



# “The Effect of External debt on Inflation Rate in Egypt”

Monica Karim Hanna Abdelmalak

Supervisor: Dr. Mina Ayad

## Abstract

The main objective of this study is to investigate the effect of External debt on inflation rate in Egypt over the period 2000-2022. This study uses the R studio with 3 libraries including readxl, car, ggplot2 to test this relationship. the data are obtained from the central bank of Egypt and CAPMAS. the results show that the External debt explains 0.2347% of the change in the inflation and that 99.7% are explained by other variables that affect the Inflation rate in Egypt including level of imports, exchange rates, interest rates... etc.

## 1. Introduction

External debt is referred to the amount of a nation's debt that is borrowed from several lenders including governments, foreign lenders, commercial banks, or international financial institutions. Typically, repayment of these loans including interest must be made in the original currency. The borrowing country may export and sell goods to the lending country in order to generate the necessary funds. Egypt's external debt dropped from 165361.10 USD million in the second quarter of 2023 to 164727.60 USD million in the third. Between 1997 and 2023, Egypt's external debt averaged 52502.38 USD million. It peaked in the second quarter of 2023 at 165361.10 USD million. It was 26132.50 USD million in the first quarter of 2001.

On the other hand, the inflation rate is the percentage at which a currency loses value over time. The consumer price index (CPI) rises during this time, which is indicative of devaluation. Stated differently, it refers to the pace at which the value of the currency is declining, which raises the average cost of consumer goods in relation to the change in the value of the currency. Egypt's consumer price inflation rate in the ten years leading up to 2022 was 12.1% on average, higher than the 5.4% regional average for the Middle East and North Africa. The average for 2022 was 13.9%.

The aim of this study is to test the relationship between the independent variable which is the external debt and the dependent variable which is the inflation ratio. The aim also is to investigate the impact of other variables on the inflation rate. As due to the increase of multiple projects in Egypt including Monorail, new capital...etc the External debt in Egypt is increasing throughout the years. Not only the External debt but also the Inflation rate.

The studied topic is important as this topic became debatable among Egyptians nowadays because people are wondering if the increase in external debt will affect the prices again or there is no effect. As when inflation rate increase it impacts several industries as some manufacturing can cease their operations due to the increasing prices of raw materials, it can also impact the purchasing power of consumers which leads to decreasing consumer spending and focusing only on basic goods and services.

This study extends the work for many researchers who studies the impact of external debt on inflation rate globally including Arisa 2020 who studied this relationship in Kenya, Gathendu and Wairima (2021) who explore the same relation in Kenya, Uganda and Tanzania, while Fathy and Mahmoud (2023) explore the same relationship in Sudan. In Egypt there are very few researchers like Helmy (2021) who studied the impact of external debt on price levels in Egypt recently. However, there is still a relative lack of investigation and different results for the Egyptian Market. For this reason, this research will be focusing on the impact of external debt on inflation rate in Egypt with a time frame from 2000 to 2022.

In order to achieve the goal of this study, data have been collected from the central bank of Egypt ana CAPMAS about the percentage of external debt to GDP in Egypt and the inflation rate in Egypt. The R studio with 3 libraries including readxl, car, ggplot2 are used to calculate the effect of external debt on inflation rate in Egypt.

Based on the literature studied, two Hypotheses were formulated

H1: there is a relation between the external debt and inflation.

H2: the relation between external debt and inflation is positive in Egypt.

This study is important for **policymakers** as it will show the impact of taking foreign loans on the inflation rate, it will help the policy makers to balancing between the country external debt and the level of inflation and to study other variables that may affect the inflation rate rather than the external debt. This study is also important for **individuals** to see what is going on in the country nowadays so they can be aware of the effect of the external debt on inflation and other factors that may affect the inflation. The study is also important is important for **the society** so they can know the potential impacts on the economy, and how to overcome any potential consequences. As the inflation has many negative implications that will affect the society which include increasing the unemployment rate, increase the poverty rate.

The flow of this paper starts with the literature review. Second, the Data and descriptive analysis, Methodology and Empirical evidence. In the literature review section, we will discuss different articles that elaborate different factors that affect inflation including growth rate and inflation, level of exports.... Etc and then we will discuss in specific the External debt effect on inflation. The data and descriptive analysis section we will be focusing on describing the variables and graphically representing the variables throughout the years. in the Methodology section, we create the equation between the dependent and the independent variable. In the empirical finding, we test the relationship between the dependent variable and the independent variables using the equation, calculating the Beta value, and estimating the change in Y. Finally, the comparison between the research findings and other researchers' findings.

## 2. Literature Review

The inflation nowadays became a debatable topic among different countries and economies. Inflation as well is influenced by multiple factors and has various impacts on many other factors. In order to analyse the inflation determinants and impacts, previous studies were conducted to test the Relationship of inflation with multiple factors.

Saymeh and Abu Orabi (2013) focused on testing the relationship between growth rate and inflation rate in Jordan using a regression model. The results demonstrated the influence of inflation rate on growth rate. Lastly, regression was used to test the relationship between GDP, inflation, and interest rates. The results indicated that the growth rate is influenced by both the current GDP and one lag GDP.

On the other hand, Kiganda et al (2017) were focusing on testing the relationship between the exports and inflation in Kenya. The findings show a strong, positive long-term correlation between inflation and total exports. However, in the short run the results show a negative relation between inflation and exports and there is a unidirectional Causal relationship between total exports and inflation.

Moving on to the impact of imports on inflation, Munepapa et al (2017) were focusing on testing this relationship in Namibia. The results show according to the error correction model, that imports have a small short-term impact on inflation but a long-term positive impact.

Imimole and Enoma (2011) were focusing on testing the relationship between Exchange Rate depreciation and inflation in Nigeria. The study concluded that the main factors influencing inflation in Nigeria are the depreciation of the exchange rate, the money supply, and the real gross domestic product. It also found that depreciation of the Naira is positive and has a large long-term impact on inflation in Nigeria. This suggests that a decline in the value of the currency may result in a rise in Nigeria's inflation rate.

Moving on to the relation between Monetary policy and inflation, Ahiabor (2013) was focusing on testing this relation in Ghana. The Results show that in the long run, the money supply and inflation have a positive relationship, while the interest rate and inflation have a negative relationship. On the other hand, the exchange rate and inflation showed a positive relationship.

Samson et al (2013) were focusing on testing the impact of fiscal policy on inflation in Nigeria. The study's conclusions demonstrate a positive correlation between government revenue and spending and the rate of inflation, albeit this correlation is not statistically significant. Additionally, there is a small but positive correlation between GDP and inflation.

Moreover, Adaramola and Dada (2020) were focusing on the relation between the inflation and economic growth in Nigeria. The study's conclusions show that while interest rates and the money supply have a significant positive impact on economic growth, inflation and the real exchange rate have a significant negative impact. Madurapperuma (2016) was testing the same relation in Sri-lanka, the findings indicate that there is a substantial and long-term negative correlation between inflation and economic growth.

Suharti et al (2021) were testing the relationship between the inflation and the unemployment in Indonesia. According to this study, the primary cause of unemployment was not inflation, which only accounted for 18.6% of unemployment; other factors were responsible for the remaining 80.4% of unemployment. This happens because factors both natural and man-made, rather than aggregate demand, are to blame for the price increases.

Moving to the impact of public debt on inflation, Aimola and Odhiambo (2021) were testing this Relation. In the presence of structural breaks, the cointegrating regression results show evidence of a stable long-run relationship between inflation, trade openness, money supply, interest rate, and total public debt as well as economic growth and private investment. Regardless of whether the regression was conducted over a short or long period of time, empirical findings demonstrate that the relationship between public debt and inflation is statistically insignificant.

Having a closer look to the impact of external debt on inflation, which is the main focus of the thesis previous literature delivers important messages. Arisa (2020) is one of the researchers that explore this relationship in Kenya, the results show a positive relation between the external debt and inflation as result the rising of external debt leads to internal currency depreciates and inflation increases.

Gathendu and Wairima (2021) explore the same relation in Kenya, Uganda and Tanzania, the findings demonstrate that external debt has a long-term positive impact on inflation and that the growth of money contributed to the explanation of this relationship. Furthermore, a unidirectional causal relationship between inflation and external debt was discovered. It was discovered that this causality was homogenous.



Aimola and Odhiambo (2020) thoroughly examined the research on the connection between inflation and public debt. The results generally point to a positive correlation between inflation and public debt, though this correlation's strength varies and could alter over time.

Another study conducted by Fathy and Mahmoud (2023) to test the relationship between the external debt and inflation in Sudan, the long-term effects of external debt on inflation are not statistically significant, according to the results of the linear ARDL model. Conversely, the NARDL model's findings demonstrate that both positive and negative external debt shocks have a long-term statistical impact on inflation.

Sharaf et al (2024) were testing the impact of foreign debt and inflation in Brazil, the results clearly show that while the nominal effective exchange rate has a short- and long-term negative impact on inflation, the domestic money supply has a statistically significant positive effect. According to the NARDL model, changes in foreign debt, whether positive or negative, have a statistically significant long-term impact on inflation. However, only positive changes in foreign debt have a statistically significant short-term negative impact on inflation.

Moreover, Umit and Dagdemir (2023) explore this relationship in 12 countries listed in the Morgan Stanley Capital Index. The panel cointegration analysis's findings demonstrated that changes in the amount of external debt have an opposite effect on economic growth and an equal effect on inflation rate. The panel cointegration analysis's country-specific results showed that, with the exception of Mexico, Egypt, India, and Turkey, all other countries' economic growth was negatively impacted by external debt. All countries saw higher inflation due to external debt, with the exception of China, Egypt, India, South Africa, and Thailand. In addition, a unidirectional causal relationship was discovered between Colombia's external debt stock and inflation, as well as a similar relationship between inflation and external debt in China, India, Peru, and Thailand. Using the findings of the cointegration analysis, another study was conducted by Mweni et al (2016) in Kenya, the findings of the regression analysis demonstrated that external debt significantly and positively affects inflation.

Ewane and Mejame (2023) were exploring this relationship, The findings suggest that external debts have an asymmetric impact on inflation that increases and decreases over time. In the short term, positive and negative external debt stocks, respectively, have a negative and positive significant impact on inflation; only the positive external debt stock's coefficient on inflation is positive and significant over the long term.

In Egypt, few researchers take a closer look into the impact of external debt on inflation. One of the researchers is Helmy (2021) who studied the impact of external debt on price levels in Egypt. The study comes to the conclusion that external debt drives up prices over the long and short terms. Furthermore, on one hand the money supply and interest rate can decrease short-term price but on the other hand it was found that it increases prices in the long run. In Addition, the global prices of primary goods drive up domestic

prices over the short and long terms, while local currency depreciation exacerbates inflation over the same time periods.

Another study conducted in Egypt by Ghaly (2023) found a positive relationship between External debt and inflation in Egypt from during the period 1976 to 2020.

This Thesis extends the previous studies by exploring the impact of external debt on inflation in Egypt. This thesis will be adding value to the previous literature as many studies are concerned with testing the impact of different factors on inflation, but few studies were conducting to test the impact of external debt on inflation and very few studies were conducted in Egypt to test this Relationship. Based on the discussion above and the potential empirical work in this thesis, the following hypothesis can be developed:

H1: there is a relation between the external debt and inflation.

H2: the relation between external debt and inflation is positive in Egypt.

### 3. Data and Descriptive Statistics

This thesis obtained data from Central bank of Egypt and CAPMAS. In Specific, information about the External Debt, as independent variable, and inflation rate, as dependent variable was extracted.

The detail for each Variable is explained through the below table.

**Table 1: Definition of Variables**

Variable	Variable in	Definition
External Debt	Externaldebt	External debt percentage from the GDP
Inflation	InflationRate	Inflation rate percentage

To conduct the statistical analysis and empirical results, we downloaded three libraries from R-language: readxl, car, ggplot2.

**Table 2: Variable types in R**

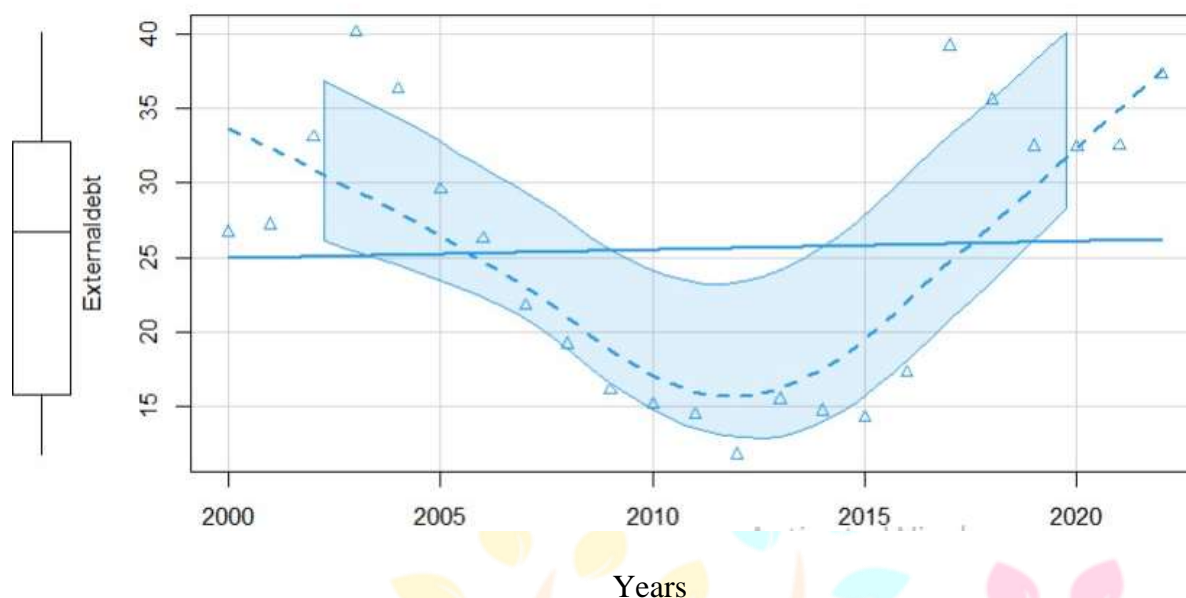
```
> str(Seminar)
Classes 'tbl_df', 'tbl' and 'data.frame':    23 obs. of  3 variables:
 $ Years      : num  2000 2001 2002 2003 2004 ...
 $ Externaldebt : num  26.7 27.2 33.1 40.1 36.3 ...
 $ InflationRate: num  2.68 2.27 2.74 5.41 11.27 ...
```

According to table 2, we are dealing with three numerical variables (years, Externaldebt, InflationRate), the thesis is conducted analysis using 23 observations.

**Table 3:**

```
> summary(Seminar)
  Years      Externaldebt      InflationRate
Min.   :2000   Min.   :11.78   Min.   : 2.270
1st Qu.:2006   1st Qu.:15.80   1st Qu.: 5.310
Median :2011   Median :26.71   Median : 9.470
Mean   :2011   Mean   :25.59   Mean   : 9.811
3rd Qu.:2016   3rd Qu.:32.77   3rd Qu.:11.515
Max.   :2022   Max.   :40.11   Max.   :29.510
```

the table above include all the variables in the study with their descriptive statistics First, the number of years range from 2000 to 2022 as shown above. Moving on to the independent variable, External debt ranges from 11.78% to 40.11% which shows a high range between the minimum and maximum value. The average is 25.59 for the studying period which means that the average percentage of external debt from GDP is equal to 25.59. lastly, the dependent variable, the inflation rate ranges from 2.27 to 29.5 which is also show a high range between the highest and the lowest amount. The average is 9.8 for the studying period.

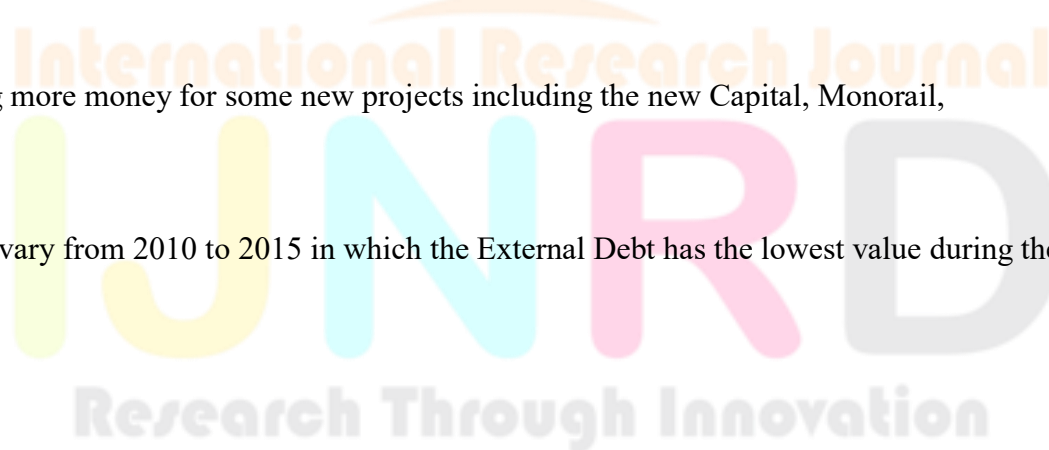
**Figure 1: Dynamics of the External Debt over time**

Source: Author's construction using Central Bank of Egypt and Rstudio

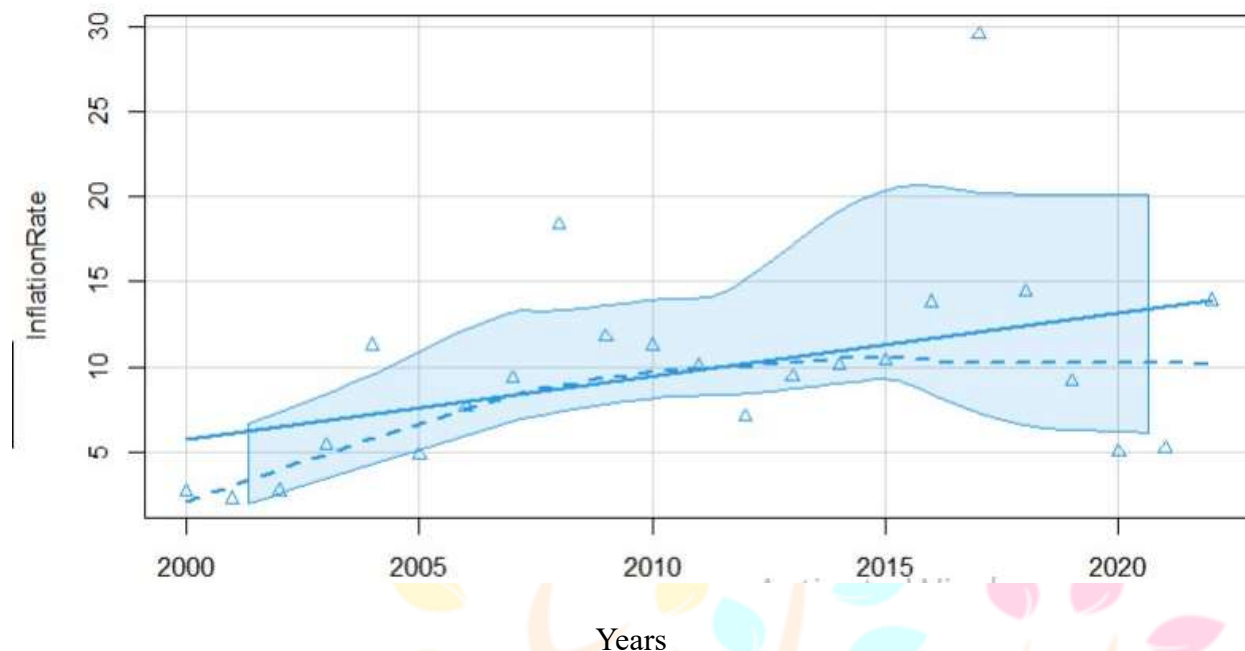
The figure above shows that External Debt faced a downward sloping from 2005-2015 and then it has an upward sloping starting from year 2015. This conclusion is based on the shaded part and linear line forecasting this variable trend based on a 95% confidence interval. This trend is well estimated by the RStudio in the package. This upward sloping is due to some reasons as follows:

- External Debt from some national governments including (KSA, Kuwait, UAE, Qatar.... etc)
- External Debt from International Financial Institutions including (AfDB, Arab Fund for Economic, IMF.... etc)
- Borrowing more money for some new projects including the new Capital, Monorail,

Best periods vary from 2010 to 2015 in which the External Debt has the lowest value during these years.





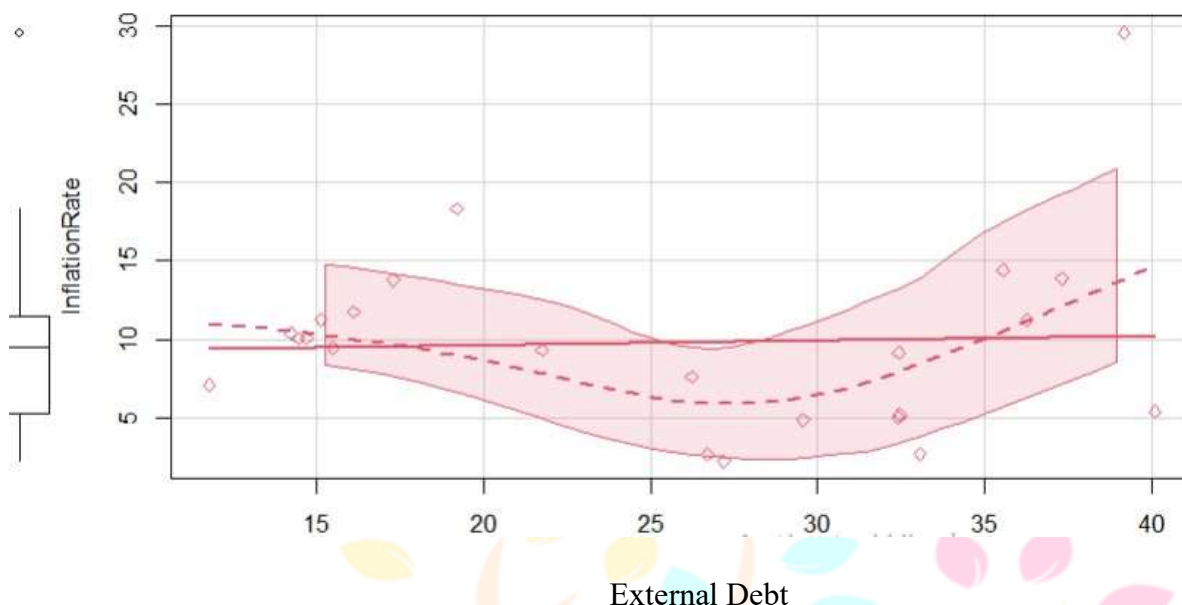
**Figure 2: Dynamics of the Inflation Rate over time**

Source: Author's construction using CAPMAS and Rstudio

The inflation rate in the studying period from 2000 to 2022 shown an upward sloping. Good periods vary from 2000-2003 where the inflation rate is somehow constant below 5%. There are many reasons that can cause this upward trend in Egypt such as:

1. Population growth which leads to the increase of demand for products and hence increase the price.
2. Egyptian Pound devaluation in 2016
3. Shortage of foreign Currency
4. Russian and Ukraine war as Egypt imports wheat from them

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**Figure 3: Inflation Rate and External Debt relation over time**

Source: Author's construction using Central Bank of Egypt and CAPMAS and Rstudio

### Methodology

The methodology in this thesis is using to predict the effect of change of External debt on the inflation rate in Egypt. In specific, this thesis used the car package in the R studio to test this relationship. This relationship in the literature can be explained theoretically as follows:

$$Y = \alpha + \beta X + \varepsilon \rightarrow (1)$$

In the context of this thesis, Y is the dependent variable which represents the Inflation rate. while X is the independent variable which represents the External debt in Egypt. The goal

is to test the impact of the external debt on inflation rate. This estimation will be reflected in  $\beta$  effect.

There are parameters like  $\alpha, \beta$  that can be estimated through the car package.  $\varepsilon$  reflects the other variables that may affect the inflation rate rather than the external debt or in addition to the external debt. The other variables can include population growth, interest rate, level of imports, GDP growth rate, Exchange rate fluctuations.....etc.

To align with the thesis's context, equation (1) can be re-written as follows:

$$\text{Inflation Rate}_t = \alpha + \beta \text{ external debt}_t + \varepsilon_t \rightarrow (2)$$

Three possible scenarios

#### Scenario 1 $\beta > 0$

When the External debt increases, inflation rate will increase.

#### Scenario 2 $\beta < 0$


When the External debt increases, inflation rate will decrease.

#### Scenario 3 $\beta = 0$

There is no relationship between External debt and inflation rate.

### 4. Empirical Findings

Table 4



```
summary(ois)

Call:
lm(formula = InflationRate ~ Externaldebt, data = Seminar)

Residuals:
    Min       1Q   Median       3Q      Max
-7.5898 -4.8285 -0.0313  2.0099 19.2827

Coefficients:
            Estimate Std. Error t value Pr(>|t|)
(Intercept)  9.02679    3.74943   2.408  0.0253 *
Externaldebt  0.03063    0.13783   0.222  0.8263
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 6.091 on 21 degrees of freedom
Multiple R-squared:  0.002347, Adjusted R-squared:  -0.04516
F-statistic: 0.0494 on 1 and 21 DF, p-value: 0.8263
```

Table 4 above estimated the following equation:

$$\text{Inflation Rate}_t = 9.02679 + 0.03063 \text{ external debt}_t$$

$$\beta = 0 \rightarrow \text{Errors: } 82.63\%$$

17.37% of the observations follow the  $\beta$

When External debt increases by 1 %, the inflation rate in Egypt increases by 0.03063% When External debt increases by 10 %, inflation rate in Egypt increases by 0.3063% with probability of error exceed 82%

The External debt explains 0.2347% of the change in the inflation.

GDP	Exchange rate	Population Growth	Interest rates and level of imports	External Debt
$\epsilon = 99.7653\% \rightarrow \text{Unexplained}$				0.2347%

The study shows a small positive impact of external debt on inflation rate. This study agrees with Fathy and Mahmoud (2023) that shows that the long-term effects of external debt on inflation are not statistically significant. This study agrees also with Aimola and Odhiambo (2021) that shows that the relationship between public debt and inflation is statistically insignificant.

This insignificant relationship between the External debt and inflation rate may be due to

1. Other External factors that affecting the inflation rate that must be taken into consideration.
2. Recent research has demonstrated that the adjustment behaviour of the majority of economic variables is characterized by large nonlinearities and asymmetries.

## 5. Conclusion

The main objective of this study is to test the impact of external debt on inflation rate in Egypt. The study was conducted using The R studio with 3 libraries including readxl, car, ggplot2. The time frame for this study ranges from 2000-2022. The results show that the external debt has a small positive impact of 0.2347% on the inflation rate in Egypt. Which means that when External debt increases by 1 %, the inflation rate in Egypt increases by 0.03063. the remaining 99.7% of the inflation change is due other external factors that may include level of imports, interest rates changes, exchange rates variance, increase in population growth.... etc.

To control inflation, Central banks can increase interest rates, most of the people will put their money into the banks to benefit from the higher interest rates, on the other hand the borrowers will not go for borrowing money as It will become more expensive for them. This policy will create less liquidity in the market and hence will decrease the demand-pull inflation. In the trade policies, the government can gradually reduce import taxes, possibly as a component of a larger trade deal with foreign nations. A lower tariff may lower import costs, which would cause a short-term aggregate supply shift outward.

This study can be a good start for other researchers, that they are aiming to test this relation in the future. They can test this relationship in a different country or a different time frame. It is also important for **policymakers** because it will demonstrate how taking out foreign loans affects inflation rates, assist in striking a balance between the nation's external debt and inflation rate, and help them look into other factors that might have an impact on inflation rates other than external debt. It's also critical that **people** understand the current situation



in the nation in order to understand the impact of external debt on inflation as well as other potential inflation-influencing factors. **For the society** to understand the possible effects on the economy and how to mitigate any negative effects. The study is also crucial, as the increase of inflation can increase the unemployment as many places will lay-off people as their production costs will be become higher, the inflation also can increase poverty as people will be fighting to buy the basic goods only.

However, there were certain restrictions on this study's execution. First of all, few numbers of years were included in the sample, this studied period include multiple revolutions and economic instability in Egypt and this may impact the response of the independent variable with the change of dependent variable. Third, there was room for improvement in the model's by using some control variables to moderate the external debt.

We recommended for future studies to include first a larger the sample size to be more representative and increase the time horizon. Furthermore, additional statistical instruments and assessments may be employed in subsequent studies to examine the distinct impacts of cross-sectional and longitudinal effects on the dependent variables. We also recommend choosing other time frame when Egypt is economically stable so it can lead to generalizing the results. Finally, further studies should study the impact of the other variables including exchange rate, interest rates, level of imports on inflation Rate in Egypt.

## References

Ahiabor, G. (2013, December 10). THE IMPACT OF INCENTIVES ON PRODUCTIVITY OF FIRMS IN GHANA: A CASE STUDY OF GHANA AIRPORT COMPANY LIMITED. *Problems of Management in the 21st Century*, 8(1), 6–15..

Aimola, A. U., & Odhiambo, N. M. (2020). Public Debt and Inflation: A Review of International Literature. *Folia Oeconomica Stetinensia*, 20(1), 9-24.

Aimola, A. U., & Odhiambo, N. M. (2021, January 1). Public debt and inflation nexus in Nigeria: An ARDL bounds test approach. *Cogent Economics & Finance*, 9(1)

Arisa, G. M. (2020). Impact of external debt on inflation and exchange rate in Kenya.

Boshra Ghaly, S. (2023). External debt in time of inflation in Egypt: a vector error correction model. *المجلة العلمية للدراسات والبحوث المالية والتجارية*, 4(1), 661-701.

Enongene, B. E., & Etape, F. M. (2023, May 1). Does External Debt Stocks Have an Asymmetric Effect on Inflation Dynamics in Cameroon? An Application of Nonlinear ARDLL. *American Journal of Economics and Business Innovation*, 2(2), 17–23

Gathendu, J. J. W. (2021). Effect of external debt on inflation: the case of Kenya, Tanzania and Uganda.

- Helmy, H. E. (2021, December 14). The external debt-inflation nexus in Egypt. *Journal of Public Affairs*, 22(S1).
- Imimole, B., & Enoma, A. (2011). Exchange rate depreciation and inflation in Nigeria (1986–2008). *Business and Economics Journal*, 28(1), 1-11.
- Kiganda, E., Obange, N., & Adhiambo, S. (2017, January 10). The Relationship between Exports and Inflation in Kenya: An Aggregated Econometric Analysis. *Asian Journal of Economics, Business and Accounting*, 3(1), 1–12.
- Munepapa, M. (2017, January 1). *The Impact of Import on inflation in Namibia*.
- Mweni, F. T., Njuguna, A., & Oketch, T. (2016, June 26). The Effect of External Debt on Inflation Rate in Kenya, 1972-2012. *International Journal of Financial Research*, 7(4).
- Olugbenga Adaramola, A., & Dada, O. (2020, April 9). Impact of inflation on economic growth: evidence from Nigeria. *Investment Management and Financial Innovations*, 17(2), 1–13.
- Samson, B., Peter, F., & Cynthia, D. (2023, June 12). Fiscal Policy and Inflation in Nigeria. *Journal of Sustainable Business and Economics*, 6(2), 1–11
- Saymeh, A. A. F., & Orabi, M. (2013, January 1). *The effect of interest rate, inflation rate, GDP, on real economic growth rate in Jordan*.
- Sharaf, M. F., & Shahen, A. M. (2023, August 15). Does external debt drive inflation in Sudan: evidence from symmetric and asymmetric ARDL approaches. *Journal of Business and Socio-Economic Development*, 3(4), 293–307.
- Sharaf, M. F., Shahen, A. M., & Binzaid, B. A. (2024, January 15). Asymmetric and Nonlinear Foreign Debt–Inflation Nexus in Brazil: Evidence from NARDL and Markov Regime Switching Approaches. *Economies*, 12(1), 18.
- Suharti, S., Naufal, M. D., & Paiman, F. L. (2021, December 31). Inflation Effect on Unemployment in Indonesia: A Comparative Studies Between Sharia and Conventional Economic Perspectives. *JURNAL BISNIS STRATEGI*, 30(2), 127–138.
- Umit, A. O., & Dagdemir, A. (2023, December 5). Panel Data Analysis of the Impact of External Debt on Economic Growth and Inflation: The Case of Emerging Market Economies. *Scientific Annals of Economics and Business*, 70(4), 529–546.
- W. Madurapperuma, M. (2016). Impact of Inflation on Economic Growth in Sri Lanka. *Journal of World Economic Research*, 5(1), 1.

## 6. Appendix

##### This part needs internet connection#####

##Libraries##

```
install.packages("readxl")
```

```
install.packages("ggplot2")
```

```
install.packages("car")
```

#####

###Let Libraries Work##

```
library(car)
```

```
library(readxl)
```

```
library(ggplot2)
```

#####

##View Data##

```
View(Seminar)
```

#Variable Names#

```
str(Seminar)
```

##Summary##

```
summary(Seminar)
```

##Scatterplot##

```
scatterplot(Externaldebt~Years, data=Seminar,col=4, pch=2)
```

```
scatterplot(InflationRate~Years, data=Seminar,col=4, pch=2)
```

```
scatterplot(Externaldebt~InflationRate, data=Seminar,col=2, pch=5)
```

####Econometrics (Empirical Results)####

```
ols<-lm(Externaldebt~InflationRate, data=Seminar)
```

```
summary(ols)
```

