

A Project
On

Foreign Investment and Economic Growth

Economics of Growth and Development
(ECON F244)

“It is declared that we, the group members, are submitting our original work in terms of project report on the topic assigned to us to fulfil the partial requirement of the course ECON F244 (Economics of Growth and Development). We all are equally responsible for the contents included in it and declare that all contents are plagiarism free. Wherever necessary, all the references are duly quoted within the text and bibliography is provided at the end”

Siddharth Malik	2018B3A40838P
Aman Narsaria	2018B3A70743P
Devansh Jain	2018B3A70798P
Manthan Patel	2018B3A70823P

Birla Institute of Technology and Science, Pilani
April 10, 2020

ACKNOWLEDGEMENT

We would like to express our most profound appreciation to all those who provided us with the opportunity to complete this report.

We would like to thank the director of BITS Pilani, Prof. Sudhir Kumar Barai, for giving us the opportunity to work on this assignment. We would like to extend special gratitude to Prof. Rahul Arora, our instructor for the course Economics of Growth and Development (ECON F244) for guiding us throughout the process of drafting the project and providing insightful feedback.

We would also like to acknowledge the crucial role of the librarian Mr. Giridhar M Kunkur and other staff members for letting us use the library resources and materials such as books and research papers which provided us with reference to write our report.

Last but not the least, we would like to thank our friends and family members for their valuable suggestions and moral support. We would also like to thank our peer group, for reviewing and proofreading our project.

TABLE OF CONTENTS

Acknowledgement.....	2
Introduction.....	4
Literature Review.....	6
Database and Methodology.....	9
Empirical findings.....	10
a. FDI growth rate and GDP growth rate.....	10
b. Descriptive statistics.....	12
c. Pearson correlation coefficient.....	12
d. Trend Analysis of foreign investment.....	12
e. Stationarity Test.....	13
f. Granger Causality test.....	15
g. Linear regression model.....	16
h. Anova analysis.....	18
i. Hypothesis testing.....	18
Conclusion and Policy implication.....	19
References.....	20

INTRODUCTION

Economic growth is an increase in the capacity of an economy to produce goods and services, compared from one time period to another. The four significant determinants of economic growth: human resources, natural resources, capital formation, and technology. Economic growth leads to an increase in incomes, thereby leading to an increase in consumption by consumers and thus, a higher quality of life or standard of living. This makes economic growth the primary parameter of an economy's health.

Gross Domestic Product (GDP) is the best way to measure economic growth, taking into account the country's entire economic output. GDP includes the total market value of all goods and services produced within a country's borders in a specific time period. GDP can be calculated by three primary methods - the expenditure approach, the output or production approach, and the income approach.

Foreign Investment is the flow of capital from one country to another by investing in assets or buying shares of companies located in another country. Although investment can be made by individuals, it is most often done by companies and corporations for the purpose of expansion, cheaper production, etc.

Foreign investments are either direct or indirect. Foreign Direct Investments (FDI) are physical investments made by a company in a foreign country, usually by setting up infrastructure, opening plants and buying machines, buildings, and other equipment in the foreign country. FDI's are generally considered long-term and thus help bolster the foreign country's economy. Foreign Indirect/Portfolio Investments (FII/FPI) involve financial institutions and private investors buying equity or positions in foreign companies that trade on a foreign stock exchange. The indirect form is less favorable, as the domestic company can sell off the investment very quickly.

FDI Flows record the data of cross border transactions related to direct investments during a given period. FDI Outflow refers to the investments made in foreign economies by the domestic

country whereas, FDI Inflow refers to investments made by the foreign economies in the domestic economy.

Role of FDI in Economic Growth (GDP):

- Trigger economic growth
- Provide capital
- Inflow of job opportunities
- New technology and managerial expertise
- Improved infrastructure
- Create competitive environment for domestic companies

Objectives of the Study:

- To find the impact of FDI on Economic Growth of India.
- To analyze the trend pattern of FDI from 2000 - 01 to 2018 – 19

LITERATURE REVIEW

Jean-Claude Berthélemy and Sylvie Démurger (2000). In their paper “Foreign Direct Investment and Economic Growth: Theory and Application to China”, they showed the relationship between Foreign Direct Investment and Economic Growth. They used simultaneous-equation model estimation based on a sample of 24 Chinese provinces, from 1985-1996, and confirmed the fundamental role played by foreign investment in monetary and economic growth in China. The paper also showed the importance of potential growth in foreign investment decisions.

Sarbapriya Ray (2012). In their paper “Impact of Foreign Direct Investment on Economic Growth in India: A Co Integration Analysis,” they show that FDI has played a significant role in the growth process of countries like India. It also attempts to analyse the relationship between Foreign Direct Investment (FDI) and Economic Growth in India and using the cointegration approach, tries to empirically analyse and estimate the effect of FDI on economic growth in India, timeline being 1990-91 to 2010-11. The analysis is done by the Ordinary Least Square Method, which suggests that there is a positive relationship between Foreign Direct Investment (FDI) and GDP and vice versa. It can be inferred that both economic growth and foreign direct investment were found to be integrated of order one using the Kwiatkowski, Phillips, Schmidt, and Shinn (KPSS) test for unit root only. It was confirmed by the cointegration test that a long-run equilibrium relationship between the two existed, as confirmed by the Johansen cointegration test results. The Granger Causality test finally proved the presence of unidirectional causality, which was applied from economic growth to foreign direct investment. The error correction estimates confirmed evidence that the Error-Correction Term is statistically significant with a negative sign and cannot be ignored using the cointegration approach, which further gives that there isn't any problem in the long-run equilibrium relationship between the independent and dependent variables. For FDI to be an essential provider to the economic growth of the nation, India would do relatively better by merely focusing on improving infrastructure facilities, human resource development, entrepreneurship exposure, creating a stable macroeconomic framework, and conditions favorable for foreign investments to improve the process of development.

Samuel Antwi, Ebenezer Fiifi Emire Atta Mills, Gifty Atta Mills, Xicang Zhao (2013).

In their paper “Impact of Foreign Direct Investment on Economic Growth: Empirical Evidence from Ghana,” they showed that FDI has been a fundamental wellspring of economic growth for Ghana, bringing in capital investment, innovation, and management resources required for economic growth. This paper examined the relationship between FDI and GDP (a measure of economic growth) and other variables from 1980-2010 using the time series data. They have used simple ordinary least square (OLS) regression using annual data on GDP, FDI, and other variables over the periods 1980-2010. The primary objective of the study was to determine the type and degree of relationship between these variables. From this, they concluded that the independent variables GDP, growth rate, GNP, MVA, TRA, etc. are all significant to explain Foreign Direct Investment and thus have an influence of FDI in Ghana.

Eldin Mehic, Sabina Silajdzic & Vesna Babic-Hodovic (2013). In their paper “The Impact of FDI on Economic Growth: Some Evidence from Southeast Europe,” they have examined the impact of Foreign Direct Investment (FDI) on Economic Growth in the transition countries of Southeast Europe. They tested their hypothesis on seven southeast European countries in the period of 1998-2007. They found that FDI has a positive and statistically significant effect on economic growth. They also found that the impact of FDI was robust when they included data on domestic investments.

Amit Saini, Dr. Pankaj Madan, Dr. S.K. Batra (2015). In their paper “Impact of FDI Inflow on Economic Growth of SAARC Economies,” they examined the relationship between Foreign Direct Investment (FDI) inflow and Economic Growth in different member nations of SAARC. This study includes the use of six economic indicators: GDP, GDP Per capita, GNI, Export Growth, Financial Position, and Trade Openness over a period of 20 years (1991 to 2012). Assuming year, nation, and FDI inflow to be fixed, results have been obtained using the MANOVA multivariate and Pearson correlation econometric technique. The paper illustrates that there exists a profound and positive impact of FDI inflow on the real GDP, GNI, and Export Growth. There also exists a feeble and negative impact of FDI inflow on Financial Position and

Trade Openness. Finally, that FDI inflow is the only fixed factor that significantly influences dependent variables.

Tamilselvan, M. and Manikandan (2015).In their paper “A Study on Impact of Foreign Direct Investment on Gross Domestic Product in India,” they showed that Foreign Direct Investment (FDI) has a positive impact on Gross Domestic Product (GDP), using a Simple Regression Model between FDI and GDP for a period of 23 years, from 1991-2014. The GDP of a country is determined by various factors such as growth of the agriculture and manufacturing sector, inflation, exchange rate, export and import, and international investment. FDI in various sectors is considered to be a crucial factor that controls all the other factors. The New Economic Policy of 1991 opened the reserved sector to private players and international investors and reduced uncertainty on the legal and regulatory framework. This resulted in a boost in investors’ confidence in the Indian economy and led to a steady growth since the implementation of Liberalization, Privatization, and Globalization (LPG).

Tilak Raj, Ashima Pahwa (2018).In their paper “Impact of Foreign Investments on Economic Growth of India,” they have explained the concept of Foreign Direct Investment, which refers to an investment made by the firms of one country in businesses based in another country. The example of the Indian economy suggests that FDI inflows not only provide financial strength to a country but also consolidate trade networks and assist in decreasing BOP deficits. The goal of this paper is to examine the effect FDI inflows have on the growth of the Indian economy. This paper involves the collection of secondary data collected over a period of 15 years (from 2002-03 up to 2016-17). Using the regression model and the regression technique, it can be inferred that FDI has a significant influence on economic growth.

DATABASE AND METHODOLOGY

Period of Analysis: - Data have been collected for the period 2000 - 2019 for the analysis.

Method: - Linear Regression model has been used to analyze the relationship between Foreign Direct Investment (FDI) and Economic Growth. Gross Domestic Product (GDP) has been taken as a proxy for economic growth. Software like Stata has been used for Linear Regression and MS Excel to calculate the Correlation Coefficient between FDI and GDP, Mean and Standard Deviation of both FDI and GDP.

Sources for the Data: - To analyze the model, secondary data have been collected from various sources. Data for the foreign direct investment have been collected from the 'Handbook of Statistics of Indian Economy' and data for Gross Domestic Product have been collected from Open Government Digital Platforms for data like Mospi, RBI, etc.

EMPERICAL INTERPRETATION

a. FDI Growth rate and GDP Growth rate: -

TABLE 1:

YEAR	FDI (bn rupees)	FDI growth rate (in %)	GDP (bn rupees)	GDP growth rate (in %)	FDI as a percentage of GDP
2000-01	267.44	-	21023.14	-	1.27
2001-02	319.2	19.35	22789.52	8.40	1.40
2002-03	200.98	-37.04	24545.61	7.71	0.82
2003-04	628.42	212.68	27546.2	12.22	2.28
2004-05	580.57	-7.61	32392.24	17.59	1.79
2005-06	687.82	18.47	37064.73	14.42	1.86
2006-07	667.91	-2.89	42839.79	15.58	1.56
2007-08	1743.95	161.11	49478.57	15.50	3.52
2008-09	350.61	-79.90	55744.48	12.66	0.63
2009-10	2399.51	584.38	62311.72	11.78	3.85
2010-11	1934.82	-19.37	77841.15	24.92	2.49
2011-12	1887.38	-2.45	87363.29	12.23	2.16
2012-13	2546.53	34.92	99440.13	13.82	2.56
2013-14	1596.5	-37.31	112335.22	12.97	1.42
2014-15	4490.72	181.29	124679.59	10.99	3.60
2015-16	2085.79	-53.55	137716.61	10.46	1.51
2016-17	2893.94	38.75	153623.86	11.55	1.88
2017-18	3376.84	16.69	170950.05	11.28	1.98
2018-19	2121.79	-37.17	190101.64	11.20	1.12

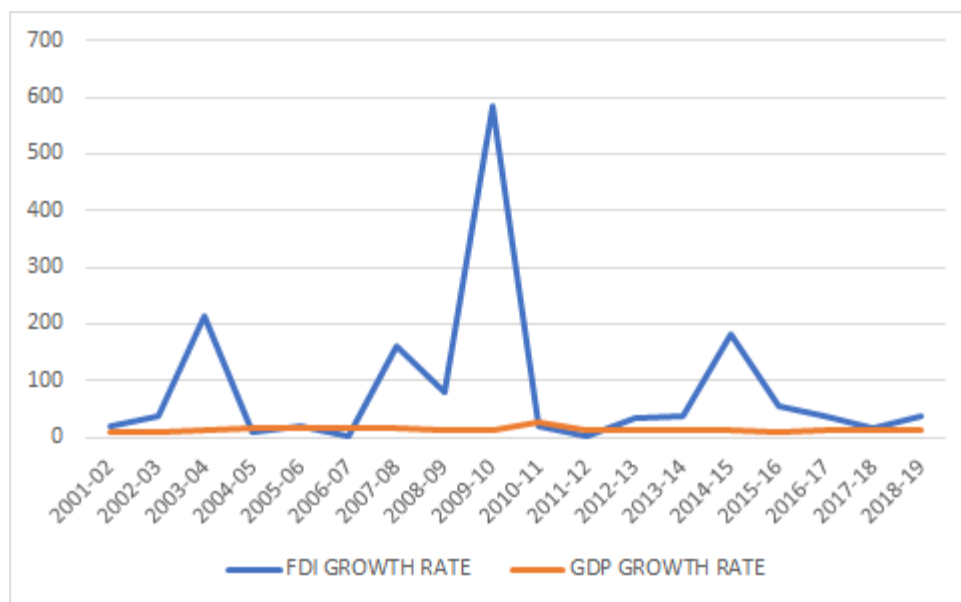
From table 1, we can clearly see FDI inflows increased from 267.44 billion rupees in 2000-01 to 2121.79 billion rupees in 2018-19, growing at a CAGR of 11.52% annually. FDI growth rate was

a maximum of 584.38% in the year 2009-10, just after the Global Financial Crisis and a minimum of -79.9% in the year 2008-09, which was due to the Global Financial Crisis.

GDP is always seen growing from 21023.14 billion rupees in the year 2000-01 to 190101.6 billion rupees in the year 2018-19. Since GDP is calculated at current prices, it includes the inflation in prices, which eventually shows the monotonically increasing trend. However, the growth rate keeps fluctuating, reaching a minimum growth rate since 2003 of 10.46% in 2015 and then increasing. CAGR of GDP is 12.29% annually. The minimum growth rate between 2000 to 2019 is observed in 2002-03 of 7.71%, and the maximum growth rate was observed in 2010-11 of 24.92%, which can be the result of recovery from the Global Financial Crisis. The FDI growth rate was maximum in the year 2009-10, which may have also affected GDP to grow more in 2010-11.

On average, FDI contributes to 1.98% of India's GDP.

GRAPH 1:



b. Descriptive Statistics: -

TABLE 2:

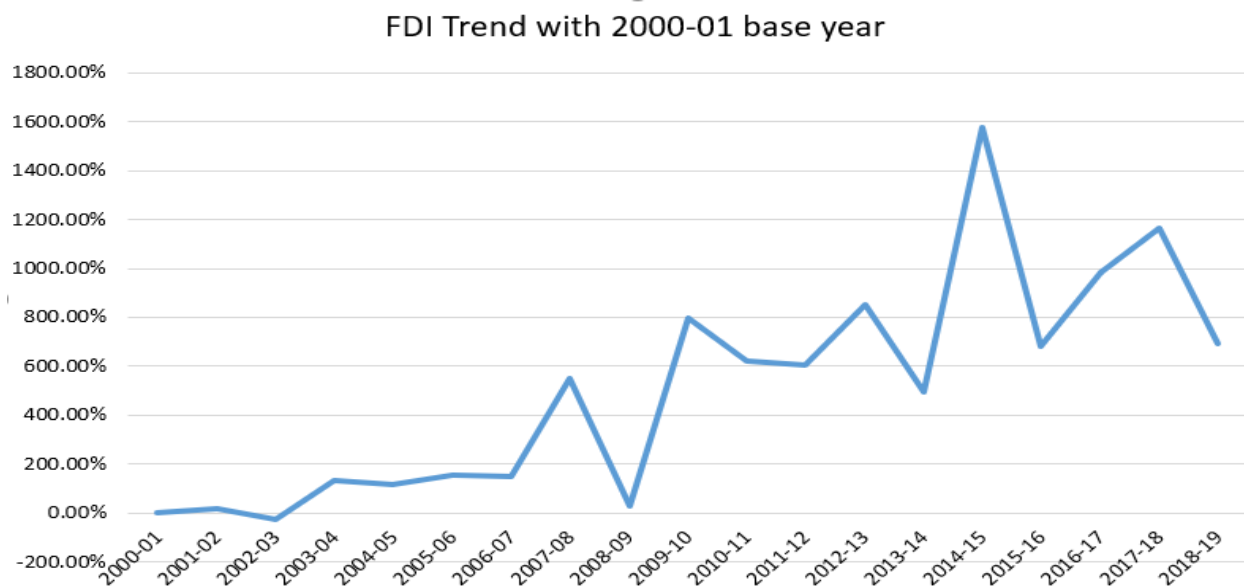
	Mean	Standard Deviation	Variance	N
GDP (bn rupees)	80515.13	54016.99	2917835020	19
FDI (bn rupees)	1620.04	1203.18	1447631	19

From the above table, we can observe that the average GDP from 2000 to 2019 is 80515.13 billion rupees and the average FDI is 1620.04 billion rupees. The dispersion of GDP about its mean is 54016.99 billion rupees and that of FDI is 1203.18 billion rupees. The variation between GDP and FDI together i.e. its covariance is 47658468.15

c. Pearson Correlation Coefficient: -

The degree of correlation between FDI and GDP is 0.774.

d. Trend Analysis of Foreign Investment: -



e. **Stationarity Test: -**

The stationarity test has been done to make sure that the collected data doesn't change itself when shifted in time. Stationarity of data has been checked by performing the Dickey-Fuller Test in Stata.

Null Hypothesis: Data is not stationary

Alternative Hypothesis: Data is stationary

FIGURE 1:

```
. dfuller dGDP
```

Dickey-Fuller test for unit root		Number of obs =		18
	Test Statistic	1% Critical Value	5% Critical Value	10% Critical Value
Z(t)	-0.819	-3.750	-3.000	-2.630

MacKinnon approximate p-value for Z(t) = 0.8135

```
. dfuller dlnGDP
```

Dickey-Fuller test for unit root		Number of obs =		18
	Test Statistic	1% Critical Value	5% Critical Value	10% Critical Value
Z(t)	-4.225	-3.750	-3.000	-2.630

MacKinnon approximate p-value for Z(t) = 0.0006

We performed an augmented Dickey-Fuller test in Stata to check stationarity. From the above result, we can see that the mod of test statistic for GDP is less than the mod of 1%, 5% and 10% critical values. As a result, we can't reject the null hypothesis. Thus, Data of GDP is not stationary.

On the other hand, the mod of test statistic for $\ln(\text{GDP})$ is greater than the mod of 1%, 5% and 10% critical values. As a result, we reject the null hypothesis. Thus, Data of $\ln(\text{GDP})$ is stationary.

Using this test, we conclude that to carry out linear regression, GDP cannot be used because then, regression will be spurious and useless. Therefore, we use $\ln(\text{GDP})$ for linear regression.

FIGURE 2:

```
. dfuller dFDI
```

```
Dickey-Fuller test for unit root                      Number of obs   =          18
```

	Test Statistic	Interpolated Dickey-Fuller		
		1% Critical Value	5% Critical Value	10% Critical Value
Z(t)	-10.207	-3.750	-3.000	-2.630

```
MacKinnon approximate p-value for Z(t) = 0.0000
```

```
. dfuller dlnFDI
```

```
Dickey-Fuller test for unit root                      Number of obs   =          18
```

	Test Statistic	Interpolated Dickey-Fuller		
		1% Critical Value	5% Critical Value	10% Critical Value
Z(t)	-9.909	-3.750	-3.000	-2.630

```
MacKinnon approximate p-value for Z(t) = 0.0000
```

From the above result, we can clearly prove that the mod of test statistic for both FDI and ln (FDI) is greater than the mod of 1%, 5% and 10% critical values. As a result, we reject the null hypothesis. Thus, Data of both FDI and ln (FDI) is stationary.

But as we can only use ln (GDP) for regression, so to make it linear regression we should use ln (FDI).

Since we can only use ln (GDP) for regression, to make the regression linear, we use ln(FDI) instead of simply FDI.

f. Granger Causality test: -

The Granger Causality test has been done to check if the past values of FDI can be used to predict future values of GDP and vice versa. Since the test can only be performed on stationary data, we use ln (FDI) and ln (GDP) to perform the test.

FIGURE 3:

Granger causality Wald tests

Equation	Excluded	F	df	df_r	Prob > F
lnFDI	lnGDP	5.2865	2	12	0.0226
lnFDI	ALL	5.2865	2	12	0.0226
lnGDP	lnFDI	4.352	2	12	0.0379
lnGDP	ALL	4.352	2	12	0.0379

For Table1:

Null Hypothesis (H_0): lagged (2 lagged) ln (GDP) does not cause ln (FDI)

Alternative Hypothesis (H_1): lagged (2 lagged) ln (GDP) causes ln (FDI)

From the above table for Granger Causality Test performed in Stata, we can clearly see that P-value is 2.26% so that at 5 % significance level, we can reject the null hypothesis and accept that ln(GDP) causes ln(FDI).

For Table2:

Null Hypothesis (H₀): lagged (2 lagged) ln(FDI) does not cause ln(GDP)

Alternative Hypothesis (H₁): lagged (2 lagged) ln(FDI) causes ln(GDP)

From the above table for Granger Causality Test performed in Stata, we can clearly see that P-value is 3.79% so that at 5 % significance level, we can reject the null hypothesis and accept that ln(FDI) causes ln(GDP).

g. Linear Regression Model: -

We build a Simple Linear Regression model of the natural logarithm of GDP, i.e., ln(GDP) on the natural logarithm of Foreign Investment, i.e., ln(FDI) with the help of secondary data collected from the financial year 2000 to 2019.

Independent Variable: ln(FDI)

Dependent Variable: ln(GDP)

Regression line: $\ln(\text{GDP}) = \beta_0 + \beta_1 \ln(\text{FDI}) + u_i$

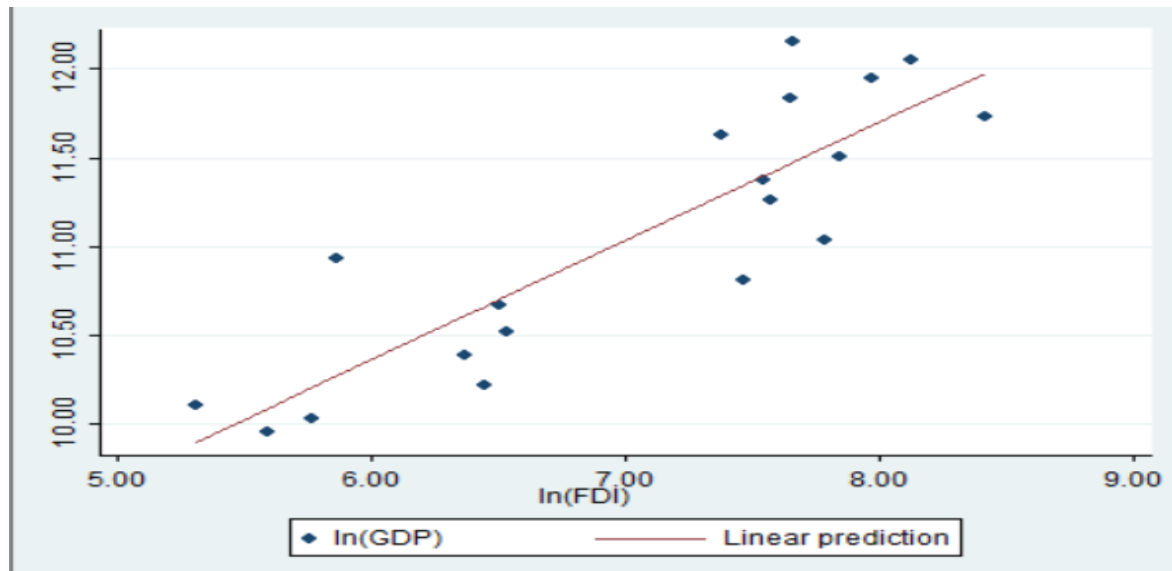
FIGURE4:

`. regress lnGDP lnFDI`

Source	SS	df	MS	Number of obs = 19		
Model	7.23192702	1	7.23192702	F(1, 17) = 53.30		
Residual	2.30641415	17	.135671421	Prob > F = 0.0000		
Total	9.53834117	18	.529907843	R-squared = 0.7582		
				Adj R-squared = 0.7440		
				Root MSE = .36834		

lnGDP	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
lnFDI	.6685182	.0915652	7.30	0.000	.4753325	.8617039
_cons	6.355093	.6500668	9.78	0.000	4.983572	7.726614

GRAPH 2:



Value of R-squared is 0.7582 which implies that the value of R is 0.871 which shows the degree of correlation between predictor ln(FDI) and outcome ln(GDP).

Value of R-squared indicates variation in outcome due to variation in the predictor. Here R-squared is 0.7582 which means 75.82% variation in ln(GDP) is due to variation in ln(FDI).

From the above table of the result of Linear regression run in Stata,

The estimated fitted line is

$$\ln(\text{GDP}) = 6.355 + 0.669 \cdot \ln(\text{FDI})$$

Thus, we can interpret that a one-unit increase/decrease in ln(FDI) leads to 0.669-units of increase/decrease in GDP respectively.

Value of R is also known as Standardized Beta. So here $R = \text{Standardized Beta} = 0.871$ which signifies that if other factors are held constant, a one-unit increase/decrease in SD of ln(FDI) will cause 0.774-units of increase/decrease in SD of ln(GDP).

h. ANOVA Analysis: -

TABLE 3:

	Sum of Squares	Degree of freedom	Mean Square	F-Value
Regression	7.232	1	7.232	53.30
Residual	2.306	17	0.136	
Total	9.538	18		

F-value is calculated by taking the ratio of mean square of regression and residual. So,
 $F_{cal} [1,17] = 53.30$

At 5% significance level, $F_{critical} [1,17] = 4.45$.

As F_{cal} is greater than $F_{critical}$, it proves the significance of this test.

i. Hypothesis Testing: -

Null Hypothesis (H_0): $\beta_1=0$ implies that no relationship between $\ln(\text{GDP})$ and $\ln(\text{FDI})$

Alternative Hypothesis (H_1): $\beta_1 \neq 0$ implies that there exists a significant relationship between $\ln(\text{GDP})$ and $\ln(\text{FDI})$

So $t_{cal} = 7.30$ from Stata table calculated above

At 5% significance level, $t_{critical} = 1.734$

As $t_{cal} > t_{critical}$, we reject the null hypothesis. Therefore, there is a significant relationship between $\ln(\text{FDI})$ and $\ln(\text{GDP})$.

CONCLUSION

The literature review has enumerated the predominant role of FDI in the growth of GDP of different nations. In this relation, the project has empirically analyzed and found the existence of a linear relationship between $\ln(\text{GDP})$ and $\ln(\text{FDI})$. The use of natural logarithm is justified by the Stationarity test. It has also been found that $\ln(\text{GDP})$ causes $\ln(\text{FDI})$ and vice versa using the Granger Causality test. Hence, it is concluded that Foreign Direct Investment has a significant and positive impact on Gross Domestic Product and consequently the economic growth of India.

POLICY IMPLICATION

The above analysis shows that FDI has a positive impact on GDP and hence on the economic growth of India. To attract more and more inflows of FDI, the government has to work on aspects such as relaxing FDI norms across sectors such as defence, PSU oil refineries, telecom, power exchanges, and stock exchanges. Policies regarding improvement of infrastructure and political stability are essential to attract FDI. Increasing the maximum permissible limit on FDI can certainly lead to economic growth.

REFERENCES

- Raj, Pahwa (2008). **Impact of Foreign Investments on Economic Growth of India.** *RESEARCH REVIEW International Journal of Multidisciplinary*,3(12).
- Ray (2012). **Impact of Foreign Direct Investment on Economic Growth in India: A Cointegration Analysis.** *World Science Publisher, United States*,2(1).
- Berthélemy, Démurger(2000). **Foreign Direct Investment and Economic Growth: Theory and Application to China.** *Review of Development Economics*, 4(2).
- Tamilselvan, M. and Manikandan, S(2015). **A Study on Impact of Foreign Direct Investment on Gross Domestic Production in India.** *International Journal of Academic Research in Business and Social Sciences*, 5(10).
- Antwi, Mills, Mills, Zhao(2013). **Impact of foreign direct investment on economic growth:Empirical evidence from Ghana.** *International Journal of Academic Research in Accounting, Finance and Management Sciences*,3(1).
- Anwar,Sun(211). **Financial development, foreign investment and economic growth in Malaysia.** *Journal of Asian Economics*,22(4).
- Abdouli, Hammami (2017).**Impact of FDI Inflows and Environmental Quality on Economic Growth: an Empirical Study for the MENA Countries.** *Journal of the Knowledge Economy*.
- Saini, Madan, Batra (2015) **Impact of FDI inflow on economic growth of SAARC economies.** *International Journal of Engineering, Business and Enterprise Applications*.
- <https://www.rbi.org.in/Scripts/PublicationsView.aspx?id=19139>
- <https://www.rbi.org.in/Scripts/PublicationsView.aspx?id=18992>

- <https://www.investopedia.com/terms/e/economicgrowth.asp>
- <https://www.investopedia.com/terms/f/foreign-investment.asp>