Theoretical and Applied Economics
Volume XXXI (2024), No. 2(639), Summer, pp. 67-86

The trend of FDI inflows and its impact on the Indian economy

Sushanta Kumar TARAI
Berhampur University, Odisha, India
taraibu@gmail.com
Sudhakar PATRA
Berhampur University, Odisha, India
sudhakarpatra65@gmail.com
Dhananjoy DATTA
The ICFAI University, Tripura, India
dattadhananjoy@gmail.com

Abstract. *More the capital more the industries can be lead to more employability. Hence, current paper aims to analyze the trend and pattern of FDI and its impact on the Indian economy using uses stepwise regression to select the appropriate variables with time series data over thirty years from 1992-2021 and found that there is a positive trend of FDI inflow into the country over the study period and the intersection between FDI and GDP is very high and the foreign exchange reserve is also very high, Moreover, foreign exchange reserves and interest rates have a significant relationship with FDI.*

Keywords: employment, FDI, GDP, growth, inflation.

JEL Classification: F31, O11, O53, P33, P44.

1. Introduction

Economic growth is not only a necessary agenda for any nation but employment generation is also required (Njoku & Ihugba, 2011: pp. 30-31). India is now the second most populous country after China. More employment is required to generate demand in the country so that the production capacity of the nation will be boosted which can boost industrialization in the country (Paudel, 2016: pp. 56-57). For industrialization, capital investment is required (Florida & Smith Jr., 1993). Capital investment is a part of foreign direct investment through which more capital inflow happens (Schnitzer, 2002: pp. 57-58).

Now India is the fastest-growing economy and we have become the fifth-largest economy (Klaus Hubacek, Dabo Guan, 2007). So to achieve sustained growth we should go for industrialization, urbanization, etc. (Shen et al., 2005: pp. 293-294). In the meantime, industry or economic growth is very extremely important for the survival of any country whether is for jobs or employment (Bernard et al., 2006). This is one of the key requisites of human survival. (Moran et al., 2008: pp. 473-474) spelt out that sustainable growth is required for any country. So generally there are three pillars: planet, people, and profit. Profit means business and economics (Diener K W, 2016: pp. 243-244)

In India there is a huge amount of FDI inflows has been seen since the liberalization(1). The current paper addresses the trends of the FDI inflows and how it has impacted the Indian economy. Moreover, the breakpoints of the FDI inflows have also been addressed. In this paper, the data for the inflows of FDI has been taken from liberalization to 2021 which is different from previous studies where the data are taken up to 2017-18.

Any emerging nation requires capital to be invested in the region for industrialization (Lall, 1992: pp. 182-183). Since, industrialization may be grown with proper funding which is a part of capital investment (Jensen, 1993: pp. 859-860). Hence foreign capital investment is required for any emerging nation like India which infect leads to employment and growth in the country (A. & Dubey, 2014: pp. 37-38). So there are many previous studies have been reviewed related to foreign direct investment and its impact on the Indian economy. A few of them are as follows:

2. Literature Review

Singhania & Gupta (2011) found that inflation and growth of gross domestic product positively impact the inflow of FDI in India. The author also in his paper found that 63% variation in FDI inflows into India. Trade openness, gross domestic product, interest rate, inflation, technological growth and money growth have taken as explanatory variables and FDI is dependent variable.

Rao (2011) found that portfolio investors and round-tripping investments are significant contributors to India's reported FDI inflows. Furthermore, they stated that FDI is preferred over FDI because the former is perceived to be more stable and, as a bundle of assets in addition to capital, could help the host economy gain competitiveness.

Chen et al., (2012) enquired about the association between outward FDI and economic growth in Malaysia from 1980 to 2010. And the study employed a general production function in which outward FDI is taken as the independent variable and labour and domestic investment are as the controlled variable. The Vector Error Correction Model was used as a model specification, and the results showed that there is a positive long-run relationship between outward FDI and growth. Furthermore, there is long-run bi-directional causality between these two. However, no granger causality was discovered between them in the short run.

Goswami & Kanta, (2012) investigated the trend of FDI inflows from 1991 to 2011, the relationship between FDI and manufactured exports and the present status of FDI and exports in North East regions. They revealed that NER fails to attract any sizable amount of FDI due to infrastructural and other lacunas in the economy and suggested that there should be some strategic intervention in NER to remove such fundamental constraints.

Khoon et al., (2013) investigated whether inward FDI confirms the observed patterns of a complementary relationship between FDI and trade, whereas outward FDI and trade linkages are insignificant because outward FDI is dominated by the services sector, which is generally non-tradable. However, intra-firm trade in services could be increased through fragmentation or outsourcing.

Prerna & Dhawan (2013) estimated the trend and patterns of FDI inflow in India. It has been demonstrated that FDI inflows to India moderated significantly in 2010-11, while other emerging economies in Asia and America received large inflows. They also suggested that policymakers should ensure policy transparency and consistency, as well as a comprehensive long-term development strategy.

Aurangzeb & Stengos, (2014) examined the relationship between FDI and economic growth. In their study, they assumed that FDI is primarily entering the service sectors after dividing the economy into export and non-export sectors, and they used a smooth coefficient semi-parametric approach to estimate the effects of FDI on economic growth. As a result, they discovered that countries with higher levels of FDI inflows have higher levels of export productivity than countries with lower levels of FDI inflows.

Mohammed et al., (2015) they examined the impact of investment on economic growth in 65 countries around the world and used panel data to examine the relationship between FDI and economic growth in the study area using panel granger causality and cointegration

tests. The empirical findings revealed a discrepancy in the relationship between the cointegration of the panel data analysis. Furthermore, there is unidirectional causality from FDI to GDP, which is a positive sign for fdi inflows.

Strat et al., (2015) conducted a study on the interdependency between the inflow of FDI and unemployment over the period from 1991 to 2012 for the latest thirteen member states of the EU. And they also analyzed the short-run causal relationship between the two variables using the T-Y procedure. Hence the study found that there is no granger causality relation between the variables for six countries and a unidirectional causality arises for the same countries.

Awasthi et al. (2017) found that the highest amount of FDI in India from 2010-11 to 2016-17 has come from Mauritius followed by Singapore and the U.K. and the maximum investment came into the manufacturing sector. Based on the data it is indicated that foreign investors showed keen interest in the Indian economy because of liberalized regime pursued and followed by the Indian economy.

Pasupathi & Sakthi (2019) aimed to analyze the trend of FDI in India, understand the reason behind its fluctuations and also analyzed the impact of the Make in India policy on FDI. This study found that India succeeded in attracting foreign investors after the launching of the Make in India policy and various other government reforms.

Oluwaseyi et al., (2020) They discovered that increasing FDI inflows in conjunction with other studied variables such as GDP and capital reduced carbon dioxide emissions in Nigeria, whereas the bounds testing to cointegration result proposed a long-term relationship between carbon emissions, income, trade integration, FDI inflows, GDP, and capital. Furthermore, the Granger causality result revealed two-way impacts between CO_2 emissions and FDI inflows, whereas there is one-way causality from capital to CO_2 emissions. In their study, they recommended that the Nigerian government continue to improve on providing incentives for economic agents, both domestic and foreign, who follow climate-friendly guidelines.

Chandra & Ridwan, (2023) Using the Auto Regressive Distributed Lag (ARDL) approach, they empirically examined how FDI, industrialization, population growth, and education affect the environment in Argentina. They discovered a co-integration relationship between CO_2 emissions, population, industrialization, and education. Again, it has been discovered that population growth and industrialization have a negative impact on the environment in Argentina in the long run. In the short run, there is a significant inverse relationship between CO_2 emissions and educational expenditure.

Clougherty & Zhang, (2023) employed sector-level data from 2002 to 2018 on US antitrust and inward FDI flows and Their empirical findings using panel data revealed that policy

uncertainty elements of antitrust enforcement deter inward FDI while policy risk elements of antitrust enforcement promote FDI. Furthermore, they argued that the distinction between policy risk and policy uncertainty inherent in antitrust allows for the reconciliation of both deterrence and promotion of competing perfectives.

3. Significance of the Study

There is much significance in this study. First of all current Finance Minister Smt. Nirmala Sitaraman announced in her budget speech that the outlay for capital expenditure is 10 lakh crore for the FY 2023-24 which is an increase of 37.4% as compared to the previous financial year[(2)]. This indicates that long-term and sustainable development may arise. Therefore, it may attract foreign investors to invest (Ślusarczyk, 2018: pp. 76-77). Hence there may be FDI inflows into India in future. Secondly, per United Nations' Sustainable Development Goals agenda eight indicates that there should promote sustained, inclusive, and sustainable economic growth, full and productive employment, and decent work for all in a country.

4. Objectives

1. To analyze the trend and pattern of FDI in India;
2. To evaluate the impact of FDI on the Indian economy.

5. Hypotheses

The research questions were translated into the following hypothesis, which was then, tested using statistical analysis:

The study has been taken up for the period 1992-2021 with the following hypotheses:
1. The flow of FDI shows a positive trend over the period 1992-2021.
2. FDI has a positive impact on the economic growth of the country.

6. Methodologies

Sources of Data

The data used for this study is from various published sources. The sample period of 30 years has been collected from World Development Indicators (WDI)[(3)], Federal Reserve Statistical Release and UNCTAD Data Centre[(4)]. And the data are in time series from 1992 to 2021 in India.

Analytical Tools

For analyzing the collected data, various mathematical tools have been used. In this study, the researcher analyzed the data using Eviews statistical software. Moreover, for knowing the characteristics of data, descriptive and correlation metrics have been shown.

Analysis of the Trend

$$\hat{y}=\beta_0 + \beta_1 x \quad (1)$$

Where

$\hat{y}$ = predicted value of the dependent variable
β_0 = Intercept,
β_1 = Slope of the regression line (or the rate of change in y for a given change in x,
x = Independent variable (which is time in this case).

Annual Growth Rate (AGR)

$$AGR = \frac{(X2 - X1)}{X1}$$

Where

$X2$ = Second value of X variable,
$X1$ = First value of X variable.

Compound Annual Growth Rate (CAGR)

$$\text{CAGR} = \left(\left(\frac{Endvalue}{Startvalue}\right)^{\frac{1}{n}} - 1\right) \times 100$$

Where

n = Number of years.

Model

One model generally explains the highest variation with the lowest number of predictors or independent variables then it is considered a good model (Ath & Fabricius, 2000: pp. 3187-3188). Since it is one of the conditions that should be parsimonious means in one model there should not be excessive or unnecessary data. Hence, to follow such a condition the model should follow the relevant data or variable for the prediction. So the objective of a model should have the best output with minimum input (Rifai et al., 2011: pp. 10-11). For selecting the most pertinent independent variables (X_i) in the model where the main objective is to regress the FDI inflow on curtained selected independent variables (X_i), generally, there are two approaches to determine the quality of the predictors in a model (Beck & Katz, 1995) & (Mukherjee et al., 2014).

A details description of the variables is given below.

Description of Variables

Y Foreign Direct Investment
X_1 Gross Domestic Investment
X_2 Inflation
X_3 Foreign Exchange Reserve
X_4 Employment Rate
X_5 Interest Rate
X_6 Exchange Rate
X_7 Import
X_8 Export
X_9 Trade (% of GDP)
X_{10} Foreign Direct Investment Growth
X_{11} = GDP growth (annual %)

Using these variables, stepwise regression has been applied to select the most appropriate explanatory variables.

Table 1. *Variable models i.e.*$Y = \beta_0 + \beta_1 X?$

Y regressed only on	X_1	X_2	X_3	X_4	X_5	X_6	X_7	X_8	X_9	X_{10}	X_{11}
β_1	0.02	-0.97	8.78	-4.32	-3.02	1.24	1.97	2.69	1.15	-8.76	-1.97
r^2	0.85	0.02	0.89	0.83	0.18	0.72	0.48	0.53	0.50	0.10	0.09
t-stat	12.76	-0.79	15.17*	-11.56	-2.48	8.58	5.05	5.64	5.34	-1.72	-1.65
p-value	0.00	0.43	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.10	0.11

Source: Computed by Author using Eviews.

Now let us take a look the table-1, the stepwise regression among the variables has been shown where all are fitted with 2-variable modes i.e.$Y = \beta_0 + \beta_1 X?$ it means which explanatory variable should be selected. As per the result shown above, the t-statistic associated with regressing Y (foreign direct investment) on X_3 (foreign exchange reserve) is the highest which is 15.17. So unknown X here in the first run would be X_3 which is a foreign exchange reserve. So with this explanatory variable, we are going to add to the selection of explanatory groups. Thus, the model is as follows:

$$Y = \beta_0 + \beta_1 X_3 \qquad (2)$$

From the first run, the resulting model is that the foreign exchange reserve is regressing FDI inflow into the country. Finally, we got the first explanatory variable in the first step. In the second step that is for the 3-variable modes ($Y = \beta_0 + \beta_1 X_3 + X?$) the result is as follows:

Table 2. *Variable models i.e. ($Y = \beta_0 + \beta_1 X_3 + X?$)*

Y regressed only on	X_3 + X_1	X_3 + X_2	X_3 + X_4	X_3 + X_5	X_3 + X_6	X_3 + X_7	X_3 + X_8	X_3 + X_9	X_3 + X_{10}	X_3 + X_{11}
β_2	0.00	0.33	-0.60	0.76	0.11	0.25	0.30	0.14	2.08	-0.72
r^2	0.89	0.89	0.89	0.90	0.89	0.90	0.89	0.90	0.90	0.90
t-stat	0.40	0.78	-0.63	1.48*	0.55	1.01	0.87	0.96	1.09	-1.76
p-value	0.02	0.00	0.54	0.01	0.04	0.32	0.00	0.03	0.00	0.09

Source: Computed by Author using Eviews.

Since X_3 (foreign exchange reserve) gets selected and the process gets followed by multiple regression whereby will regress Y to each of the remaining explanatory variables. So here the result shows (table-2) the coefficient for each of these additional variables. It is found that β_2 which is the beta coefficient for X_5 (interest rate) has the highest absolute t-statistic. Since β_2 represents the beta coefficient for each of the second variables that have been included and this is a forward selection process and X_3 has already been selected so it is concerned only with the coefficient, therefore the t-statistic is associated with the second variable that is being examined. Hence here X_5 (interest rate) is selected for joining with X_3 (foreign exchange reserve) as a second explanatory variable. Based on the result the model is as follows:

$$Y = \beta_0 + \beta_1 X_3 + \beta_2 X_5 \quad (3)$$

It means that equation 3 shows the foreign exchange reserve and interest rate are regressing FDI inflow into the country. Further, the third step is for the 4-variable modes ($Y = \beta_0 + \beta_1 X_3 + \beta_2 X_5 + \beta_3 X?$) the result has been shown in the following table where we will select the next explanatory variable after X_3 and X_5.

Table 3. *Variable models i.e. ($Y = \beta_0 + \beta_1 X_3 + \beta_2 X_5 + \beta_3 X?$)*

Y regressed only on	X_3 + X_5 + X_1	X_3 + X_5 + X_2	X_3 + X_5 + X_4	X_3 + X_5 + X_6	X_3 + X_5 + X_7	X_3 + X_5 + X_8	X_3 + X_5 + X_9	X_3 + X_5 + X_{10}	X_3 + X_5 + X_{11}
β_3	0.00	0.88	-0.01	-0.07	0.47	0.57	0.26	1.98	-0.63
r^2	0.90	0.91	0.90	0.90	0.91	0.91	0.91	0.90	0.91
t-stat	-0.04	1.93*	-0.01	-0.29	1.89	1.65	1.80	1.06	-1.54
p-value	0.00	0.02	0.15	0.01	0.01	0.11	0.08	0.00	0.03

Source: Computed by Author using Eviews.

Since this step is looking for the third explanatory variable and the β_3 is the coefficient for the third variable, the table-3 shows that the coefficient for X_2 has the highest absolute t value which is 1.93. Therefore Y is the function of X_3, X_5, and X_2. Hence, inflation was added as the next explanatory variable. Therefore, the foreign exchange reserve, interest rate and inflation are regressing FDI inflow in the following equation.

$$Y = \beta_0 + \beta_1 X_3 + \beta_2 X_5 + \beta_3 X_2 \quad (4)$$

In the fourth step for the 5-variable modes ($Y = \beta_0 + \beta_1 X_3 + \beta_2 X_5 + \beta_3 X_2 + \beta_4 X?$) the result has been depicted in table-4.

Table 4. *Variable models i.e. ($Y = \beta_0 + \beta_1 X_3 + \beta_2 X_5 + \beta_3 X_2 + \beta_4 X_?$)*

Y regressed only on	$X_3 + X_5 + X_2 + X_1$	$X_3 + X_5 + X_2 + X_4$	$X_3 + X_5 + X_2 + X_6$	$X_3 + X_5 + X_2 + X_7$	$X_3 + X_5 + X_2 + X_8$	$X_3 + X_5 + X_2 + X_9$	$X_3 + X_5 + X_2 + X_{10}$	$X_3 + X_5 + X_2 + X_{11}$
β_4	0.00	0.53	0.06	0.47	0.63	0.27	1.44	-0.54
r^2	0.91	0.91	0.91	0.92	0.92	0.92	0.91	0.92
t-stat	-0.04	0.51	0.27	1.98*	1.92	1.97	0.78	-1.36
p-value	0.07	0.01	0.00	0.02	0.07	0.06	0.44	0.19

Source: Computed by Author using Eviews.

As per the result in table 4, X_7 (import) has the highest absolute t value. Therefore Y is the function of X_3, X_5, X_2, and X_7. Therefore, import is added as the next explanatory variable. Hence, the regression equation is:

$$Y = \beta_0 + \beta_1 X_3 + \beta_2 X_5 + \beta_3 X_2 + \beta_4 X_7 \quad (5)$$

Equation 5 shows that foreign exchange reserve, interest rate, inflation and import are regressing FDI inflow. Further, for the 6-variable modes ($Y = \beta_0 + \beta_1 X_3 + \beta_2 X_5 + \beta_3 X_2 + \beta_4 X_7 + \beta_5 X?$) we go for the next step.

Table 5. *Variable models i.e. ($Y = \beta_0 + \beta_1 X_3 + \beta_2 X_5 + \beta_3 X_2 + \beta_4 X_7 + \beta_5 X?$)*

Y regressed only on	$X_3 + X_5 + X_2 + X_7 + X_1$	$X_3 + X_5 + X_2 + X_7 + X_4$	$X_3 + X_5 + X_2 + X_7 + X_6$	$X_3 + X_5 + X_2 + X_8$	$X_3 + X_5 + X_2 + X_9$	$X_3 + X_5 + X_2 + X_7 + X_{10}$	$X_3 + X_5 + X_2 + X_7 + X_{11}$
β_5	0	-0.36	0.03	0.63	0.27	1.86	-0.82
r^2	0.92	0.92	0.92	0.92	0.92	0.93	0.94
t-stat	-0.25	-0.33	0.12	1.92	1.97*	1.07	-2.22
p-value	0.81	0.06	0.18	0.07	0.03	0.29	0.04

Source: Computed by Author using Eviews.

Table-5 shows X_9 (trade, % of GDP) has the highest absolute t value which is 1.97. Therefore Y will be the function of X_3, X_5, X_2, X_7 and X_9. Therefore, trade, (% of GDP) is added as the next explanatory variable. Hence, the regression equation is:

$$Y = \beta_0 + \beta_1 X_3 + \beta_2 X_5 + \beta_3 X_2 + \beta_4 X_7 + \beta_5 X_9 \quad (6)$$

Finally, after selecting the X9 variable, no relationship is coming with the other remaining variables. It means the X9 variable is not having any coordination. Hence we should quit at this point. So X_9 is the last explanatory variable. So Y = f (X_3, X_5, X_2, X_7 and X_9).

And final regression model is equation 6 i.e.

$$Y = \beta_0 + \beta_1 X_3 + \beta_2 X_5 + \beta_3 X_2 + \beta_4 X_7 + \beta_5 X_9$$

The foreign exchange reserve, interest rate, inflation, import, and trade (% of GDP) are regressing FDI inflow. Now we will check the impact of FDI on these variables.

7. Current FDI Trends in India

Table 6. *Year-Wise FDI Inflow in India*

Year	FDI Inflows to India (US$ "000 Million)	The annual growth rate of FDII (in per cent)	Growth of Gross Domestic Product (in per cent)
1992	0.25	----	0.09
1993	0.53	112.00	0.19
1994	0.97	83.02	0.3
1995	2.15	121.65	0.58
1996	2.53	17.67	0.64
1997	3.62	43.08	0.85
1998	2.63	-27.35	0.61
1999	2.17	-17.49	0.47
2000	3.59	65.44	0.75
2001	5.48	52.65	1.12
2002	5.63	2.74	1.1
2003	4.32	-23.27	0.72
2004	5.78	33.80	0.82
2005	7.62	31.83	0.93
2006	20.33	166.80	2.16
2007	25.35	24.69	2.14
2008	47.1	85.80	3.72
2009	35.63	-24.35	2.71
2010	27.42	-23.04	1.64
2011	36.19	31.98	1.93
2012	24.2	-33.13	1.3
2013	28.2	16.53	1.47
2014	34.58	22.62	1.69
2015	44.06	27.41	2.05
2016	44.48	0.95	1.94
2017	39.9	-10.30	1.52
2018	42.16	5.66	1.53
2019	50.56	19.92	1.75
2020	64.07	26.72	2.4
2021	44.74	-30.17	1.41

Source: UNCTAD Data Centre.

The FDI inflow into India from 1992-2021 is shown in table-6. In this table annual growth rate of FDII and the growth of GDP (in per cent) are also shown for 30 years from 1992-2021.

Table 7. *Descriptive Statistics Analysis*

	FDII	FOREX	IMPORTS	INFLATION	INTEREST_RATE	TRADE
Mean	21.67	215.49	19.75	6.92	5.30	37.02
Median	22.02	217.74	21.10	6.35	5.52	40.02
Maximum	64.36	638.48	31.26	13.23	9.19	55.79
Minimum	0.28	9.54	9.59	3.33	-1.98	18.43
Std. Dev.	19.42	180.44	6.80	2.97	2.73	12.02
Skewness	0.38	0.57	0.01	0.54	-0.91	-0.08
Kurtosis	1.80	2.44	1.73	2.00	3.67	1.67
Observations	30	30	30	30	30	30

Source: Computed by Author using Eviews Software.

The descriptive statistic is important because it will create a feel for the data (Potter et al., 2010). The descriptive statistics (table-9) of the study, including mean (M), median (M_d), maximum (M^x), minimum (M^n), standard deviation (SD), skewness, kurtosis, and observation are measured. We can conclude that the values for the dependent variable i.e. foreign direct investment (M) = 21.67, M_d = 22.02, M^x = 64.36, M^n = 0.28, SD = 19.42, skewness = 0.38, kurtosis = 1.80, observation = 30), for foreign exchange reserve the mean is 215.49, M_d = 217.74, M^x = 638.48, M^n = 9.54, SD = 180.44, skewness = 0.57, kurtosis = 2.44, and the total observation is 30. Similarly, for the next explanatory variable imports, the mean is 19.75, the median value is = 21.10, M^x = 31.26, M^n = 9.59, SD = 6.80, skewness = 0.01, kurtosis = 1.73, and observation = 30. For inflations the values are (M = 6.92, M_d = 6.35, M^x = 13.23, minimum value is 3.33, SD = 2.97, skewness = 0.54, kurtosis = 2.00, and observation is 30.

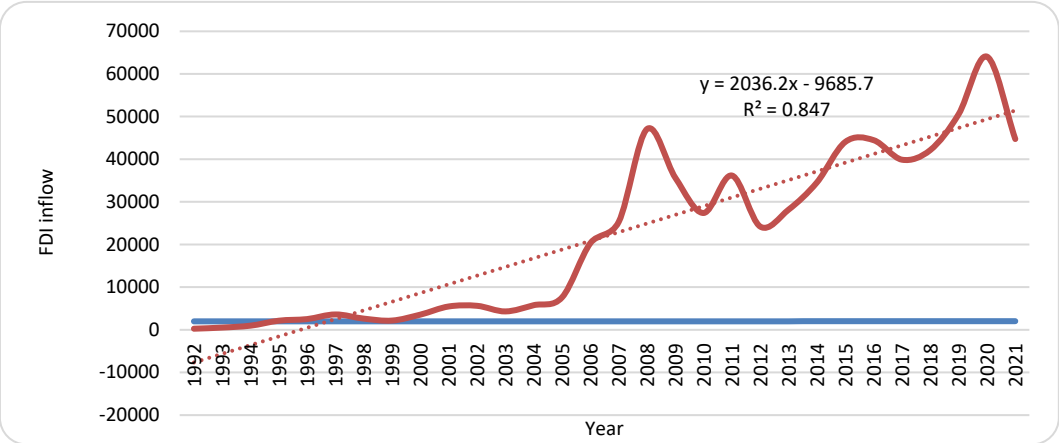
Table 8. *Correlation Metrics*

	FDII	FOREX	IMPORTS	INFLATION	INTEREST_RATE	TRADE
FDII	1.00					
FOREX	0.94	1.00				
IMPORTS	0.69	0.68	1.00			
INFLATION	-0.15	-0.21	0.02	1.00		
INTEREST_RATE	-0.42	-0.53	-0.62	-0.32	1.00	
TRADE	0.71	0.71	1.00	-0.02	-0.62	1.00

Source: Computed by Author using Eviews Software.

Table-8 shows the correlation among the variables. The intersection between FDI and GDP is very high. FDII has a very strong and positive correlation with foreign exchange reserve (r= 0.94, which is less than 1) which means with the increase of FDII the FOREX will also increase. It means that more FDI inflows lead to more foreign exchange reserves which can also lead to more economic growth (Kanu et al., 2014). Table-10 shows the correlation among the variables. The intersection between FDI and GDP is very high. FDII has a very strong and positive correlation with foreign exchange reserve (r= 0.94, which is less than 1) which means with the increase of FDII the FOREX will also increase. in the country (Faroh & Shen, 2015). However, there is coming a strong positive correlation between FDII and trade in the country. Higher the FDII inflow more trade will be generated in the country (Kimino et al., 2007).

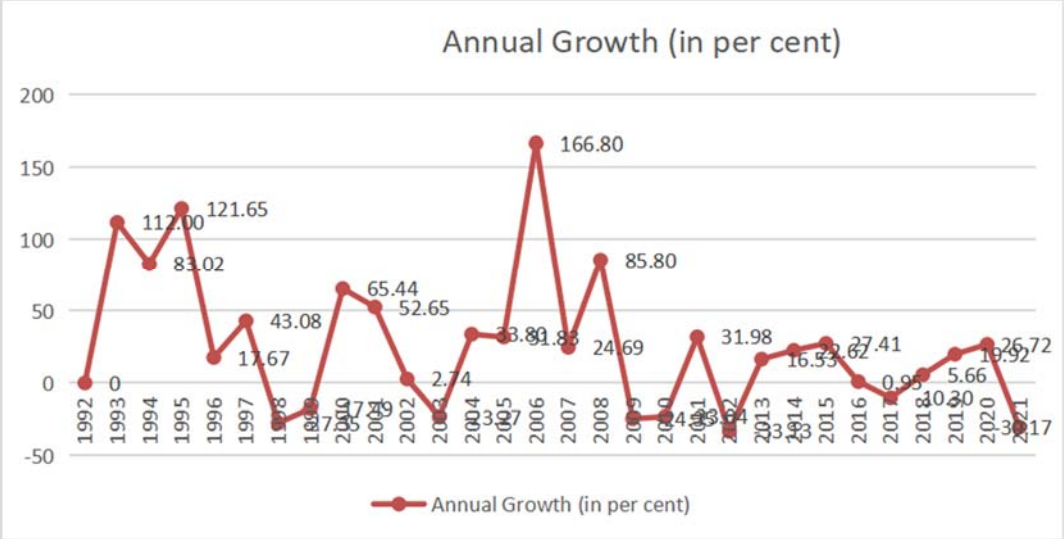
Figure 1. *Trend Lines of Year Wise FDI Inflow in India*



Source: Computed by Author Using Excel / UNCTAD Data Centre.

The trend analysis of the FDI data (figure-1) from 1992 to 2021 shows that there is a positive average trend of FDI in India but if we deeply analyze that data, from 1992 to 2005 there is a steep growth arises whereas, after 2005 there is a sharp increase up to 2008 in FDI inflows into India. Again after 2008, a little bit of fluctuation is there in FDI inflow. Still, it is a trend of positive FDI inflow in India. The value of R^2 is found around 85% which shows that 85% of the data are closely fitted to the trend line. Hence it is a goodness of fit of this model.

Figure 2. *Annual Growth of FDI inflow into India (in Percent)*



Source: Computed by Author Using Excel / UNCTAD Data Centre.

The per cent wise Annual Growth of FDI inflow into India has been shown in figure-2 where it is clear that there is a steady fluctuation is seen in the figure. It means there is a constant flow of FDI inflow into India during the study period. In 2006, there is a huge inflow of FDI into India since it is showing that around 167% of FDI inflow has been received by India. In 1995 there the second-highest FDI received growth wise is around 122% against 112% in 1994.

For studying the impact of foreign direct investment on the Indian economy, a couple of models have been framed. Firstly, the foreign direct investment model shows the factors influencing foreign direct investment in India, and the last one is the impact on the Indian economy (a proxy variable that is economic growth) model that shows the contribution of foreign direct investment to the Indian economy (economic growth).

1) $FDI = f(FOREX, IR, INF, IMP, Trade)$ (7)

2) $GDPG = f(FDIG)$ (8)

Where,

FDI	Foreign Direct Investment
FOREX	Foreign Exchange Reserve
IR	Interest Rate
INF	Inflation
IMP	Import
TRADE	Trade (X+M) (%of GDP)
GDPG	GDP growth (annual %)
FDIG	Foreign Direct Investment Growth

Model 1

Factors Influencing Foreign Direct Investment in India (FDI Model)

Many factors have an impact on FDI inflow into India. As per the stepwise regression, there are five main variables are selected that are influencing FDI inflow into India. These are foreign exchange reserves, interest rates, inflation, imports, and trade. Based on the stepwise regression the economic growth model is as follows:

$$FDI = f(ForeignExchangeReserve, InterestRate, Inflation, Imports, Trade) \quad (9)$$

Table 9. *Result of the FDI model*

Dependent Variable: FDI Method: Least Squares Date: 02/20/23 Time: 13:39 Sample: 1992 2021 Included observations: 30				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
FOREX	0.106706	0.009999	10.67139	0.0000
IMPORTS	0.643195	2.704246	0.237846	0.8140
INFLATION	0.858889	0.471550	1.821418	0.0810
INTEREST_RATE	1.734510	0.594006	2.920022	0.0075
TRADE	-0.101503	1.574271	-0.064476	0.9491
C	-25.39307	10.01321	-2.535957	0.0181
R-squared	0.924202	Mean dependent var		21.67300
Adjusted R-squared	0.908411	S.D. dependent var		19.41541
S.E. of regression	5.875830	Akaike info criterion		6.556428
Sum squared resid	828.6090	Schwarz criterion		6.836668
Log-likelihood	-92.34642	Hannan-Quinn criteria.		6.646079
F-statistic	58.52610	Durbin-Watson stat		2.082412
Prob(F-statistic)	0.000000			

Source: Computed by Author using Eviews Software.

The result of the FDI of FDI model (table-9) shows that among all five independent variables, there are merely two variables those are having a significant relationship with foreign direct investment, they are foreign exchange reserve and interest rate. Since the result shows that the probabilistic value of these two variables is less than 5% which is why foreign exchange reserve and interest rate are more significant variables in the model. On the other hand, we see the combined effect of all the five explanatory variables on FDI inflow into the country is very high is 92.42% which is indicated by the R^2 value in the model.

If we see the individual effect of foreign exchange reserve and interest rate on FDI inflow into the country, one unit change in foreign exchange reserve (holdings of monetary gold, special drawing rights, reserves of IMF members held by the IMF, and holdings of foreign exchange under the control of monetary authorities) may lead to 10.67% increase in FDI inflow in the country. The current result also supports the result found by (Zhao, 2003), in his study the author found that an increase in FOREX leads to FDI inflow into the Chinese economy. Similarly, one unit change in interest rate there is 173.45% may occur in FDI inflow in the country. It means an increase in interest rate leads to an increase in FDI inflow into the country. (Agyeman et al., 2021) also found their study that Interest rates have a statistically significant positive impact on FDI inflows in Africa after employing panel data on six major FDI-hub economies in Africa for the period 1990-2017.

However, (Faroh & Shen, 2015) argued in a study conducted on the economy of Sierra Leone that a high-interest rate does not affect FDI flow in Sierra Leone. Moreover, one

more study on the interest rate and FDI inflow is conducted (Musyoka & Ocharo, 2018) and it has been found that Real interest rates have a negative and significant influence on FDI inflows into Kenya(5). Similarly, to argue the result (Arbatli, 2011) where the result is found that an increase in real interest rates tends to lower FDI flows. The current result also opposed the study conducted by (Sasana & Fathoni, 2019) where they found that the real interest rate does not affect the FDI inflow(6).

Contribution of Foreign Direct Investment to the Indian Economy (Economic Growth Model)

$$GDP = f(FDI) \quad (10)$$

Where,
GDP = gross domestic product and
FDI = foreign direct investment.

Equation (1) is treated as a Cobb-Douglas function with foreign direct investment into India(7), and FDI is the only explanatory variable in this model. The link between Economic growth (measured in terms of GDP)

Table 10. *Result of the Growth model*

Dependent Variable: GDP Method: Least Squares Date: 02/21/23 Time: 13:56 Sample: 1992 2021 Included observations: 30				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	341.7039	99.75154	3.425550	0.0019
FDI	44.05970	3.453882	12.75657	0.0000
R-squared	0.853196	Mean dependent var		1296.610
Adjusted R-squared	0.847953	S.D. dependent var		926.1125
S.E. of regression	361.1213	Akaike info criterion		14.68065
Sum squared resid	3651440.	Schwarz criterion		14.77406
Log-likelihood	-218.2097	Hannan-Quinn criteria.		14.71053
F-statistic	162.7302	Durbin-Watson stat		1.379601
Prob(F-statistic)	0.000000			

Source: Computed by Author using Eviews Software.

In the result of the economic growth model in table-10, the estimated coefficient of FDI is having a positive relationship with GDP. The result shows that foreign direct investment inflow into the country is a highly statistically significant variable since the p-value result is less than 5%(8). Hence it is a significant factor influencing the level of economic growth in India. The coefficient of determination, i.e. the value of R^2 explains the 85.31% level of economic growth by foreign direct investment in India. The F-statistics value also explains the significant relationship(9) between the level of economic growth and FDI inflows in India. Moreover, the D-W statistic value is found 1.38 which confirms that there is no

autocorrelation problem in the analysis. Therefore, the findings of the economic growth model revealed that FDI inflow is an important and statistically significant factor influencing the level of economic growth in India(10). The current result also supports the study (Ray, 2012) where it has been found that FDI inflow creates economic growth in the country. Similarly, (Bandekar, 2014: pp. 8-9) found in his study that capital inflow is a major determinant of any country which enhances economic growth.

8. Results And Discussion

After taking the stepwise regression for selecting the most appropriate variables affecting foreign direct investment, there are five major variables we got that are affecting FDI inflow into the country, they are foreign exchange reserve, interest rate, inflation, import, and trade (% of GDP). For trend analysis, it is found that there is a positive average trend of FDI in India but if we deeply analyze that data, from 1992 to 2005 there is a steep growth arising whereas, after 2005 there is a sharp increase up to 2008 in FDI inflows into India. Again after 2008, a little bit of fluctuation in FDI inflow is there. Still, it is the trend of positive FDI inflow in India. The value of R^2 is around 85% which shows that 85% of the data are closely fitted to the trend line. Hence it is a goodness of fit of this model.

The estimated coefficient of FDI has a positive relationship with GDP as a result of the economic growth model in table-10. Because the p-value is less than 5%, the result indicates that foreign direct investment inflows into the country are a highly statistically significant variable. As a result, it is a significant factor influencing India's level of economic growth. The coefficient of determination, or R2, explains 85.31% of India's economic growth through foreign direct investment. The F-statistics value also explains the significant relationship between India's economic growth rate and FDI inflows. Furthermore, the D-W statistic value is 1.38, indicating that there is no autocorrelation problem in the analysis. As a result, the economic growth model's findings revealed that FDI inflows are an important and statistically significant factor influencing the level of economic growth in India.

9. Conclusion

There is extensive literature on FDI inflows and economic growth in India. This literature is based mostly on various macroeconomic variables which are influenced by FDI inflow in India. This study differs from the previous works in two important ways: First, FDI inflow is explained by some selected macroeconomic variables which have been selected based on stepwise regression. Second, the growth of an economy is an endogenous variable

which affects FDI inflow in India. Our stepwise regression result finds some selected five explanatory variables.

Many macroeconomic variables are there that are affecting FDI inflow in India. Based on the step-wise regression some selected variables have been used in this study. Based on the empirical results some variables are positive relation with FDI inflows while some are not. Moreover, more research is required based on this FDI inflow issue though India is a positive trend of FDI inflow still it lacks foreign capital in India. There should be more policy formulation not only in the field of exports and imports sectors but also in the field of the manufacturing sector is required.

Notes

(1) https://www.rbi.org.in/scripts/bs_viewcontent.aspx?Id=2513
(2) https://pib.gov.in/PressReleasePage.aspx?PRID=1895279
(3) https://databank.worldbank.org/source/world-development-indicators
(4) https://unctadstat.unctad.org/EN/
(5) http://repository.embuni.ac.ke/handle/123456789/1528
(6) http://erepository.uonbi.ac.ke/handle/11295/103228
(7) https://journalofeconomicstructures.springeropen.com/articles/10.1186/s40008-016-0043-x
(8) https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6532382/#:~:text=These%20are%20as%20follows%3A%20if,that%20yield%20P%20values%20on
(9) https://statisticsbyjim.com/regression/interpret-f-test-overall-significance-regression/
(10) https://www.mdpi.com/2227-7099/5/2/20

References

A., T. and Dubey, S., 2014. Managing Tourism as a source of Revenue and Foreign direct investment inflow in a developing Country: The Jordanian Experience. *International Journal of Academic Research in Economics and Management Sciences*, *3*(3), pp. 16-42. <https://doi.org/10.6007/ijarems/v3-i3/901>

Agyeman, A.S., Arthur, B. and Addai, B., 2021. Interest rates and FDI in some selected African countries: The mediating roles of exchange rate and unemployment. *African Review of Economics and Finance*, *13*(1), pp. 214-238.

Arbatli, E., 2011. *Economic Policies and FDI Inflows to Emerging Market Economies*.

Ath, G. De and Fabricius, K.E., 2000. Death Fabricius_2000_CART. *Ecology*, *81*(11), pp. 3178-3192.

Aurangzeb, Z. and Stengos, T., 2014. The role of Foreign Direct Investment (FDI) in a dualistic growth framework: A smooth coefficient semi-parametric approach. *Borsa Istanbul Review*, *14*(3), pp. 133-144. <https://doi.org/10.1016/j.bir.2014.06.004>

Awasthi, A., Rawal, P. and Upadhyay, S., 2017. A Study of Trends and Patterns of Foreign Direct Investment in India. *International Journal of Latest Engineering and Management Research (IJLEMR)*, *02*(04), pp. 41-49.

Bandekar, B., 2014. Factor Determinants of FDI Inflows into India. *A Journal of Radix International Educational and Research Consortium*, *3*(5), pp. 1-12.

Bernard, A.B., Jensen, J.B. and Schott, P.K., 2006. Survival of the best fit: Exposure to low-wage countries and the (uneven) growth of U.S. manufacturing plants. *Journal of International Economics*, *68*(1), pp. 219-237. <https://doi.org/10.1016/j.jinteco.2005.06.002>

Chandra, L. and Ridwan, M., 2023. Impact of FDI, industrialization, and education on the environment in Argentina: ARDL approach. *Heliyon*, *9*(1), e12872. <https://doi.org/10.1016/j.heliyon.2023.e12872>

Chen, J., Azreen, S. and Zulkifli, M., 2012. Malaysian outward FDI and economic growth. *Procedia - Social and Behavioral Sciences*, *65*(ICIBSoS), pp. 717-722. <https://doi.org/10.1016/j.sbspro.2012.11.189>

Clougherty, J.A. and Zhang, N., 2023. Antitrust policy and inward FDI: The impact of policy risk and uncertainty on U.U. inward-FDI flows. *International Business Review*, *March*, pp. 1-12. <https://doi.org/10.1016/j.ibusrev.2023.102124>

Diener K.W., 2016. The Restricted Nature of the Profit Motive: Perspectives from Law, Business, and Economics. *Notre Dame Journal of Law, Ethics & Public Policy*, *30*, pp. 225-246.

Faroh, A. and Shen, H., 2015. Impact of Interest Rates on Foreign Direct Investment : Case Study Sierra Leone Economy. *International Journal of Business Management and Economic Research(IJBMER)*, *6*(1), pp. 124-132.

Florida, R. and Smith Jr., D.F., 1993. Venture Capital Formation, Investment, and Regional Industrialization. *Annals of the Association of American Geographers*, *83*(3), pp. 434-451.

Goswami, C. and Kanta, K., 2012. FDI and its relation with exports in India, status and prospect in north east region. *Procedia - Social and Behavioral Sciences*, *37*, pp. 123-132. <https://doi.org/10.1016/j.sbspro.2012.03.280>

Jensen, M.C., 1993. The Modern Industrial Revolution, Exit, and the Failure of Internal Control Systems. *The Journal of Finance*, *48*(3), pp. 831-880. <https://doi.org/10.1111/j.1540-6261.1993.tb04022.x>

Kanu, B., Ikechi, S. and Anayochukwu, B., 2014. Capital Formation and Economic Growth in Nigeria. *Global Journal of human-social science: E*, *14*(4), pp. 42-58.

Khoon, S., Nyen, K. and Yean, S., 2013. Trade linkages of inward and outward FDI : Evidence from Malaysia. *Economic Modelling*, *35*, pp. 224-230. <https://doi.org/10.1016/j.econmod.2013.06.035>

Kimino, S., Saal, D.S. and Driffield, N., 2007. Macro determinants of FDIn inflows to Japan: An analysis of source country characteristics. *The World Economy*, *30*(3), pp. 446-469. <https://doi.org/10.1111/j.1467-9701.2007.01001.x>

Klaus Hubacek, Dabo Guan, A.B., 2007. Changing lifestyles and consumption patterns in developing countries. *White Rose Rsearch*, *39*(9), pp. 1084-1096.

Lall, S., 1992. Technological capabilities and industrialization. *World Development*, *20*(2), pp. 165-186. <https://doi.org/10.1016/0305-750X(92)90097-F>

Mohammed, S., Mosté, B. and Mohammed, G., 2015. Causal Interactions between FDI, and Economic Growth: Evidence from Dynamic Panel Co-Integration. *Procedia Economics and Finance 23*, *23*(October 2014), pp. 276-290. <https://doi.org/10.1016/S2212-5671(15)00541-9>

Moran, D.D., Wackernagel, M., Kitzes, J.A., Goldfinger, S.H. and Boutaud, A., 2008. Measuring sustainable development — Nation by nation. *Ecological Economics*, *64*, pp. 470-474. <https://doi.org/10.1016/j.ecolecon.2007.08.017>

Mukherjee, J.R., Nimon, K., Mukherjee, S. and Morris, D.W., 2014. Using commonality analysis in multiple regressions a tool to decompose regression effects in the face of multicollinearity. *Methods Ecol Evolution*, *5*, 320328. <https://doi.org/10.1111/2041-210X.12166>

Musyoka, N. and Ocharo, D.K.N., 2018. Real Interest Rate, Inflation, Exchange Rate, Competitiveness and Foreign Direct Investment in Kenya. *American Journal of Economics*, *3*(1), pp. 1-18. <https://doi.org/10.47672/aje.330>

Njoku, A.C. and Ihugba, O.A., 2011. Unemployment and Nigerian Economic Growth (1985-2009). *Mediterranean Journal of Social Sciences*, *2*(6), pp. 23-32.

Oluwaseyi, A., Samad, A.A. and Madina, A., 2020. Does gross domestic income, trade integration, FDI inflows, GDP, and capital reduces CO2 emissions? An empirical evidence from Nigeria. *Current Research in Environmental Sustainability*, *2*, 100009. <https://doi.org/10.1016/j.crsust.2020.100009>

Pasupathi, S. and Sakthi, V., 2019. Recent Trends of Foreign Direct Investment in India and its Impact on Economic Growth. *IOSR Journal of Business and Management (IOSR-JBM)*, pp. 8-11.

Paudel, M.N., 2016. Prospects and limitations of agriculture industrialization in Nepal. *Agronomy Journal of Nepal (Agron JN)*, *4*, pp. 38-63.

Potter, K., Kniss, J., Riesenfeld, R. and Johnson, C.R., 2010. Visualizing summary statistics and uncertainty. *Computer Graphics Forum*, *29*(3), pp. 823-832. <https://doi.org/10.1111/j.1467-8659.2009.01677.x>

Prerna and Dhawan, S., 2013. Trends And Patterns of FDI Inflow in India : A Review. *International Journal of Management & Business Studies*, *3*(1), pp. 2230-2231.

Rai, S.M., Brown, B.D. and Ruwanpura, K.N., 2019. SDG 8: Decent work and economic growth – A gendered analysis. *World Development*, *113*, pp. 368-380. <https://doi.org/10.1016/j.worlddev.2018.09.006>

Rao, K.S.C. and D.B., 2011. *India's FDI Inflows: Trends and Concepts* (Issue 29153).

Ray, S., 2012. FDI & economic growth Impact of Foreign Direct Investment on Economic Growth in India: A Co integration Analysis. *Advances in Information Technology and Management (AITM)*, *2*(1), pp. 187-201. <www.worldsciencepublisher.org>

Sasana, H. and Fathoni, S., 2019. Determinant of Foreign Direct Investment Inflows in Asean Countries. *Journal of Economics and Policy*, *12*(2), pp. 253-266.

Schnitzer, M., 2002. Debt v. Foreign Direct Investment: The Impact of Sovereign Risk on the Structure of International Capital Flows. *Economica*, *69*, pp. 41-67.

Shen, L., Cheng, S., Gunson, A.J. and Wan, H., 2005. Urbanization, sustainability and the utilization of energy and mineral resources in China. *Cities*, *22*(4), pp. 287-302. <https://doi.org/10.1016/j.cities.2005.05.007>

Ślusarczyk, B., 2018. Tax incentives as a main factor to attract foreign direct investments in Poland. *Administratie Si Management Public*, *2018*(30), pp. 67-81. <https://doi.org/10.24818/amp/2018.30-05>

Strat, V.A., Alexandru, A.D., Maria, A. and Vass, P., 2015. FDI and The Unemployment - A Causality Analysis for The Latest EU Members. *Procedia Economics and Finance*, *23*(October 2014), pp. 635-643. <https://doi.org/10.1016/S2212-5671(15)00448-7>

Zhao, H., 2003. Country Factor Differentials as Determinants of FDI Flow to China. *Thunderbird International Business Review*, *45*(2), pp. 149-169. <https://doi.org/10.1002/tie.10067>