Dynamics Of Foreign Direct Investment In India After New Economic Policy: An Empirical Analysis

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Abstract:

It has been seen generally that Foreign Direct Investment (FDI) is helping the growth of national income growth in India. India and its neighboring countries have seen an influx of FDI with varying degrees of impact on the local economy. The relationship between FDI and economic growth has been extensively studied, with the view to establishing causality between the two. However, there have been varying results depending on the country's particular context and situation, and the results are inconclusive. This paper attempts to analyze the relationship between FDI and GDP using a time series analysis from 1990 to 2021.

Keywords: Distance/online learning, challenges, intervention.

Introduction:

Foreign direct investment (FDI) inflows have driven economic growth in several countries worldwide. At the same time, India and its neighborhood have experienced varied FDI flows and differing impacts on their respective economies. Foreign direct investment (FDI) is crucial to global economic integration. FDI is an investment made by a country or direct investor into an enterprise in another country. For the past two decades, until 2020, India has risen to one of South Asia's best-emerging countries. India's FDI outlaid in 2014-15 totaled $45.15 bn and showed a consistent upward trend. In addition, the gap between the total FDI outlay figures in 2007-14 ($266.21 bn) and 2014-21 ($440.01bn) increased by 65.3, and thus from $185.03 bn it increased to $312.05 bn (2014-21) gradually. The investment climate in India improved considerably in 1991. The comprehensive reforms undertaken by the government have led to a more open and liberalized economy, allowing for increased investments from foreign entities. This has been instrumental in helping India achieve its current position as one of the fastest-growing economies in the world. The Indian government's efforts to

streamline regulations and reduce bureaucracy have made it much easier for companies to invest overseas in India. This has helped attract more foreign direct investment (FDI) into the country, leading to an influx of capital that can be used for growth and development.

Moreover, initiatives such as Make In India have encouraged investors from around the globe to establish their businesses in India, further fueling economic growth and job creation. The investment and the FDI typically track the sectors showing higher growth potential as the economy increases. So FDI would be coming into sectors that seem to show the highest possible returns, which is fair enough. Several factors influence foreign direct investment in both countries. In this paper, an endeavor has been made to analyze the relationship between FDI and the National Income of India, especially from 1991 to 2021.

The global economy has seen a remarkable shift in the last few decades, with developing countries, emerging economies, and countries in transition increasingly relying on foreign direct investment (FDI) as a source of economic development and modernization. FDI is an essential ingredient in promoting income growth and employment opportunities. The FDI may spur development in overseas originating MNCs. Its direct impact on the target company consists of achieving synergy between the purchasing company, efforts to boost efficiency and reduce costs, and developing new operations OECD,(2002). Recipients of FDI may take additional forms, including the transfer of technology via our FDI or otherwise via capital investments or trade in goods and services. The international provision of FDI has also boosted competition in the input market.

A large body of research is devoted to understanding the relationship between FDI and economic growth. Studies examining causality between foreign direct investment (FDI) and gross domestic product (GDP) also found causality in either direction and, in some cases, both. Sarker, B., Khan, F. (2020). This study investigated the causality between foreign direct investment (FDI) and gross domestic product (GDP) in Bangladesh through the use of augmented Dickey-Fuller, augmented Dickey-Fuller generalized least-squares, tests to determine stationarity. After entry scores for FDI and GDP had been augmented, the augmented vector autoregression model detected a causal relationship between them. The error correction model and the Granger causality check also revealed the existence of a unidirectional causality running from GDP to FDI. Puri, Roma (2020) examines the link between Foreign Direct Investment (FDI) and Gross Domestic Product (GDP) in India. The study analyses whether FDI plays a role in economic growth, with a focus on India. The the study show that there is a strong association between FDI and GDP in India,

and that FDI is instrumental in enhancing the economic growth of India. The data of the time series data of the study is mainly from 1995 to 2015. However, the patter of FDI and GDP data is not clearly mention in their study.

Kisswani, Khalid M., et al.(2015) used a cointegration methodology to study the relationship between FDI and real GDP in Est for the period of 1994:Q1 to 2013:Q2. The research team concluded that there is a long-term causal relationship between foreign direct investment (FDI) and real GDP in Estonia. They determined this using an autoregressive distributed lag (ARDL) bound test procedure combined with Granger causality tests. Their results showed that FDI and real GDP are not stationary, and the Engle-Granger method showed that FDI and GDP are not cointegrated. Plugging in the Joh Test for Cointegration indicated that the real GDP and FDI series are cointeg. They found that FDI was significantly associated with economic growth due to its ability to contribute directly to private investment by providing funds, technology transfer, marketing expertise, and managerial resources into the host country's economy.

Ranjan Kumar Dash & Chandan Sharma (2011) analyze linkage between financial FDI and economic growth in developing economies. It investigates this connection using Vector Autoregression (VAR), as there is limited empirical evidence to guide our understanding of this relationship. Accoding to them a causal relationship exists between these two variables, with FDI leads to economic growth in developing countries. They employ the VAR technique to examine the respective impacts of macroeconomic factors, including real GDP per capita, investment rate and inflation rate on FDI.

FDI Inflow To India:

During the COVID period, when the entire world economy was trying to stay afloat, there was a sharp increase in FDI inflows. Manufacturing FDI has increased by 76 %, whereas computers and hardware are top recipients. The tax benefit announced a few years ago on reduced corporate tax on manufacturing. Investors have ranked India as the third most favorite attractive destination for FDI. In the case of manufacturing, there is a huge jump, but the largest share goes to computer hardware and software services, and the auto sector stays at around 12 % each. The government is investing heavily in the Indian manufacturing sector. Every country is looking for an alternative option. Vietnam was an alternative, but it is too small a country to take the international demand, and now the world has only one option: India, which has emerged as the preferred destination.

This record FDI inflow in this financial year is the jump we have seen. So there are large global 500 global 1000 corporations setting up in India and building facilities here to support their core operations in R. And D. On the other hand, Singapore has been India's top source of foreign investments for the past three years. In FY 2021-22, Singapore (%27.01), USA (%17.94), Mauritius (%15.98), Netherlands (%7.86) and Switzerland (%7.31) will top the list of countries for equity inflows into India. From 2018 to the 2021 financial year, Singapore has collectively invested over 55 billion dollars positioning the two countries as a game-changing economic partnership(Govt. of India, 2022). A free trade agreement was signed that boosted business interactions and promoted a better trade, investments, and educational environment.

There are currently half a million Indians living in Singapore besides Malaysia and the Chinese. Furthermore, Singapore is also an attractive destination for Indian entrepreneurs and investors. After all, Singapore is one of the best financial hubs in the world. According to a report in 2018, the cumulative FDI from India to Singapore is 62.9 billion dollars. Singapore is also one of its biggest trading partners with India. Their total trade with each other has consecutively grown over the years, and by 2020 it stood at over twenty billion dollars (2009). One of the most significant breakthroughs of these two partnerships is the India Smart City initiative. It was a plan that would transform the nation's urban areas and become a house for its overall economic growth. The population. As an already smart city and well ahead of its time, Singapore has played a vital role in helping India reach its smart city dreams.

It was the current Prime Minister, Narendra Modi, who reached out to Singapore in 2015 in helping apply this success in India. Since then, Singapore has laid down the framework, governance, training and management in helping India succeed. Singapore and India have continuously exchanged talks and partnerships and some of these are ought to help each other's country by collaborating in the most disruptive advanced technologies.

The two countries are renowned for their startup environment and it is also known that the unicore businesses of one another are always keen on collaborating and engaging. Even the state owned Temasek Holdings is a known active investor within the country. It is so far injected over eleven billion dollars worth of investments in Indian. Companies and is looking for more. These have well positioned the Indian Singapore relations to be tied with each other in terms of culture, economics and even his blockbuster startup journeys. He could also be said that the future of both countries is going to be more intertwined in the decades to come. For many developing countries in comparison to Eastern European and Asian markets, the African

countries receive the least funds from bilateral and multilateral lending institutions. Moreover, debt services are viewed as a massive burden for African governments, thus constraining the capacity to provide quality social services for the citizens with regards to Ghana's goal of becoming a higher income earning country.

The main objectives of the paper are to examine the relationship between FDI and GDP in India. Secondly, to find out cause effect relationship FDI and GDP using Granger causality test. The hypothesis of the paper is that there is no interrelation in between FDI and GDP in India.

Methodology:

This paper is based on mainly based on secondary time series data which are collected from World Bank yearly basis from 1990 to 2021. The cointegration analysis is used to determine the relative interrelationship between FDI and GDP. Augmened Dicky Fuller test is used to determine the stationarity of the variables. The Johansen Cointegration Test is used that will help to understand the long-term relationships between FDI and GDP. This test will used to determine whether a linear combination of FDI and GDP is stationary. Vector Autoregressive models (VAR) will be used to to better understand relationships between FDI and GDP for examining the effects of short-term shocks on long-term trends.

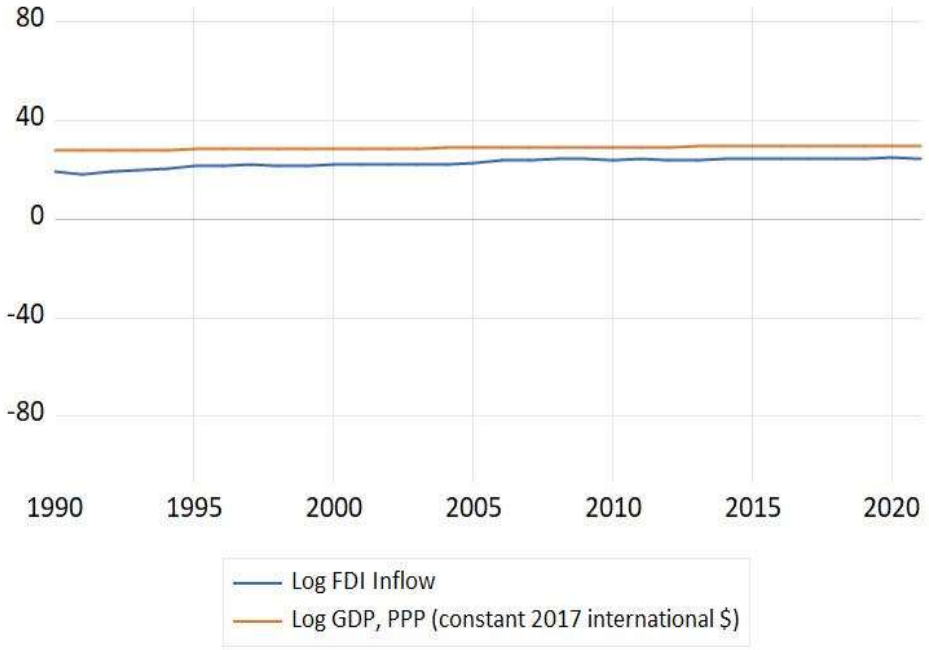
Result and Discussion:

1) Stationarity Test of Indian National Income and Plan Expenditure in India:

In this paper the time series data of FDI (log value) are used. Two specified variables are Xt and Yt; where Xt is the FDI and Yt is the log value of the GDP in constant 2017 international dollar prices.

The time plot of the Xt and Yt over periods concerned has been presented through the figure: 1

Figure: 1



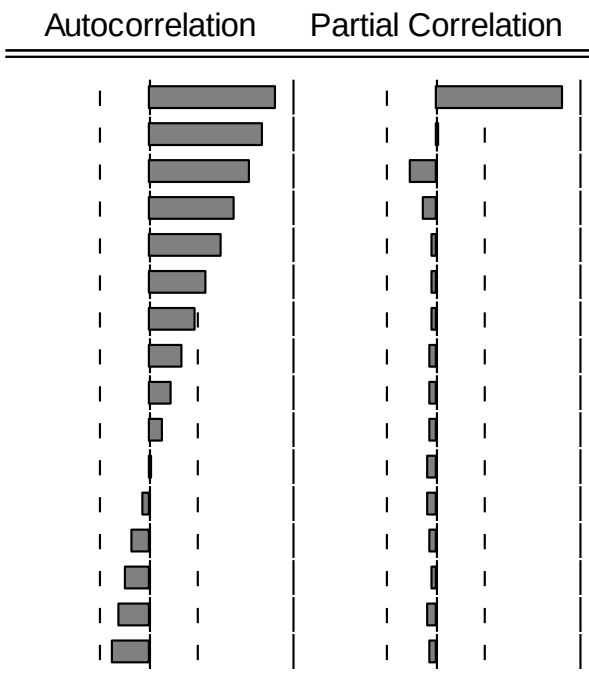
It is observed from the figure: 1 that both the series exhibits stochastic trends over the periods concerned. These features of the series are pointer of their nonstationarity of Xt and Yt which is also reflected by the their respective correlograms fig:2

Figure: 2 Correlograms of Xt

Autocorrelation	Partial Correlation		AC	PAC	Q-Stat	Prob
		1	0.885	0.885	27.464	0.000
		2	0.744	-0.177	47.545	0.000
		3	0.642	0.114	63.027	0.000
		4	0.563	0.003	75.364	0.000
		5	0.498	0.022	85.370	0.000
		6	0.408	-0.160	92.331	0.000
		7	0.335	0.079	97.208	0.000
		8	0.269	-0.080	100.48	0.000
		9	0.218	0.050	102.73	0.000
		10	0.147	-0.186	103.79	0.000
		11	0.078	0.055	104.11	0.000
		12	0.013	-0.134	104.12	0.000
		13	-0.108	-0.302	104.78	0.000
		14	-0.234	-0.128	108.09	0.000
		15	-0.332	-0.020	115.13	0.000
		16	-0.396	-0.074	125.82	0.000

The correlograms of Xt reflects that ACF exhibits dying out patterns of spikes and the PACFs contains only one significant spikes which reflects the nonstationarity patterns of the stochastic process.

Figure: 3 Correlograms of Yt



Autocorrelation	Partial Correlation		AC	PAC	Q-Stat	Prob
		1	0.912	0.912	29.168	0.000
		2	0.832	0.005	54.264	0.000
		3	0.727	-0.187	74.118	0.000
		4	0.621	-0.088	89.095	0.000
		5	0.519	-0.022	99.940	0.000
		6	0.422	-0.026	107.39	0.000
		7	0.332	-0.027	112.20	0.000
		8	0.249	-0.039	115.00	0.000
		9	0.170	-0.044	116.38	0.000
		10	0.097	-0.044	116.84	0.000
		11	0.026	-0.056	116.87	0.000
		12	-0.043	-0.063	116.98	0.000
		13	-0.107	-0.044	117.63	0.000
		14	-0.163	-0.026	119.25	0.000
		15	-0.217	-0.060	122.27	0.000
		16	-0.264	-0.042	127.01	0.000

Similarly, the correlograms of Yt reflects that ACF exhibits dying out patterns of spikes and the PACFs contains only one significant spikes which replicates the nonstationarity outlines of the stochastic progression.

Augmented Dicky-Fuller Tests (ADF) of the stationarity:

The stationarity of the Xt and Yt over periods in India can be tested with the help of ADF test. The relevant regression equations for ADF tests are

$\Delta Xt = \alpha 1 + \beta 1 + \gamma 1 Xt\text{-}1 + \delta 1t \sum_1^n \Delta Xt\text{-}1 + \varepsilon 1t$

$\Delta Yt = \alpha 2 + \beta 2 + \gamma 2 Yt\text{-}1 + \delta 2t \sum_1^n \Delta Yt\text{-}1 + \varepsilon 2t$

Where the ε1t and ε2t are the white noise error terms and

$\Delta Xt = (Xt - Xt\text{-}1)$ and $\Delta Yt = (Yt - Yt\text{-}1)$

The optimum lag will be determined through Akaike Information Criterion. Again the estimated regression equation for the ADF tests involving differenced series for Xt and Yt are

$\Delta^2 Xt = \alpha 3 + \gamma 3 Xt\text{-}1 + \delta 3t \sum_1^n \Delta^2 Xt\text{-}1 + \varepsilon 3t$

$\Delta^2 Yt = \alpha 4 + \gamma 4 Yt\text{-}1 + \delta 4t \sum_1^n \Delta^2 Yt\text{-}1 + \varepsilon 4t$

Where the ε3t and ε4t are the white noise error terms

Results of the ADF Tests:

The results of the ADF tests for the presence of unit root test in the series concerned are being presented through the table:1

Table: 1 ADF Unit Root Tests on X_t and Y_t in India

Variable	Null Hypothesis	Lag length	ADF test statistics	Prob	Test critical values 1% 5% 10%
Xt	Xt has a unit root (intercept)	0	-0.927279	0.7658	-3.661661 -2.960411 -2.619160
Xt	Xt has a unit root (Contant, Linear Trend)	0	-3.126052	0.1181	-4.284580 -3.562882 -3.215267
Yt	Yt has a unit root (intercept)	0	-1.59009	0.7738	-4.284580 -3.562882 -3.215267
Yt	Yt has a unit root (Contant, Linear Trend)	0	4.143333	0.9999	-3.661661 -2.960411 -2.619160
ΔXt	ΔXt has a unit root (intercept)	1	-5.676725	0.0001	-3.670170 -2.963972 -2.621007
ΔYt	ΔXt has a unit root (intercept)	1	-4.642330	0.0009	-3.670170 -2.963972 -2.621007

*MacKinnon (1996) one-sided p-values.

The ADF test results shows that Xt and Yt at levels are nonstationary since the null hypothesis of unit roots have been accepted at 5% levels of significance with intercept in maintained equations. But the 1st differencing leads to the ADF test results stationary since the null hypothesis of unit roots have been rejected at 5% levels of significance. Thus the Xt and Yt attains stationarity at their 1st differencing and both are integrated of order 1 i.e. both series are I(1)

Johansen Cointegration Test Specification:

After analyzing the stationary status of the series, the Johansen Cointegration Test is applied for Cointegration Test. Advantage of Johansen cointegration over Engle-Granger cointegration that EG cointeration identify only 1 cointegrating equation, on the other side, Johansen cointegration can identify more than one cinterating relationship.

There are five assumptions of the Cointegration Test (2007).

Deterministic trend assumption of test Assume no deterministic trend in data:

Deterministic trend assumption of test Assume no deterministic trend in data:

1) No intercept or trend in CE or test VAR

2) Intercept (no trend) in CE - no intercept in VAR

Allow for linear deterministic trend in data:

3) Intercept (no trend) in CE and test VAR

4) Intercept and trend in CE - no intercept in VAR

Allow for quadratic deterministic trend in data:

5) Intercept and trend in CE - intercept in VAR

Further summary of assumptions is used to determine appropriate assumption and leg length

Figure: 4 Summary of Assumptions

Selected (0.05 level*) Number of Cointegrating Relations by Model

Data Trend:	None	None	Linear	Linear	Quadratic
Test Type	No Intercept No Trend	Intercept No Trend	Intercept No Trend	Intercept Trend	Intercept Trend
Trace	1	1	0	0	0
Max-Eig	1	1	0	0	0

*Critical values based on MacKinnon-Haug-Michelis (1999)

Information Criteria by Rank and Model

Data Trend:	None	None	Linear	Linear	Quadratic
Rank or No. of CEs	No Intercept No Trend	Intercept No Trend	Intercept No Trend	Intercept Trend	Intercept Trend
	Log Likelihood by Rank (rows) and Model (columns)				
0	-1547.454	-1547.454	-1542.431	-1542.431	-1539.411
1	-1541.466	-1539.102	-1537.381	-1537.072	-1535.317
2	-1539.474	-1536.399	-1536.399	-1533.763	-1533.763
	Akaike Information Criteria by Rank (rows) and Model (columns)				
0	103.4302	103.4302	103.2287	103.2287	103.1607
1	103.2977	103.2068	103.1588	103.2048	103.1544*
2	103.4316	103.3599	103.3599	103.3175	103.3175
	Schwarz Criteria by Rank (rows) and Model (columns)				
0	103.6171	103.6171	103.5090*	103.5090*	103.5344
1	103.6714	103.6272	103.6258	103.7186	103.7149
2	103.9921	104.0138	104.0138	104.0648	104.0648

To determine the appropriate assumption for applying the VAR, summarize all 5 sets of assumptions are used. Schwarz Criteria and Akaike information criteria are used to determine particular assumption or the lag interval. According to Akaike Information Criteria assumption 5 with intercept and trend in CE with lag length 1 is appropriate. Therefore, Johansen Cointegration Test with Intercept and trend with leg length 1 is applied.

Dynamic Relationship between FDI and GDP in India:

For interpretation the null hypothesis i.e there is no cointegration. It means no long run relationship between FDI and GDP. There are two

methods one is the probability method. Based on probability values the result may be concluded and other one is maximum eigen statistics and critical value based.

Figure: 5 Johansen Cointegration Test Results

Lags interval (in first differences): 1 to 5

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.525684	19.39499	18.39771	0.0362
At most 1	8.01E-05	0.002083	3.841465	0.9600

Trace test indicates 1 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.525684	19.39291	17.14769	0.0232
At most 1	8.01E-05	0.002083	3.841465	0.9600

Max-eigenvalue test indicates 1 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegrating Coefficients (normalized by b'*S11*b=I):

FDI INFLOW	GDP PPP	CONSTANT 2017 INTERNATIONAL $ 01
-1.80E-10	-2.88E-12	
2.38E-10	-5.04E-12	

Unrestricted Adjustment Coefficients (alpha):

D(FDI INFL...	3.70E+09	6650294.
D(GDP P...	-4.47E+10	1.19E+09

1 Cointegrating Equation(s): Log likelihood -1312.947

Normalized cointegrating coefficients (standard error in parentheses)

FDI INFLOW	GDP PPP	CONSTANT 2017 INTERNATIONAL $ 01
1.000000	0.015976	
	(0.00780)	

Adjustment coefficients (standard error in parentheses)

D(FDI INFL...	-0.667360
	(0.17970)
D(GDP P...	8.062216
	(6.98777)

From the above result it is found that the null hypothesis is rejected since the trace value is greather than the critical value and there is only one con-integrating value based on both the criterion. The normalize equation reflect that there is a positive effect of GDP on FDI. We may conclude that higher in national income helps to increase more inflow of FDI.

Estimation and Results of VAR model:

The results of the estimation of the VAR model are being presented through the tables

Figure: 6 Result of the VAR Estimation

Dependent Variable: D(FDI)
Method: Least Squares (Gauss-Newton / Marquardt steps)
Date: 01/11/23 Time: 09:24
Sample (adjusted): 1992 2021
Included observations: 30 after adjustments
D(FDI) = C(1)*D(FDI(-1)) + C(2)*D(GDP(-1)) + C(3)

	Coefficient	Std. Error	t-Statistic	Prob.
C(1)	-0.087953	0.197544	-0.445231	0.6597
C(2)	0.017261	0.005714	3.020574	0.0055
C(3)	-2.32E+09	1.92E+09	-1.212359	0.2359

R-squared	0.282402	Mean dependent var	1.49E+09
Adjusted R-squared	0.229247	S.D. dependent var	7.56E+09
S.E. of regression	6.64E+09	Akaike info criterion	48.16465
Sum squared resid	1.19E+21	Schwarz criterion	48.30477
Log likelihood	-719.4698	Hannan-Quinn criter.	48.20948
F-statistic	5.312761	Durbin-Watson stat	1.894706
Prob(F-statistic)	0.011334		

From the Figure:6 with Xt as dependent variable C(2) is significant at 5% level and greater than zero. Here C(2) indicates that FDI is positively related to the one period lagged value of the GDP. It implies the possibility that GDP Granger caused FDI inflow in India. The elasticity coefficient C(2)= 0.017 implying that the FDI rose by only 1.7% of a rise GDP in the previous 1 lagged periods. The VAR Granger Causality/Block Exogeneity Wald Tests also satisfied the significance of GDP Granger caused FDP in India.

Figure: 7 Granger Causality/Block Exogeneity Wald Tests

Dependent variable: D(FDI)

Excluded	Chi-sq	df	Prob.
D(GDP)	9.123869	1	0.0025
All	9.123869	1	0.0025

Dependent variable: D(GDP)

Excluded	Chi-sq	df	Prob.
D(FDI)	0.198702	1	0.6558
All	0.198702	1	0.6558

The significant F- statistics indicates that the estimated equation is a good fit free from autocorrelation. However, the lag FDI inflow has not caused GDP (rejected by Granger Causality/Block Exogeneity Wald Tests) but one period lagged GDP helps to increase in the current period FDI.

Figure: 8 Optimum Lag Lenghth Selection

Included observations: 29

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-1498.448	NA	2.99e+42	103.4792	103.5735*	103.5087
1	-1491.802	11.91688*	2.49e+42*	103.2967*	103.5796	103.3853*
2	-1490.260	2.553102	2.97e+42	103.4662	103.9377	103.6138

* indicates lag order selected by the criterion
LR: sequential modified LR test statistic (each test at 5% level)
FPE: Final prediction error
AIC: Akaike information criterion
SC: Schwarz information criterion
HQ: Hannan-Quinn information criterion

Stability of VAR Model:

The condition of the stability of the VAR model is evaluated by examining the characteristics roots of the following model:

$A(L)\ Xt = \alpha_1 + \sum_{i=1}^{2} \gamma_{1i}\, Y_{t-2} + u_{1t}$

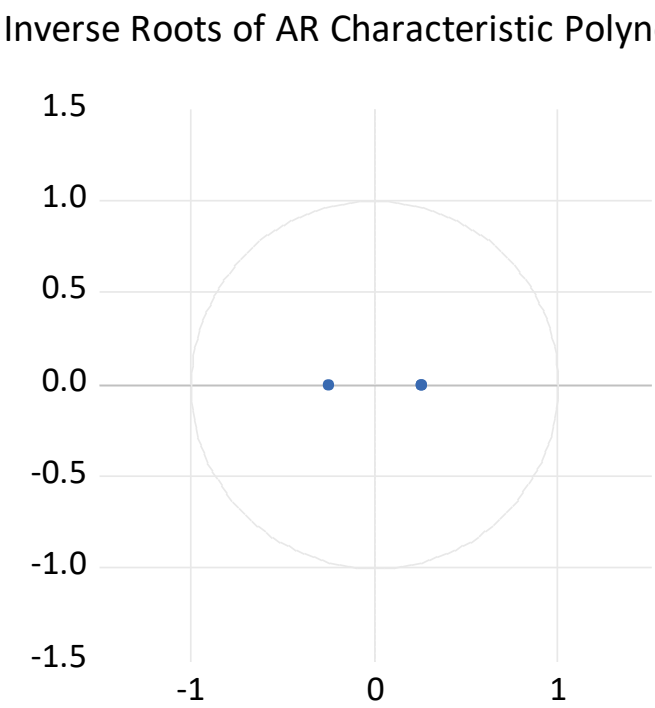
$B(L)\ Yt = \alpha_2 + \sum_{i=1}^{2} \gamma_{2i}\, X_{t-2} + u_{2t}$

Table: 9 VAR stability condition

Root	Modulus
0.253599	0.253599
-0.251842	0.251842

No root lies outside the unit circle.
VAR satisfies the stability condition.

Figure:10



The absolute value of the roots is less than unity, of which two positive roots are significantly different from zero. On the other hand, the no roots lie out a circle which testify the stability of the VAR system (Figure:)

Conclusion:

Thus, the fundamental stochastic analysis of the FDI and GDP of India reflects that GDP Granger caused FDI in India, and a rise in GDP will cause a rise in FDI of India. So there is a considerable contribution of GDP growth on FDI inflow from 1990 to 2021 in India. On the other hand, one period of lagged GDP helps more FDI inflow in India sustain itself and reduces the pressure of foreign capital. So there is a considerable effect of Indian GDP growth on the FDI inflow of India, but in reverse, FDI inflow further no effect on GDP growth in India as suggested by the time series data.

The study of the relationship between Foreign Direct Investment (FDI) and Gross Domestic Product (GDP) in India has always been an interesting area of research for economists. The stochastic analysis conducted on the FDI and GDP data of India for past 30 years shows that there is a strong correlation between these two economic variables. The results from the statistical analysis show that GDP Granger caused FDI in India and a rise in GDP will cause a rise in FDI. This finding indicates that increasing the GDP would improve investment climate, reduce risk factors associated with investing, increase profits margins and further stimulate investment inflow into India. The findings also suggest that policy makers should take initiatives to promote growth through fiscal policies like tax

reforms, deregulation and reduction of red tape as well as structural reforms like labour market reform, trade liberalization etc.

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