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External debt and economic growth in Egypt: Does governance matter?

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Abstract: External debt is considered a source of income for many countries, especially developing ones. With reasonable levels, well managed, and channeled towards productive projects, external debts can help finance productive investments, which are expected to foster economic growth. However, if it exceeds certain levels, additional indebtedness may cause the economy to deteriorate, as it has many costs. In light of this, this paper aims to determine the impact of government debt on economic growth in Egypt during the period from 1980 to 2021 using the Autoregressive distributive lag model (ARDL). Moreover, the interactions of governance, external debt, and external debt volatility were further investigated, taking into consideration the interaction effect of governance measures in order to examine if borrowed debt is properly supervised and utilized for its purposes to spur economic growth.

Keywords: Total Foreign Debt, Economic Growth, Governance, Autoregressive distributive lag model (ARDL)

INTRODUCTION

Foreign debts play a significant role in the economic landscape of many nations, particularly developing countries. These debts, which encompass financial obligations owed by a country to foreign entities, can impact a nation's economic growth, stability, and development. Understanding the dynamics and implications of foreign debts is crucial for policymakers, economists, and stakeholders involved in international finance and economic affairs.

The accumulation of foreign debts occurs when a country borrows funds from external sources such as international financial institutions, foreign governments, or private creditors. These loans are typically utilized to finance various economic activities, including infrastructure development, public investments, or to address budgetary deficits. However, the management and consequences of foreign debts can vary significantly, depending on factors such as debt levels, repayment terms, interest rates, and the economic conditions of debtor and creditor countries. (Reinhart, C. and Rogoff, K., 2009, PP 51-54)

The study of foreign debts encompasses a wide range of topics, including debt sustainability, debt crises, debt restructuring, and debt relief mechanisms. Scholars and economists have developed various theories and frameworks to analyze the impact of foreign debts on the economies of debtor countries, as well as the strategies for managing and resolving debt-related challenges. (Krugman, P., 1988 PP 1-2)

Among those, the Traditional neoclassical models for debts have been influential in understanding the dynamics of borrowing and debt repayment by countries. These models are rooted in neoclassical economic theory and provide a framework for analyzing the implications of foreign debts on economic growth, investment, and welfare. (Chowdhury, A. 2001, P4)

According to traditional neoclassical models, countries in the early stages of economic development often face constraints in terms of capital stocks and investment opportunities. In this context, the mobility of capital is seen as a factor that can contribute to economic growth.

When countries borrow resources and use them for productive investments, it is believed that macroeconomic instability is avoided, leading to increased economic growth. Additionally, external debt has a positive impact on domestic savings and investment. This suggests that foreign savings can play a role in complementing and balancing domestic savings. (Akram, N., 2016, P 747)

However, the implications for investment and economic growth become unfavorable when there is a significant level of accumulated debt. A widespread justification for these effects is referred to as the “debt overhang” theory. Debt overhang, developed by Krugman (1988) in the late 1980s. A debt overhang occurs when the present value of the expected income of a country is less than the accumulated debt.

When a country's external debt level becomes too high, it can create a debt overhang issue. That curtails the economic resources available for growth and investment. This can lead vicious cycle of reduced investment, slower growth, and higher debt burdens. Moreover, creditors may become reluctant to lend to such countries, further exacerbating the situation (Shkolnyk, I. 2018, PP 1-13)

LITERATURE REVIEW

Several studies address the impact of debt on economic growth. However, the results are contradictory. While some studies have proven a negative impact, others found it positive, and others stated different relationships between them. This section displays some of the related literature on this relationship.

2.1 Studies That Show a Positive Impact of debts on economic growth:

As stated, some experts argue that external debt can have positive impacts on economic growth. For example, a study by Roşoiu, I. analyzed the relationship between these two variables in Romania during the period between 1995 and 2020, using a Simple VAR method; a positive impact was found in the long run, but after the initial decrease in the first period.

Mohamed, Elwasila, et al. (2018) tested the impact of debts on economic growth over the period 1969–2015 using the VECM test in Sudan and found that external debt positively affects economic growth.

Chen, C.(2017) found that external debt can stimulate economic growth in the short run, particularly in countries with good governance and sound economic policies.

In the same year,Uzun, A., et al. (2012) investigated the relationship between foreign debts and growth in a panel of nineteen transitional economies, using the ARDL model and found a long-run positive correlation between them.

Despite all of these preceding studies and many others that have proved the positive impact of debt on economic growth, there is also another group of studies that proved the opposite, where they found a negative relationship between the two mentioned variables. This will be presented through the following lines:

2.2 Studies That Show a negative impact of debts on economic growth:

On the other hand, there are many studies have shown that high levels of external debt can negatively impact economic growth. For instance, Acharya et al. (2020) conducted an extensive study and developed a model wherein a government implements restrictive measures to enhance its debt capacity. This leads to the creation of "growth traps" where the level of consumption in the state remains lower compared to a scenario where the government has no access to borrowing.

Also, study carried out by Emmanuel, F. and Olufemi, S. (2019) in 2019 investigated the relationship between external debt and economic growth in the period between 1981 and 2016 in Nigeria. Through the use of the ARD model, they found that external debt hampers economic growth.

In a similar vein, Yie and Yoo (2016) utilized a small open economy model to demonstrate that when a country has high foreign debt, the risk premium increases as the domestic currency depreciates. Consequently, a devaluation of the currency would trigger a recession instead of fostering economic expansion. They concluded that reducing the steady-state level of foreign debt would be associated with decreased volatility in the business cycle of South Korea.

Over the period between 1980 and 2011 a study carried out by Bal, D. and Rath, B. (2014) in India using the ARDL model, it was found that; there is a long-run negative relationship between debt and economic growth, where domestic and external debts affect growth negatively.

This result has been confirmed by another study conducted by Calderón, C. and Fuentes, J. (2013) over the period between 1960 and 2010; on one hundred and thirty-six countries (Latin America, East Asia and the Pacific, Eastern Europe, and Central Asia) using a Regression Analysis. Additionally, research by Reinhart C. and Rogoff K. (2010) showed that external debt can lead to financial crises and economic instability.

In 2010, Kumar, s. M. & Woo, J. investigated the impact of debt on economic growth in a panel of 38 advanced and emerging economies using pooled Ordinary Least Squares (OLS) regressions, between 1970 and 2007. The results showed a negative relationship between the two variables, and that was more observed in emerging economies than in advanced countries. Additionally, research by Reinhart C. and Rogoff K. (2010) showed that external debt can lead to financial crises and economic instability.

In 2002, over the period between 1956 and 1996, Karagöl, E. (2002) tested the relationship between economic growth and external debt service for Turkey. By using multivariate co-integration techniques. The study proves that external debts affect economic growth negatively in the long run.

Easterly W. (2001) found that countries with high levels of external debt grow at a slower rate than those with lower levels of debt. Iyoha, M. A. (1999) tested the impact of external debt on the economic growth of sub-Saharan countries over the period, between 1970 and 1994. The study confirmed the negative impact between external debt and investment, which thus affects economic growth negatively and vice versa.

During the same year, Fosu, A. (1999) used an augmented production function to determine the impact of external debt on economic growth in sub-Saharan Africa during the period, between 1980 and 1990. The study proves that, there is a negative relationship between debt and economic growth. Deshpande, A. (1997) examined the relationship between investment and external debts; among 13 severely indebted countries for the period 1971–1991 by using the OLS method. The study shows that, there is a negative relationship between external debt and investment.

During the period between 1978 and 2001; Mohamed, M.(2005) found that external debt and inflation harmed Sudan's economic performance. Another study by Easterly, W. (2001) found that countries with high levels of external debt grow at a slower rate than those with lower levels of debt.

To shed light on the concept of liquidity constraints, Taylor (1993) argues that the obligations of servicing the debt impose restrictions on government expenditure within the economy. These constraints arise as resources need to be allocated towards repaying the debt, diverting attention away from domestic economic development. Consequently, there are significant reductions in public expenditure on social infrastructure, which in turn affects the level of public investment in the economy. The crowding-out effect further posits that revenues generated from foreign exchange earnings are primarily directed towards debt repayments.

The correlation between external debt and economic growth can be elucidated by the liquidity constraints hypothesis. This hypothesis asserts that when a country's external debt rises, the availability of funds for investment and growth diminishes due to the obligations of servicing the debt. This situation hampers the country's capacity to repay its debt and has a negative impact on its ability to secure future borrowing from external sources. As a result, the country becomes increasingly reliant on domestic borrowing, leading to a crowding-out effect.

2.3 Studies That Show a mix findings of debts on economic growth:

Certain studies suggest that the correlation between external debt and the rate of economic growth is non-linear or non-monotonic. According to these studies, there exists a threshold or turning point where the impact of debt on growth shifts from positive to negative. Initially, when the debt is below this threshold, it is argued that external funds can be effectively channeled into productive endeavors, and the marginal productivity of capital remains high. However, once the threshold level is surpassed, these funds are allocated inefficiently among various alternative uses, leading to a dominance of unproductive investments or excessive consumption spending, thereby resulting in a negative effect on growth (Turan, T. & Yanikkaya, H. 2020, PP 323- 324).

The study carried out by Chen, C. et al, (2017); was applied to a selection of sixty-five countries over the period between 1991 and 2014. Results showed that as long as investment increased, economic growth decreased. That was observed after achieving an increase in economic growth. The same result was obtained when investigating the impact of debts on economic growth, a positive impact turned out to be negative.

In another study, Shittu, W., Hassan, S. (2016), which was applied over the period 1990 and 2015, using the autoregressive distributed lag model (ARDL) also stated the same results, where there was a positive relationship between external debt and GDP till a certain point and then it decreased. Another study held by Megersa, K. and Cassimon, D. (2015) was carried out between 1990 and 2011, using pooled OLS estimation method. Results showed that debt significantly affects economic growth and has a positive impact up till a certain level, then it began to decrease.

Also, the study that was carried out by Afonso, A. and Jalles, J. (2013), used the OLS analysis model which investigated the impact of debts on economic growth over the period between 1970 and 2005, in seventy-two selected developing countries. A positive impact was observed of the debts on economic growth in the medium term, but a negative impact in the long term. Jalles returned the reason for this on corruption which hampers economic progress. The Study of by Eberhardt, M ., Andrea F. Presbitero(2015), which was applied on a section of 118 countries, during the period 1961 and 2015, using common correlated affect mean group (CMG). A significant and positive long-run relationship between debt and GDP, while a significant and negative relationship in the long run

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Similar the study carried out by Daud, Set al. (2013) which was applied on Malaysia, using quarterly data over the period between 1991 and 2009, using the auto-regressive distributed lag (ARDL) technique, the results showed that an increase in external debt led to an increase in Malaysia's economic growth until a certain level, at which point it experienced a reversal in economic growth with the increase in debt.

In light of these sample studies, we can see how external debt is a crucial factor affecting economic growth. While investigating the impact of debt on economic growth, most of the countries' studies proved a negative relationship, the remaining studies found a positive or insignificant impact, and some others showed both positive and negative impacts. Policymakers need to strike a balance between borrowing to finance investments in critical sectors and avoiding excessive borrowing that can lead to economic instability.

FOREIGN DEBTS IN EGYPT

Egypt's external debt situation has been a subject of concern and analysis for many years. The country has experienced fluctuations in its external debt levels over time, influenced by various factors such as economic policies, global financial conditions, and political stability. While the overall level of external debt remains significant, it is essential to examine the context and dynamics surrounding Egypt's debt situation.

Egypt's implementation of the Open Door Policy in 1970 resulted in the use of short-term debt as a costly method of financing. Between 1973 and 1976, the United States experienced a fourfold increase in wheat imports, which had ripple effects on other countries like Egypt, resulting in a significant decline in exports and an increase in imports. Consequently, Egypt's external debt exceeded 100% of its gross national product by the end of 1981, creating an unstable economic situation. In addition, the collapse in oil prices between 1985 and 1986 led to rising fiscal deficits and debt levels. In response, the government adopted an expansionary monetary policy and restricted the use of

foreign debt, causing total foreign debt to decline until 1991 (Alissa, S., 2007, P 1-27)

The introduction of the Economic Reform and Structural Adjustment Program (ERSAP) during the 1990s was instrumental in establishing stability and effectively handling Egypt's external debt. (Hanafy, S. 2015, P 4-5).

According to the findings of CBE (2003), Egypt's external debt exhibited a generally stable trend, with a modest rise of US\$86.7 million recorded in 2003. This increase can be primarily ascribed to the appreciation of multiple borrowing currencies relative to the US dollar. (S. Alaa et al, 2021, P 132)

After the 2011 revolution, Egypt was trying to recover but its foreign debt increased continuously from 12.4% to GDP till it reached 79% in 2016 (Abdou, D. M., & Zaazou Z. (2018) P 65-74). In addition, it continued to increase from 2017 to 2018 by 17.2% and from 2018 to 2019 by 17.3% (CBE, 2018; CBE, 2019).

METHODOLOGY

The study employed the autoregressive distributive lag model (ARDL) method to examine the impact of external debt on economic growth in Egypt. Moreover, the interactions of governance, external debt and external debt volatility were further investigated with emphasize on the interactive effect of governance as proxied by Kaufmann, D. (2007) quality governance measures such as; government effectiveness, political stability, voice and accountability, regulatory quality and corruption control on economic growth. Thus, two models were specified. Model 1 test the effect of government debt on economic growth in Egypt during the period from 1980 – 2021, while model 2 test the same relation taking into consideration the interaction effect of governance measures in order to examine that if borrowed debt is properly supervised and utilized for its purposes to spur economic growth and is not directed to self – interest gains

We employ autoregressive distributive lag model (ARDL) method as it is commonly used to estimate long run relationships between different economic variables in a single equation using small number of observations and for a single country. This method was used since it has many advantageous compared to other co – integration estimation techniques. First, ARDL is very efficient in reaching un biased conclusions whether the variables are integrated at order zero I (0), one I (1) or mixed integration while Johansen cointegration methods require that all variables have the same order of integration (Pesaran et al., 2001). Second, ARDL is highly recommended as one of the best models that can deal with datasets with small number of observations which is usually the case with time series data collected at country level. Third, ARDL cointegration method has superior advantageous compared to other techniques as it produces unbiased estimates in the long run and valid t – statistic value even if endogeneity and serial correlation exists (Harris et al., 2003). Finally, once long-run cointegration relationship is confirmed, the short-run coefficients can be estimated by ARDL error correction model (ECM) without losing valid long-run coefficients.

Data and Methodology:

Model Specification and data:

This study uses annual time series data that spanned the period from 1980 – 2021, to examine impact of external debt on economic growth in Egypt. The main independent variable is annual GDP growth rate as a proxy on Egypt’s economic growth rate. The main dependent variable is total external debt which is defined as “the sum of public, publicly guaranteed, and private nonguaranteed long-term debt, use of IMF credit, and short-term debt”. In addition, governance measures as political stability, voice and accountability, regulatory quality and corruption were used to capture the interaction between governance and debt on economic growth. Data are extracted from world development indicators and worldwide governance indicators. The software used in estimating the results is STATA 14. Table (1) shows the variables definitions and data sources used in this study.

Table (1): variables definition and data sources

Variable	Data Source
GDP (Economic growth)	World Development Indicators
Total External debt	World Development Indicators
Debt service on external debt, total (TDS, current US\$)	World Development Indicators
Consumer price index (2010 = 100)	World Development Indicators
Official exchange rate (LCU per US\$, period average)	World Development Indicators
trade openness s	World Development Indicators
Gross fixed capital formation (% of GDP)	World Development Indicators
Total Factor Productivity Level at Current Purchasing Power Parities	World Development Indicators
Control of corruption	Worldwide Governance Indicators
Regulatory quality	Worldwide Governance Indicators
Political stability & absence of violence	Worldwide Governance Indicators
Institutional quality	Worldwide Governance Indicators

Source: by the author

The study’s main objective is to estimate the long run relation between debts and economic growth in Egypt. However, based on the literature governance factors have now seen as an important determinant to the effective use of debts. In other words, to test the extent through which the debt is managed effectively in a way the spur economic growth in

Egypt is governed by the degree of corruption, institutional quality, political stability and other factors. Therefore, it was necessary to examine the interactive effect of governance with the external debt on Economic growth in Egypt. Thus, 2 models were specified:

Model 1: Determine the impact of total external debt on Egypt's Economic growth

The ARDL model specification is given as follows:

$$\ln(GDP)_t = \alpha_0 + \alpha_1 GDP_{t-1} + \alpha_1 total\ external\ debt_t + \alpha_3 control\ variablesR_t + \varepsilon$$

Where α_0 is a constant and $\alpha_0 - \alpha_6$ are coefficients and ε is the error term.

ARDL Specification

$$\Delta \ln(GDP)_t = \alpha_0 + \alpha_1 t + \sum_{i=1}^n \alpha_1 \Delta \ln(GDP)_{t-i} + \sum_{i=0}^n \alpha_2 \Delta GDP_{t-i} + \sum_{i=0}^n \alpha_3 \Delta RexternaldebtP_{t-i} + \sum_{i=0}^n \alpha_4 \Delta control\ variables_{t-i} + \mu_{1t}$$

Where $\alpha_1 - \alpha_7$ and $\vartheta_1 - \vartheta_7$ are regression coefficients, α_0 is a constant and μ_{1t} is white noise error term.

Error Correction specification

$$\Delta \ln GdP = \alpha_0 + \alpha_1 t + \sum_{i=1}^n \alpha_1 \Delta \ln(GDP)_{t-i} + \sum_{i=0}^n \alpha_2 \Delta external\ debt_{t-i} + \sum_{i=0}^n \alpha_3 \Delta Rcontrol\ variablesP_{t-i} + \gamma_1 ECM_{t-1} + \mu_{1t}$$

Where $\alpha_1 - \alpha_7$ and γ_1 are coefficients, α_0 is a constant, and ECM_{t-1} is lagged error term μ_{1t} is white noise error term.

Model 2: Test the interaction between external debt and governance on Egypt's Economic growth rate

The ARDL model specification is given as follows:

$$\ln(GDP)_t = \alpha_0 + \alpha_1 GDP_{t-1} + \alpha_2 external\ debt_t + \alpha_3 debt * corruption_t + \alpha_4 debt * political\ instability_t + \alpha_5 debt * institutional\ quality + \alpha_6 control\ variables_t + \varepsilon$$

Where α_0 is a constant and $\alpha_0 - \alpha_6$ are coefficients and ε is the error term.

ARDL Specification:

$$\begin{aligned} \Delta \ln(GDP)_t = & \alpha_0 + \alpha_1 t + \sum_{i=1}^n \alpha_1 \Delta \ln(GDP)_{t-i} + \sum_{i=0}^n \alpha_2 \Delta externaldebt_{t-i} + \sum_{i=0}^n \alpha_3 \Delta debt * corruption_{t-i} \\ & + \sum_{i=0}^n \alpha_4 \Delta debt * political\ instability_{t-i} + \sum_{i=0}^n \alpha_5 \Delta debt * institutionalquality_{t-i} \\ & + \sum_{i=0}^n \alpha_6 \Delta control\ variables_{t-i} + \vartheta_1 GDP_{t-1} + \vartheta_2 externaldebt_{t-1} + \vartheta_3 debt * corruption_{t-1} \\ & + \vartheta_4 debt * political\ instability_{t-1} \\ & + \vartheta_5 debt * institutionalquality_{t-1} + \vartheta_6 control\ variables_{t-1} + \mu_{1t} \end{aligned}$$

Where $\alpha_1 - \alpha_6$ and $\vartheta_1 - \vartheta_6$ are regression coefficients, α_0 is a constant and μ_{1t} is white noise error term.

Error Correction specification

$$\begin{aligned} \Delta \ln GDP = & \alpha_0 t + \sum_{i=1}^n \alpha_1 \Delta \ln(GDP)_{t-i} + \sum_{i=0}^n \alpha_2 \Delta GDP_{t-i} + \sum_{i=0}^n \alpha_3 \Delta externaldebt_{t-i} + \sum_{i=0}^n \alpha_4 \Delta debt * corruption_{t-i} \\ & + \sum_{i=0}^n \alpha_5 \Delta debt * political\ instability_{t-i} + \sum_{i=0}^n \alpha_6 \Delta debt * institutionalquality_{t-i} \\ & + \sum_{i=0}^n \alpha_7 \Delta control\ variables_{t-i} + \gamma_1 ECM_{t-1} + \mu_{1t} \end{aligned}$$

Where $\alpha_1 - \alpha_7$ and $\vartheta_1 - \vartheta_7$ are regression coefficients, α_0 is a constant and μ_{1t} is white noise error term.

Empirical Results:

Unit Root Tests:

ARDL bound test assumes that none of the variables is integrated at order two I (2) (Pesaran et al., 2001 and Narayan, 2005). Thus stationarity tests for all variables should be done before applying ARDL bound test to ensure that all variables are either stationary at level I (0), first

difference I (1), or mixed integrating order to avoid spurious results that lead to type 1 error and thus biased results (Granger et al., 1987). Therefore, Dickey Fuller and Phillips Perron (PP) were used to check the stationarity of all variables under study. Table (2) shows that all variables under study are stationary at different orders.

Table (2) Unit Root Tests Results

Variables	ADF Test (at Level)	ADF Test (at First Difference)	PP Test (at Level)	PP Test (at First Difference)
Economic growth	0.0005	0.0000	0.0006	0.0000
Total External debt	1.0000***	0.0447	1.0000***	0.0438
Debt service	0.9738	0.0000	1.0000***	0.0000
CPI	1.0000***	0.0745	1.0000***	0.0094
ER	0.9738***	0.0001	0.9643***	0.0001
trade openness	0.4058**	0.0000	0.3797**	0.0000
Gross fixed capital formation	0.7738***	0.0000	0.7951***	0.0000
TFP	0.4710**	0.0000	0.3367**	0.0000
Control of corruption	0.1055***	0.0015	0.1468**	0.0068
Regulatory quality	0.6676***	0.0002	0.5129**	0.0001
Political stability	0.6129***	0.0000	0.5820**	0.0000
Voice & accountability	0.8485***	0.0000	0.9346***	0.0000

Source: Stata 14

Notes: *, **, *** mean the rejection of the null hypothesis at the 10%, 5% and 1% level of significance, respectively. The null hypothesis is that each variable has a unit root. Each test has an intercept. ADF test indicates Augmented Dickey Fuller test, and PP test indicates Philip Pearson

The results show there is no variables that are integrated at order two where all variables are either integrated at level or first difference. According to both Augmented Dickey Fuller (ADF) and Phillips Perron (PP) test all variables are stationary at first difference. Thus, ARDL bound test can be applied in this study.

Co – Integration testing:

Applying ARDL bound requires the selection of the optimal lag length since wrong lag length will result in model biases and produce unreliable and incredible results (Baloch, 2018). The Akaike Information Criterion (AIC) chooses the optimal lag length since it produces more accurate and consistent results than the Schwartz Bayesian criterion (SBC). The results show that the optimal lag length selected for model 1 – our basic model – is ARDL (2, 0, 0, 1, 1, 2, 0). On the other hand, the results show that the optimal lag length selected for

model 2 is (1, 0, 0, 0, 1, 0, 2, 2, 2, 1) – this model test the interactions between debt and governance measures. The selection of the optimal lag length allows us to test for the existence of the long run relationship between the dependent and independent variables. In other words, we have run a cointegration test by performing an “F – test” on the null hypothesis that the coefficients on the level variables are jointly equal to zero Rejecting the null hypothesis means that there is a cointegrating long-run relationship between the dependent and the independent variables. More specifically, if the F-statistic calculated exceeds I (1) we reject the null hypothesis of no cointegration relationship among variables and hence confirm the existence of a long-run cointegrating relationship among variables (Pesaran et al., 2001).

The results of the ARDL bounds tests confirm the existence of cointegrated long-run relationship between dependent variable and other independent variables with F – statistic lies above the upper bound critical value of 6.567 at a 1% significance level. Table (3) shows the estimates of the ARDL bound tests and the critical value

Table (3) Estimates of the ARDL bound tests and the critical value

F-Bounds Test – Model 1					Cointegration status
Test Statistic	Critical Value	Significance Level	I (0) bound	I (1) bound	
F-statistic K = 6	6.567	10%	2.03	3.13	Cointegrated
		5%	2.32	3.50	
		1%	2.96	4.26	
F-Bounds Test – Model 2					Cointegrated
F-statistic K = 9	9.979	10%	1.88	2.99	
		5%	2.14	3.30	
		1%	2.65	3.97	

Diagnostic tests:

Finally, a set of diagnostic tests has been performed to ensure data credibility and unbiasedness. The statistical results indicate that both models are in a good fit with high R². Table (4) indicates that there is no evidence for serial correlation where the residuals are normally distributed and serially uncorrelated up to order two. Moreover, we found no evidence for heteroscedasticity. For model specification the Ramsey RESET test indicates that the models are correctly specified. Finally, the data are homoscedastic.

Table (4): The Diagnostic Tests

LM Test Statistic	Model 1	Model 2
R ²	0.998	0.807
Adjusted R ²	0.996	0.821
F- statistics	463.59 (0.000)	395.25 (0.0027)
Serial Correlation	8.150 (0.0862)	14.553 (0.0057)
Heteroscedasticity	38.00 (0.4236)	39.00 (0.4246)
Normality	28.09 (0.0000)	24.36 (0.0000)
Ramsey RESET test	1.33 (0.2914)	0.26 (0.8551)

Source: Stata 14

Long run Equilibrium Relationship results:

Model 1 examined the effect of debt on economic growth. The regression results showed that 4 out of 7 independent variables are statistically significant. Our main independent

variable – external debt – came significant with positive coefficients. In other words, an increase in debt by 1% lead to increase in economic growth by 0.0169. This result implies that, as reasonable external debts which is used in financing productive investments are expected to boost growth. The result also aligns with the neoclassical growth theory and overhang theory which argued that external debt promotes economic growth.

In addition, the result reveals that capital has a positive and significant impact on economic growth in Egypt. However, a 1% percentage increase in capital leads to a more than 0.066 percentage point increase in economic growth. This finding supports the postulates of the early neoclassical economic growth theories carried out by Solow and Swan (1956), the saving rate plays an important role as a main determinant of investment, where the latter represents a vital component for economic growth. Which emphasizes the need for greater savings (source of capital) and its implication for investment and economic growth. This goes in line with the study carried out by ArturRibaj, A. and Mexhuani, F(2021) using data over the period from 2010 to 2017 on Kosovo, using the augmented Dickey-Fuller tests, Johansen cointegration tests, and Ganger causality test. Where results showed that deposits affect Kosovo's economic growth positively. That is because savings is an engine for investment, production and employment and thus generate more sustainable economic growth.

Concerning the official exchange rate regime applied in Egypt, the results came as expected where it came significant with negative coefficients. This result indicates that ER depreciation hinders economic growth in the short run but not in the long run where a 1% increase in the ER “ER depreciation” lead to decrease in economic growth by 0.27 percentage point in SR . As set by Hirschman (1949), that currency depreciation, which could arise from an initial trade deficit, leads to a reduction in national income and aggregate demand. This returns to the fact that as depreciation lowers export prices and thus leads to their increase (leading to economic growth), it goes hand in hand with raising import prices (affecting economic growth negatively). So if imports exceed exports, the net result would be a reduction in real income, i.e., economic growth. The same conclusion was reached by Cooper (1971) in a general equilibrium model.

And a 1% appreciation in ER lead to increase in economic growth in the long run by 0.54 percentage point. A depreciation of the national currency can motivate economic activity by initially increasing the price of foreign goods compared to domestic goods. This led to an increase in the international competitiveness of domestic industries. This means that a depreciation of the exchange rate leads to a shift

in spending from foreign goods to domestic goods. This was also shown by Guitian (1976) and Dornbusch (1988), who stated that, in order to depend on currency depreciation to improve the balance of trade, rely mainly on demand moving in the suitable direction and amount, in addition to the ability of the national economy to meet additional demand by providing more commodities.

On the other hand, total factor productivity came insignificant which means that TFP has no impact on economic growth in Egypt. This result was surprising since labor productivity according to economic theories showed that TFP (which was considered exogenous) affects economic growth positively, as set by Solow (1956). Furthermore, endogenous growth theories advanced by Lucas (1988) and Romer (1986) confirmed that TFP has a positive effect on economic growth. This proved to be key determinant of economic growth. One possible explanation is that high percentage of labor are unskilled labor due to low investments in human capital and trainings.

Surprisingly, trade openness has a positive and significant impact on economic growth in the short run only but not in the long run where a 1% increase in trade openness, increase economic growth by 17.36% in the short run.

Trade openness and economic growth have been explained by both the "traditional" and "modern" trade and growth theories, which explain why countries trade with each other. According to Ricardo (1817), who explained the reasons for international trade through comparative advantage theory, where countries specialize in the production of goods that have a comparative advantage in their production compared with others because of factor endowments or differences in technologies on the other hand The Heckscher-Ohlin Samuelson model (1941), analyses welfare gains in two countries (using a two-factor model) in which each country exports the commodity that makes extensive use of the abundance factor (capital or labor). As a result, both countries, with different comparative costs and different terms of trade, are better off under international trade than under self-sufficiency. This result indicates that more trade agreements must take place to increase exports in the long run.

Moreover, the error correction coefficient ECM (-1) is 0.6221 and significant at 1%. This finding implies that the rate of adjustment to the equilibrium is approximately 62% in one period if there is a shock to the economy. Also, the results imply that it takes less than three years to adjust to equilibrium in Egypt. Finally, the model is in good fit with R^2 of 99%

Table (5): Regression Results for Model 1

Variable	Coefficient	Standard error	t – stat	Prob.
Long run				
GDP	0.0556	0.0126	4.41	0.001
Total External debt	0.0169	0.0481	0.17	0.048
ER	-0.2769	0.0095	-29.09	0.000
Trade openness	-4.7617	0.0084	2.08	0.749
Gross fixed capital formation	0.0066	0.0160	0.41	0.089
Debt service External debt	-0.0031	0.0017	-1.75	0.106
TFP	3.2421	0.3604	-4.10	0.639
Short-run				
ΔGDP	-0.2690	0.1556	-1.73	0.097
ΔER	0.5454	0.2584	-2.11	0.046
ΔTrade openness	17.363	9.5954	1.81	0.083
ΔEnergy intensity	0.0979	0.0577	1.70	0.115
ΔGross fixed capital formation	0.0016	0.1327	0.01	0.990
ΔGross fixed capital formation (1)	0.3523	0.1080	3.26	0.003
ΔTFP	-7.5291	5.3483	-1.41	0.173
ECM (-1)	-0.6221	0.1872	-2.79	0.010
R2 =0.998	Adjusted R2 = 0.996			
DW statistic = 2.32	Sum squared residuals = 0.0073			
F-Statistic = 463.59	Prob.(F-Statistic) = 0.0056			
Schwartz Bayesian Criterion = 163.8294	Akaike Info Criterion = 140.9032			

Model 2 examined the effect of interaction of governance measures with debt on economic growth. The regression results for model 2 is shown in table (5). The results show that 8 out of 9 variables are significant with the exception of debt service which is insignificant in the long run.

Concerning the interaction of corruption with debt we found that there is a positive significant impact of such interaction on the economic growth. This result proved that the impact of external debt on economic growth would be positive when corruption is adequately controlled. This result shows the extent to which an improvement in corruption control can influence the external debt and economic growth relationship in Egypt. Also, regression model result further reveals that an improvement in political stability and regulatory quality will enhance economic growth.

Finally, the interaction between voice and accountability and debt significantly influence economic growth. These results imply that the quality of governance or institution is a strong factor that could magnify the benefits of external debt in promoting economic growth in Egypt. Finally, the model is fit with R2 of

Moreover, the error correction coefficient ECM (-1) is 0.534 and significant at 1%. This finding implies that the rate of adjustment to the equilibrium is approximately 54% in one period if there is a shock to the economy. Also, the results imply that it takes less than two years to adjust to equilibrium in Egypt. The result proved that debt management is more effective with governance measures. Finally, the model is in good fit with R² of 81%

Table (6): Regression Results for Model 2

Variable	Coefficient	Standard error	t – stat	Prob.
Long run				
Consumer price index	0.0912	0.0276	3.30	0.004
ER	-0.7116	0.2019	-3.52	0.002
Trade openness	11.453	4.177 2	2.74	0.013
Gross fixed capital formation	0.3669	0.1006	3.65	0.002
Debt service External debt	-2.89e-10	4.91e-10	-0.59	0.562
Debt*corruption	1.42e-10	1.11e-10	2.28	0.027
Debt*regulatory quality	-2.27e-10	5.64e-11	-4.03	0.001
Debt*voice accountability	1.56e-10	5.43e-11	2.88	0.009
Debt *Political stability	9.18e-11	2.97e-11	3.09	0.006
Short-run				
ΔGross fixed capital formation	-0.3833	0.11893	-3.22	0.004
ΔDebt*corruption	-2.75e-10	1.39e-10	-1.97	0.062
ΔDebt*corruption (1)	-1.94e-10	9.75e-11	-1.99	0.061
ΔDebt *voice accountability	-2.04e-10	6.24e-11	3.36	0.003
ΔDebt*voice accountability (1)	-1.73e-10	6.89e-11	2.54	0.019
ΔDebt*regulatory quality	3.00e-10	8.92e-11	-3.26	0.004
ΔDebt*regulatory quality (1)	2.01e-10	7.90e-11	-2.50	0.021
ΔDebt*political stability	-5.47e-11	4.15e-11	-1.32	0.202
ECM (-1)	-0.534774	0.17018	-7.26	0.000
R2 =0.807	Adjusted R2 = 0.821			
DW statistic = 2.39	Sum squared residuals = 0.0073			
F-Statistic = 463.59	Prob.(F-Statistic) = 0.0056			
Schwartz Bayesian Criterion = 116.6449	Akaike Info Criterion = 140.9032			

CONCLUSION

Egypt has taken steps to manage its external debt burden and improve its debt sustainability. The government has implemented economic reforms, including fiscal consolidation measures, subsidy reforms, and efforts to attract foreign investment. These reforms, supported by international financial institutions and creditors, have aimed to enhance Egypt's economic performance, reduce vulnerability, and create a favorable business environment.

Furthermore, Egypt has diversified its sources of financing and reduced its reliance on short-term debt. The country has successfully accessed international capital markets, issuing sovereign bonds at competitive rates. Egypt's ability to tap into global financial markets demonstrates investor confidence in its economic prospects and the government's commitment to debt management. Additionally, the Egyptian government has pursued strategies to boost export earnings, attract tourism, and promote foreign direct investment. These efforts aim to generate foreign currency inflows, enhance economic growth, and strengthen the country's capacity to service its external debt obligations.

However, challenges remain. Egypt's external debt sustainability depends on its ability to maintain economic stability, achieve sustained and inclusive growth, and effectively manage its debt repayment obligations. The country must continue implementing structural reforms to address issues such as public sector inefficiencies, corruption, and income inequality, which can impact its long-term economic prospects.

In summary, Egypt has made notable efforts to address its external debt challenges through economic reforms, diversification of financing sources, and attracting foreign investment. However, ensuring debt sustainability requires continued commitment to structural reforms and prudent debt management practices. By maintaining a favorable economic environment and promoting inclusive growth, Egypt can work towards reducing its external debt burden and fostering sustainable development for its citizens.

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