESET Test	0.8303

-We can perceive from the LM test that the model does not suffer from serial correlation since we accept the null hypothesis, which says that there is no autocorrelation in the model;

besides, we reject the alternative hypotheses, which says the opposite. To put it another way, we fail to reject the null hypothesis ($p\text{-value} > 5\%$) thus, there is no serial correlation detected in the model.

-As reported by Heteroskedasticity Test, the problem of Heteroskedasticity doesn't exist because as can be seen in the table the $p\text{-value} > 5\%$ which means we reject the alternative hypotheses rather we accept the null hypotheses and that what is desirable

-Running the normality test, we can observe that the residuals are normally distributed because as can be seen the probability of Jarque-Bera = 75%, which implies the acceptance of the null hypotheses and rejection of the alternative hypotheses since Null hypotheses: Model is normally distributed, Alternative: model normally distributed.

-Looking at the Ramsey RESET test, we conclude that our model doesn't suffer from misspecification, in other words, the estimator model is free from specification errors since the $p\text{-value}$ is greater than 5%.

STABILITY TEST

FIG 2. Plot of CUSUM and CUSUM of squares test for lnGDPkt model

Figure 2 provides a cumulative sum (CUSUM) and the sum of squares (CUSUM sq) for the series model lnGDPkt. The CUSUM and CUSUM sq graphs indicate the stability of the parameters in the model (Pesaran et al., 2001). Therefore, the figure above confirms the stability of the model because as we can see all the coefficient values lie inside the critical limits.

CONCLUSION

The main purpose of the study is to examine the relationship between public debt (external and domestic debt) and economic growth in both the long and short run basing on ARDL (Autoregressive Distributed Lag Bound Test) model and that between 1998-2018 in Morocco. It's worth mentioning that the ARDL bound testing approach is used to test long-run equilibrium relationships among economic growth, external and domestic debt. According to empirical results and as reported by ARDL bound test we conclude that there is a long-run relationship between our three variables. Which means our variables (domestic debt, external debt, GDP per capita) move together in the long run since the F-Statistic (25.95958) is obviously greater than the critical value bound I (1), furthermore, external debt (EXD) has a

negative and significant impact on GDP per capita (GDPK) in the short-run, where a 1% increase in External debt leads a decrease of 0.006% in economic growth in the short run. Equally, Domestic debt (DD) has an adverse effect and significant on economic growth, In other words, a 1% rise in Domestic debt (DD) causes about a 0,0008 % decrease in economic growth in the short run. In the long run, External debt (EXD) has a negative and statistically significant impact on economic growth, where a 1% increase in External debt (EXD) results a decline of 0.029% in economic growth in the long run. Nevertheless, domestic debt has a statistically insignificant and negative effect on economic growth in which a 1% rise in domestic debt implies a diminution of 0,009% in economic growth (GDP per capita).

It worth noting that according to the Granger causality test there is only one unidirectional causality running from GDP per capita to External debt. Whereas, there's no Granger causality between the rest of the variables.

All in all, it can be said that External debt (EXD) has a negative and statistically significant effect on GDP per capita (economic growth) in both the long and short run.

Domestic debt has a negative and statistically significant impact on economic growth in the short run. However, it has a negative and insignificant influence on economic growth in the long run. Consequently, in general, we can say that the impact of public debt has an adverse influence on Moroccan economic growth, it is interesting to highlight that this result is corresponding to Nor-Eddine and Chkiriba (2019) findings where they confirm that an increase in the public debt leads to a decrease in Moroccan economic growth rate. besides, they emphasized that external debt has a negative impact on economic growth in the short run as well as in the long run. Nevertheless, our findings in contrast with Hind Es-Sounboula (2019), who claims that Moroccan public external debt has a positive impact on GDP growth. likewise, our results it is not consistent with El Bettoui and Ouia (2018) who confirm also that Moroccan public external debt has a positive impact on GDP growth.

Finally, we ended up that the government ought to decrease public debt to boost economic growth, to put it another way, the Moroccan government must look for methods or strategies whereby debt could be reduced or the debt borrowed by the government should be used wisely, for instance, using debt to urge and stimulate investments, thus, faster economic growth.

But the question is whether nations must borrow to get out of the current crisis (Covid 19).? Are there alternative methods whereby we can reduce the negative impact of this affliction without heading for debts? Can this crisis be an opportunity for some countries to boost their economic growth?

REFERENCES

- Akhter, T., & Hassan, H. 2012. Impact of Public Debt Burden on Economic Growth: Evidence from Bangladesh. *Journal of Finance and Banking*, 10(1).
- Akram, N. 2011. Impact of Public Debt on the economic growth of Pakistan. *The Pakistan Development Review*, 599-615.
- Babu, J. O., Kiprop, S., Kalio, A. M., & Gisore, M. 2014. External debt and economic growth in the East Africa community. *African journal of business management*, 8(21), 1.
- Balassone, F., Francese, M., & Pace, A. 2011. Public debt and economic growth in Italy. *Bank of Italy Economic History Working Paper*(11).
- Barro, R. J. 1974. Are government bonds net wealth?. *Journal of political economy*, 82(6), 1095-1117.
- Baum, A., Checherita-Westphal, C., & Rother, P. 2013. Debt and growth: New evidence for the euro area. *Journal of international money and finance*, 32, 809-821.
- Blake, T. 2015. *Investigating the impact of public debt on economic growth in Jamaica*. Retrieved from
- Benicourt, E. and Guerrien, B., 2008. Is anything worth keeping in microeconomics?. *Review of Radical Political Economics*, 40(3), pp.317-323.
- Eberhardt, M., & Presbitero, A. F. 2015. Public debt and growth: Heterogeneity and non-linearity. *Journal of International Economics*, 97(1), 45-58.
- Egbetunde, T. 2012. Public debt and economic growth in Nigeria: Evidence from granger causality. *American Journal of Economics*, 2(6), 101-106.
- El Bettoui, R., & Ouia, A. 2018. L'Impact du Financement par la Dette Exterieur Publique sur la Croissance Economique Marocaine: Investigation Quantitative. *Finance and Finance Internationale*, 442(5705), 1-16.
- Fincke, B., & Greiner, A. 2015. Public debt and economic growth in emerging market economies. *South African Journal of Economics*, 83(3), 357-370.
- Guisse, O. 2016. *Effets de l'Endettement Public sur la Croissance Economique en présence de non linéarité : Cas des pays de l'Union Economique et Monétaire Ouest Africaine*. UNIVERSITÉ D'ORLÉANS, Retrieved from <https://tel.archives-ouvertes.fr/tel-01477847>
- Hind Es-Sounbola, A. H. 2019. LA DETTE EXTERIEURE PUBLIQUE ET SON IMPACT SUR LA CROISSANCE ECONOMIQUE MAROCAINE. *Revue du Contrôle de la Comptabilité et de l'Audit*.
- Le dico du commerce international.
- Lee, S.-P., & Ng, Y.-L. 2015. Public debt and economic growth in Malaysia. *Asian Economic and Financial Review*, 5(1), 119-126.

- Mencinger, J., Aristovnik, A., & Verbic, M. 2014. The impact of growing public debt on economic growth in the European Union. *Amfiteatru Economic Journal*, 16(35), 403-414.
- Mohanty, A. R., & Mishra, B. R. 2016. Impact of Public Debt on Economic Growth: Evidence from Indian States. *Vilakshan: The XIMB Journal of Management*, 13(2).
- Moki, M. 2012. An analysis of the relationship between public debt and economic growth in Africa. *Unpublished MBA Project, University of Nairobi*.
- Nor-Eddine, O., & Chkiriba, D. 2019. External public debt and economic growth in Morocco: assessment and impacts. *Global Journal of Management And Business Research*.
- Owusu-Nantwi, V., & Erickson, C. 2016. Public debt and economic growth in Ghana. *African Development Review*, 28(1), 116-126.
- Panizza, U., & Presbitero, A. F. 2014. Public debt and economic growth: is there a causal effect? *Journal of Macroeconomics*, 41, 21-41.
- Pesaran, M. H., Shin, Y., & Smith, R. J. 2001 . Bounds testing approaches to the analysis of level relationships. *Journal of applied econometrics*, 16(3), 289-326.