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# Debt Buildup Waves and Economic Growth Nexus: An Empirical Investigation of Morocco

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## Abstract

This paper studies the impact of overseas borrowing on economic growth in Morocco over the period spanning from 2000 to 2020. The empirical exploration is based on ARDL approach to co-integration, allowing the interaction between external debt, exports and debt's source structure. The results show that in long term, external debt and multilateral debt have negative and insignificant impact on economic performance. Capital stock has a positive and significant effect on economic growth. The results are robust to various tests.

## Keywords
ARDL, Sovereign External Debt, Economic Growth, Exports, Debt Structure.

## 1. Introduction

Growth- enhancing in Emerging Markets Developing Economies (EMDEs) is challenging, since investment- domestic savings and import – export gaps are critical. These countries tend to finance investments through foreign debt. If the borrower country induces sound macroeconomic policies which promote macroeconomic stability and allocate raised funds to profitable investments, economic growth rate will raise and the country will meet its long term debt commitments. Nevertheless, accumulating a large amount of public external debt especially by poor countries can be a source of macro-financial vulnerabilities, since it is difficult to sustain high levels of indebtedness. And consequently, the expenditure of the external debt is reserved only for debt servicing instead of investments financing which retards the growth. The negative nexus between economic growth and public external debt is argued by the debt overhang hypothesis. According to this hypothesis, when countries are highly indebted, investors anticipate a future tax increase to settle debt obligations, therefore, a drop in investments which negatively impacts the economic growth. See (Ramzan and Ahmad 2014)

Besides macroeconomic policies, the impact of public external debt on the economic growth depends also on debt structure. Gómez-Puig et al. (2022) argue that a higher percentage of short-term maturity will aggravate the negative impact of increasing external debt on economic growth. The effect may result also from debt source multilateral or bilateral. According to Workie Tiruneh (2004), bilateral external debt can negatively affect economic growth. In contrast multilateral debt might stimulate economic growth as its corresponding interest rate is often low. Ottonello & Perez (2019) analyze the relation between economic growth and foreign public borrowing, introducing currency denomination of sovereign debt. Accordingly, in the event of growth, sovereign debt is denominated in foreign currency, given that the strong negative correlation between the exchange rate and GDP.

The available literature assesses the impact of public external debt on economic growth using an heterogeneous sample. The present paper attempts to conduct an empirical study of the relationship between public external debt and economic growth in case of Morocco over the period 2000-2020, utilizing Autoregressive Distributed Lag (ARDL) models and following the previous literature.

Since the early 1980's, Moroccan public external debt profile has been affected by Structural Adjustment Program (SAP). As result of the implementation of this program, external debt to GDP reduces from 128 percent in 1985 to almost 70 percent in 1994, and maintaining debt service (% of exports of goods, services) below of 36 percent.

Over the period 2000-2020, Moroccan government finances its needs combining both domestic and external debts, with a higher reliance on the internal one (Figure 1). For instance, in relatively to GDP, the central government external debt outstanding was 18.3 percent in 2020, against a central government domestic debt outstanding which represented 58.1 percent; whereas the public external debt reached the threshold of 27.42 percent of GDP.

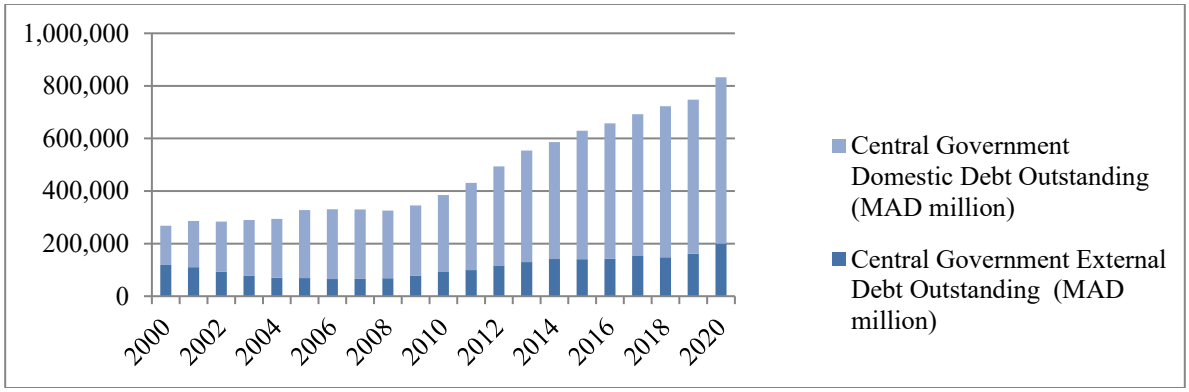


Figure 1. Moroccan total central government debt

### 1.1 Objectives

The objective of this study is to analyze Moroccan public external debt profile from 2000, focusing on the relationship between the Moroccan economic performance and the public external debt. Differently to the previous studies assessing the impact of external debt on economic growth in the Moroccan case, this study entail the role of debt source structure namely multilateral debt in external borrowing- growth nexus.

## 2. Literature Review

Over the last two decades, debt around the world and particularly in EMDE has been increasing, reaching by the end of 2020 -which is the year characterized by a deep economic recession and a health crisis- $226 trillion. The trend of debt accumulation and its implications on economic performance was undertaken by numbers of studies since the rise of global indebtedness is associated to potential macroeconomic vulnerabilities.

International macro-finance literature provides a wide range of studies investigating the nexus between economic growth and external debt. Wang et al. (2021) conduct a panel regression using data from low and middle income countries to investigate the dynamic relationship between sovereign external financing and the economic performance between 1970 and 2018. The results prove that public foreign borrowing contribute to macroeconomic fragility and impacts negatively the economic growth in the short and medium run. Also, the negative effect can be alleviated by the presence of better institutional quality. Similarly, Jibir et al. (2018) empirically examined the impact of external debt on economic growth in Nigeria over the period 1981-2006, using ARDL bounds testing approach to co-integration. The authors found that external borrowing affects negatively the economic performance both in the short and long run, whereas the domestic debt enhances the growth. The study of Ramzan and Ahmad (2014) analyzes the impact of foreign borrowing on economic growth in Pakistan with annual data spanning 1970-2009, introducing the interaction between the former and the macroeconomic policy index, in addition of the decomposition of debt into bilateral and multilateral external debt. The study concludes that external borrowing has an adverse effect on economic performance, namely when the country relies more on bilateral external debt than the multilateral. However; a sound macroeconomic policy can mitigate the negative effect. The adverse effect of foreign public debt on economic growth is explained in the study of Qureshi and Liaqat (2020). The authors argue, examining a large sample of countries with different income levels through a panel vector auto regression, that the negative impact is significant across all income categories of economies.

Edo et al. (2020) investigate the impact of external debt and exports on the economic growth of Sub-Saharan African countries. The results affirm an insignificant positive impact in short run and a significant negative impact in the long run. Also, the adverse effect of export is more important than external borrowing.

Siddique et al. (2016) explore short-run and long-run nexus between external debt and economic growth in 40 heavily indebted poor countries (HIPC) from 1970 to 2007. The results reveal that external debt affects adversely the economic performance both in short and long run, since a bulk of GDP is expended in debt servicing, thus decreasing investment. These findings are in line with (Hameed et al. 2008).

Among the studies investigating the influence of public external debt on economic growth, some works focus on the nonlinearity effects in foreign debt- growth nexus. Accordingly, the impact of external financing becomes negative beyond a certain threshold. Comparing the impact of domestic and foreign debt on economic performance in case of Fiji Islands, Makun (2021) outlines that public external financing has a stronger adverse impact as indebtedness increases above a certain level. The author emphasizes on stabilizing debt, through an objective fiscal management and worthwhile government expenditures. Reinhart and Rogoff (2010) assert that external debt drops economic growth as the debt to GDP ratio overreaches the threshold of 90 percent. The panel data study for 93 developing countries of Pattillo et al. (2011), affirms that in average, the negative impact coincides with a level of debt equivalent to 35 – 40 percent of GDP and 160 – 170 of exports. Also, the analyses of Mohsin et al. (2021) exhibit the negative influence of public debt on growth in the long run, which increases as the country accumulate more debt instead of deleveraging. The results outline that when public external debt exceeds 58 percent of GDP, might slacken the economic performance, notably for countries with a large reliance on foreign debt.

In opposition to the aforementioned strand of literature that acknowledge the presence of common threshold which beyond public external debt harm the economic growth, (Eberhardt and Presbitero 2015; Gómez-Puig et al. 2022) among others focus on heterogeneity besides the nonlinearity in assessing the relationship between public foreign borrowing and economic performance and show that the threshold differs across countries. For instance, Gómez-Puig et al. (2022) analyze the heterogeneity of debt- growth nexus using a panel data for 115 countries with annual data spanning 1995-2016. The Grouped Fixed Effect (GFE) estimator sunders the sample into five categories in which the estimated impact of public debt on growth differs. The authors conclude that the negative impact can be mitigated by the institutional quality and productive expenditure, whereas debt maturity and indebtedness level accentuate the influence.

Multifold studies have undertaken the impact of external borrowing on economic growth in case of Morocco. These studies may be sundered into two groups. The first includes the works of (Bettioui and Ouia 2018; Es-Sounboula and Hefnaoui 2019). The authors assert that in case of Morocco, the public external debt has a positive impact on economic growth, since it has not exceeded a threshold yet. Nevertheless, debt servicing has an adverse impact on the economic performance. The second group entails the studies conducted by (Aboudi and Khanchaoui 2021; Msatfa and Meskini 2021; Nor-Eddine and Driss 2019), supporting the negative impact of foreign debt on economic growth in Morocco both in short and long term. Nor-Eddine and Driss (2019), analyze the effect of Moroccan public external debt over the period 1988- 2016, utilizing ARDL Bound Test, and confirm the existence of a negative effect, which is more important in short term than long term.

The study of Tatouti et al. (2021) introduces another approach in the nexus between foreign debt and economic performance in Morocco. The authors' findings are in line with the classical economics, arguing that external borrowing does not have a significant impact on economic growth.

## 3. Descriptive Analysis

This section highlights the evolution of Moroccan sovereign external debt during the last two decades, sundering the period into two sub periods: the first spans from 2000 to 2009, and the second from 2010 to 2020. The rational for this decomposition is to position Moroccan public external debt's evolution regarding the waves of debt accumulation as described by the World Bank (World Bank 2020). Accordingly, since1970, debt buildup in EMDE went through four waves that each led changes in global financial landscape, expanding vulnerabilities and preoccupations about debt's efficient expenditure. The first wave was from 1970s to 1980s, and it was characterized by a large government's debt accumulation in Latin America and Caribbean (LAC) and low income countries in Sub-Saharan Africa (SSA), taking advantage of low interest rates and the syndicated loan market. The following, spans from 1990 to the early 2000's, known with an increase in private external debt in East Asia and Pacific (EAP) and a large governments indebtedness

in Europe Central Asia (ECA) and ending with crises in the two regions. The third wave started in 2001 and ended with the2008-09 global financial crisis, as result of debt accumulation in advanced countries and an increase in direct cross-border lending in interbank market through US and EU banks' subsidiaries in EMDE debt market. The fourth wave has been rising since 2010. It is described by the World Bank (2020), Chapter 4 as "*largest, fastest and most broad-based wave of debt accumulation yet*."

## 3.1 Moroccan sovereign external debt over the period 2000 – 2009

To explore the tendency of foreign borrowing in Morocco during the first decade of 2000s, we will focus on four points namely: (1) issuance volume and its quality; (2) outstanding stock; (3) maturity at issuance; (4) Debt source structure.

Insurance volume and its quality:

During the period 2000 – 2009, Moroccan government issued two bonds on the International Financial Market (IFM). The first issuance was in 2003, with an amount of around $ 44 million. At that year, Moroccan bonds were classified as speculative, according to the two credit rating agencies S&P and Moody's. The second access to the IFM was in 2007 with an amount of $55 million. This issuance was investment grade.

During this period, Moroccan level of issuance on the IFM is low comparing to the total external debt issuances of EMDEs. However, based on the works of (Feyen et al. 2015; World Bank 2020), considering the ratings and the level, the issuance in Morocco is in line with the trend of Middle East and north Africa as well as the third wave.

Outstanding stock:

The evolution of external debt stock registers attenuation during the period spanning 2000-2008. The debt to GDP ratio decreases from 43.40% in 2000 to 19.40% in 2008 before going up again in 2009 reaching 20.80%. The downtrend represents specifically the evolution of central government external debt, while government business enterprises and public sector entities increased the use of external funds to finance investment projects. The decrease results from the mobilization of donations, the conversion of external debt to public and private investments and redemption. The level of indebtedness relative to GDP in Morocco during the first period is the lowest comparing to EMDE and LIC where the average debt to GDP ratio reached 43.23% and 72.27% respectively.

Maturity at issuance:

The structure of external debt stock in terms of maturity at issuance is composed of medium term and long term debts, similarly to the maturity trend of developing countries.

Debt source structure:

The structure central government external debt outstanding during the period 2000-09 saw an upward trend in multilateral debts, while bilateral debts declined before the 2008 financial crisis and rebounded during the crisis. Nevertheless, the domestic debt was the main source of financing the deficit over this period, enabling the government to access to long term finance and enjoying favorable conditions, since the average savings to GDP ratio was 31.67 percent, besides the low weighted average rate at issue which was 5.7 percent in 2000 and declined to 3.39 percent in 2007. The debt source structure in Morocco during this period was characterized by a preference to domestic debt instead of foreign borrowing, similarly to the EMDEs during the third debt wave, in which the domestic bond markets have deepened.

## 3.2 Moroccan sovereign external debt over the period 2010 – 2020

In this subsection, we will assess Moroccan external debt during 2010-20. The analysis will be in terms of issuance volume and its quality, outstanding debt stock, maturity and creditors structure.

Issuance volume and its quality:

The trend of sovereign bonds issuance on the IFM, over the period spanning between 2010- 2020, was discontinuous. In other words, the access to the international market was punctual: after an issuance in 2010 denominated in euro, with an objective of improving Moroccan debt liquidity on the IFM, the government will issue the second bond over this period in 2012 and the first denominated in US. Dollars aiming the establishment of new borrowing benchmark besides the diversification of the investor base, in a context of pressure relief on the domestic market following the retrogression of external and fiscal balances. In the same year, Morocco has signed an arrangement with the IMF for a Precautionary and Liquidity Line (PLL) which strengthen the Moroccan position on the IFM and allowing the risk premium to be revised downwards. Thus, Morocco re-accesses to the market in 2013, as part of reopening 2012's debt

line. The central government issuance dated 2014 results from a trade-off between domestic and external debt. The uptrend of Moroccan central government external debt, benefiting from favorable market conditions and being rated "*investment grade*", is in line with the EMDEs' trend. During the following four years, no bonds were issued on the IFM. This decision was taken in a context where domestic financing was more beneficial comparing to external fund raising, and a mastery of macroeconomics balances. As the trade-off between external and internal debt shows that the former is more favorable than the latter, Moroccan government re-accesses to the market in 2019, benefiting from an interest rate of 1.5 percent (the lowest rate historically).

The year 2020 is characterized by the Covid-19 pandemic, which slowed sharply the economic activity in the first half of the year. The consequences of the pandemic on the Moroccan economy are a deterioration of fiscal position driven mainly by a decrease in tax revenues, and an increase in the current account deficit, despite the decrease of importations, as the tourism income falls. To maintain international reserves at adequate level, the Moroccan government had a full access to the PLL, and had issue a bond denominated in euros to repay a debt contracted in 2010. Although, the credit agency Fitch changed Moroccan sovereign rating from investment grade to speculative, a second bond was issued by the end of the year as a part of the trade-off between domestic and foreign debt, with the objectives of enhancing international reserves, financing central government needs and diversifying the investor base. The total amount of the two issuances in 2020 is above $ 3 billion, a level that it has not been reached all over the last two decades. The same, on an international scale the external public debt surge during 2020 has reached records which have not been reached since the second world war (IMF 2021).

Outstanding debt stock:
Even though the sovereign external bonds or Public Business Entities bonds are issued punctually on the IFM, the Moroccan government keeps raising funds from bilateral and multilateral partners. Thus, the external public debt to GDP ratio rises to 22.2 percent in 2010 after representing 20.8 percent in 2009. The evolution of external public debt outstanding between 2010 and 2020 went through three phases: first, an uptrend over the period 2010-17, reaching the level of 31.3 percent of GDP. Then, it increases to 29.5 percent of GDP in 2018 and 2019, culminating at 34.4 percent of GDP in 2020.

According to World Bank (2020), since 2010 the world is experiencing a fourth wave debt accumulation, which is characterized by fast increasing in government's debt especially in EMDEs. Over this period, debt outstanding stock in these countries rose in average 50 percent of GDP at end 2018 and over 60 percent of GDP at end 2020 (IMF, 2021). Comparing Moroccan outstanding debt stock to the international trend, external indebtedness in Morocco is maintained at low levels despite the crisis.

Since 2009, the maturity structure in developing countries changes sharply. Despite the dominance of long term maturities at issuance, the share of short term maturities is doubling comparing to the beginning of the 2000's (See UN Secretary-General 2019). Nevertheless, the Moroccan external public debt structure maturity is decomposed of long and medium term maturities with an absence of short term maturity. The maturity of external bonds issued from 2010 to 2020 varies between 5 and 30 years, with a dominance of 10-year maturity.

Debt source structure:
Over the period spanning between 2010 and 2020, the share of multilateral debt in Moroccan external creditors' composition is maintained at levels between 45 percent and 51 percent. Nevertheless, the structure of debt mobilized from bilateral partners and IFM has sharply changed. For instance, bilateral debt was on downtrend falling from 39.6 percent in 2010 to 23 percent in 2020, while the use of bank debt or bond issuance increases from 11 percent in 2010 to 28.1 percent in 2020. This strategy of shifting toward multilateral and capital markets is common among EMDEs during the fourth wave.

### 3.3 Synthesis
During the years following the structural Adjustment Program, the Moroccan government hasn't acceded to foreign funds especially on the IFM till the beginning of the 2000's, which coincide with the period of improvements in terms of financial and macroeconomic stability, fiscal situation and economic diversification. These factors, besides the ratings contributed to strengthen the Moroccan position towards his international partners. This has been confirmed in the works of (Thomas 2009; Grigorian 2003), among others.

Presbitero et al. (2016) outline the catalytic role of IMF programs in market access. The authors argue that countries which have a lending arrangement with the IMF in the previous three years are more susceptible to raising funds. In line with these findings, the PLL arrangement with the IMF, allowed Morocco to benefit from foreign borrowing in 2013 with law risk premium.

According to Ottonello and Perez (2019), debt denomination in local currency is pro-cyclical, thus, the government tends to issue a larger share of debt in local currency during periods of widespread expansion of economic activity. Similarly, the Moroccan government relies more on foreign borrowing in times of crisis like during the Covid-19 pandemic in 2020.

Over the last two decades, the Moroccan external public debt is maintained in average at levels less than 30 percent of GDP, with predominance of share of multilateral creditors in sovereign external debt composition. In conformity with the contributions of (Bettioui and Ouia 2018; Es-Sounboula and Hefnaoui 2019; Ramzan and Ahmad 2014; Reinhart and Rogoff 2010; Workie Tiruneh 2004), the public foreign borrowing should have a positive impact on Moroccan economic performance. This impact will be assessed in the following section.

## 4. Method

To explore the relationship between external public debt and economic growth, we consider neoclassical growth theory, and we use the empirical growth model of Solow (1956) augmented with public external debt as share of GDP. The model is presented as follows:

$$y_t = A_t k_t^{\alpha} \ , 0 < \alpha < 1 \tag{1}$$

With, $y_t$ is GDP per capita, $A_t$ is technology stock, $k_t$ is capital stock and α is the capital share.

Technology progress in Solow framework is: $A_t = A_0 e^{gt}$ (2)

According to this framework, the growth depends on the technical progress which is exogenous. So, $A_0$ represents the initial stock of technology progress and the exogenous technological progress is g.

Besides the external public debt which represents the main focus of this study, we add three control variables. In consistent with Edo et al. (2020), stating that export is a major driver of economic growth, we include exports as a control variable. Moreover, we find that is significant to entail Total Factor Productivity (TFP) as another control variable, since it affects economic performance. According to Pattillo et al. (2002), the negative impact of high indebtedness on economic growth operates through a negative impact on physical capital accumulation and TFP growth. The third control variable is the share of multilateral debt in external public debt, as multilateral debt is has a positive and significant effect on economic growth (Workie Tiruneh 2004).

As a result, $A_t = f(EXD_t, Exports_t, TFP_t, MD_t)$ (3)

So, $GDP_t = A_0 e^{\alpha_1 EXD_t + \alpha_2 Exports_t + \alpha_3 TFP_t + \alpha_4 MD_t} k_t^{\alpha_5}$ (4)

We convert the model to log (using natural logarithm) for estimation and interpretation aims.

$$lGDP_t = \alpha_0 + \alpha_1 lEXD_t + \alpha_2 lExports_t + \alpha_3 lTFP_t + \alpha_4 lMD_t + \alpha_5 lk_t + \varepsilon_t \tag{5}$$

The stationarity of the variables is the main criteria in selecting the appropriate model to analyze time series (Shrestha and Bhatta 2018). Accordingly, Ordinary Least Squares (OLS) or Vector Autoregressive (VAR) are employed if all the variables are stationary. However, in the case of non-stationary variables, the authors assert the utilization of Johansen test. If the variables are mix (stationary and non-stationary) the data series analyses must be conducted utilizing ARDL models.

In this study, the stationary tests conducted reveal that the variables are co-integrated at different orders of integration. Thus, to explore the impact of external borrowing on economic growth, we employ the ARDL model developed by Pesaran et al., (2001), which is as follows:

$$\Delta lGDP_t = \alpha_0 + \alpha_1 lGDP_{t-1} + \alpha_2 k_{t-1} + \alpha_3 lEXD_{t-1} + \alpha_4 lExports_{t-1} + \alpha_5 lTFP_{t-1} + \alpha_6 lMD_{t-1} + \sum_{i=0}^{n} \beta_{1i}\Delta lGDP_{t-i} + \sum_{i=0}^{n} \beta_{2i}\Delta lk_{t-i} + \sum_{i=0}^{n} \beta_{3i}\Delta lEXD_{t-i} + \sum_{i=0}^{n} \beta_{4i}\Delta lExports_{t-i} + \sum_{i=0}^{n} \beta_{5i}\Delta lTFP_{t-i} + \sum_{i=0}^{n} \beta_{1i}\Delta lMD_{t-i} + \varepsilon_t \quad (6)$$

With, $\alpha_0$ is constant; $\alpha_i$ and $\beta_i$ represent long run and short run respectively; $i = \{1; 2; 3; 4; 5; 6\}$; n is the optimal lags.

According to Pesaran et al. (2001)s framework, the existence of co-integration means that there is no long run relationship between variables and all the coefficients of the lagged variables are equal null. Thus the ARDL mode equation becomes:

$$\Delta lGDP_t = ECM_{t-1} + \sum_{i=0}^{n} \beta_{1i}\Delta lGDP_{t-i} + \sum_{i=0}^{n} \beta_{2i}\Delta lk_{t-i} + \sum_{i=0}^{n} \beta_{3i}\Delta lEXD_{t-i} + \sum_{i=0}^{n} \beta_{4i}\Delta lExpor \sum_{i=0}^{n} \beta_{5i}\Delta lTFP_{t-i} + \sum_{i=0}^{n} \beta_{1i}\Delta lMD_{t-i} + \varepsilon_t \quad (7)$$

With, ECM is the Error Correction term and Δ is the short term effect.

## 5. Results and Discussion

Before estimating the long-run relationship, we will check variables integration and finally we will test the model stability.

### 5.1 Unit root tests

To examine the stationary of the variables, we use ADF and PP tests both in levels and in the first difference, with and without trend. The results, as presented in Table1, show that the variables are not integrated of the same order *(mixture of I (0) and I (1))*. ARDL approach to co-integration requires that the regressand is integrated of order 1 and the regressors are not integrated with an order above 1. In this case, the GDP is stationary at first difference, and I (1) represent the maximum integration process of the explanatory variables. Thus, ARDL approach can be utilized.

Table 1. Unit root tests results

| Variables | ADF | | | | PP | | | |
|---|---|---|---|---|---|---|---|---|
| | NO TREND | | TREND | | NO TREND | | TREND | |
| | LEVEL | FIRST DIFF | LEVEL | FIRST DIFF | LEVEL | FIRST DIFF | LEVEL | FIRST DIFF |
| lGDP | 3.601308 | -1.917044*** | 2.0578838 | -4.08477** | 3.289342 | -1.712187*** | 2.2476091 | -3.912453** |
| lEXD | -0.453160 | -1.763769*** | -3.399154*** | -2.806889 | -0.115598 | -1.763769*** | -1.837284 | -2.872929 |
| lExports | -0.921949 | -4.871871* | -3.488856*** | -4.761816* | -2.152500** | -5.24615* | -3.287420*** | -9.532412* |
| lk | 0.008944 | -3.792775* | -0.815840 | -4.327173** | 0.008944 | -3.801887* | -0.772459 | -7.114151* |
| lTFP | 1.225722 | -6.403322* | -4.967944* | -6.360868* | 0.712875 | -6.675658* | -5.385993* | -13.08637* |
| LMD | -2.130387* | -4.787121* | -3.595764* | -4.803777* | -2.041267** | -5.010656* | -3.595764*** | -4.918907* |

*,**and *** denote at 1%,5% and 10% significance level respectively

### 5.2 ARDL to co-integration results

In consistent with Pesaran et al. (2001), ARDL approach to co-integration examines the long run relationship between variables. The null hypothesis is that there is no co-integration, alternatively there is a co-integration. The hypothesis test is run using F-test. The F-statistic computed is compared to critical bounds values. If F is between the two bounds, the test is inconclusive. The null hypothesis is rejected when the F-statistics is more than the upper bound critical value. The test's result shows the absence of co-integration when the F-statistics is less than lower bound critical value. The ARDL approach to co-integration estimated in this study (equation 7) is presented in Table2.

Table 2. ARDL approach to co-integration results

| F-Bounds Test | | Null Hypothesis: No levels relationship | | |
|---|---|---|---|---|
| Test Statistic | Value | Signif. | I(0) | I(1) |
| | | | Asymptotic: n=1000 | |
| F-statistic | 9.745807 | 10% | 2.75 | 3.79 |
| k | 5 | 5% | 3.12 | 4.25 |
| | | 2.5% | 3.49 | 4.67 |
| | | 1% | 3.93 | 5.23 |
| Actual Sample Size | 19 | | Finite Sample: n=35 | |
| | | 10% | 3.087 | 4.277 |
| | | 5% | 3.673 | 5.002 |
| | | 1% | 5.095 | 6.77 |
| | | | Finite Sample: n=30 | |
| | | 10% | 3.157 | 4.412 |
| | | 5% | 3.818 | 5.253 |
| | | 1% | 5.347 | 7.242 |

The result shows that the estimated F-statistics is greater than the upper bound, thus the null hypothesis is rejected, and confirming a co-integration at 5% level of significance.
After confirming the long run nexus, we determine long-run and short run coefficients as follows:

Long-run coefficients:
The long run estimation is presented in Table 3.The estimation results outline a negative relationship between external borrowing and economic performance in the case of Morocco. However, this adverse impact is insignificant in the long run. Similarly, the negative impact was spotted in exports and multilateral debt without significance. Capital stock which is proxy by gross fixed capital formation and Total Factor Productivity have a positive impact but insignificant.

Table 3. Long-run coefficients

| Levels Equation<br>Case 5: Unrestricted Constant and Unrestricted Trend | | | | |
|---|---|---|---|---|
| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
| LEXD | -0.504559 | 0.455940 | -1.106633 | 0.3006 |
| LEXPORTS | -0.036581 | 0.317545 | -0.115199 | 0.9111 |
| LKSTOCK | 0.536896 | 0.266443 | 2.015052 | 0.0787 |
| LMD | -0.751256 | 0.721519 | -1.041214 | 0.3282 |
| LTFP | 0.376671 | 1.150616 | 0.327364 | 0.7518 |
| EC = LGDP - (-0.5046*LEXD -0.0366*LEXPORTS + 0.5369*LKSTOCK -0.7513 *LMD + 0.3767*LTFP) | | | | |

Short-run coefficients:
The Error Correction Model (ECM) is negative and significant (Table 4). As result, the initial association is confirmed. This model indicates the adjustment speed which is equivalent in this case in around of 16.16%, which is slow to adjust the disequilibrium within one year. In short-run exports and Total Factor Productivity have a positive and significant impact on economic growth. Whereas, the economic performance is negatively influenced by the capital stock, which has a significant negative impact in short-term.

Table 4. Short-run coefficients

| ECM Regression<br>Case 5: Unrestricted Constant and Unrestricted Trend | | | | |
|---|---|---|---|---|
| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
| C | 1.171578 | 0.115548 | 10.13933 | 0.0000 |
| @TREND | 0.004874 | 0.000685 | 7.111436 | 0.0001 |
| D(LEXPORTS) | 0.092164 | 0.012667 | 7.276113 | 0.0001 |
| D(LKSTOCK) | -0.144719 | 0.019628 | -7.373009 | 0.0001 |
| D(LTFP) | 0.385664 | 0.028206 | 13.67316 | 0.0000 |
| CointEq(-1)* | -0.161625 | 0.016580 | -9.747903 | 0.0000 |

### 5.3 Validation

The model's robustness is proved through the examination of the stability of the coefficients. To conduct a robustness test, we will employ Cumulative Sum (CUSUM). The results are presented in Figure 2.

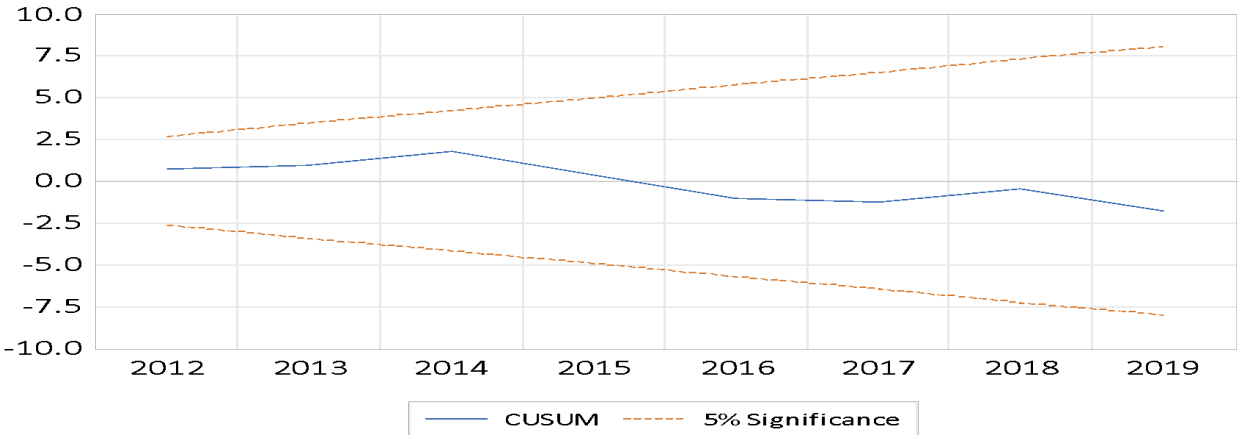


Figure 2. CUSUM TEST

The CUSUM remains with critical bounds of 5 percent significance level, thus, the stability of the model is affirmed. Other tests can be employed: Serial correlation LM Test, Heteroskedasticity, Normally test, and Ramsey reset test. Table 5 plots the results, outlining that there is no serial correlation and the residuals are normally distributed.

Table 5. Model test

| **Test techniques** | **Statistics** | **Probabilities** |
|---|---|---|
| **Serial correlation LM Test** | 4.691900 | 0.0958 |
| **Heteroskedasticity** | 9.623753 | 0.4741 |
| **Normally test** | 1.732349 | 0.420557 |
| **Ramsey reset test** | 0.936555 | 0.3654 |

## 6. Conclusion

The objective of this paper is to investigate the effect of external public debt on economic growth of Morocco over the period spanning from 2000 to 2020 employing Autoregressive Distributed Lag (ARDL) bounds to co-integration. The results show that in long term, external debt and multilateral debt have negative and insignificant impact. Also, exports have an insignificant positive effect in the short term but it turns negative in the long run. The economic growth is negatively affected by the capital stock in the short run and positively and significantly (10 percent level of significance) in the long run. Total factor productivity contributes positively in economic growth. The insignificant result is in line with the findings of Qureshi and Liaqat, (2020) outlining the effect of debt threshold on economic performance. Accordingly, with a level of debt between 0 percent and 60 percent, the impact of public external debt on economic growth is insignificant in lower middle income countries.

The major purpose behind foreign borrowing is to enhance economic growth. In case of morocco, the estimated results reveal an insignificant impact of external public debt on the economic performance. It should be expected that the external debt drugs the economic performance in the long run since the income is maintained at low levels, whereas the debt service is important.

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