

# **A STUDY OF IMPACT OF EXTERNAL DEBT ON** **GDP AT MARKET PRICE IN INDIA**

SUBMITTED BY

Geetika Gupta (193032)

Harshita Singh (193068)

Jasmehak Kaur (193039)

Riya Bhatia (193096)

Shruti Bansal (193048)

Srishti Grover (193106)



**Sri Guru Gobind Singh College of Commerce**

**UNIVERSITY OF DELHI**

## **CERTIFICATE**

This is to certify that we have successfully completed the project titled ‘The Study on Impact of External Debt on GDP at Market Price of India’ submitted in fulfilment of the requirements of the subject of Research Methodology (Semester 4) for the Degree of Bachelors of Economics Honours from Sri Guru Gobind Singh College of Commerce, Delhi University. It is further certified that the submitted report is based on original research work carried out by us. The material obtained from secondary sources is duly acknowledged.

Geetika Gupta (193032)

Harshita Singh (193068)

Jasmehak Kaur (193039)

Riya Bhatia (193096)

Shruti Bansal (193048)

Srishti Grover (193106)

Batch: 2020-21

[Principal Signature]

Principal

[Faculty Signature]

Ms. Divya Seth

## **ACKNOWLEDGEMENT**

This project has been a great learning experience for us and we would like to express our sincere gratitude to all the people who guided us throughout the project and without the valuable guidance and suggestions of these people, this project would not have been completely successful.

A special thank you to our Faculty Guide (mentor), Ms. Divya Seth, Sri Guru Gobind Singh College of Commerce, DELHI UNIVERSITY, who provided rigorous review and input throughout every phase of the project. Her vast knowledge, expertise and constructive feedback have allowed us to reach at this point in our project. We doubt that we could have even begun to initiate research and do the project without Divya Ma'am's encouragement, guidance, support, and patience.

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## **TABLE OF CONTENTS**

<b><u>TOPIC</u></b>	<b><u>Page No.</u></b>
Acknowledgement	3
Executive Summary	5
List of Tables	6
List of Charts	7
<b>Chapter 1: Introduction</b>	
o Overview of the Research Topic	9
o Statement of the Problem	10
o Rationale of the Project	10
o Objective of the Study	11
<b>Chapter 2: Review of Literature</b>	12
<b>Chapter 3: Research Methodology</b>	
o Sample Size and Data Collection	20
o Hypothesis of the study	20
o Descriptive Statistics	20
o Inferential Statistics	21
o Data Framework	22
<b>Chapter 4: Data Analysis &amp; Findings</b>	24
<b>Chapter 5: Conclusions, Recommendations, And Limitation</b>	41
o Conclusion	42
o Recommendation	43
o Limitations	44

## **EXECUTIVE SUMMARY**

The impact of external debt on the developing economies has been a much-debated issue. The shortfall in the revenue generated from tax and non-tax sources of revenue of the government, as well as deficit faced from capital raised from domestic financial institutions, leads to the situation of external debt borrowing. When borrowing from abroad, the interest rate, currency denomination of loan and repayment schedule matters a lot. While some agencies and friendly countries provide loans at a concessional rate for specific projects, other loans are provided at a high rate and are not denominated in the rupee. External debt provides the necessary capital to the government to carry out economic activities.

External debt as a ratio to GDP rose marginally to 20.6 per cent as at end-March 2020 from 19.8 per cent a year ago. Reflecting the acceleration in the growth rate of external debt recorded during the first five years of the previous decade, the ratio witnessed gradual rise and reached a high of 23.9 per cent as at end-March 2015, before falling to 19.8 per cent as at end-March 2017. The ratio has hovered around 20 per cent since then. India's external debt, at US \$ 558.5 billion as at end-March 2020, grew moderately by 2.8 per cent (US \$ 15.4 billion) over the level a year ago. This moderate growth is in contrast to the sharp growth witnessed during the first five years of the previous decade.

The external debt to GDP ratio which was 32.7% in FY 1993-94 has been reduced to 19.17% in FY 2018-19 and has stayed lower than or around 20% levels for a significant number of years post the start of 21st century. India's external debt has totalled USD 521.39 billion in FY 2018-19.

This study aims to identify the trend of India's external debt borrowing and to determine whether over the years from 2010 – 2018, this external debt has helped in improving the economic growth of India.

## **LIST OF TABLES**

- 1: Total External debt of India year wise from 2010-11 to 2019-20 (Rs. In Crores)
- 2: GDP of India from 2010-11 to 2019-20 (taking base year 2011-12) (Rs. In Crores)
- 3: Real GDP Growth Rate of India (%)
- 4: External Debt and GDP at Market Price of India (Rs. In Crores)
- 5: Total External Debt (Rs. In Crores) and Real GDP Growth Rate (%)
- 6: Descriptive Analysis of External Debt
- 7: Descriptive analysis of GDP
- 8: Summary Output
- 9: ANOVA Table
- 10: Regression analysis output- Coefficients
- 11: Residual Output
- 12: Correlation (to check Hypothesis of the study)
- 13: Augmented Dickey Fuller Test
- 14: F Test

## **LIST OF CHARTS**

- 1: Total External debt of India year wise from 2010-11 to 2019-20 (Rs. In Crores)
- 2: GDP of India from 2010-11 to 2019-20 (taking base year 2011-12) (Rs. In Crores)
- 3: Real GDP Growth Rate (%)
- 4: External Debt and GDP at Market Price of India (Line Chart) (Rs. In Crores)
- 5: External Debt and GDP at Market Price of India (Bar Chart) (Rs. In Crores)
- 6: Total External Debt (Rs. In Crores) and Real GDP Growth Rate (%) (Scatter Chart)
- 7: Total External Debt (Rs. In Crores) and Real GDP Growth Rate (%) (Pareto Chart)
- 8: Impact of External Debt on GDP (Regression Line)

# **CHAPTER 1:**

# **INTRODUCTION**



## **1.1 OVERVIEW OF THE PROJECT**

External debt is the portion of a country's debt that is borrowed from foreign lenders, including commercial banks, governments, or international financial institutions. These loans, including interest, must usually be paid in the currency in which the loan was made. To earn the needed currency, the borrowing country may sell and export goods to the lending country. External debt and its interest payments are important sources of capital outflow from the economy. For developing nations like India, it is important to make sure that capital is not flowing outward excessively in such a way that it will drain out domestic savings and investments in the country. Contrary to the given, external borrowing also seems to be an important component in improving economic conditions, thus allowing a return to a normal state and reviving a struggling economy. It is believed that external debt helps to finance productive investment and so contributes to economic growth. As in most emerging markets, as the economy expands, foreign debt typically accumulates to address shortage of domestic savings, India is no exception to this phenomenon. Nonetheless, beyond a certain level, additional debt is likely to hamper economic growth.

From a governmental point of view, external debt provides the necessary capital to the government to carry out economic activities, but if not utilized properly for asset building activities it increases the burden of repayment on the government. Many developing economies have fallen into the debt trap which occurs when new debt is taken to repay the old debt. The situation described above provides motivation to look into the contribution of external debt in India's development process. This study aims to identify the trend of India's external debt and to determine whether over the years from 2011 – 2020, this external debt has helped in improving the economic growth of India.

## **1.2 STATEMENT OF PROBLEM**

An economy which experienced a fiscal deficit can finance the public deficit by borrowing domestically from a private sector through financial institutions or from other international sources. Due to lack of a strong private sector and well-established banking system the amount of money domestically available are very insignificant. In spite of this and other reasons, many poor countries borrow extensively from international lenders and other external sources.

In general, external debt may affect economic growth in two ways:

- a. Through the debt overhang effect: - a situation when an accumulated debt, discourage and overhang investment, mainly private investment; as private investors expect an increase in tax by government to pay the accumulated debt.
- b. Through debt crowding out effect, this is a situation when income from export is used to pay the accumulated debt. This in turn may affects investment.

## **1.3 RATIONALE OF SELECTING THE PROJECT**

The concept of growth and development is well documented, with investment in the economy often advocated, both directly and indirectly, as an important factor in sustainable economic development.

Economies have both internal and external sources for meeting debt requirements.

External borrowing seems to be an important component in improving economic conditions, thus allowing a return to a normal state and reviving a struggling economy. It is believed that external debt helps to finance productive investment and so contributes to economic growth.

It is true that the focus of external debt is motivated to enhance the economic development, but it starts affecting economic development adversely when the external debt is not managed efficiently.

It is observed by many researchers that the accumulation of external debt particularly in developing

countries may ascend a problem of debt overhang and original sin.

Hence, we feel the need to investigate various aspects of external debt in Indian context, and also to examine whether external debt has really ignited India's growth engine or not.

#### **1.4 OBJECTIVES OF THE STUDY**

The present study has following objectives:

- To study the trends of India's external debt borrowing over the years of 2011-2020.
- To study the correlation between external debt and GDP at Market Price.
- To study the impact of external debt on GDP at Market Price.

**CHAPTER 2:**  
**REVIEW OF LITERATURE**

1. **Swami Prasad Saxena and Ishan Shanker** in their paper titled **“External Debt and Economic Growth” (2018)** reflected on the BOP situation of India during the early nineties and studied how India was required to lift its reserves by borrowing from the International Monetary Fund (IMF) in turn focusing upon the role external borrowing plays in the improving of economic conditions. The key indicators of India’s external debt show continuous improvement in India’s external debt position. However, even though the figures of External Debt-to-GDP Ratio show a declining trend, indicating that external debt is under prudent limits, the fact remains that absolute debt is raising fast, which is a big cause of worry. The objective of this paper was to examine the impact of external debt on India’s economic growth using the Ordinal Least Square analysis (OLS), on data spanning from 1990-91 to 2015-16. Conclusively the study confirms a negative relation between Gross Domestic Product (GDP) and Gross External Debt (EXD).
  
2. **Pattillo C., Poirson H., and Ricci L.A.** conducted a research on **“External debt and growth” (2011)**. The study was an attempt to provide a thorough analytical answer to the important economic issue that recurrently demands attention i.e., the impact of external debt and debt reduction on growth. The study used data from 93 developing countries from the period from 1969 to 1998 and constructed 3-year averages to retain information on the time dimension of the change in debt. To work towards this aim, the various indicators used were debt in nominal and in net present value terms, measured both as a ratio to exports and to GDP. Similarly, the researchers used several econometric specifications (quadratic debt terms, a model with debt dummies, a spline function, in addition to simple linear specification) to investigate the non-linearity of the relation between debt and growth. The main results of the paper were intuitive and interesting and claimed that external debt appears to have a non-linear effect on growth.

3. **Smita Nath** in **“An Analysis of the Relationship among Economic Growth, External Debt and Exports in India (1970-2018)” (2020)** examined the relationship among debt servicing, exports and GDP of India during 1970 – 2018 using co-integration test, error correction model and Granger causality test. As mentioned, external debt is often used to supplement investment which is expected to impact economic growth positively. However, it can upset the process of economic growth under certain situations. It was revealed that the tri-variate model including GDP, Exports and debt service reveals a long-term relationship among the variables where both exports and debt services affect GDP positively and significantly. A significant positive long run impact of external debt on economic growth was also observed when debt service was taken as the indicator of external debt.
  
4. **Piyush Chauhan, Aniket Sabale, Ketan Shelke, Yuvraj Yeole** published a research paper on **"Impact of External Debt on the Economy of India" (2020)**. The study aims to identify the trend of India's external debt borrowing and to determine whether over the years from 1970 – 2018, this external debt has helped in improving the economic growth of India. Also, it suggests some methods to improve the current debt position if the situation is, in fact, worsening due to external borrowing. For data analysis, External debt (EXDT), Debt Service Payments (DSPT) and USD/INR Exchange Rates (EXR) were considered. Also, to represent the growth in the economy or economic development the Gross Domestic Product (GDP) was chosen. All of the data used in this research has been collected from the database of the World Bank. The study conducted does not show a significant relationship between external debt and economic growth and indicates that the Indian governments over the years have controlled the debt from spiraling out of control and lead to a situation of debt overhang. Also, the study concludes that external debt

doesn't show any positive long-run relationship with economic growth in the Indian context.

5. **Hadhek Zouhaier**, Faculty of Higher Institute of Management (ISG) of Gabès, Tunisia. and **Mrad Fatma**, Faculty of Economics and Management sciences of Sousse, Tunisia conducted a research on **"Debt and Economic Growth" (2014)**. The paper aims to study the effect of debt on economic growth of 19 developing countries over the period 1990-2011, through the use of a dynamic panel data model. The second part of the paper involves an empirical study of the effect that debt have on the contribution of investment to economic growth. The main statements issued from these two empirical tests stipulate a negative effect of the total external debt to GDP and external debt as a percentage of GNI ratio on economic growth and a negative interaction between these two debts' measures and investment. The most important results drawn from this empirical study is that external debt negatively affects economic growth of countries. Indeed, the ratio of external debt as a percentage of GDP and the debt ratio as a percentage of GNI have negative and statistically significant coefficients, which justify the negative effect exerted by the debt on economic performance countries, especially developing countries.
6. **Abu Siddique, E A Selvanathan, and Saroja Selvanathan** conducted a research on the **Impact of External Debt on Economic Growth: Empirical Evidence from highly indebted Poor Countries (2015)** showed how many of the countries failed to use the external debt wisely and prudently during 1970's and 1980's. The paper analyzed the extent to which the external debt burden impacts on a country's gross domestic product (GDP) using data from HIPC over the period 1970-2007. The findings of empirical analysis suggested that, in the short-run as well as in the long-run, a reduction in debt stock would have significantly increased the growth performance of the indebted nations.

Across the three estimation methods (dynamic fixed effects (DFE) estimation, mean group (MG) estimation and pooled mean group (PMG) estimation) debt variable has a negative and statistically significant influence on GDP in the short run as well as in the long run and supports prior expectations. This means that higher levels of debt as a proportion of GDP would have reduced the level of GDP in the HIPC's.

7. **Alfredo Schclarek** in his research **Debt and Economic Growth in Developing and Industrial Countries (2014)** investigated both the linear and nonlinear relationship between debt and economic growth for developing and industrial countries. Further, it tried to determine the channels through which debt affects economic growth, by considering its effects on total factor productivity, capital accumulation and private savings rates, respectively. The paper provides a comprehensive treatment of this issue by exploring four different dependent variables (GDP per capita growth rate, total factor productivity growth rate, capital accumulation growth rate, and private savings rate). In order to uncover these relationships, we use the system GMM dynamic panel econometric technique proposed by Arellano and Bover (1995) and Blundell and Bond (1998). The data set consists of a panel of 59 developing countries and 24 industrial countries, with data averaged over each of the seven 5-year periods between 1970 and 2002. The results show that for developing countries there is a negative and significant relationship between total external debt and economic growth, i.e., lower total external debt levels are associated with higher growth rates and that this negative relationship is driven by the incidence of public external debt, and not by private external debt.
8. **Justin Joy, Prasant Kumar Panda** conducted a research on "**Pattern of External Debt and its Impact on Macroeconomic Variables in India**" (2019). This paper showed the pattern of external debt in India since 1980s and verified the impact of external debt on



macroeconomic indicators of India. From the analysis it was observed that though there was significant reduction in external debt after liberalization period, still the ratio of external debt to GDP was high. Annual time series data for the period 1980 to 2017 was used, it was checked with Augmented Dickey-Fuller test and results were confirmed with Phillips-Perron Unit Root Test and it was evident that there exists long run relationship between external debt, external debt servicing and GDP. The long run coefficients suggested that external debt was significantly and positively influencing inflation where as it was significantly and negatively influencing non-developmental expenditure.

9. **Safia Shabbir** in "**Does External Debt Affect Economic Growth: Evidence from Developing Countries**" (2013) examined long run relationship between external debt and economic growth in developing economies by using a sample of 70 developing countries over a period of 1976-2011. The paper explored the long run linkage between economic growth and external debt indicators investigating debt overhang theory and the liquidity constraint hypothesis. The study found that increase in external debt stock reduced the fiscal space to service external debt liabilities and thus dampened the economic growth. Moreover, it reduced the level of private fixed capital formation in the country. A strong negative impact of external debt and external debt servicing on per capita GNI growth was seen.
10. **Aylin Soydan, Serap Bedir** in their paper titled "**External Debt and Economic Growth**" (2015) examined the impact of external debt on economic growth by using the data for moderately indebted middle-income countries over the period of 1985-2013. The paper employs a relatively recent panel analysis technique, the common correlated effects (CCE) framework, which considers cross-sectional dependence and heterogeneity implications in the data. According to the findings of the study, there is a negative linear

impact of external indebtedness on economic growth in the countries of interest. The main channel through which debt has an impact on economic performance appears to be the debt stock rather than liquidity constraint effect represented by debt service directly. The uncertainty created by indebtedness may discourage new investments, and furthermore, may be distortionary for investment decisions, leading to less efficient and short-term investment choices, hence impeding economic growth.

**CHAPTER 3:**  
**RESEARCH AND METHODOLOGY**

### **3.1 Data Collection**

We have tried to build our model upon the secondary data, in order to study the impact of external debt on growth of the Indian Economy.

For this purpose, we have considered data for the past 10 years of 2011-2020 and have chosen the parameters of External Debt (EXDT) and Gross Domestic Product (GDP) to represent external debts statistics and the growth in the economy or economic development.

#### **3.1.1 Source of Data**

All of the data used in this research has been collected from the Database on Indian economy of the Reserve Bank of India.

<https://dbie.rbi.org.in/DBIE/dbie.rbi?site=statistics>

#### **3.1.2 Sample Size**

External Debt and GDP of India of the years 2011-2020.

### **3.2 Hypothesis of the Study**

Ho:  $E=0$ , i.e., there is no significant impact of India's external debt on GDP of India

Ha:  $E \neq 0$ , i.e., there is significant impact of India's external debt on GDP of India

(E represents the correlation between India's external debt and India's GDP)

### **3.3 Descriptive Statistics**

The Charts that we will use in this analysis are as follows-

**The Bar Chart :** A bar chart visualizes a categorical variable as a series of bars, with each bar representing the tallies for a single category. In a bar chart, the length of each bar represents either the frequency or percentage of values for a category and each bar is separated by space, called a gap.

**The Pareto Chart:** In a Pareto chart, the tallies for each category are plotted as vertical bars in descending order, according to their frequencies, and are combined with a cumulative percentage line on the same chart. Pareto charts help you to visually identify the “vital few” categories from the “trivial many” categories so that you can focus on the important categories.

**The Scatter Plot :** A scatter plot explores the possible relationship between two numerical variables by plotting the values of one numerical variable on the horizontal, or X, axis and the values of a second numerical variable on the vertical, or Y, axis.

**The Line Chart:** A line graph is a type of chart used to show information that changes over time. We plot line graphs using several points connected by straight lines. We also call it a line chart. The line graph comprises of two axes known as 'x' axis and 'y' axis. The horizontal axis is known as the x-axis.

### **3.4 Inferential Statistics**

It refers to the various ways in which statistics derived from findings on samples from research populations can be used to determine if those populations are genuinely distinct. For this reason, a variety of statistical tests may be used; which test is used is defined by the type of data being evaluated and the number of groups involved. When comparing the differences between treatment groups, inferential statistics are commonly used. Inferential statistics equate groups and make generalisations about the broader population of subjects using measures from the subset of subjects in the experiment.

Regression equations used in the study:

$$Y = 2.487 X + 4,032,945.51$$

### **3.5 Data Framework**

We will be using following tests.

#### **3.5.1 Augmented Dickey-Fuller Test**

The Augmented Dickey-Fuller Test used to check the existence of unit root in the time series or in general whether the series is stationary or not at various difference levels.

The equation for the Augmented Dickey-Fuller Test is as below –

$$\Delta y_t = \gamma y_{t-1} + \delta_1 \Delta y_{t-1} + \delta_2 \Delta y_{t-2} + \dots$$

Where,

Y – time series variable

t – time index

$\gamma$  – coefficient of process root

$e_t$  – error term/residual term

$H_0 - \gamma = 0$  ; Time series has a unit root i.e.; time series is not stationary and can be differenced.

$H_a - \gamma < 0$  Time series is stationary, hence there is no need to be differenced.

We will perform this test for each time series variable i.e., GDP, External Debt.

#### **3.5.2 Checking for Heteroscedasticity**

One of the assumptions made about residuals/errors in OLS regression is that the errors have the same but unknown variance. This is known as constant variance or homoscedasticity. When this assumption is violated, the problem is known as heteroscedasticity.

F Test for heteroskedasticity under the assumption that the errors are independent and identically distributed (i.i.d.). We will perform the test using the fitted values of the model, the predictors in the

model and a subset of the independent variables.

Ho: Variance is homogeneous

Ha: Variance is not homogeneous

### **3.5.3 Checking for Normality of Residuals**

In statistics, normality tests are used to determine if a data set is well-modelled by a normal distribution and to compute how likely it is for a random variable underlying the data set to be normally distributed.

Ho – The residuals are normally distributed

Ha – The residuals are not normally distributed

## **CHAPTER-4 DATA ANALYSIS AND**

## **INTERPRETATION**



## **EXTERNAL DEBT**

The external debt of India is the total debt the country owes to foreign creditors. The debtors can be the Union government, state governments, corporations or citizens of India. The debt includes money owed to private commercial banks, foreign governments, or international financial institutions such as the International Monetary Fund (IMF) and World Bank.

India's External Debt is Rs. 41,98,492 crores in 2020. At end march 2020 India's External Debt showed an increase of 11.81% over the level at end march 2019. It is held in multiple currencies, the largest of which is the United States dollar. As on 31 March 2020, 53.7% of the country's debt was held in U.S. dollars. The rest of the debt is held in Indian rupees (31.9%), Japanese yen (5.6%), special drawing rights (4.5%), Euros (3.5%) and other currencies (0.8%).

**Table: 1 Total External debt of India year wise from 2010-11 to 2019-20**

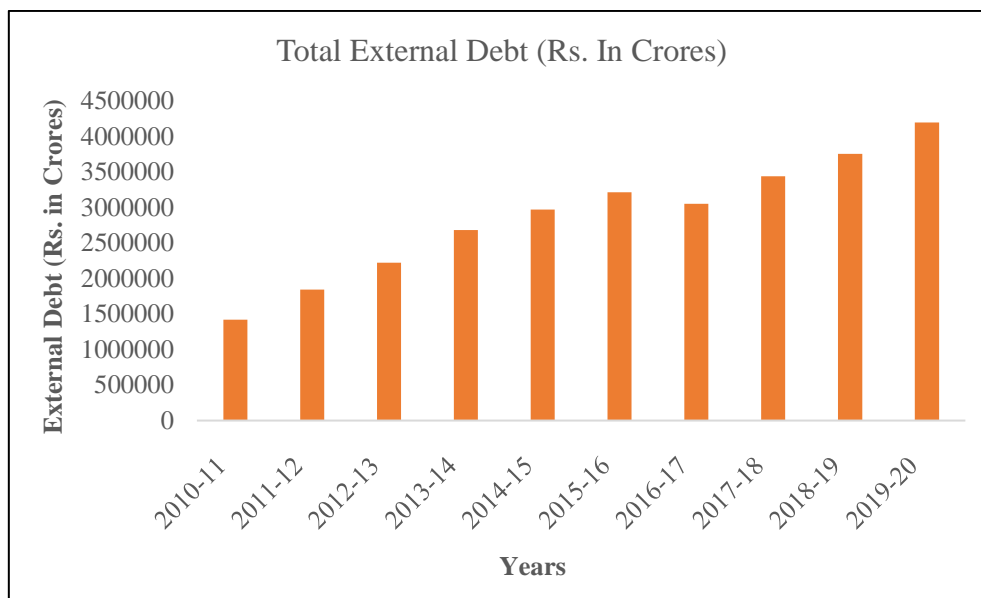
(Rs. In Crores)

Year	Total External Debt (Rs. In Crores)
2010-11	1419407
2011-12	1844167
2012-13	2224734
2013-14	2682214
2014-15	2971542
2015-16	3217563
2016-17	3055095
2017-18	3441883
2018-19	3754872
2019-20	4198492

(Source: Database on Indian economy of the Reserve Bank of India)

**Chart: 1 Total External debt of India year wise from 2010-11 to 2019-20**

(Rs. In Crores)



## **GROSS DOMESTIC PRODUCT (GDP) and GROWTH RATE**

Gross domestic product (GDP) is the single standard indicator used across the globe to indicate the health of a nation's economy: one single number that represents the monetary value of all the finished goods and services produced within a country's borders in a specific period. The economy of India is characterized as a middle-income developing market economy. It is the world's sixth-largest economy by nominal GDP and the third-largest by purchasing power parity (PPP).

According to the International Monetary Fund (IMF), on a per capita income basis, India ranked 142nd by GDP (nominal) and 124th by GDP (PPP) in 2020. The GDP of India is Rs. 1,45,65,951 crores in year 2019-20 which shows that economy grew only 0.2 % from the year 2018-19. In all the years from 2010-11 to 2019-20 the GDP has been slightly increasing which can be a positive outlook. Part of the reason for India's success is the economic liberalization that started in 1991 and encouraged trade subsequently ending some public monopolies. GDP growth has slowed in recent years, due in part to skyrocketing inflation. India's workforce is expanding in the industry and

services sectors, growing partially because of international outsourcing — a profitable venture for the Indian economy. The agriculture sector in India is still a global power, producing more wheat or tea than anyone in the world except for China. However, with the mechanization of a lot of processes and the rapidly growing population, India's unemployment rate remains relatively high. India's rate of growth has become more stable. This is partly due to the stabilization of growth within each sector – agriculture, industry and services – and partly to the transition of the economy toward the services sector, where growth is more stable.

**Table: 2 GDP of India from 2010-11 to 2019-20 (taking base year 2011-12)**

**(Rs. In Crores)**

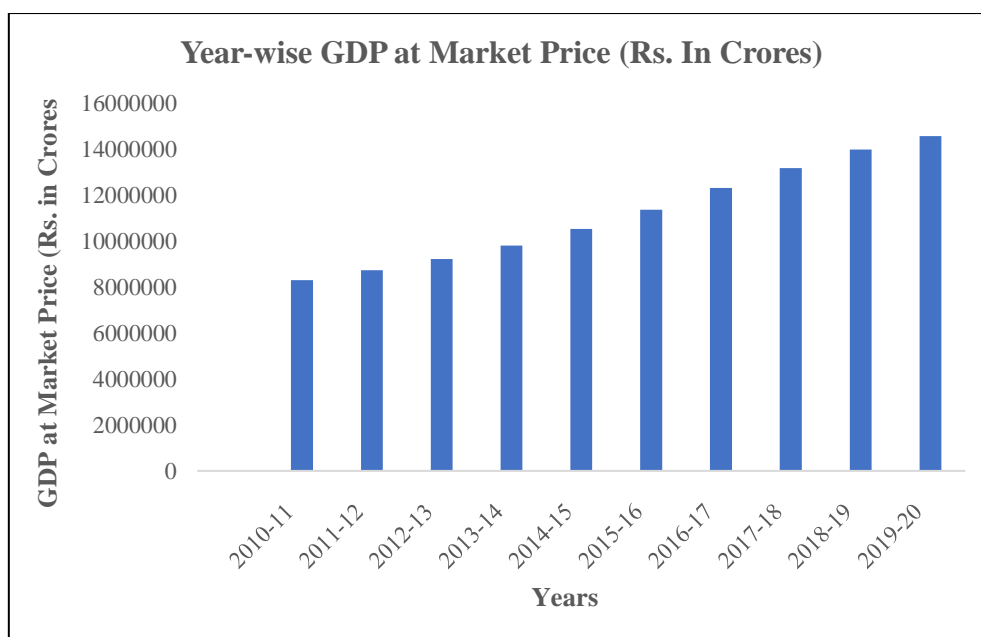
Year	GDP at Market Price (Rs. In Crores)
	(Base Year- 2011-12)
2010-11	8301235
2011-12	8736329
2012-13	9213017
2013-14	9801370
2014-15	10527674
2015-16	11369493
2016-17	12308193
2017-18	13175160
2018-19	13981426
2019-20	14565951

(Source: Database on Indian economy of the Reserve Bank of India)

Notes : 1. Data for 2016-17 are Third Revised Estimates,  
for 2017-18 are Second Revised Estimates and  
for 2018-19 are First Revised Estimates.  
2. Data for 2019-20 are Provisional Estimates.

**Chart: 2 GDP of India from 2010-11 to 2019-20 (taking base year 2011-12)**

**(Rs. In Crores)**

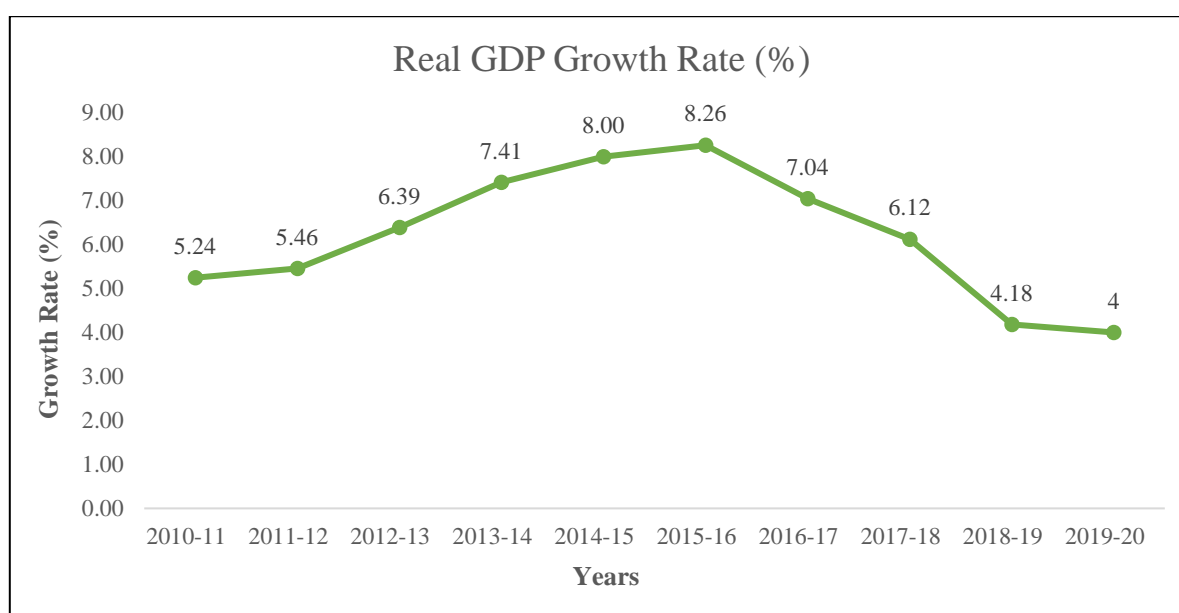


**Table: 3 Real GDP Growth Rate of India (%)**

Year	Real GDP Growth Rate (%)
	(Compared to previous years)
2010-11	5.24
2011-12	5.46
2012-13	6.39
2013-14	7.41
2014-15	8.00
2015-16	8.26
2016-17	7.04
2017-18	6.12
2018-19	4.18
2019-20	4

(Source: Database on Indian economy of the Reserve Bank of India)

**Chart: 3 Real GDP Growth Rate (%)**



## **EXTERNAL DEBT AND GDP**

**Table: 4 External Debt and GDP at Market Price of India**

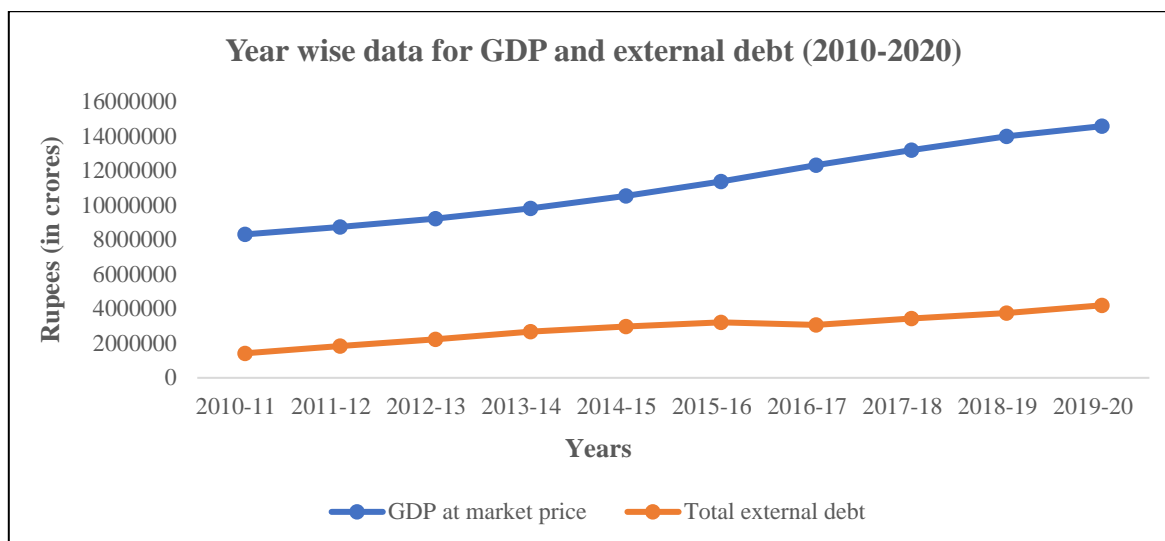
(Rs. In Crores)

Year	GDP at Market Price (Rs. In Crores)	Total External Debt (Rs. In Crores)
	(Base Year- 2011-12)	
2010-11	8301235	1419407
2011-12	8736329	1844167
2012-13	9213017	2224734
2013-14	9801370	2682214
2014-15	10527674	2971542
2015-16	11369493	3217563
2016-17	12308193	3055095
2017-18	13175160	3441883
2018-19	13981426	3754872
2019-20	14565951	4198492
	Notes : 1. Data for 2016-17 are Third Revised Estimates, for 2017-18 are Second Revised Estimates and for 2018-19 are First Revised Estimates. 2. Data for 2019-20 are Provisional Estimates.	

(Source: Database on Indian economy of the Reserve Bank of India)

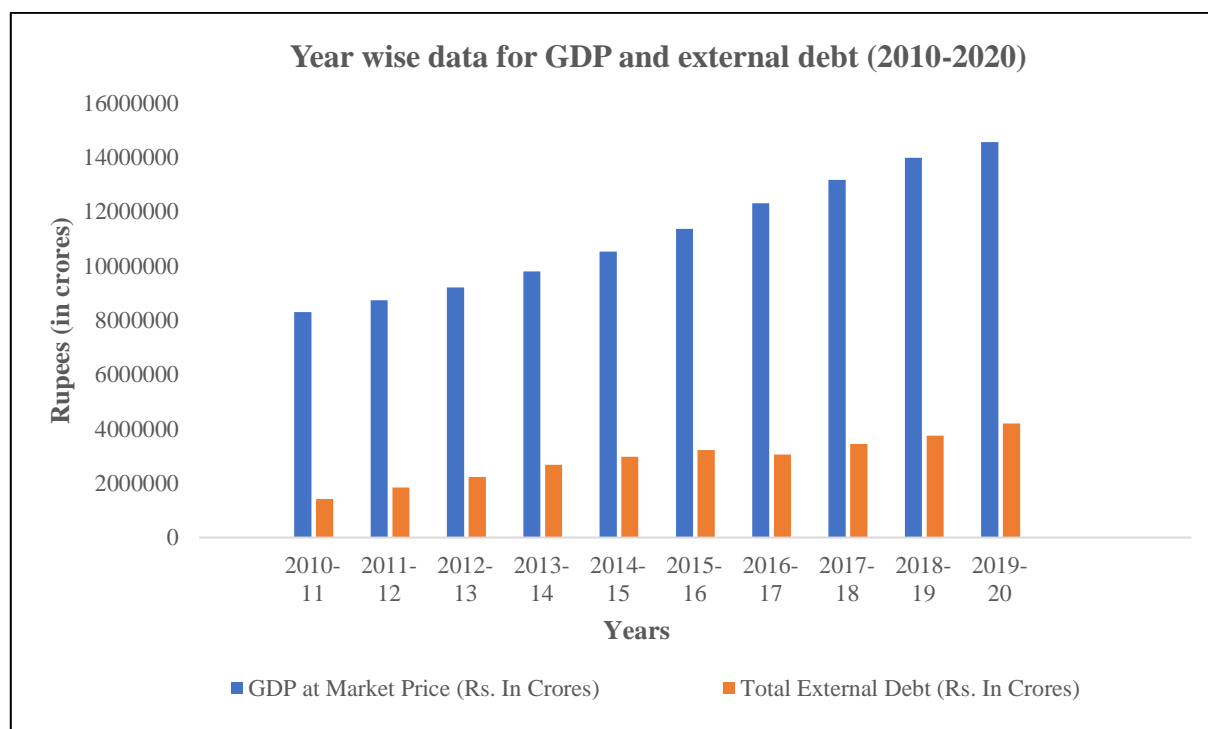
**Chart: 4 External Debt and GDP at Market Price of India (Line Chart)**

(Rs. In Crores)



**Chart: 5 External Debt and GDP at Market Price of India (Bar Chart)**

(Rs. In Crores)



## **Interpretation**

1. Both the GDP at market price and external debt from the year 2010- 2020 show a positive trend.
2. The total external debt showed a slowdown as it decreased from Rs. 32,17,563 cr. to Rs.30,55,095 cr. in the year 2015-16 to 2016-17
3. The gap between GDP at market price and Total External Debt has also increased over time which shows decrease in dependency from external sources.
4. Over the decade, there was an increase of about 75.467% in the GDP at Market Price and about 195.791% in Total external debt.
5. As compared to the base year (2011-12), there has been an increase of about 66.728% in the GDP and about 127.66% in the total external debt.

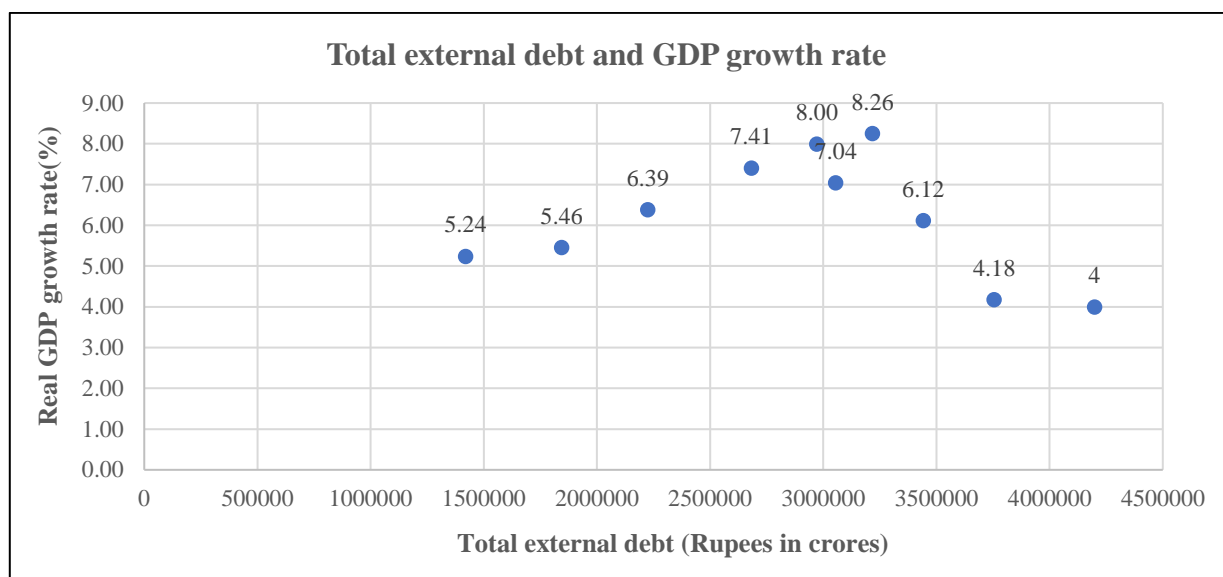
## **EXTERNAL DEBT AND REAL GDP GROWTH RATE**

**Table: 5 Total External Debt (Rs. In Crores) and Real GDP Growth Rate (%)**

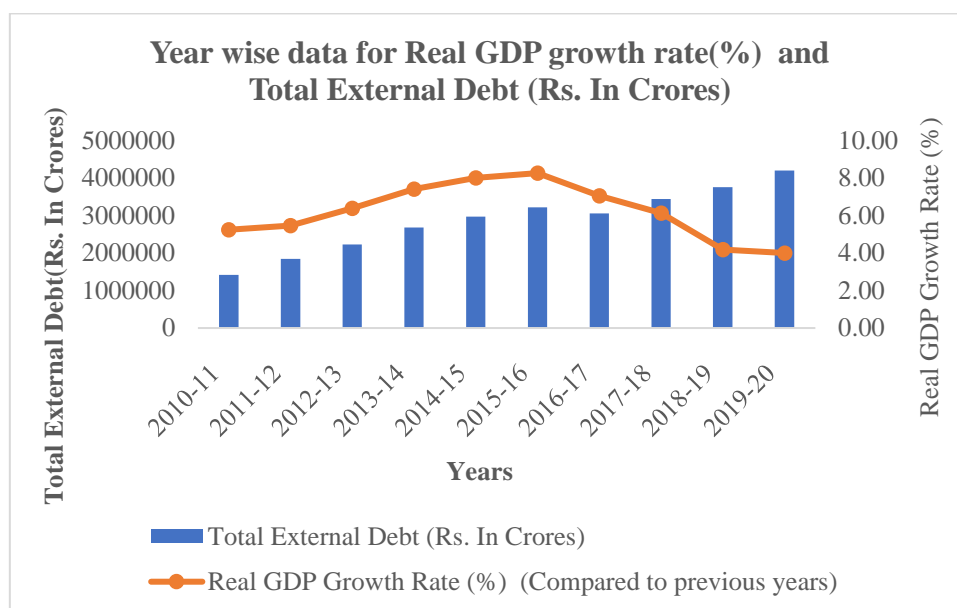
Year	Total External Debt (Rs. In Crores)	Real GDP Growth Rate (%) (Compared to previous years)
2010-11	1419407	5.24
2011-12	1844167	5.46
2012-13	2224734	6.39
2013-14	2682214	7.41
2014-15	2971542	8.00
2015-16	3217563	8.26
2016-17	3055095	7.04
2017-18	3441883	6.12
2018-19	3754872	4.18
2019-20	4198492	4

(Source: Database on Indian economy of the Reserve Bank of India)

**Chart: 6 Total External Debt (Rs. In Crores) and Real GDP Growth Rate (%) (Scatter Chart)**



**Chart: 7 Total External Debt (Rs. In Crores) and Real GDP Growth Rate (%) (Pareto Chart)**



### Interpretations

1. The total external debt showed a positive trend whereas the Real GDP showed a positive trend from 2010 to 2016 and then showed a negative trend thereafter.
2. To be precise, total external debt gradually increased over the years from Rs.14,19,407 cr. to Rs. 41,98,492 cr. whereas there was an increase in Real GDP growth rate from 5.24% to 8.26% in the



years 2010-11 to 2015-16 but showed a drop after that and came down to 4% in the year 2019-2020

3. Over the decade, there was an increase of about 195.791% in Total external debt and a fall of 1.24% in the Real GDP Growth Rate.

4. As compared to the base year (2011-12), there has been an increase of about 127.66% in the Total External Debt, whereas there has been a fall of about 1.46% in the Real GDP Growth Rate.

5. As external debt was increasing from 2010 to 2016, Real GDP was also increasing. This shows a direct relation between the 2 variables.

On the other hand, as external debt was increasing from 2016 to 2020, Real GDP growth rate was falling. That means after 2016 indirect relationship existed between them.

## **DESCRIPTIVE ANALYSIS**

The **mean** can suggest a typical or central value and serves as a “balance point” in a set of data, similar to the fulcrum on a seesaw and the **median** is the middle value in an ordered array of data that has been ranked from smallest to largest. The **range** is the difference between the largest and smallest value and is the simplest descriptive measure of variation for a numerical variable. Being a simple measure of variation, the range does not consider how the values distribute or cluster between the extremes. So, two commonly used measures of variation that account for how all the values are distributed are the **variance** and the **standard deviation**. These statistics measure the “average” scatter around the mean—how larger values fluctuate above it and how smaller values fluctuate below it. **Kurtosis** measures the peakedness of the curve of the distribution while **Skewness** measures the extent to which the data values are not symmetrical around the mean.

**Table 6: Descriptive Analysis of External Debt**

External Debt	
Mean	2880997
Standard Error	271769.7
Median	3013318
Standard Deviation	859411.1
Sample Variance	7.39E+11
Kurtosis	-0.49234
Skewness	-0.29596
Range	2779085
Minimum	1419407
Maximum	4198492

Source- Computed using Excel

The External Debt data has a mean 28,80,997 and the median is 30,13,318, Since median > mean we have negative kurtosis or platykurtic which means that the distribution has a slower-rising (flatter) center peak than the peak of a normal distribution while the data is left-skewed, means most of the values are in the upper portion of the distribution.

**Table 7: Descriptive analysis of GDP**

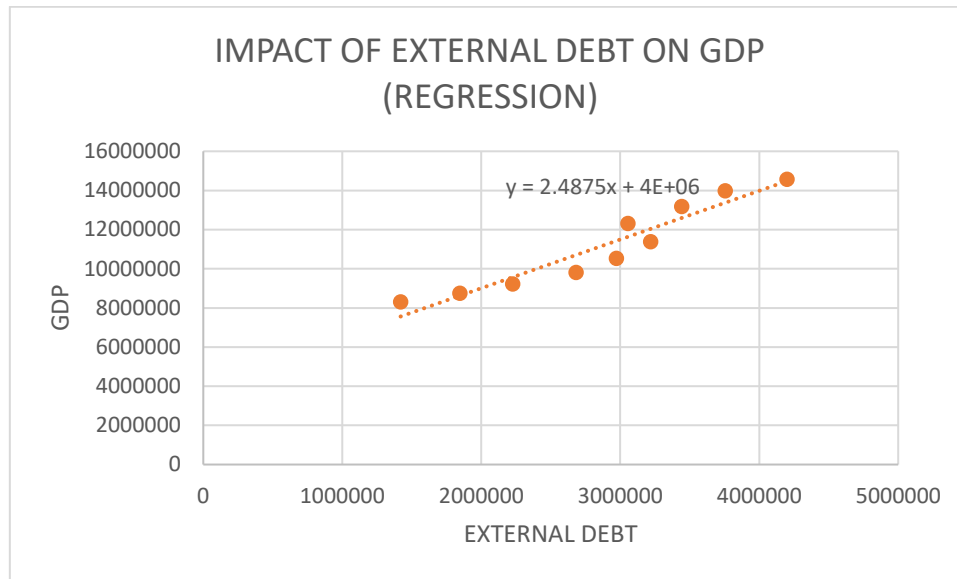
GDP	
Mean	11197984.72
Standard Error	707521.49
Median	10948583.39
Standard Deviation	2237379.40
Sample Variance	5005866583015.31
Kurtosis	-1.45
Skewness	0.23
Range	6264716.01
Minimum	8301235.00
Maximum	14565951.01

Source- Computed using Excel

The GDP data has a mean 11,97,984.72 and the median is 1,09,48,583.39, Since median > mean we have negative kurtosis or platykurtic which means that the distribution has a slower-rising (flatter) center peak than the peak of a normal distribution while it is a right-skewed data in which most of the values are in the lower portion of the distribution.

## REGRESSION

**Chart: 8 Impact of External Debt on GDP (Regression Line)**



**Table: 8 Summary Output**

<i>Regression Statistics</i>	
<b>Multiple R</b>	0.955502486
<b>R Square</b>	0.912985001
<b>Adjusted R Square</b>	0.902108126
<b>Standard Error</b>	700024.0161
<b>Observations</b>	10

Source: Computed using Excel

1. Multiple R is the Correlation Coefficient that measures the strength of a linear relationship between two variables. Since multiple R is 0.9555 and is close to 1 therefore it shows a positive relation because the larger the absolute value, the stronger the relationship.
2. R Square is the Coefficient of Determination, which is used as an indicator of the goodness of fit. It shows how many points fall on the regression line. The  $R^2$  value is calculated from the total sum of squares, more precisely, it is the sum of the squared deviations of the original data from the mean.

R square is 0.91 (rounded to 2 digits), which is fairly good. It means that 91% of our values fit the regression analysis model. In other words, 91% of the dependent variables (y-values)

are explained by the independent variables (x-values). Generally, R Squared of 95% or more is considered a good fit.

3. Adjusted R Square is the R square adjusted for the number of independent variables in the model.
4. Standard Error is another goodness-of-fit measure that shows the precision of our regression analysis. The standard error of our model is 700024.0161, as it is a small number, we can be more certain about our regression equation.

While R<sup>2</sup> represents the percentage of the dependent variables variance that is explained by the model, Standard Error is an absolute measure that shows the average distance that the data points fall from the regression line.

**Table: 9 ANOVA Table**

	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
<b>Regression</b>	1	4.11325E+13	4.11325E+13	83.93817222	1.62532E-05
<b>Residual</b>	8	3.92027E+12	4.90034E+11		
<b>Total</b>	9	4.50528E+13			

Source: Computed using Excel

The ANOVA Table splits the sum of squares into individual components that give information about the levels of variability within our regression model:

**df** is the number of the degrees of freedom associated with the sources of variance.

**SS** is the sum of squares. The smaller the Residual SS compared with the Total SS, the better the model fits the data.

**MS** is the mean square.

**F** is the F statistic, or F-test for the null hypothesis. It is used to test the overall significance of the model.

Significance F is the P-value of F.

Since Significance F is tending towards 0 and when Significance F is less than 0.05 (5%), then the model is OK.

**Table: 10 Regression analysis output- Coefficients**

.	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%	Lower 95.0%	Upper 95.0%
Intercept	4031382.78385	812948.03137	4.95897	0.00111	2156721.26180	5906044.30591	2156721.26180	5906044.30591
X Variable 1	2.48754	0.27151	9.16178	0.00002	1.86143	3.11365	1.86143	3.11365

Source: Computed using Excel

The most useful component in this section is Coefficients. It enables you to build a linear regression equation in Excel:

$$Y = bX + a$$

For our data set, where y is the GDP at Market Price and x is the external debt, our linear regression formula goes as follows:

$$Y = \text{External Debt Coefficient} * x + \text{Intercept}$$

Equipped with a and b values rounded to three decimal places, it turns into:

$$Y = 2.487X + 4,032,945.51$$

**Table: 11 Residual Output**

Observation	Predicted Y	Residuals
1	7562217.915	739017.0848
2	8618826.436	117502.5642
3	9565502.994	-352485.994
4	10703503.9	-902133.9028
5	11423219.58	-895545.5777
6	12035207.25	-665714.2527
7	11631061.21	677131.7901
8	12593212.77	581947.2304
9	13371786.19	609639.8143
10	14475309.76	90641.24352

Source: Computed using Excel

## **HYPOTHESIS OF THE STUDY**

*Ho:  $E=0$ , i.e., there is no significant impact of India's external debt on GDP of India*

*Ha:  $E \neq 0$ , i.e., there is significant impact of India's external debt on GDP of India*

(E represents the correlation between India's external debt and India's GDP)

**Table: 12 Correlation (to check Hypothesis of the study)**

	Total External Debt (Rs. In Crores)	GDP at Market Price (Rs. In Crores)
Total External Debt (Rs. In Crores)	1	
GDP at Market Price (Rs. In Crores)	0.955502472	1

(Source: computed using Excel)

Correlation is a statistic that measures the degree to which two variables move in relation to each other. In this study Correlation comes out to be 0.955 which is a positive number and means that if the points were plotted on a scatter plot, all the points could be connected with the upward sloping straight line. This reflects a positive relationship between Total External Debt and GDP at market price. Thus, we reject Ho in favour of Ha which says that there is a significant impact of India's External Debt on GDP of India.

## **AUGMENTED DICKEY FULLER TEST**

We will be using the Augmented Dickey-Fuller Test, as it is a commonly used statistical test to find the presence of stationarity in a time series.

*Ho – Time series has a unit root i.e., time series is not stationary*

*Ha – Time series is stationary*

Augmented Dickey-Fuller Test is applied at the level and then at the 1st Difference level. To obtain a stationary time series we need to reject the null hypothesis and for that, the p-value should be less than 0.05 at a 5% significance level.

**Table 13: Augmented Dickey Fuller Test**

AUGMENTED DICKEY FULLER TEST		
VARIABLE	AT LEVEL	
	T stat	P value
GDP	-2.5961	0.3453
EXTERNAL DEBT	-1.9094	0.6069

Source- computed using R

As p value  $> 0.05$ , therefore we do not reject  $H_0$

Therefore, the time series is not stationary and need to be differenced.

## **CHECKING FOR HETEROSKEDASTICITY**

*$H_0$  – There is no heteroskedasticity*

*$H_a$  – There is heteroskedasticity*

**Table: 14 F Test**

F TEST	
F stat	6.7776
P value	0.008814

Source- computed using R

As  $P \text{ value} < 0.05$ , we reject  $H_0$ .

Therefore, there is heteroskedasticity in our model.

### **CHECKING FOR NORMALITY ASSUMPTION**

*$H_0$  – The residuals are normally distributed*

*$H_a$  – The residuals are not normally distributed*

We have used Jarque Bera Test to check normality assumption

data: x

X-squared = 0.83912, df = 2, p-value = 0.6573

Where x is a vector of residuals of GDP

data: y

X-squared = 0.38668, df = 2, p-value = 0.8242

Where y is a vector of residuals of external debt.

Since Value of both the variables are greater than 0.05, we reject  $H_0$

And conclude that the residuals are not normally distributed.



**CHAPTER-5**

**CONCLUSIONS, RECOMMENDATIONS AND**

**LIMITATIONS**

## **CONCLUSION**

External Debt is the money borrowed from a source outside the country. It has to be paid back in the currency in which it is borrowed while Gross domestic product (GDP) is the total monetary or market value of all the finished goods and services produced within a country's borders in a specific time period. As a broad measure of overall domestic production, it functions as a comprehensive scorecard of a given country's economic health. External debt is an important parameter of GDP as it can also become a problem if there is Excessive confidence in borrowing to promote economic growth and development. Equally, there could be over-confidence in lenders to lend money in short-term without evaluation of possible problems. Also, Investment that is misplaced and fails to achieve a decent rate of return to help pay the debt interest payments.

This paper examines the relationship between external debt and GDP in India over the period of 2011-2020 with the aid of the growth accounting process. It was observed in previous studies on this topic that though there is a significant reduction in external debt after liberalization period, still the ratio of external debt to GDP is high. Further, after reform period there is significant improvement in gross domestic capital formation.

Here, the paper indicates that the external debt has a positive relationship with economic growth (GDP) in the short run as well as in the long-run. We used regression model, charts and tables to achieve our results. Our regression equation for the same came out to be  $Y = 2.487X + 4,032,945.51$ . In a regression stat, multiple R is 0.9555 and is close to 1 therefore it shows a positive relation because the larger the absolute value, the stronger the relationship. The standard error of our model is 700024.0161, as it is a small number, we can be more certain about our regression equation.

Next, we ran 3 tests in R namely Augmented Dickey Fuller test, to check whether our data (in time series) is stationary or not, secondly checking for Heteroskedasticity and lastly

checking for Normality Assumption, to see whether the residuals are normally distributed or not. The results shown are time series is not stationary, heteroskedasticity is present in our model and the residuals are not normally distributed.

Now the tables and charts that we used namely, scatter plot, double bar graph, pareto chart and others, showed that over the decade, there was an increase of about 75.467% in the GDP at Market Price and about 195.791% in Total external debt. The gap between GDP at market price and Total External Debt has increased over time which shows decrease in dependency from external sources.

Lastly, speaking of the COVID times, the International Monetary Fund has said that India's debt to GDP ratio increased from 74 percent to 90 percent during the COVID-19 pandemic, noting that it expects this to drop down to 80 percent as a result of the country's economic recovery. Though that's a very large increase, but it is something that other emerging markets and advanced economies have experienced as well. Currently, the immediate priorities are to continue supporting people and firms, and, in particular, to focus on supporting the most vulnerable. At the same time, it is important to reassure the general public and investors that public finance is under control and the way to do so is through a credible medium-term fiscal framework.

## **RECOMMENDATIONS**

From the policy perspective it must be noted that external debt is not significantly contributing to the developmental expenditure of the country where as it is contributing negatively to the non-developmental expenditure. Therefore, appropriate actions must be taken in order to channelize external debt funding towards more developmental activities. Also, external debt is not significantly contributing to the exports of the country as expected. Required attention must be given to enhance more expo

Required attention must be given to enhance more export promotion activities with the external debt fund so that the country would be more capable of meeting its debt and debt service burden in the future.

## **LIMITATIONS**

- **Time constraint**

Being students of University of Delhi, we had to turn in our research project at deadline assigned.

Therefore, the time available to study the research problem and to measure change or stability over time was pretty much constrained by the due date of the project unlike researchers who have unlimited access of time to research over a particular topic.

- **Lack of access to resources**

Some resources like research papers written previously were hard to get as the access to them was provided to the researchers only. Thus, studying those research papers were out of reach for us.

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