ELK ASIA PACIFIC JOURNAL OF FINANCE
ISSN 2349-2325 (Online); DOI: 10.16962/EAPJFRM/issn. 0976-7185; Volume 11 Issue 4 (2020)

www.elkjournals.com

Effect of Foreign Direct Investment (FDI) inflow, Interest rate and Inflation on Gross Domestic Product (GDP) of India—an Empirical study.

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Abstract:

Purpose – This paper aims to examine the effect of FDI, interest rate, inflation on GDP of INDIA.

Research Methodology – The secondary data has been collected for the study on annual basis applied correlation to study the relationship among variable and regression tool to examine the effect of selected variable on GDP for the period from 2005 to 2019.

Findings – The outcome of the analysis is, there is a significant effect of FDI, interest rate and inflation on GDP.

Practical implications – The analysis of interrelationship and effect of macroeconomic variable on economic growth will help policy makers to design and plan strategies for stable and sustainable economic condition of the country.

KEY WORDS: FOREIGN DIRECT INVESTMENT, INTEREST RATE, INFLATION, GDP and REGRESSION

JEL Classification: C22, C53, C58, G32

INTRODUCTION

Macroeconomic variables are important for every developing country like India, since this will play a major role in maintain high growth and sustainability in economic growth. Where economic growth will be represented by GDP of the country. Gross domestic product is the value of all finished goods and services produced in a specified time period. GDP is used as a tool to measure and compare the nation's economic progress and development.

In India working age group population is more due to which dependency ratio is low and there is a rise in saving and investments,

ISSN 2349-2325 (Online); DOI: 10.16962/EAPJFRM/issn. 0976-7185; Volume 11 Issue 4 (2020)

hence India's growth of GDP remains positive from longer perspective.

Maintaining high growth rate in the economy is one of the primary objective of Indian monetary policy. GDP of the country will tell us about the size of the economy and its often used as indicator to know the growth of the country. It's also true that how well the country is doing may depend on GDP of the country, there are many macroeconomic variables like interest rate, inflation, FDI, FII, import, export, foreign reserves and economic policy influence the GDP of India. The relationship between these Macroeconomic variable and GDP may be positive or negative. Omankhanlen (2011) finds that there is no relationship between FDI and inflation and he also finds that FDI effects the economic growth.

Evans Agalega & Samuel Antwi (2013) finds that there is a positive relation between inflation and GDP and negative relationship between interest rate and GDP in Gana. If inflation rate low, it is favorable condition for any developing country or if inflation rate is high, there exist adverse effect. Likewise, interest rate also has its own effect on GDP. While both interest rate and inflation have impact on FDI flows

LITERATURE REVIEW

A H M Yeaseen Chowdhury and Md. Kaysher Hamid et n al, (2019) have assessed the impact of macroeconomic variables on economic growth of Bangladesh by using correlation and multiple regression by using correlation and multiple regression from the period 1987 to 2015 which reported positive relationship between exchange rate and household consumption expenditure on GDP but negative relationship between inflation and interest rate on GDP.

Abeid Ahmed Ramadhan and Zhi Hong Jain et n al (2016). The study was conducted by applying ordinary least squares method of regression to study the impact of FDI on GDP a Comparative study of Mozambique and South Africa. The data has been collected for 18 years from 1996 to 2014 and they found that there is a positive relationship between variable in Mozambique and negative relationship in South Africa.

Dr. S. Jamuna (2016) studied impact of Inflation on Indian Economy by considering 13-year data from 1999 to 2011. Applied Karl Pearson Coefficient and trend analysis **which reports** there was 0.3% strong impact on inflation on economy and also quoted that they are many factors that affect

ISSN 2349-2325 (Online); DOI: 10.16962/EAPJFRM/issn. 0976-7185; Volume 11 Issue 4 (2020)

the economic growth among inflation is also one factor.

Hatane Semuel and Stephanie Nurina (2015) Analyzed the Effect of Inflation, Interest rates, and Exchange rates on Gross Domestic Product (GDP) of Indonesia by considering the data from June 2005 to December 2013 of Indonesia applied partial least square method to find the relationship.

Joseph Hakizimana (2015) observed the relationship between Foreign Direct Investment (FDI) and GDP per capita in Rwanda for the period from 2008 to 2012. By applying correlation, he finds that there is a strong and positive relationship between FDI and GDP per capita of Rwanda.

Khun Sokang (2018) using Cambodian inflation rate, FDI, foreign exchange rate data applied ANOVA & OLS finds that there is positive relationship between selected independent variable and economic growth (GDP).

Dr. Rubee Singh (2018) through regression found that there is a negative relationship of GDP & inflation on unemployment during the period 2011 to 2018 in India.

Nexhat Kryeziu and Esat Durguti (2019) assessed the Impact of Inflation on Economic Growth of Eurozone by using panel data basis using multiple linear regression model and further using Breusch-Pagan and Koenker test reported that there is positive impact of inflation on economic growth.

Nina P. Goridko and Robert M. Nizehegorodtsev (2016) used the regression statistics and envelope curve to determine the relationship between GDP growth and inflation rate of US economy over a period 1977 to 1987. The studies result showed that inflation rate was a non-slowing economic growth rate of inflation

Ramakrushna Mahapatra and Sunita Patra (2014) finds that there exist a strong and positive correlation between FDI and GDP of India for the period from 1990 to 2012.

Shariq Ahmad Bhat and Mahboob Rasul Laskar (2016). The study used data for the period from 1998 to 2012 and multiple linear regression model applied. They concluded that there was negative relationship of interest rate between GDP and positive relationship between inflation rate and GDP.

Though the studies have conducted to know the unidirectional and bidirectional relationship among macroeconomic

ISSN 2349-2325 (Online); DOI: 10.16962/EAPJFRM/issn. 0976-7185; Volume 11 Issue 4 (2020)

variables, there are very limited studies have found with respect to interest rate, inflation, FDI and GDP. Hence this study tries to fill the academic research gap by studying effect of interest rate, inflation, FDI on GDP of INDIA for this period.

OBJECTIVE OF THE STUDY

The primary objective of the study is to examine the effect of FDI, Interest Rate & Inflation on GDP of India for the period of fifteen years from 2005 to 2019.

HYPOTHESIS

H_0 : There is no significant effect of selected macroeconomic variables on GDP of India
H1: There is a significant effect of selected macroeconomic variables on GDP of India

RESEARCH METHODOLOGY

Main objective of the study is to examine the effect of selected variable on GDP of India. Here the selected independent variables are FDI, Interest rate and Inflation and Dependent variable is GDP. For this study Secondary data has been collected from World bank, RBI and Federal Reserve Bank of St. Louis and the data frequency is on annual basis for fifteen years from the period 2005 to 2019. For this study we have employed the correlation to find the relationship between variables and regression tool to examine the effect of selected variable on GDP of India through SPSS software. **(Ref Table- 1)**

LIMITATION OF THE STUDY

The study is only restricted to know the effect and relationship between the three independent variable such has FDI equity inflows, Interest rate and Inflation and dependent variable as GDP in Indian rupee. At the time of data collection 2020 financial year was not completed, hence the data is considered till 2019.

DATA ANALYSIS

Sources:
https://www.mospi.gov.in
https://dipp.gov.in/
https://data.worldbank.org/

In Table-1 the data related to FDI equity inflow (in million), interest rate, inflation in percentage and GDP in billion US dollar have collected and drawn from 2005 to 2019 for the study. For the collected data we have run the correlation test, and the result shows (Table-2) that there is strong relationship between FDI and GDP and we got r value of 0.999^{**} which is significant at the 0.01 level. The result shows that there is highly perfect positive correlation between FDI & GDP. There is positive

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correlation between interest rate, GDP and FDI, and negative correlation between inflation and GDP. **(Ref Table- 2)**

The **R** value **(0.911)** indicates a **perfect positive correlation** with small association between the select variables in the model.

R Square value (0.830) explains the percentage of variability in the dependent variable by all of the three independent variables (it's a multiple R-square).

In other words, we would interpret the result as, the $R^2 = 0.830$ that means that the linear regression explains 83 % of the variance in the dependent variable by the three independent variables **(Ref Table- 3 & 4)**

This table gives the outcome of F-test to determine whether the model is a good fit for the data. The result is significant according to p-value, since $0.001 < 0.05$ and the model is a satisfactory fit for the data. **(Ref Table- 5)**

Model Specification

The model used in this study is multiple linear regression models. This attempted to look at the effects or the relationship between a dependent (responsive) variable and number independent (explanatory) variables. With regard to this study, the dependent variable is Gross Domestic Product (GDP) and the independent or explanatory variables FDI, Interest rate and Inflation

The model specified is therefore: $Y = \beta0 + \beta1X1 + \beta2X2 + \beta3X3 + eij$. Letting GDP = Y, FDP = X1, Interest rate = X2 and Inflation = X3. The model is re-specified as GDP = $\beta0 + \beta1$FDP + $\beta2$Interest rate+ $\beta3$Inflation, where $\beta0$, $\beta1$, $\beta2$ and $\beta3$ are the regression coefficients which are estimated from the sample data. The eij is the random error term. **(Ref Table- 6)**

From Table 6 above, the exact regression model that can be developed is thus $Y = 1936.17 + 0.104X_1 - 9.387\ X_2 - 45.330\ X_3$ Where Y, X_1, X_2 and X_3 denote their usual meanings. The model is thus interpreted as follows:

The constant value of 1936.171 is the intercept which represent total output of the Indian economy in terms of its Gross Domestic Product (GDP) given that FDP (x_1), interest rate (x_2) and inflation (x_3) are zero, all other factors held constant. On the other hand, the coefficients of x_1 (i.e. FDP) of 0.104 implies how much or the magnitude by which GDP would change (in this case would increase) per unit change in x_1 (FDP). This of course shows that there is a positive relationship between GDP and FDP given the data for the period under consideration. This means that both GDP and FDP behave or move in the same direction. As FDP rate

ISSN 2349-2325 (Online); DOI: 10.16962/EAPJFRM/issn. 0976-7185; Volume 11 Issue 4 (2020)

increases GDP also increase. FDP & GDP move together. FDP and GDP move together because, during the period of flow of FDP, flow of money will pull many opportunities, could lead to increase in demand for goods and services, this lead to productivity increase which in turn increases the GDP.

The coefficient of x_2 (i.e. -9.387) shows that how much GDP would change (would decrease) by if there is a unit increase in the interest rate. It further indicates a negative or inverse relationship between GDP and interest rate. If interest rate decreases the GDP increases vice versa. That means if GDP and interest rate move in an opposite direction.

Also The coefficient of x_3 (i.e. -45.330) shows that if there is a unit increase in the inflation how much GDP would change (would decrease). It shows that there is an inverse relationship between GDP and inflation. The reviewed literature explains the relationship among the variable that Central Bank will raise the interest rate on borrowings due to raise in inflation, which leads to increased cost of borrowings so that decreased individual borrowings and company's borrowings, leads to decreased money flow in the economy, which result in low economic output which reflects on country's GDP rate.

CONCLUSION

The present study aims to examine the effect of FDP, interest rate and inflation on GDP which finds and reveals that there is positive relationship between selected macroeconomic variables on GDP. The correlations table shows that there is positive relationship (90.9%) between FDI and GDP and Interest rate and GDP, but low negative correlation between inflation and GDP. R Square value (0.830) explains the percentage of variability of independent variable on the dependent variable, in other words other variable will effect 17% on GDP. Coefficient table shows that 0.104 % change in FDI will change 1% change (Increase) GDP, -9.387 % change in Interest rate showing % decrease in GDP, also -45.330 % change in Inflation showing % decrease in GDP. This means interest rate and inflation moves in opposite direction. It recommends that the central bank and government of India can frame a monetary policy to control inflation rate and interest rate for stable and sustainable economic growth. Further research is encouraged in future to examine the effect on GDP by considering the remaining macroeconomic variable for year ahead and also applying other tools and models.

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ISSN 2349-2325 (Online); DOI: 10.16962/EAPJFRM/issn. 0976-7185; Volume 11 Issue 4 (2020)

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LIST OF TABLES

Table – 1

FDI equity inflows in million, Interest Rate, Inflation GDP in bil. US $

Year	FDI	INT	INF	GDP
2005	8,961	4.85515	4.24635	3238.3
2006	22,826	2.57061	5.79652	3647.0
2007	34,843	5.68184	6.37288	4111.1

ISSN 2349-2325 (Online); DOI: 10.16962/EAPJFRM/issn. 0976-7185; Volume 11 Issue 4 (2020)

2008	41,873	3.77176	8.34927	4354.8
2009	37,745	4.80859	10.8824	4759.9
2010	34,847	-1.9839	11.9894	5160.8
2011	46,556	1.31798	8.85836	5618.3
2012	34,298	2.47352	9.31245	6153.1
2013	36,046	3.86599	10.9076	6477.5
2014	45,148	6.69518	6.35319	6781.0
2015	55,559	7.55649	5.87243	7159.7
2016	60,220	6.23271	4.94103	7735.0
2017	60,974	5.52162	2.49089	8280.9
2018	62,001	4.68519	4.8607	8998.6
2019	74,390	6.36912	7.65969	9542.2

Table -2 Correlations

		GDP	FDI	INT	INF
GDP	Pearson Correlation	1	.909**	.394	-.244
	Sig. (2-tailed)		.000	.146	.380
	N	15	15	15	15
FDI	Pearson Correlation	.909**	1	.408	-.208
	Sig. (2-tailed)	.000		.131	.456
	N	15	15	15	15
INT	Pearson Correlation	.394	.408	1	-.596*
	Sig. (2-tailed)	.146	.131		.019
	N	15	15	15	15
INF	Pearson Correlation	-.244	-.208	-.596*	1
	Sig. (2-tailed)	.380	.456	.019	
	N	15	15	15	15

**. Correlation is significant at the 0.01 level (2-tailed).
*. Correlation is significant at the 0.05 level (2-tailed).

Table-3

Variables Entered/Removed

Model	Variables Entered	Variables Removed	Method
1	INF, FDI, INT[b]	.	Enter

a. Dependent Variable: GDP
b. All requested variables entered.

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Table-4

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.911[a]	.830	.784	909.3061

a. Predictors: (Constant), INF, FDI, INT

Table-5

ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	44417090.236	3	14805696.745	17.906	.001
	Residual	9095212.922	11	826837.538		
	Total	53512303.157	14			

a. Dependent Variable: GDP

b. Predictors: (Constant), INF, FDI, INT

Table-6

Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1936.171	1298.122		1.492	.164
	FDI	.104	.016	.901	6.607	.000
	INT	-9.387	132.840	-.012	-.071	.945
	INF	-45.330	110.368	-.064	-.411	.689

a. Dependent Variable: GDP