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Foreign Direct Investment and Indian Economic Growth

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ABSTRACT

The present study investigates the impact of the foreign direct investment (FDI) on Indian economic development during the period 1981 to 2016. The annual data of Index of Industrial Production (IIP) have been considered as a proxy of Indian economic development. The estimated results of the Johansen's cointegration test and vector error correction model (VECM) suggest that there exists a long-run positive cointegrating relationship between FDI and IIP. The result of the VECM indicates that any change in the value of FDI causes to change the value of IIP in the long run. But in the long run, change in IIP does not have any causal effect on FDI. The results of short-run causality test among the variables based on Granger causality test shows a bidirectional short-run causal relationship between FDI and IIP, that is in short-run the value of FDI significantly affect the movement of IIP and vice versa. So, with the help of the estimated results, the study concludes that FDI plays a crucial role in enhancing the economic growth and development of the country, as the flow of FDI leads to improve the economic development indicator used in this study.

Keywords: Foreign direct investment, Index of industrial production, Economic development, Indian Economy, Time Series Analysis

JEL Classification Codes: F21, F43, O11, O40

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INTRODUCTION

An economy of any country is composed of some sectors, and the growth of a country's economic fabric depends on the individual growth of its different sectors, which further depends on the growth of their constituents. The economy of India which is seventh largest in the world (*Source:* International Monetary Fund, retrieved 2014-04-08) by nominal gross domestic product (GDP) has three sectors, namely agriculture, industry and service. The agricultural sector is the largest employer in India's economy but contributes to a declining share of its GDP. Presently, near about 45% of total population of India is doing agriculture as their occupation although this sector only contributes 17% to the GDP (in 2013–2014) of India. Now, putting the industry sector into perspectives, we see the industry sector has held a constant share of its economic contribution (26% of GDP in 2013–2014), especially, the Indian automobile industry is one of the largest in the world with an annual production of 21.48 million vehicles (mostly two and three wheelers) in FY

2013–2014 (*Source:* IBEF, Auto Industry). So far as service sector of India is concerned, it has been the largest share in the GDP of our nation, accounting for 57% in 2012 (*Source:* 2013 Annual Report Ministry of Commerce, Govt: of India). This sector accounts for 27% employment of the workforce of the nation. So, the significant sectoral contribution regarding production, employment, income and so on is most vital for the economy to prosper. Now, the contribution of each sector depends on some factors (e.g. availability of finance, technological advancements, educated and skilful workforce etc.) relating to a particular sector of the economy. Among all other factors, the flow of investable funds to a particular sector is supposed to be a major determinant of sectoral growth. Investable funds for any sector come from a fraction or part of total savings of the economy, comprises savings of public, private bodies and government of the state and central level. So, the total amount of savings is the main source of investment for the economy which ultimately enhances the production and operation capacity, attracts employment, generates income and contributes to the growth of nation's economy.

In a more formal language of economics, we can state that the uninterrupted and successive growth of an economy largely depends on the two primary macroeconomic aggregates, that is gross domestic capital formation (GDCF) and gross domestic savings (GDS). The GDCF and GDS show how much additional savings and capital have been formed by a country during a particular period (generally in a financial year). The amount of savings and capital formation in totality has a direct impact on the economic growth of a nation.

Many times, few countries have more than sufficient or quite sufficient savings for their national investments, whereas few suffer from a shortage of funds. This savings–investment gap many times are seen to be bridged up through some ways or instruments like a loan from international financial institutions (e.g. IMF (International Monetary Fund), IBRD (International Bank for Reconstruction and Development) etc.), a loan from foreign banks, portfolio investment by foreign institutional investors and mostly through allowing and promoting foreign direct investment (FDI). However, among all sources of external finance, the flow of fund through allowing FDI is perceived as most useful and beneficial for a country because of its features like non-debt creating source, contribution to home country's production, employment and income, and so on. Although the positive features of FDI have not been accepted and recognised by all parties and people concerned to it. There exists a vast perceptional and attitudinal difference towards the advantages and disadvantages of FDI in India and other countries as well. Possession of oligopolistic power, the creation of unparalleled competition, exploitation of domestic workforce and abolition of local business are some of the well-discussed and pointed-out disadvantages of FDI for the host country.

However, FDI is always recognised and believed to be much preferable and impactful than the other ways of foreign investment especially the foreign institutional investment (FII). The reason is that FII is a short-term investment and refers to invest only in the financial assets. FII inflows only contribute to the secondary market with an aim to increase the capital inflows. It has no direct impact on host countries production, employment and income generation and so on.

Taking all the advantages and disadvantages of FDI into consideration, this empirical study makes an attempt to inquire the effect of FDI on one of the most accepted and recognised index indicating the state of the industrial sector of India, the Index of Industrial Production (IIP), a composite indicator

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that measures the changes in the volume of production of a basket of industrial products during a given period with respect to that in a chosen base period.

REVIEW OF LITERATURES

Figuring out the empirical relationship between the extent of foreign capital inflow mainly in the form of FDI and the economic well-being of a country has been a core interest of many research works in India and abroad. The issue is highly controversial and conflicting and different empirical researchers have got to different conclusions. However, these are highly country specific. FDI is considered by a school of thought as a catalyst to economic growth as it brings in additional capital, technology, management and expertise which ultimately enhance production and operational activities of a nation, boost up exports and add to the GDP. The impact of FDI has been continuously tried to be statistically correlated with the economic growth of a nation mostly presented by GNP, GDP, stock indices and so on and sometimes more specifically by export promotion, growth in industrial production (measured by IIP in India). From an empirical perspective, a substantial academic and professional literature explores the interrelationship between FDI and economic growth of a country. Rosenstein-Rodan (1961) in his study restored a favourable impact of FDI on the economic efficiency and growth of developing countries in short run. The study of Bornschier (1980) went further and explained that the growth rate reduces in long run due to the repatriation of investment or decapitalisation by the firms. However, these two studies did not go with the line of earlier study of Singer (1950) which documented a negative impact of FDI on host countries' economic health and explained FDI as a capital flow to the primary sector of an economy which promotes less market value. Furthermore, in line with this study, Griffin (1970) and Weisskof (1972) have also restored the negative relationship between FDI and economic growth. In Bangladesh, Aitken *et al.* (1997) has considered the export industry and found that the FDI by a Korean multinational company in garment exports led to the establishment of some other domestic export firms in the host country. However, FDI is also found to be effective for economic betterment only when there is sufficient absorptive capacity available in the host country's economy (*Borensztein et al., 1998*).

Now coming to the Indian perspective, we observe that the globalisation and economic liberalisation of Indian economy during 1991–1992 has triggered great discussion and debate on the impact of FDI on Indian economic growth. The liberalisation and privatisation have brought in specific changes including a reduction in import tariffs, complete abolition of Licence Raj, deregulation of markets, reduction of taxes and more significant foreign investment through allowing automatic approval of FDI in many sectors. However, the effect of such policy decisions especially the impact of FDI on the growth of nation's economy remained questionable for the economic policymakers, practitioners and academicians. Some studies have been conducted by different prominent researchers on this topic to inquire the true empirical association between FDI and economic growth of India.

Dua and Rashid (1998) studied the relationship between FDI and economic activity in India in the post-liberalisation period (after 1991–1992). In their study, the amount approved as well as the actual flows of FDI are taken into consideration, and economic activity is measured by the IIP. The study used the Granger causality tests and innovation accounting analysis. The test result suggested that the FDI flows (approvals and actual) respond to the level of industrial production. Actual flows, however, do not Granger cause industrial

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output. The finding of this study can be well aligned with the similar study conducted by Chen and Zhang (1995) in China, attempting to contribute to this general debate of FDI's impact on economic growth by critically assessing the role of FDI in China's economic development since 1978 when its 'Open Door' policy was introduced. The study documented a positive association of FDI with economic growth, and the increase of total fixed asset investment in China has also forced an increasing number of domestic manufacturers to compete globally.

Further, the study of Chakraborty and Nunnenkamp (2008) attempted to find out the effect of FDI on Indian economic growth adopting industry-specific analysis. The study considered Granger causality test within a panel cointegration framework and found the growth effect of FDI is varying upon industry specifications. The FDI and output are observed to be mutually reinforcing in manufacturing sector, whereas no causal relationship is found in the primary sector. However, the study has shown a transitory effect of FDI on service sector of India. Besides, the manufacturing sector is again found to be affected by the FDI in service sector through cross-sector spillover. Again, in the recent past, the study of Shah and Parikh (2012) focuses on export promotion effect of FDI. The study to a considerable extent went with the line and reinforced the study of Aitken *et al.* (1997) in Bangladesh and found a positive impact of FDI on host country's export promotion through the employment generation and use of sophisticated technology used for its production. This export promotion effect of FDI has also been reinforced by the study of Prasad and Sharma (2012) of similar time. This study also introduced some other important economic indicators like GDP, IIP and employment. The study pointed out a positive effect of FDI on GDP, IIP and exports to India and concluded that FDI makes nation self-sufficient by arranging required facilities and creating trade opportunities. Moreover, the similar positive impact has also been documented by Gola *et al.* (2013) and Hussain and Haque (2016) who described FDI as an important catalyst, stimulating economic growth by enhancing domestic investment, increasing the human capital formation and by facilitating technology transfer in the host country. However, a long-run equilibrium relationship between IIP as a proxy for GDP and FDI has been restored by Sethi (2013) in his study in the Indian context.

The study of Srikanth and Kishore (2012) have made slightly different inquiry and used monthly data of FDI and IIP and few other macroeconomic variables for the period of April 2005 to March 2011 before and after the eruption of global financial crisis to establish the impact of FDI inflows on Indian economy. The study adopted 'Granger Causality Test' to establish the linkages between FDI equity inflows and macroeconomic variables such as inflation, IIP, interest rates, exchange rates and foreign exchange reserves. The study documented unidirectional causality from FDI equity inflows to IIP and also from foreign exchange reserves to FDI. This unidirectional causality especially from FDI to IIP is not supported by further study of Alam and Mittal (2014) which attempted to establish the long-run and short-run linkages between FDI and economic growth using vector error correction model (VECM), pairwise cointegration test and pairwise Granger causality test for FDI and IIP (as a proxy of economic growth) and showed how economic growth Granger causes FDI and the FDI also Granger causes economic growth. It implies a bidirectional causal relationship between economic growth and FDI in India. Furthermore, Maheswari (2015) in his study relating to the various macroeconomic determinants of FDI in Indian context found FDI and IIP to move in the same direction, that is when IIP

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increases, FDI also increases significantly and vice versa. So, in this study also, the positive impact of FDI on IIP is reinforced.

From the above discussion, it is quite clear that the studies on the relationship between FDI and economic growth have been extended for many developed countries. Most of the critical literature in this domain have documented a significant statistical relationship between the level of FDI and economic growth of a nation. However, the available research into this phenomenon is limited concerning the emerging economies like India. In India after the liberalisation, the regulatory authorities are creating a different economic environment under which the industries are performing now. Thus, it is worth to carry out studies on emerging economy which has become an increasingly attractive destination for a huge amount of capital movement from major economies.

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OBJECTIVE OF THE STUDY

In this backdrop, the present study is an endeavour to investigate empirically the dynamic relationship between FDI and Indian economic growth proxied by the IIP.

DATA AND METHODOLOGY

Data

The empirical investigation is being carried out using the data during the period 1981 to 2016. The annual data IIP have been considered as a proxy for Indian economic growth.

The study deals with the secondary data that are collected and composed of different databases and websites. The study pays due considerations to the nature of the data, their coverage, the definitions on which they are based and their degree of reliability during the use of secondary data in the analysis. Most of the data are collected from various issues of Handbook of Statistics on the Indian Economy and Reserve Bank of India Bulletins, published by Reserve Bank of India, and the database of Economic and Political Weekly Research Foundation. Besides these sources, the data are extracted from the database of World Bank, IMF World Economic Outlook. Microsoft Office Excel 2007 and Eviews-7 package is used for econometric analyses.

Methodology

Given the nature of the problem and the quantum of data, we first study the data properties from an econometric perspective with the help of descriptive statistics and unit root test to show the nature and basis characteristics of the variables used in the analysis and to find out whether the data series is stationary or non-stationary. This would help us applying cointegration test, VECM to establish the long and short-run dynamic relationship between the variables and Granger causality test to identify the direction of causality.

The stationarity of a data series is a prerequisite for drawing meaningful inferences in time series analysis to enhance the accuracy and reliability of the models constructed. The unit root test is one of the standard methods to find whether a time series data set is stationary or not. The unit root test result gives an idea whether the data series contain unit root property or not. The test results also indicate the order of integration. When applying regression models or cointegration techniques, the order of integration is essential. If the data series is not in the correct order of integration, spurious regressions or wrong test statistics are the consequences and can make the analysis useless. There are a large number of unit root tests available; however, the present study uses two most popular and commonly used tests like Augmented Dickey–Fuller (ADF) test and Phillips–Perron (PP) test.

As the autoregressive model is sensitive to the selection of appropriate lag length, the study ascertains the appropriate lag length before estimation. However, a large lag order in the VAR (Vector Autoregressive Model) model can rapidly exhaust the degree of freedoms in small samples. There is no commonly agreed technique on how to select the lags and variables structure, while the outcome of the estimation heavily depends on the estimated lag length. The study determines the optimum lag length based on the Akaike information criteria (AIC), Schwarz information criteria (SIC) and Hannan–Quinn information criteria (HQC).

To determine the long-run relationship between FDI and IIP, the study considers the VAR-based approach of cointegration test suggested by Johansen (1988). In this approach of cointegration test, trace test (or likelihood ratio test) as well as maximum eigenvalue test is applied to decipher the stated long-term dynamics. The cointegration becomes relevant when the time series are non-stationary in level, and all the variables used in the study should be integrated in the same order. In econometric terms, two or more variables are said to be cointegrated if they share common trends. Appropriately, the test provides us information on whether the variables, particularly the flow of FDI and the IIP, are tied together in the long run. The presence of cointegration indicates interdependence of the endogenous variables, which may be the result of economic linkage between the variables.

There often exists a long-run equilibrium relationship between two or more variables, but in the short run, there may be disequilibrium. The nature of the relationship between FDI and IIP in the short-run can be explored by considering the vector error correction mechanism. A VECM is a restricted VAR that has cointegration restrictions built into the specification so that it is designed for use with non-stationary series that are known to be cointegrated. The error correction term of VECM specification indicates the rate at which it corrects its previous period disequilibrium or speed of adjustment to restore the long-run equilibrium relationship.

The study applies the Granger causality test to identify the existence and nature of the causal relationship between the variables. It can be conducted in two different ways depending on the results of the long-run analysis. The Granger test (*Granger, 1969*) is suitable for analysing the short-run causal relationship if no cointegration exists among the variables. On the other hand, when the variables are cointegrated, the standard Granger test is misspecified, and the error correction strategy suggested by Engle and Granger (1987) should be used. The study proceeds with a Granger causality test in the form of VECM, as the variables are found to be cointegrated. VECM allows the modelling of both the short-run and long-run dynamics of the variables involved in the model. The error correction term of VECM indicates the direction of long-run causality. The short-term causality among the variables is tested through VEC (Vector Error Correction) Granger causality test or block exogeneity Wald test.

FINDINGS OF THE STUDY

Findings from the Descriptive Statistics

The primary statistical values of the variables are calculated in the first phase of our study. The descriptive statistics provide a historical background for the behaviour of the data used in the study. From the descriptive statistics (Table 1), it is observed that the variables used in the study are not stable at all during the study period. During the study period, the IIP and FDI are found to be very high and significantly varying from their mean values. In respect of a FDI, the maximum value of $43.40628 billion and a minimum value of $0.00564 are found with an average of $9.22438 billion, which justify its instability during the study period. The high

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Table 1: Descriptive statistics

Statistics	FDI	IIP
Mean	9.224381	392.5842
Median	2.426057	323.6980
Maximum	43.40628	866.3106
Minimum	0.005640	100.0000
Standard deviation	13.35114	254.5109
Skewness	1.290750	0.677523
Kurtosis	3.124836	2.062263
Jarque–Bera test statistic	9.741260	3.960104
Probability	0.007669	0.138062

Source: Authors' calculated.

value of standard deviation in this regard also confirms the instability. However, in most of the cases, values of the data series lie within $\overline{X} \pm 3\sigma$, where $\overline{X}$ and σ represent mean and standard deviation, respectively.

From the descriptive information, it can be said that none of the variables are normally distributed, though in most of the cases, the median values of variables are very close to average values. The measures of skewness suggest that the variables are not distributed symmetrically. Results obtained from Jarque–Bera statistic confirm that none of the series are normally distributed.

Findings from Long-Run Analysis

As mentioned before, the long-run analysis is conducted using the Johansen's cointegration test. Typically, the Johansen cointegration test consists of three general steps. First, examine whether all variables in the model are integrated in the same order, which can be established by unit root tests. Second, determine the optimal lag length for the VAR model to verify that the estimated residuals are not autocorrelated. Third, evaluate the VAR model to construct the cointegration vectors to determine the cointegrating relationship. For this, it is necessary to establish the trace and the maximum eigenvalue statistics tests. The following subsections present the results for each step.

Results of Unit Root Test

As already stated, testing stationarity of a data series is a prerequisite for drawing meaningful inferences in a time series analysis. It enhances the accuracy and reliability of the models constructed. So, it is necessary to determine the unit root property and order of integration for each variable included in the system. Both the unit root tests (ADF and PP) are performed with intercept, and time trend and intercept for all variables in their levels and then the tests are presented with their first difference values and so on.

Tables 2 and 3 present the ADF and PP unit root test results of the variables in their level and first difference. From the result shown in the tables, it is clear that the null hypothesis that is the existence of a unit root in its levels cannot be rejected for any

Table 2: Results of augmented Dickey–Fuller (ADF) unit root test

Variables	Level		First Difference		Result
	Intercept	Trend and Intercept	Intercept	Trend and Intercept	
FDI	-0.454671 [0] (0.8881)	-2.034204 [0] (0.5624)	-6.407675 [0] (0.0000)	-6.480880 [0] (0.0000)	I(1)
IIP	0.895930 [1] (0.9942)	-1.657304 [1] (0.7474)	-3.064900 [0] (0.0393)	-3.777063 [0] (0.0286)	I(1)

Notes: ( ) MacKinnon (1996) one-sided *p*-values; [ ] lag lengths for ADF test; I(1): stationary after first difference.
Source: Authors' calculated.

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Table 3: Results of Phillips–Perron (PP) unit root test

Variables	Level		First Difference		Result
	Intercept	Trend and Intercept	Intercept	Trend and Intercept	
FDI	-0.391177 [3] (0.8997)	-2.068148 [3] (0.5443)	-6.402463 [2] (0.0000)	-6.481968 [1] (0.0000)	I(1)
IIP	1.629534 [3] (0.9993)	-1.411348 [3] (0.8394)	-3.025881 [3] (0.0428)	-3.599176 [3] (0.0460)	I(1)

Notes: ( ) MacKinnon (1996) one-sided *p*-values; [ ] lag lengths for PP test; I(1): stationary after first difference.
Source: Authors' calculated.

of the series as the *t*-statistic of ADF and PP tests of the variables are less than the critical values at any significance level, that is 1%, 5% and 10%. Therefore, the unit root tests result concludes that all the series are non-stationary in level. Applying the same tests to their first differences shows that the null hypothesis of a unit root is rejected in all cases. So, from the unit root tests results, it is observed that the values of FDI and IIP are stationary at their first difference, that is I(1).

Selection of Optimum Lag Length

As the autoregressive model is sensitive to the selection of appropriate lag length, the study is to ascertain the appropriate lag length before conducting the cointegration analysis in line with Johansen. The optimum lag length based on the three commonly used criteria, namely AIC, SIC and HQC are presented in Table 4. All the lag selection criteria show 5 as the optimum lag length.

Table 4: VAR lag order selection criteria for FDI–IIP

Lag Length	AIC	SIC	HQC
0	20.10857	20.20198	20.13845
1	15.06422	15.34445	15.15387
2	14.61379	15.08086	14.76321
3	14.70320	15.35709	14.91239
4	14.44765	15.28837	14.71660
5	13.31510*	14.34265*	13.64382*

Source: Authors' calculated.
*Indicates optimum lag order selected by the criterion.

Results of Johansen Cointegration Test

As FDI and IIP have unit root property at their level values, the study conducts a cointegration test suggested by Johansen's with the purpose of finding whether these variables have a long-term common stochastic trend.

The calculated values of Trace statistics (Table 5) and maximum Eigen statistics (Table 6) of Johansen's cointegration test, when the null hypothesis is $r = 0$ (i.e. no cointegration), are 16.54 and 14.59, respectively. Here the null hypothesis of no cointegration when $r = 0$ is rejected at 5%

Table 5: Results of Johansen cointegration test (trace statistics) for FDI and IIP

H_0	H_1	Trace Statistics	5% Critical Value	Probability*
$r = 0$	$r = 1$	16.54211	15.49471	0.0347
$r \leq 1$	$r = 2$	2.351633	3.841466	0.1252

Source: Authors' calculated.
*MacKinnon–Haug–Michelis (1999) *p*-values.

Table 6: Results of Johansen cointegration test (maximum Eigen statistics) for FDI and IIP

H_0	H_1	Maximum Eigen Statistics	5% Critical Value	Probability*
$r = 0$	$r = 1$	14.59048	14.26460	0.0494
$r \leq 1$	$r = 2$	2.351633	3.841466	0.1252

Source: Authors' calculated.
* MacKinnon–Haug–Michelis (1999) *p*-values.

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level of significance, as the calculated value of Trace statistics and maximum Eigen statistics are higher than the MacKinnon–Haug–Michelis critical value at 5% level of significance. This indicates the existence of a cointegrating vector between FDI and IIP. So, the Johansen's cointegration test result depicts that FDI and IIP are cointegrated and there exist long-term cointegrating relationship. The long-run cointegrating equation is

$$IIP = 224.6824 + 19.3854\ FDI_{(t=5.1460)} + \mu_t$$

Based on the above cointegrating equations, the study concludes that in long-run there exists a positive and significant (based on *t*-test statistics) relationship between FDI and IIP, that is they move together in the same direction, as the *t*-values associated with the coefficient of the FDI in the cointegrating equation is significant at 5% level of significance.

Findings from Short-Run Analysis

Having established that both the variables are cointegrated, the fundamental question that arises regarding the nature of the dynamic relationship between FDI and IIP in the short run can be answered by considering the vector error correction mechanism.

Result of the Vector Error Correction Model

The results of the VECM presented in Table 7 shows that the *t*-values associated with the coefficient of the lag value of the FDI are statistically significant when IIP is used as a dependent variable, which indicates that the FDI has a significant impact on the Indian economic growth (represented by IIP). The result also shows that in short run, the level of industrial production also positively affects the movement of FDIs.

The VECM result also indicates that the values of IIP adjust the disturbances to restore long-run equilibrium significantly and in the right direction,

Table 7: Results of vector error correction model for FDI and IIP

Independent Variables	Dependent Variables	
	***D*(IIP)**	***D*(FDI)**
ECT (γ_1)	-1.469666** [-2.42621]	0.099603 [1.25856]
D(FDI(-1))	3.522660 [1.66615]	-0.605613** [-2.19246]
D(FDI(-2))	0.658792 [0.43732]	-0.214918 [-1.09199]
D(FDI(-3))	3.124222** [2.34205]	-0.544848*** [-3.12626]
D(FDI(-4))	3.430970* [1.94784]	-0.920930*** [-4.00181]
D(FDI(-5))	1.363213 [0.85958]	-0.480551* [-2.31930]
D(IIP(-1))	0.194082 [0.70532]	0.185440*** [5.15824]
D(IIP(-2))	-0.767777* [-1.88976]	0.168953*** [3.18297]
D(IIP(-3))	0.179587 [0.38949]	-0.081674 [-1.35581]
D(IIP(-4))	-0.457168 [-0.91962]	0.161569** [2.48764]
D(IIP(-5))	-1.119519* [-1.93835]	0.013564 [0.17976]
C	58.20757** [2.71713]	-6.856199** [-2.44967]

Source: Authors' calculated.
* Statistically significant at 10% level
** Statistically significant at 5% level; [ ] *t*-values.
*** Statistically significant at 1% level.

but the values of FDI do not react significantly. The coefficients of error correction term -1.4697 is significant at 5% level. This value indicates the rate at which it corrects the disequilibrium of the previous period. Thus, the speed of adjustment towards the long-run equilibrium is about 146.97% per annum.

Findings from Causality Test

As the variables are cointegrated, the standard Granger test is misspecified, and the error correction strategy suggested by Engle and Granger (1987) is

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Table 8: Result of VEC Granger causality/block exogeneity Wald test for FDI and IIP

Dependent Variables	Independent Variables	Chi-Square Value	Probability Value	Implication
FDI	IIP	20.69279	0.0009	Causality exists
IIP	FDI	15.05840	0.0101	Causality exists

Source: Authors' calculated.

used to identify the long- and short-run causal relationship among the variables. The result of the long-run and the short-run causality tests under VECM framework are reported below:

Long-Run Causality

The *t*-values associated with the error correction terms of VECM, reported in Table 7, indicate the existence of significant unidirectional long-run causality. The coefficients of the error correction term -1.4697 is statistically significant at 5% level which indicates that any change in the value of FDI causes to change the value of IIP in the long run. But in long run, change in IIP does not have any causal effect on FDI.

Short-Run Causality

The results of short-run causality test among the variables based on VEC Granger causality test are presented in Table 8. According to the obtained results, it can be documented that there exists a bidirectional short-run causal relationship between FDI and IIP, that is in short-run, the value of FDI significantly affect the movement of IIP and vice versa.

SUMMARY AND CONCLUSION

The study investigates the impact of FDI on Indian economic growth over the period from 1981 to 2016. Existing financial and economic literature advocate the presence of a relationship between flows of FDI and Indian economic growth. However, these literatures suggest some contradictory findings regarding the nature of the relationship and the degree of influencing power. These conflicting findings of the earlier studies are the principal motivation behind conducting this research work in the Indian context.

Findings of this study provide a comprehensive understanding of the dynamic relationship between the net flow of FDI and the movement of IIP which is used as a proxy for Indian economic growth. In line with the findings of some earlier studies done especially in Indian context like Prasad and Sharma (2012), Maheswari (2015) and so on, our present study based on vector autoregressive estimation confirms the existence of a significant positive relationship between the flow of FDI and the movement of IIP in India.

Thus, from the obtained results, the study documents a significantly positive long-run and short-run relationship between FDI and IIP. So, the impact of FDI on economic growth of India is reinforced by this study. The suppositions relating to advantages of FDI regarding employment generation, technology transfer, the flow of non-debt creating capital, contribution to home country's production and thereby growth of industrial production are found to hold good in this present study.

The study would enhance our understanding of the dynamic relationship between the net flow of FDI and Indian economic growth. This study is expected to offer some insights for financial regulators and policymakers for formulating economic and financial policies. This study suggests some future research to enhance our understanding about the relationship between the net flow of FDI and the country's economic growth. Further research efforts could either eliminate some of the limitations or

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expand the scope of investigation in this study. The possible extension of this study is to consider the impact of FDI along with other important macroeconomic determinants such as interest rate, inflation rate, the growth rate in the real sector and so on which are not included in this study. Moreover, instead of using only the quantitative macroeconomic variables, the study suggests the inclusion of socio-economic and political factors as dummy variables on these grounds. Further, the study could empirically test the relationship by considering the potential structural breaks in the time series data. But, this is beyond the aim of this present study. It is left for further research.

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