The Relation Between the External Debt and the Economic Growth: Case Study of Egypt

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Abstract

The persistence growth of Egypt's external debt has raised concerns regarding its impact on economic growth. This study examines the effect of the external debt on economic growth of Egypt .It adopted a time series analysis of ARDL (Auto- Regressive Distributive Lag model) on secondary data sourced from World Bank. The study tackles the period (1985- 2020). GDP growth is used as a dependent variable and external debt servicing, savings, foreign direct investment and exports are the explanatory variables. The finding indicates that external debt had a positive effect on economic growth in Egypt. The study provides an understanding of
how the importance of external debt could be short-lived due to its misapplication. The result
reveals evidence to support a long-run equilibrium relationship between external debt and economic growth in Egypt. The result demonstrates that beyond a specific capacity, the short-run converges to equilibrium in the long-run and external debt would start to have a deteriorating impact on economic growth in Egypt. The findings of this study reinforce the need for policymakers to ensure proper application of external debt on economic activities that would lead to sustained long-term economic performance. Moreover, the government and development partners must put in place a monitoring mechanism to ensure the efficient use of borrowed funds.
Keywords: external debt; government investment; economic growth; policy; Egypt.

Research Significance:

This paper focuses on studying the impact of external debt on the economic growth in Egypt. Although the literature covers this issue in different countries this issue hasn't been tackled before in Egypt. Most of the studies that cover the Egyptian case discussed the relationship between public debt and economic growth but not the external debt explicitly. So this paper tries to cover the gap in the literature by studying the impact of external debt on economic growth in Egypt during the period.

Research Question:

What is the relationship between external debt and economic growth in Egypt?

Sub-Questions:

1. What is the nature of the relationship between external debt and economic growth?
2. What are the main reasons for accumulated external debt in Egypt?
3. What is the situation for economic growth, debt sustainability and debt servicing in Egypt?
4. What is the impact of external debt on economic growth in Egypt using econometric model?
5. What are the recommendations and policies to decrease external debt and enhance economic growth in Egypt?

Introduction

Foreign aid and external debt are considered a significant source of income for developing countries. The countries facing current account deficit are encouraged to borrow from international community to boost their economic growth. During the last thirty years the external debt problem is one of the main challenges faced by the developing countries like Egypt. On the whole, the over-surge of external debt leads to investment slowdown and reduced economic growth rate. In relation to this, the notions of "debt overhang" and "debt laffer curve" introduced later in the theoretical overview are thus helpful in understanding the negative impacts of high debt burden on investment incentive and production to justify debt relief.

The external debt is like an unfavorable tax on future generations, which they have to pay for nothing. The interest of this topic is mainly due to the significant and clear impacts of both external debt and economic growth on the effectiveness of the various ongoing processes and outcomes in the economy. Furthermore, after the war of 1973 Egypt suffer a lot from debt and after the peace agreement in 1978 the economic situation was not stabile because the president Anwar el Sadat was dead. The long run external debt was 14.3 billion dollars and short run external debt was 6.8 billion dollars. In addition to the military debt was 5 billion dollar to US and other foreign countries and about 3

billion dollars to Soviet Union. So Egypt took the 1991 loan to fill the gap of the budget deficit, also after the 25th January revolution the economic growth destroyed and the economic and political situation deteriorated so Egypt took the second loan at 2016 with interest rate 16%. (2018)

This research aims to identify the impact of external debt on economic growth in Egypt starting from 1985 until 2017. This will be carried out using quantitative and qualitative methods, such as the calculation of a correlation coefficient, the depiction of bar and line graphs and the usage of various descriptive statistics. Furthermore, it is also essential for practitioners and other stakeholders of the economy to understand how external debts impact on economic growth. The result of the study demonstrates a co integrating relationship between the variables under consideration. The analysis of this study indicates that there is a negative and nonlinear relationship between public external debt and economic growth in Egypt. More also, the result demonstrates that human capital development and investment have a positive impact on growth. This study will benefit policymakers in formulating policies that would ensure the optimum deployment of external debt to drive economic growth and development.

This paper will be divided as follows: Section one in which the introduction has been tackled. Section two includes the theoretical and empirical literature. Section three includes an overview of the external debt and economic growth in Egypt, the reasons for borrowing, and descriptive analysis for both variables. Section four will tackle the econometric analysis of the relationship between external debt and economic growth in Egypt for the period (1985 -2020) using time series analysis. Section five includes the conclusion and recommended policies.

1. Literature Review

It has been observed in the literature for the relationship between the external debt and the economic growth that researchers were faced with mixed outcomes within this field of study. Although the general trend indicates an inverse relationship between the ED [1]and economic

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[1] ED is the abbreviation of the external debt

growth, several studies have proved the presence of either a positive relationship or nonlinear relationship. The literature review will be divided into two parts; the theoretical overview, which sheds light upon the underlying theories and the empirical literature, which discusses the different outcomes of previous studies.

Further, using the Granger Causality method to analyse data from 27 countries from the Caribbean and Latin American regions for the period 1970 to 2003, Butt evaluated the impact of external debt on growth. The study recorded evidence of a causal relationship between the variables in 13 countries. Using the dynamic board information model to analyse the dataset from 19 nations for the period 1990 to 2011, Zouhaier and Fatma assessed the impact of financial obligation on financial development. The study found that the ratio of outside obligations to GDP negatively influenced monetary growth. J. Open Innov. Technol. Mark. Complex. 2020, 6, 88 5 of 16 The work of Halima [39] used the fixed and arbitrary impact models and data from Kenya, Rwanda, Tanzania and Uganda to examine the impact of outer open obligations on monetary development for the period 1981 to 2014. In that study, Halima reported that external obligations adversely impacted the financial growth of the countries under consideration. Halima argued further that local obligations and macroeconomic variables such as the expansion rate and conversion scale amongst others were not crucial for financial development. Still, capital stock significantly impacted on monetary development. Senadza et al. [8] used a dataset from 39 Sub-Saharan African (SSA) countries and the framework summed up techniques for a minute estimation strategy to investigate the connection between outside obligations and financial development during the period 1990 to 2013. They recorded a negative relationship between outside obligations and monetary development of the 39 SSA countries. Following the mixed evidence in the literature, Mensah et al. [23] attempted to explain the collective impact of institutional quality and external debt on the economic growth of 36 Sub-Saharan African countries from 1996–2013. The study used the system GMM and found that external debt explains the patterns of economic growth in SSA. The study submitted that external debt invested correctly in profitable projects would have a positive effect on growth. However, beyond

certain levels, external debt may not be relevant and has a negative influence on economic growth in SSA.

1.1 Theoretical overview

Tackling literature from a theoretical perspective, there has been an adequate number of theories explaining the extent of ED's impact on economic growth. The majority, if not all, proved that a negative relationship exists between our stated variables.

> Krugman, (2023) defined "debt overhang," as a situation in which the expected repayment on ED falls short of the contractual value of the debt. This situation occurs when a country's debt level exceeds its ability to repay. There is a set of explanations that explain this situation. First, is the "credit worthiness" of the country is reduced if creditors do not expect that debt will be fully repaid, leading to lower capital inflows, in addition to the lower investment, because investor fear from setting higher taxes by the government. "Crowding out effect" is a situation where the increased interest rate leads to reduction in private investment because of the increase in government borrowing. Crowding out is another channel that revels a negative impact of external debt service on investment and growth. (Frimpong & Abayie, 2023)

Second, it is argued that debt overhang depresses investment and growth by increasing uncertainty about actions and policies. As the stock of external debt increases, there may be expectations that the government will resort to distortionary measures (inflation tax, for example) in order to meet its debt-servicing obligations (Agénor & Montiel, 2023).

Looking from other perspective positive effects of ED and economic growth, there are three broad theoretical explanations on economic growth namely: the " Harrod-Domar model" ED like foreign aid, helps close the savings gap of a country thus finance the investment thus, within the Harrod-Domar model by (Harrod, 1939) and (Domar, 1946), external debt, through its impact on investment, should positively affect economic growth. This point of view introduced by the neo-Keynesian.
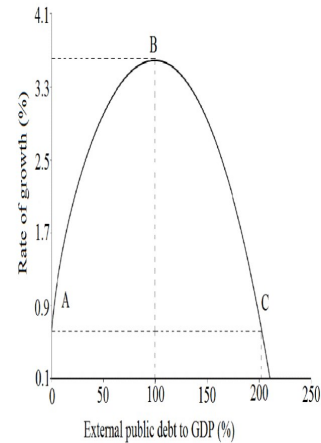
Similar to the Harrod-Domar model, savings (and investment) play important role in the "Solow model" by (Sato, 1964) and (Solow, 1994). However, in Solow model the increase in saving cannot lead to permanently increasing the economic growth it leads to a temporary increase in the growth. In this sense, the ED closes the gap and boosts the investment and promotes the technology this point of view introduced by the neoclassical. In addition to the Romer-Lucas-inspired endogenous growth models highlight a number of determinants of economic growth.

Other perspective talked about the Non-linear "Laffer Curve" relationship between ED and economic growth. The external debt may have positive effect on investment and growth but only up to certain threshold. Beyond which the impact become negative.

(Cohen 1993) argues that the relationship between the face value of debt and investment represented by laffer curve. It demonstrate that when debt increases beyond a certain level , factors such as uncertainty about government ability to service the debt and diversion of resources to less productive investment slow down economic growth.

1.2 Empirical literature

Many empirical studies have been carried out using different econometric tests in order to identify the relationship between the ED and the economic growth in different countries. And a vast number of papers have tested the aforementioned theories empirically and the results they found were mixed. The following is the empirical literature

Many studies concluded a negative relationship between ED and the economic growth including CHEN (2023) who studied the external debt and economic growth in low income developing countries during the early 1980s and found out that the over-surge of external debt leads to investment slowdown and reduced economic growth rate. Yeasmin & Chowdhury (2022) studied the impact of foreign debt on growth in Bangladesh for the period (1972- 2020) using annual time series data. GDP is the dependent variable and Investment, employment and external debt are independent variables. Auto - Regressive distributive lag model (ARDL) was implemented. Chowdhury (2023) examined the relationship between external debt and economic growth in developing countries using panel data for two groups of countries HIPC and non-HIPC.[2] The number of countries in HIPC group is 35 while the number of countries in the non-HIPC group is 25. It uses the extreme bounds analysis for sensitivity and the fixed, mixed, and random coefficient approach that allows for heterogeneity. Al Kharusi & Ada (2018) investigated the relationship between external debt and economic growth, in emerging economies including Oman for the period (1990-2021) using an ARDL co-integration approach. Shabbir (2013) examined the relation between external debt and GNI on 70 countries for thirty years (1976-2011) over the long run by examining overhang theory and found that it was consistent with the theory and that there is a negative relation between economic growth and external debt. Choong& Jayaraman (2023) analyzed the relation between external debt and economic growth through time series data over 30 years (1970-

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[2] HIPC refers to Heavily indebted poor countries

2022) in Fiji through two tests by the bound testing of Pearsan et al (2023) and found that the external debt and budget deficit had a negative effect on economic growth. Mashingaidze (2023) aimed to study the impact of external debt on economic growth in Zimbabwe using annual time series data for the period (1980-2012) using Vector Autoregressive approach (VAR).The findings also show that according to the Granger causality test there is a unidirectional causality from external debt to economic growth.

Tackling another group of studies, all of them used OLS technique to investigate the relation between external debt and growth and found a negative relationship. Malik, Hayat, & Hayat (2010) studied the case of Pakistan for the period (1972 – 2022). Using OLS methodology they found not only Negative relation between external debt and growth was found but also a negative and significant impact of debt servicing on GDP growth. Were (2023) examined the impact of external debt on economic growth in Kenya for the period (1970-12021). The results show that there is a significant negative relationship between external debt and economic growth and between external debt and private investment. While debt servicing doesn't have any negative impact on economic growth, it has a crowding-out impact on private investment. Boboye& Ojo (2023) studied the effect of external debt on growth and development in Nigeria. The result was a negative effect of external debt on growth. High level of debt leads to devaluation of currency, poor educational system, continuous strikes and hence damage of the Nigerian economy. Also Shahzad, Zia, Ahmed, Fareed, & Zulfiqar (2023) studied the effect of external debt on development and growth of Pakistan's economy for the period (1980 – 2022). Five variables which are growth, external debt servicing, saving, net export, foreign direct investment were used in the least square multiple regression analysis

Although most of the studies concerning this issue found a negative impact of ED on growth, there are some few studies that found a positive relation between ED and economic growth. Frimpong & Abayie (2023) studied the impact of external debt on economic growth in Ghana for the time frame (1970 – 2022) using Co-integration and VECM.

Another study found a non-linear relationship including Shkolnyk & Koilo (2023) that examined the relationship between external debt and economic growth in emerging economies including Ukraine for the period (2006–2022). The result was that the influence of external debt on the dynamics of GDP is non-linear. The marginal impact of external debt on GDP dynamics becomes negative with the level of external debt 62%, and the GDP growth rate increases twice with 8% of the level of external debt to GDP. Pattillo, Poirson, & Ricci (2023) studied the external debt and economic growth in developing country during the second half of the 1990s. The analysis used panel regression for 93 developing countries spanning sub-Saharan Africa, Asia, Latin America, and the Middle-East over the period (1969-1998) using different econometric specification (quadratic debt term, a model with dummy variables, a spline function, and simple linear specification) to investigate the nonlinear relationship between external debt and economic growth and they found the impact of external debt become negative with economic growth. Jarju, Nyarko, Adams, Haffner, & Odeniran (2023) the study used panel data analysis with annual datasets from 2000 to 2014 analyzed trends and investigated the relationship between external debt and economic growth in the WAMZ[3] using descriptive trend analysis and panel data analysis. They specify a reduced-form growth model based on Clements, Bhattacharya and Nguyen (2023). The model introduced by a square of the external debt variable, (a quadratic term) to capture the non-linear (laffer curve) relationship between external debt and growth. The relationship between external debt and growth in the WAMZ is non-linear "Laffer curve" shaped confirming the debt overhang theory that the accumulation of external debt beyond a certain threshold adversely affects economic growth.

Another group of studies reached somehow ambiguous results. Fosu (2023) examined the extent of the negative impact of external debt on economic using panel data of sub Saharan countries from 1970 till 1986 mainly by measuring how the capital have been affected negatively with its productivity through "direct effect of debt hypothesis". The

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[3] six countries – Gambia, Ghana, Guinea, Liberia, Nigeria and Sierra Leone

result was that the long term impact of debt is non-monotonic. It is positive at low levels of investment but after certain threshold it becomes negative. This shows the complicity of the relation between ED and growth. However, most of the sub- Saharan countries reveal that ED has negative impact on growth. Ogunmuyiwa (2023) tried to examine whether external debt promote economic growth in Nigeria using time series data for the period (1970-2022) which are fitted using regression analysis. The results show that in case of Nigeria external debt can't be used as a factor in determining the improvements or the slowdowns of the economic growth. They also show that the causality between external debt and economic growth is insignificant.

In conclusion, those researchers were faced with mixed outcomes within this field of study it is an evidence that literature within this field of study is abundant in various countries. The predominant trend regarding the relationship between ED and economic growth proves to be a negative relationship. Although there are numerous studies, it is observed that there are very few studies found positive relationship and also there are studies founded the non-linear relationship.

2. Overview of external debt and economic growth in Egypt.

2.1 External debt, debt sustainability and debt servicing

External debt definition

External debt is the money borrowed from a source outside the country; it can be obtained from commercial banks, international financial institutions like International Monetary Fund (IMF), World Bank, etc and from the government of foreign nations. External debt has to be paid back in the foreign currency in which it is borrowed. Normally these debts are in the form of tied loans, meaning that the debts have to be used in a predetermined purpose agreed upon by the borrower and the lender.

External debt in Egypt

In 1981 the external debt was 30 billion dollar. The long run external debt was 14.3 billion dollars and short run external debt was 6.8 billion dollars. The private sector debt was one billion dollar; In addition to military debt of 5 billion dollar to US and other foreign countries and about 3 billion dollars to Soviet Union.

In 1986 Egypt's economy was shocked due to the collapse of oil prices, foreign exchange reserves decreased sharply. Consequently the long run external debt increased to 24.3 billion dollars, the private sector debt increased to 2.7 billion dollar. The external debt was increasing due to borrowing to finance public utility projects while ignoring commodity sectors that has the ability to service these debts in the future and it continued to increase till it reached 45.7 billion dollar in June 1989 and then 47.6 billion dollar in 1990 that is 78.6% of GNI (World Bank, 2018). At that time, Egypt was considered one of the highest countries that had external debt in the world. The percent of debt servicing to GDP in Egypt was the highest between all the developing countries. The budget deficit was more than 20% of GDP So Egypt took the first loan from the IMF in 1991 after agreeing on economic reform program.

In the Gulf war of 1991 Egypt strongly supported the alliance states in the face of Iraq. As a result Saudi Arabia, Kuwait and UAE supported Egypt in its debts by 4726 million dollars; also it got exemptions from debts of 13.7 billion dollars from Gulf countries and the US. In addition to Paris Club that agreed with 17 creditor countries to exempt Egypt from nearly half its debts if it abides by the instructions of the IMF. So the external debt has fallen from 34 billion dollar in 1991 and then to 27.78 billion dollar in 2000 (Central Bank of Egypt, 2003). The percent of external debt to GNI decreased from 78.6% in 1990 to 29% in 2000 (World Bank, 2018).

For the period (1994 – 2004), the external debt was relatively stable compared to the first 10 years of Mubarak presidency (1981- 1991) in which external debt increased by 60%. This stability is due to two reasons, first is the deterioration in the growth rate that decreased the imports so the balance of payments improved. As a result the need for

external debt decreased. Second is the exemption from large debt burden that Egypt acquired due to political reasons. (Amin, ٢٠١٢)

The external debt increased again starting from 2008 because of the financial crises and increasing loans. As we can observe from table (1) that external debt increased to 33.694 in 2010 then to 43.233 in 2013 and continued increasing till it reached 79.032 in 2017.

Table (1): Total external debt in billion dollars through (2007-2017)

End of June (year)	Total external debt (billion $)
2007	29.898
2008	33.892
2009	31.531
2010	33.694
2011	34.905
2012	34.384
2013	43.233
2014	46.067
2015	48.062
2016	55.764
2017	79.032

Source: central bank of Egypt, annual report various years.

The data for external debt as a percentage of GDP have many years missing so the external debt as a percentage of GNI is used as a proxy in the descriptive analysis. Figure (1) represents the percent of external debt from GNI for the period of concern (1985 – 2017).

Figure (1) External debt stock (% of GNI)
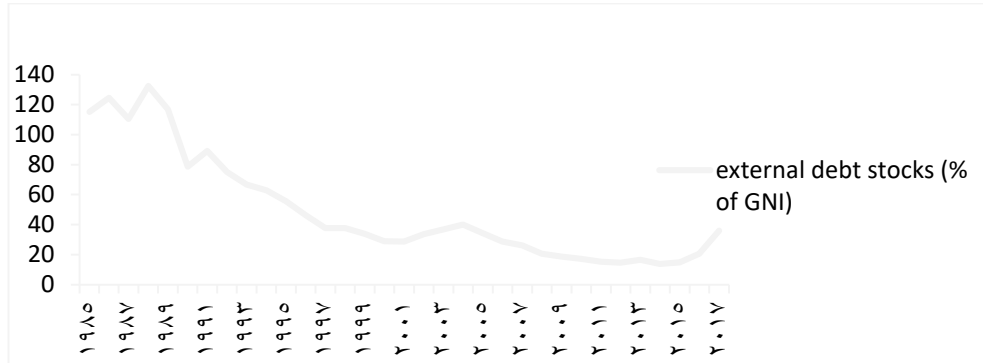
Source: World Bank data, (2018).

From figure (1) it can be observed that the highest value of external debt is 132.47% from GNI in 1988 and the lowest value is 13.99% in 2014. Starting from 2014 the external debt is increasing till it reached 35.88% in 2017.

This is mainly due to the replacement of local debt by external debt for financing the budget deficit and this replacement is to reduce the cost of public debt and make use of international finance available at low cost (low interest compared to government debt securities). External debts strengthen the trust of foreign investors in the country's economy when it comes to an agreement with international finance institutions such as IMF and World Bank. It worth mentioning that the cost of financing the external debt by dollars looks cheaper but if calculated by the Egyptian pound it depends on the depreciation of Egyptian pound in front of the dollar, so after the floating in 2016 the external loans that was taken before the floating became of a higher cost than the local debt. (Hussen, 2023)

In 2023 Egypt took the second loan from the IMF, it worth ١٢ billion dollar with interest rate 16. The loan is divided into 5 sections; the fifth review is the only remaining and pretended to be in March 15, 2023 and worth 2 billion dollar.

Debt sustainability and debt servicing

It is important for any country to direct the external loans toward increasing the productivity to replace the imports and also increase its exports to gain foreign currency, so that the loan repayment becomes easier. This is not the case in Egypt where the debt is directed to the central bank and infrastructure projects that do not generate foreign currency. The government is enhancing the foreign reserves in the central bank through more and more external debt, in the short run it is expected that those loans will run out quickly after the floating, without making use of the loans in improving production or services as well as the burden of debt servicing and its costs remains. Also Commercial banks' external debts or liabilities exceeded their assets abroad these debts construct 6% of Egypt's total external debt. The share of government and its sectors from external debt decreased from 94% in 2022 (central bank of Egypt, 2023) to 57% in (2022/2023), while the share of central bank and other banks increases to 43%. The following pie chart, figure (2) clarifies the share of each sector according to 2023 percentages.

Figure (2) share of external debt for each sector at the end of 2023

Source: CBE, External debt position, no.52, 2023.
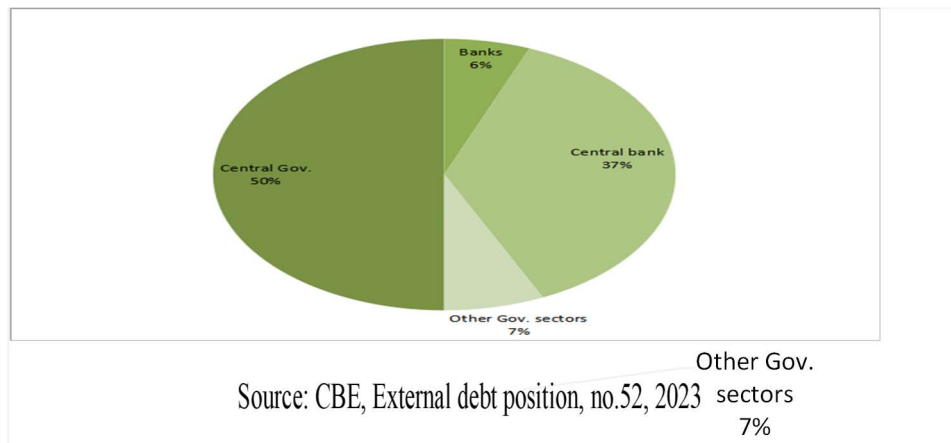
Source: CBE, External debt position, no.52, 2023.

The central government is committed to repay 5.45 billion dollar in 2016/2017 (Central Bank, 2016) and it worth mentioning that by

2018 the central government commitments of debt increased by 12.8 billion dollar to reach 47.6 billion dollar (CBE, External Debt Position, no.62, 2018).

By (2017/2018) Egypt has to service long run debts of 800 million dollars (Central bank, 2017). Generally debt servicing of external debt in Egypt increased in (2016/2017) reached about 6.5 billion dollars compared to 3.7 billion dollar in 2015. The total debt servicing on external debt for the period (1985- 2017) is represented in the following bar chart, figure (3).

Figure (3) Debt servicing (1985- 2017)

Source: World Bank, 2018

2.2 Reasons for accumulated external debt:

There are a lot of reasons that puts a country in need of money and extra financial resources that don't exist or are insufficient for implementing specific projects and their only resort is to borrow from abroad. This part tackles the reasons behind it and they are divided into economic, political and social reasons that apply on Egypt and most of the developing countries in general.

Economic reasons:

One of the biggest reasons that pushed countries to borrow heavily from abroad was the oil crisis in the 1980s especially for the oil production countries that counted on foreign currency from exporting oil. Oil prices

have fallen heavily at this period which resulted in shortage of foreign financial resources, especially the countries that were facing high inflation rates that suppressed development process and western commercial banks started pouring in loans with very high interest rate. (Svertinov, Trajkovska & Paceskowski, 2023)

As for countries that are just starting on their development plan the interest rate that was set on their loan repayment is very high which puts these countries on a borrowing cycle whether it's for fulfilling development process or for debt repayment

The excessive debt and loan repayments have actually resulted in devaluation of the developing countries currency in comparison with the foreign currency making financial resources insufficient for the current expenditures which results in an endless cycle of borrowing and repaying loans.("Third World Debt: Causes and Solutions",2023)

Neglecting internal sources of production and income like manufacturing and agriculture sectors like in Egypt the investing in manufacturing sector dropped from 40% in 1973 to 19% in 1981 instead they relied on external financial resources.(Mossallem,2023)

Political reasons:

When a country borrows from an international institution they enforce policies and intervene in country's economic decisions to ensure that the country remains in debt for them like the IMF intervention in Egypt in 1991 with the economic reform programs that just left structural problems unsolved and left the country just more in need of money.(Mossallem,2023)

Some countries and international financial institutions would lend money to corrupted ruler to earn him as an ally or for political reasons even though they know that he would use it for personal purposes rather than benefiting the public.

Some rulers when they find that the public is outraged and unsatisfied or on the verge of a revolution or at the beginning of elections season, they try to enhance living standards by raising wages and salaries and

adjusting fees without affecting the public budget so they borrow.("Third World Debt: Causes and Solutions",2023)

Social reasons:

Developing countries hold a high percentage of diseases and outbreaks of the world, and people who have such diseases will not have the ability to work and become fully functional citizen thus they become the country's responsibility to care for and remain as a burden on the working population.

Another factor is the high birth rates and increasing population that results in a high percent of underage working population that raises the dependency ratio and affects the economic growth.

Recently developing countries have been focusing on restructuring educational and health institutions for highly efficient sustainable development but this opens the door for more money to finance such process.("Third World Debt: Causes and Solutions",2018)

2.3 The economic growth rate in Egypt:

This study considers the growth in the Egyptian economy before the crises of the COVID19 and the Russian-Ukrainian War to avoid to be biased.

Egypt applied the open door policy in 1974 this period is divided into two phases: the first phase from 1974 to 1982 and the second phase from 1983 to 1991. Then in 1991 Egypt has started its first economic reform program. And in 2016 Egypt applied the second economic reform program. The macroeconomic variables (especially GDP growth rate) have been affected differently during each period.

Figure (4): The annual GDP growth rate in Egypt during the period (1985-2017)
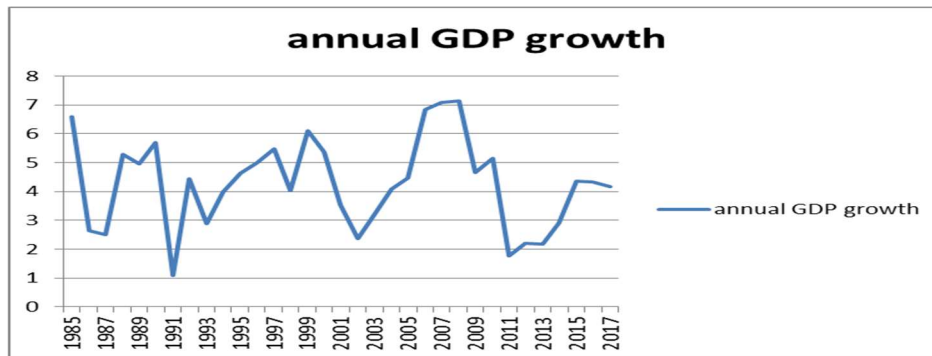
Source: World Bank data, 2018

According to figure (4) there was a sharp decrease in GDP growth during the period from year 1985 when it was (6.602%) to 1991 when it reached (1.07%). This sharp decrease in GDP growth is due to oil prices crisis which influenced the earnings of Suez Canal and negatively affect the remittances of those working abroad. Also there was a reduction in the earnings of tourism due to some security events. The government tried to do some efforts to reform the economic situation in Egypt but it failed.

Then in 1991 Egypt applied the economic reform program. It is noticed that the GDP growth started to gradually increase from 1992 when it was (4.43%) to1997 when it reached (5.49%). And this is due to the fiscal and monetary reforms that the government has applied to reduce its budget deficit, the deficit in the balance of payment and its external debts. Although the GDP growth was (4.03%) in 1998 and in 2004 was (4.08%) but the trend of the GDP growth decreased and this was due to the stagnation and liquidity crisis that happened during this period and also due to the deterioration of investment.

According to the graph it is noticed that the GDP growth has increased during the period from 2004 to 2008. It was (4.08%) in 2004 and reached (7.15%) in 2008.This increase in GDP growth was due to the reforms that the government did in many sectors like the banking sector, foreign trade and exports. It was also due to the improvement in the required infrastructure for investment.

From 2008 to 2011 there was a large decrease in the GDP growth as it was (7.15%) in 2008 and it became (1.77%) in 2011. The reasons for this decrease were; first the impact of the global financial crisis. Second at 2011 the total reserves decreased from 35 billion dollars to 18.1 billion dollars. Third the 25th January revolution ,which led to rioting and absence of security in this period, deterioration in the industry sector, tourism, Suez cannel, petroleum and construction sector and the inability of government to provide basic needs to the people. Those three events have affected the Egyptian economy and the economic growth negatively in Egypt during this period.

From 2012 to 2015 the economic growth increased by small amount. It was (2.21%) in 2012 reaching (4.37%) in 2015. And this is mainly due to the relatively political and economic stability as a result of the adoption of the constitution and due to the new presidential election in 2014. All of these have led to an increase in the performance of most of the macroeconomic variables particularly the economic growth rate.

From 2016 to 2017 the GDP growth has gradually decreased from (4.34%) in 2016 till reached (4.18%) in 2017 although the economic reform in this period, this reduction in the economic growth was due to some economic actions like flotation, shortage of foreign currency and security issues in the middle east which affected tourism in Egypt.

2.4 Descriptive analysis for the relation between external debt and economic growth

Graph (5): The trend of annual GDP growth rate and external debt stock (% of GNI)
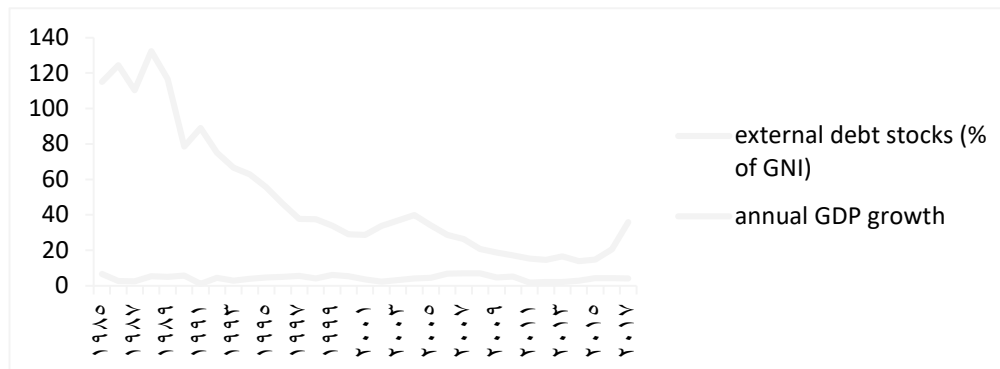
Source: World Bank data, 2018

As previously mentioned, the figure shows that in the period from 1991 to 2000 the external debt decreased while the economic growth on average increased. From 2004 to 2008 before the financial crises the external debt continued to decrease while the economic growth increased to its maximum level. In 2008/2009 the external debt fall and the economic growth decreased a little bit but on average it is a high level. In 2016/2017 the external debt increased and the economic growth decreased. The relation between external debt and GDP growth couldn't be clearly determined from the descriptive analysis it seems negative for some periods and positive for others so we will depend on the econometric analysis to capture a clear cut relation between them.

3. Methodology and data

3.1 Description of variables

Annual time series data for GDP growth, debt servicing, foreign direct investment, savings and exports of goods and services for the period (1985 – 2017) has been used in this study. All the annual Secondary data for Egypt has been collected from "world bank indicators" to apply an ARDL model. Economic growth is measured by annual percent of GDP growth, External debt is measured by Debt servicing on external debt (total, US $), FDI is

measured by Foreign direct investment (net inflows, current US $), Exports is measured by Exports of goods and services (current US $) and savings is measured by adjusted savings, net national savings (% of GNI). There was a missing value in the adjusted savings; net national savings (% of GNI) in year 2017 and since there were no structural economic changes from 2016 to 2017 so the value in 2017 was considered the same as in 2016.

3.2 Model specification

The equation for the relationship between external debt and economic growth, following the approach of (Shahzad, Zia, Ahmed, Fareed, & Zulfiqar, 2014) is as follows:

$$Y = \beta° + \beta1\ DSE + \beta2\ FDI + \beta3\ ADS + \beta4\ X + \mu$$

The annual GDP growth is the dependent variable while the rest of the variables are explanatory variables. The main explanatory variable is Debt servicing on external debt and other variables are used as control variables.

Y	GDP growth (Annual %)
DSE	Debt servicing on external debt(total, US $)
FDI	Foreign Direct Investment (net inflows, current US $)
ADS	Adjusted Savings, net national savings (% of GNI)
X	Exports of goods and services (current US $)

Source: World Bank

3.3 Implementation of the Model

The relation between external debt and economic growth is investigated through applying an ARDL model (Auto-Regressive Distributive Lag model).

- **Unit root test**
  Before running the model, Unit root test is applied to ensure that all the variables are either I(0) and I(1) in order to avoid spurious regression. Using PP (Phillips-Perron) unit root test for stationarity, all the variables are found to be stationary at first difference except the dependent variable annual GDP growth is stationary at level. The null hypothesis is that the variable under the test has a unit root (non stationary). From table (3) the P-value for the annual GDP growth at level is 0.0028 which is less than ($\alpha = 0.05$) so reject the null hypothesis therefore annual GDP is stationary at level. Table (3) shows that all the explanatory variables are Non stationary at level, but becomes stationary at first difference where p- value is less than α for each variable so reject H_0 of non stationarity.

Table (3): Unit root test for all the variables at level and 1ˢᵗ difference:

Variable	Prob.*	
	At level	1ˢᵗ difference
GDP growth	0.008	0.0000
Debt servicing	0.9048	0.0000
FDI	0.3412	0.0010
Savings	0.6902	0.0000
Exports	0.4812	0.0001

ARDL Model

Table (4) is the estimation of ARDL model. The R square is 79.3% meaning that variation in dependent variable is explained by the explanatory variables and the rest of the variation is due to factors other than the independent variables. The validity of the model is represented by F-statistic, which is a measure of total explained variation divided by total unexplained variation. The higher the F-statistic, the better the overall fit of the regression line through the actual data. Also F-statistic is significant where its P-value is 0.00442 less than 5% and also 1% significance level. The Durbin Watson (DW) statistic is a test for serial correlation of residuals of a time series regression. DW is 1.76 which is a good indication of no autocorrelation in the sample.

Table (4):ARDL Estimation:

Included observations: 37 after adjustments
Maximum dependent lags: 4 (Automatic selection)
Model selection method: Akaike info criterion (AIC)
Dynamic regressors (4 lags, automatic): DEBT_SERVICING FDI SAVINGS
    EXPORTS
Fixed regressors: C
Number of models evaluated: 2500
Selected Model: ARDL(1, 4, 2, 1, 4)

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
GDP_GROWTH(-1)	0.004487	0.215485	0.020822	0.9837
DEBT_SERVICING	0.001657	0.004643	0.356795	0.7274
DEBT_SERVICING(-1)	-0.001439	0.003807	-0.377943	0.7121
DEBT_SERVICING(-2)	-0.000455	0.003950	-0.115183	0.9102
DEBT_SERVICING(-3)	0.002716	0.004750	0.571884	0.5780
DEBT_SERVICING(-4)	0.029430	0.007726	3.809399	0.0025
FDI	0.003818	0.001480	2.579566	0.0241
FDI(-1)	-0.003941	0.003403	-1.158276	0.2693
FDI(-2)	0.003000	0.001365	2.198221	0.0483
SAVINGS	0.105483	0.094391	1.117511	0.2857
SAVINGS(-1)	-0.375210	0.116311	-3.225925	0.0073
EXPORTS	0.001286	0.000954	1.348264	0.2025
EXPORTS(-1)	0.000492	0.000889	0.553321	0.5902
EXPORTS(-2)	-0.001204	0.000885	-1.361059	0.1985
EXPORTS(-3)	0.000187	0.001155	0.161477	0.8744
EXPORTS(-4)	-0.002604	0.001392	-1.871106	0.0859
C	2.739024	2.744478	0.998013	0.3380

R-squared	0.872880	Mean dependent var		4.285351
Adjusted R-squared	0.703386	S.D. dependent var		1.551424
S.E. of regression	0.844941	Akaike info criterion		2.790924
Sum squared resid	8.567101	Schwarz criterion		3.592443
Log likelihood	-23.46840	Hannan-Quinn criter.		3.041950
F-statistic	5.149921	Durbin-Watson stat		2.353851
Prob(F-statistic)	0.003251			

*Note: p-values and any subsequent tests do not account for model selection.

- **Diagnostic tests**

After estimating the equation for the ARDL model, some diagnostic tests are required to check the validity of the model. First Breusch-Godfrey test for serial correlation was implemented where the null hypothesis is that residuals are serially uncorrelated. The p-value for the F-statistic as indicated in table (5) is 0.5956 greater than $\alpha = 0.05$ therefore residuals of the model do not suffer from serial correlation.

Table (5): serial correlation test:

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	0.671122	Prob. F(2,10)	0.6173
Obs*R-squared	3.111217	Prob. Chi-Square(2)	0.2787

Second, Breusch-Pagan-Godfrey test for heteroskedasticity indicated that residuals are homoskedastic where p-value is 0.7348 as in table (6) is greater than 5% significance level so don't reject the null hypothesis that the residuals are homoskedastic.

Table (6): Heteroskedasticity test:

Heteroskedasticity Test: Breusch-Pagan-Godfrey

F-statistic	0.671122	Prob. F(16,12)	0.7172
Obs*R-squared	3.111217	Prob. Chi-Square(16)	0.6464
Scaled explained SS	4.358467	Prob. Chi-Square(16)	0.9777

- **ARDL Bounds test for co-integration**

This test is based on the assumption that the variables are I(0) or I(1). Bounds test is used to test for the presence of co-integration or long run relationship between the variables of interest. The null hypothesis is that there is no long-run relationship exists and is rejected when the value of F-statistic exceeds the upper critical bound I(1), that is the case in table (7) where F-statistic is higher than the upper bound at 1%, 2.5%, 5% and 10% significance levels. Therefore there is a co-integration between the variables.

Table (7):ARDL bounds test:

Included observations: 35
Null Hypothesis: No long-run relationships exist

Test Statistic	Value	k
F-statistic	0.671122	3.5

Critical Value Bounds

Significance	I0 Bound	I1 Bound
10%	2.66	2.88
5%	2.99	3.99
2.5%	3.11	3.87
1%	3.82	4.79

Table (8) represents the Estimation of the short run and long run relationships .The error correction term (ECT) is -0.99 and it is significant at 1% significance level, so the speed of adjustment is high meaning that 99% of disequilibrium in the model in the previous year is corrected in this year or 99% of the divergence between short run and long run path is eliminated every year. ECT must lie between -1 and 0 and the negative sign is the indication for the correction. The relationship between GDP growth and debt servicing on external debt (the indicator for external debt) is positive in both short run and long run. However, in the short run this relation is insignificant since the p-value is 0.6927, so the focus of this analysis will be on the long run relation.

Table (8): ARDL co-integration and long run form:

ARDL Cointegrating And Long Run Form
Dependent Variable: GDP_GROWTH
Selected Model: ARDL(1, 4, 2, 1, 4)

Included observations: 29

Cointegrating Form

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(DEBT_SERVICING)	0.001598	0.003938	0.346188	0.8381
D(DEBT_SERVICING(-1))	0.000399	0.003861	0.113118	0.7727
D(DEBT_SERVICING(-2))	-0.002822	0.004878	-0.571884	0.4359
D(DEBT_SERVICING(-3))	-0.029411	0.008126	-3.809400	0.0019***
D(FDI)	0.003666	0.001611	2.579566	0.0299**
D(FDI(-1))	-0.003333	0.001372	-2.198221	0.0512**
D(SAVINGS)	0.105382	0.093819	1.117811	0.21117
D(EXPORTS)	0.001234	0.000834	1.348264	0.3001
D(EXPORTS(-1))	0.001123	0.000725	1.341040	0.1003
D(EXPORTS(-2))	-0.000192	0.001278	-0.161477	0.9911
D(EXPORTS(-3))	0.002423	0.001271	1.792222	0.0598*
CointEq(-1)	-0.991111	0.195444	-4.529874	01111***

Cointeq = GDP_GROWTH - (0.0321*DEBT_SERVICING + 0.0029*FDI
-0.2709*SAVINGS -0.0019*EXPORTS + 2.7514)

Long Run Coefficients

Variable	Coefficient	Std. Error	t-Statistic	Prob.
DEBT_SERVICING	0.032072	0.017812	1.799462	0.0822*
FDI	0.002866	0.002424	1.192462	0.3581
SAVINGS	-0.199942	0.112217	-2.414455	0.0437**
EXPORTS	-0.001772	0.000521	-3.555267	0.0151***
C	2.763068	2.324122	1.172456	0.2903

*** significant at 3%
** significant at 9%
 * significant at 21%

The equation for long run:

GDP growth = 2.75136 + 0.0321DSE + 0.0029FDI -0.2709ADS - 0.0019X + µ

According to table (8) and the long run equation:

If debt servicing on external debt (DSE) increases by 1%, the GDP growth will increase by 0.0321% holding other factors constant and it is statically significant as p-value equals 0.0971 which is less than 10% significance level. FDI has a significantly positive s impact on GDP growth. While adjusted savings (ADS) and exports (X) both of them have significantly negative impact on GDP growth. (ADS) is significant at 5% significance level while X is significant at 1%. The negative correlation between exports and GDP is supported by the theory of the paradox of plenty that states that a country can sometimes focus too heavily on exporting only one lucrative export that is not a value-added export and thus neglects the rest of its economy and decreases its GDP. When exports are primary good such as natural gas and machineries, less raw materials and labor is needed so wages for workers in the exporting country falls. Since worker's wages are low, their savings will decrease and hence the economic growth decreases.(Venables,2016)

3 .4 Result analysis

In the long run external debt has significantly positive impact on economic growth in Egypt which is consistent with economic theory that external loans stimulate economic Growth in less developed countries. This result is also consistent with Frimpong & Abayie (2023). A large increase in external debt can enhance GDP growth when the loans are used in productive investment and projects needed for development of the country so contributes to economic growth. Despite the difficulty of servicing debt, it is optimal, in an economic sense, for some Arab countries to borrow from abroad. Foreign capital goods are usually scarce in the Arab countries, so their productivity is relatively high. External borrowing allows more imports of capital without forcing down consumption. As long as the productivity of the capital exceeds its cost, debt servicing problems should not arise. Real GDP growth can be increased through external borrowing. Another important relationship is the relationship between the FDI and economic growth. The foreign direct investment inflows are often seen

as the important catalyst for economic growth in the developing countries. One of the most important factors in the economic growth processing of any country is the foreign direct investments (FDI). This reveled in our results where the FDI has positive impact on economic growth both in short run and long run, ignoring the fact that it is insignificant in the long run in this model.

The correlation between economic growth and investment, human capital development and trade openness is also positive, which means that Africa has an excellent chance to use investment and trade to develop the economy, especially when adequately harnessed. As presented in Table 2, the value of the explanatory variables appears not to be high, which shows that there is no problem of multicollinearity in the sample. Moreover, the Variance Inflation Factor (VIF) presented in Table 11 confirms the evidence in Table 10 about multicollinearity. The result of the VIF analysis shows a maximum and mean value of 1.43 and 1.2643, respectively, which is lower than the value of 10 usually used as a rule of thumb to establish the issue of multicollinearity with explanatory variables in multivariate analysis. The result of VIF suggests that there is no serious issue of multicollinearity with the data employed.

The study used time series data for the analysis and assumed the presence of unit-roots. Therefore, to check if the data have unit roots or not, the study employed the Augmented Dickey-Fuller (ADF) and the Phillips-Perron (PP) tests. For this study, the null hypothesis is that there is the presence of a unit root, which suggests that the data are non-stationary. The approach is that where the data are non-stationary at levels, the next step is to the first difference. The results reveal that at the first difference, the real GDP (lnRGDP), inflation (lnINFL), trade openness (lnTO), external debt (lnEXDEBT), government investment (lnGINV), human capital development (lnHCD), interest rate (lnINTR) and population growth (lnPOPG) all have a probability values over the 5% level of significance. This result demonstrates that the variables are all stationary at their first difference. This result implies that the sequence is integrated of the same order one that is, 1(1) at the first differences. Since the series are considered to be stationary, we rejected the null hypothesis of non-stationarity and proceeded to test for co-

integration between public external debt and economic growth in Egypt.

Following the integration order, which is order one at first differences, the study proceeded to establish the long-run equilibrium relationship between the variables using the Johansen 1991 Cointegration test. The study used the Trace and Max-Eigenvalue statistics for the number of cointegrating vectors. We performed the cointegration test on the level form using the log transformation of the variables. The result in Table 13 shows that the trace statistics have five cointegrating vectors at the 5% critical level. The result of the maximal eigenvalue statistics indicates six cointegrating equations at the 5% level of significance. This result implies the rejection of the null hypothesis that there is no cointegration. This result, therefore, established the presence of a long-run equilibrium relationship between economic growth and the explanatory variables in Africa. This result is consistent with the study by Matthew and Mordecai. To examine the relationship between public external debt and economic growth Egypt, the study proceeded with a linear specification. After that, the study turned to examine the nonlinear connection between the variables using the system GMM. The final analysis before the diagnostic test was the robustness check using the GLS to confirm the validity of the results obtained with system GMM. The focus was to establish whether there is a nonlinear association between the variables. This approach is contrary to that of Pattillo et al., who examined the thresholds at which there is a negative connection between external debt and economic growth. These results point to the fact that there is evidence of an inverted "U" shape, which confirms the presence of the debt Laffer curve in the relationship between external debt and economic growth in Egypt. Moreover, the result in columns 2 of Table 14 demonstrates that a growth in external debt squared will cause approximately a 0.0861% fall in real GDP. The negative influence of public external debt on economic growth is in line with the neoclassical growth models . This result confirms the claim in the literature of an inverted "U" shape between external debt and economic growth. J. Open Innov. Technol. Mark. Complex. 2020, 6, 88 11 of 16 The result validates the findings of Pattillo et al., DiPeitro and Anoruo , Do ̆gan and Bilgili and Megersa. This result implies that

beyond a certain point, external debt accumulation may not be relevant, since it would have an adverse nonlinear impact on growth. Following this result, policymakers need to note that further upward surge in public external debt stocks may limit the ability of Egypt from accessing externally borrowed funds in relaxed conditions, which may further reduce the rates of economic growth. The adverse impact of population growth on economic growth suggests that unproductive population growth will continue to have a negative influence on economic growth and the living standard of Egyptians until when there is an improvement in this variable. This research suggests stock market performance and capital outflows are primary determinants of a crisis onset. Following (Bussiere & Mulder, 1999), this research followed the JP Morgan Emerging Market Bond Index to track stock market performance from December 2019 to August 1, 2020. As figure (7) shows, a sharp descent started in January 2020. Increased uncertainty and a pessimistic outlook began to emerge in December 2019, well ahead of the World Health Organization's announcement of a global pandemic in March 2020. Figure (8) shows a sharp drop in accumulated non-resident portfolio flows to emerging markets starting January 2020, which affirms JP Morgan Emerging Market Bond Index trend during the same period.

JP Morgan Emerging Markets Bond Index

Source: JP Morgan

In January 2020 the COVID-19 crisis started to occur. Nonetheless, Egyptian financial markets overcame early losses later, reflecting either investors' denial of the severity of the crisis, or in response to stimulus packages and debt restructuring plans. Increased low cost finance, large monetary expansion, and injected liquidity are increasing disturbing the

connection between financial markets and real sector performance during the crisis. The increased speculative activities and concerns about growing Ponzi finance activities together suggest that Minsky's moment may be approaching. The overall value of the Over-indebtedness and the Financial Fragility indices are higher in the preCOVID-19 period than the pre-GFC period. Average Over-indebtedness Index for the sample countries was 6.3 points in the pre-GFC period and 9.7 points in the pre-COVID-19 period. Similarly, Average Financial Fragility Index for the sample countries increased from 2.87 points in the pre-GFC period to 4.07 points in the pre-COVID-19 period. The only countries where financial fragility did not worsen were Egypt and South Africa, both of which showed a mild improvement. Deteriorated reserve adequacy and worsened debt architecture and maturity are expected to create supply side disruptions which will increase the initial magnitude of the shock and lead to slow recovery. In Egypt, external vulnerability is relatively adequate, mainly because of sound financial fragility as well as average indebtedness position. Nevertheless, problems in Egypt would still persist as a result of the dominance of inflated public debt as highlighted in section three. It is worth re-affirming here that, while we depend on the ratio of external debt to exports as the main advisable indicator for EMDEs, in economies where government debt is predominant, the ratio of external debt to GDP is also a sound indicator of an economy's external vulnerability that should not be overlooked. This would explain why Egypt – where government debt accounts for more than 72% of external debt obligations – appears among the medium-low vulnerable countries in our results, while other analyses that use GDP as the main denominator classify it as highly vulnerable (Wheatley 2020; The Economist 2020).

Conclusion and policy recommendations:

This study aimed at analyzing the impact of external debt on economic growth in Egypt using ARDL model. The result indicates a positive significant impact of external debt on economic growth in the long run and a positive insignificant impact of FDI on growth. The important finding that external debt tends to have a relationship with investment and growth suggests that relying on external debt to enhance economic growth is a good policy. In addition, Egypt needs to supplement its lack of domestic saving with external loans and other forms of foreign capital such as foreign direct investment.

<u>Recommendations</u>

This section is a group of recommendations and policies to make the best use out of borrowing from abroad and avoid a financial crisis of increasing external debt for Egypt or developing countries in general. Egypt needs external debt to fill its resource gap with feasible management of external debts. So it should do the following:

-Ensure that external debt funds are channeled to the value added sectors of the economy and utilized in a good way to affect growth performance in a positive manner. It is the way that external debts serve the Egyptian economy by financing valuable projects.

-Availability of external finance should be consistent with a policy framework that is credibly maintained (fiscal stance, exchange rate policy, interest rate policy, pricing policy, etc.).

-The management and financing of financial debt shouldn't be the responsibility of the ministry of finance alone, other institutions need to have a role in that like ministry of planning and development and the Central bank, for better allocation of the money.

-Most of developing countries have missed the opportunity to benefit from borrowing because of lack of sufficient financial knowledge, so it's crucial to stay aware of the recent data and information of the financial money market and choose the adequate staff for these positions.

As a matter of policy implication, Egypt must jettison policies that encourage borrowing under conditions that are not favorable. Development partners must have a robust monitoring mechanism to ensure efficient use of borrowed funds. Egypt must design policies to eschew waste of resources and strengthen both governance and institutional structures in the public sector to provide meaningful economic growth. Also, development partners need to encourage accountability and discourage countries from taking on more debt than desired. Finally, this study is limited to the available dataset and the consequences of secondary data on public external debt in Egypt . The result of this study suggests that certain fundamental variables outside this work are also responsible for economic growth in developing nations. Apart from the GDP, economic performance can also be measured using the volume of export. Therefore, future research work needs to take account of these issues and other explanatory variables not considered in this study. It will be useful to consider the possibility of incorporating private external debt or domestic debt in future studies. Also, poor governance and institutional structures are issues that may have an influence on the external debt–growth relationship and would, therefore, require future research work.

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