The economic determinants of foreign direct investment in Indian economy: An analytical study

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Abstract

Objectives: The present research work is an attempt to assess the factors determining the inflow of foreign direct investment in India by evolving an empirical framework using time series data.

Methods/Statistical analysis: Owing to time series data, stationary of economic variables was checked by using unit root test. Thereafter, for assessing the unidirectional and bidirectional relationship among variables a pair wise granger causality test was performed. Further, Ramsey's reset test and white's heteroscedasticity test have been used. After investigating the tolerance and variance inflating factor, a multiple ordinary least squares regression model was developed which enabled to partially explain the inflows of FDI in Indian Economy.

Findings: The estimated model encompasses five explanatory economic variables. These variables are the market size (population), the size of the tourism industry (tourist arrivals), infrastructure development (rail and road density), economic growth (percentage change in GDP) and openness (export plus import as a percentage of gross domestic products) of markets. Hence, the paper tries to examine the impact of above said factors on Indian economy in general and their impact on foreign direct investment in particular. Apparently, some of the variables such as tourism, infrastructure, and openness of markets have exhibited a favorable impact on foreign direct investment. On the other hand, market sizes impact on FDI has been found insignificant. Therefore, in order to attract the foreign direct investment in India, a sound infrastructure, liberal economic policy, favorable tourism policy and GDP growth seem to be desirable determinants whereas population size may not be obliging in this regard.

Application/Improvements: The results of the study suggest that to increase the inflows of FDI in Indian Economy, the policy should be focused on infrastructure development and increasing economic growth. Further, the policy of trade liberalization is also beneficial for Indian Economy.

Keywords: Foreign Direct Investment, FDI Determinants, Time Series Analysis, Economic Growth, Trade-Openness, Tourism.

1. Introduction

Over the last two-and-a-half decades, policy implications of most of the developing countries have shifted from state-driven mechanism to export-led growth. Therefore, this transformation has augmented the need for foreign direct investment, especially in developing countries. In this regard, many developing countries have begun to adopt liberal foreign trade policy by modifying the existing stringent laws [1]. Apparently, poverty removal, employment generation, and literacy rate improvement have always remained a daunting task for the policymakers in India. And at the same time, the mobilization of domestic resources has declined over the years. A high growth rate is a solution to many such problems and in the absence of domestic resources; it can be performed with the greater inflows of FDI [2]. Therefore, since the liberalization policy adopted in 1991, we have seen that the Indian policymakers have been trying hard to consistently attract the FDI inflows into the country. Despite this, the growth rate in FDI inflows has shown high volatility and this raises the important question of why India is weak in attracting FDI when the economists, as well as the politicians of our country, have recognized the importance of FDI in India's growth? Thus, the present research work attempts to observe the

Indian experience in terms of FDI inflows by using empirical framework during the period of 1991-2015; and also tries to detect the factors advantageous for FDI inflows during the same period.

2. Literature survey

Owing to the diverse nature of Indian economy, assessing the decisive factors for FDI has required comprehensive examinations using past experiences [3] study of Jordanian Economy found a positive significant impact of economic indicators and liberalization of financial market on FDI inflows. The study of [4] on landlocked countries in Sub-Saharan Africa disclosed that in the sample countries FDI has been determined by market extent, political and economic integration, availability of natural and human resources. Apparently, in Nigeria, the FDI was found positively associated with the exchange rate, market openness and GDP growth [5]. According to the study of [6] in Indochina (Cambodia, Laos, and Vietnam), the variables such as market size, government effectiveness, and political stability have contributed to increasing the FDI inflows significantly.

A region (Middle East and North Africa) based study carried by [7] assessed that infrastructure, human capital; lagged FDI and market openness have helped in generating a favorable environment for additional foreign direct investment. Furthermore, an empirical study about Norway's Economy conducted by [8] perceives that the stable exchange rate, market openness, improved sectoral and real GDP have strengthened the FDI inflows in the country whereas the influence of unemployment rate, inflation, interest rate and money supply seems to be negative on FDI. In addition to that, in sixteen Arab countries, FDI has witnessed a positive impact of market size, liberalization, and special trade contracts and restructured financial policy [9]. In [10] study of BRICS countries disclosed that in order to maintain the FDI inflows, economic integration and bilateral trade have been found significant in the sample countries. The inflows of FDI in Latin American countries have been associated with the FDI stock, trade liberalization, BOP deficit and short-term debts [11]. A panel data study conducted by [12] conceived that the FDI inflows in 32 developing countries have been influenced by market size, infrastructure development, labor costs and total reserves. In the study of [13], it was found that GDP, inflation rate, and scientific research have had a significant impact on FDI inflows in India. The study of [14] revealed that in BRICS countries FDI has been found positively associated with population size, cost of labor, infrastructure, exchange rate and gross capital formation whereas the impact of economic growth and liberalization seemed to be insignificant in the region.

Vector Error Correction Model (VECM) of [15] revealed the three important findings: (a) FDI in India did not exhibit granger causality with GDP (b) short run positive impact of trade liberalization on FDI in India, and (c) FDI has affected in displacing the labor. The findings of [16] suggested that in developing countries communicative variables have influenced the FDI significantly. The association of communicative variables with FDI has had a significant and positive impact on the economic growth. However, total debt services/GDP and inflation had a negative influence on FDI. Similarly, tourist inflow, availability of basic infrastructure and trade openness were found to be significant variables that attracted FDI in small developing countries [17]. On the other hand [18] observed that in attracting FDI, large economies have been benefited by a high degree of openness and low country risk. Further, in Turkey, real interest rate and budget consolidation were able to attract the FDI inflows in the country [19]. In [20] observed that unit labor cost, size of exporter and importer countries and their trade relations have been found positively associated with FDI in developed and developing western countries. Apparently, in developing countries and Sub-Saharan Africa, the FDI was positively influenced by sound infrastructure and higher return on investment whereas in Non-Sub-Saharan Africa these factors were not helpful in generating fresh FDI. On the other hand, openness to trade promotes FDI to SSA and Non-SSA countries [21]. One of the empirical findings suggested that FDI inflow has been positively influenced by the growth of human capital [22].

The literature supports the argument that FDI and economic growth have a bidirectional association [23, 24]. Further, studies support that liberalization and openness of market have stimulated the FDI's inflows. Studies conducted by [25, 26] perceived that FDI inflows and openness have exhibited a positive association. Similarly, [27] observed that FDI has been positively influenced by the size of the host country.

3. Objectives of the study

1. To study the factors which are expected to influence the inflows of FDI in Indian Economy.
2. To develop the basic framework for the study, a set of hypothesis, which is mentioned as under, has been developed:
3. Hypothesis I: The FDI inflows have not been significantly influenced by economic growth rates.
4. Hypothesis II: The FDI inflows have not been significantly influenced by infrastructure development.
5. Hypothesis III: The FDI inflows have not been significantly influenced by the market size.
6. Hypothesis IV: The FDI inflows have not been significantly influenced by the market openness.
7. Hypothesis V: The FDI inflows have not been significantly influenced by the tourism.

3.1. Data sources

In order to collect the relevant data for the period of 1991 to 2015, United Nations Economic & Social Commission for Asia and the Pacific's official website has been examined. Table 1, the name of the dependent and independent variables, their proxies, an expected sign of independent variables as well as sources of data are given as under:

Table 1. Variables for time-series model

Types of variable	Name of the variable	Proxy	Expected sign	Data source
Dependent	FDI	Inflow of FDI		UNESCAP
Independent	Economic growth	Percentage change in GDP per annum	Positive	UNESCAP
	Infrastructure development	Rail and road density	Positive	UNESCAP
	Market size	Population	Positive	UNESCAP
	Openness	(Export + Import) as % of GDP	Positive	UNESCAP
	Size of tourism industry	Tourists arrivals	Positive	UNESCAP

Source: Authors' analysis

3.2. Research tools

In order to establish understand the degree of association among considered variables, various statistical and econometrics procedures were used. Owing to time series data, stationary of economic variables was checked by using unit root test. Thereafter, for assessing the unidirectional and bidirectional relationship among variables a pair wise granger causality test was performed. Further, Ramsey's reset test (to examine model specification error), and white's heteroscedasticity test (to observe constant error variance) have been used. Likewise, for investing the associations among explanatory variables tolerance and variance inflation factor and for error term stationary and the long run relationship among variables co-integration tests have been performed. A multiple ordinary least squares regression model is developed in order to arrive at a subset of robust variables to partially explain the inflows of FDI in Indian Economy. The equation of the developed model is spelled out below:

$$FDI = \alpha + \beta_1 (EG) + \beta_2 (INF) + \beta_3 (MS) + \beta_4 (OPN) + \beta_5 (STI) + \varepsilon \quad \ldots\ldots\ldots\ldots (i)$$

Where, FDI = Foreign Direct Investment Inflows, EG = Economic Growth,
INF = Infrastructure Development, MS = Market Size, OPN = Openness, and
STI = Size of Tourism Industry.

4. Results and discussion

Table 2. ADF unit root test

	Variable	Lag Length	Value	T-statistic	P value	Result
With Intercept	FDI	0	1st Diff.	-5.457362	0.0002	Stationary
	EG	0	-	-3.575785	0.0144	Stationary
	INF	0	1st Diff.	-6.270439	0.0000	Stationary
	MS	3	-	-5.220991	0.0022	Stationary
	OPN	0	1st Diff.	-4.288638	0.0030	Stationary
	STI	0	1st Diff.	-4.792445	0.0449	Stationary

Source: Authors' analysis

A stationary series helps in achieving the functional and practical association. Therefore, due to time series data, the stationary problem pertaining to considered economic determinants has been checked by using Augmented Dicky-Fuller (ADF) test. The results of the ADF test have been shown here-as-under in Table 2. Table 2 shows that at 5 per cent level of significance, unit root null hypotheses of non-stationary are rejected; meaning that the considered series has been found stationary for all the determinants. Thereafter, Table 3 examines the unidirectional and bidirectional relationship among considered determinants by using granger causality test.

Table 3. Pair wise granger causality test

Null Hypothesis	F-Statistics	Prob.
EG does not Granger Cause FDI	5.48843	0.0033
FDI does not Granger Cause EG	0.02673	0.8717
INF does not Granger Cause FDI	4.37361	0.0488
FDI does not Granger Cause INF	2.06107	0.1658
MS does not Granger Cause FDI	5.11524	0.0344
FDI does not Granger Cause MS	5.95235	0.0237
OPN does not Granger Cause FDI	4.98809	0.0032
FDI does not Granger Cause OPN	0.22184	0.6425
STI does not Granger Cause FDI	9.09507	0.0066
FDI does not Granger Cause STI	1.31615	0.2642

Source: Authors' analysis

The results of granger causality test (Table 3) show that the market size and FDI inflows have been found bidirectional associated with each other. The obtained relationship of inflows of FDI with other variables such as the size of the tourism industry, infrastructure development, economic growth and openness of the economy is unidirectional. This indicates that inflows of FDI are affected by all these variables and these variables can be used as a predictor of inflows of FDI. A multi linear regression analysis which shows the causal relationships between FDI and considered independent variables has been mentioned here as under:

$$D (FDI) = \alpha + \beta_1*EG + \beta_2*D (INF) + \beta_3*MS + \beta_4*D (OPN) + \beta_5*D (STI) + \varepsilon \quad \text{……………… (ii)}$$

Where, D (FDI), D (OPN) and D (STI) stands for first difference of these variables

The results of the regression model which include the independent variables, economic growth, infrastructure development, market size, openness and size of the tourism industry are presented in Table4. Sixty-two (62) percent variation in FDI inflows is explained by these explanatory variables with all variables having the hypothesized signs. Among explanatory variables, economic growth, infrastructure development, openness and size of tourism are statistically significant at 5 percent level whereas at 5 percent level market size is not significant. The larger F value suggests that considered model is statistically significant and the absence of autocorrelation is observed by using DW statistics. Thereafter, using tolerance and variance inflation factor, the absence of multicollinearity among the determinants has been assessed in Table 4. The VIF values of all the independent variable are ranging between 2.1 to 1.1 and the TOL values are near to 1 meaning that there is an absence of multicollinearity in the model under consideration [28].

Table 4. Regression results

Model Variables	t-Statistics	Prob.	Co linearity Statistics	
			Tolerance	VIF
Constant	1.092	.206		
Economic Growth*	3.620	.022	.474	2.110
Infrastructure Development*	2.713	.040	.845	1.183
Market Size**	1.343	.174	.687	1.456
Openness*	2.324	.046	.534	1.853
Size of Tourism Industry*	3.074	.038	.782	1.279

Source: Authors' analysis

Dependent Variable: D (FDI) R-squared = 0.767; Adj. R^2 = 0.624; F = 11.128; n = 25; DW = 1.96; *Significant at 5%; **Insignificant at the 5%; Standard error of the estimate is 0.816

After substituting the values of coefficient, the regression model appears as:

D (FDI) = 1752.329 + 73.160*EG + 16.574*D (INF) + 0.001*MS + 0.061*D (OPN) + 3.019*D (STI)................ (iii)

It is clearly evident from the regression equation that among considered repressors, economic growth is the most effective variable to enhance the inflows of FDI in Indian Economy. On the other hand, the coefficient of market size is statistically insignificant. Therefore, we can conclude that except hypothesis III, all other null hypothesis to be rejected. Thereafter, the result of Ramsey's reset given in Table 5 advocates that, overall, the model under consideration is correctly specified.

Table 5. Ramsey's reset test

	Value	Df.	Probability
t-statistic	0.674438	17	0.5091
F-statistic	0.454867	(1, 17)	0.5091
Likelihood ratio	0.633725	1	0.4260

Source: Authors' analysis

The computed t-value at 5 per cent level of significance (prob. = 0.5091) is insignificant. Therefore, model is not mis-specified or the null hypotheses of no misspecification to be accepted. Hence, it can be concluded that the dependent and independent variables relationship is correctly specified in the present model.

Further, in order to check the common variance or homoscedasticity of residual term ε, white's test is executed. And the results of Table 6 show that the null hypothesis of homoscedasticity cannot be rejected, meaning that on the basis of p-value (0.1524) homoscedasticity assumption to be accepted. Therefore, the estimated regression model exhibits a constant variance of error term.

Table 6. White's heteroscedasticity test

F-statistic	24.85231	Prob. F(20,3)	0.0013
Obs*R-squared	28.77503	Prob. Chi-Square(20)	0.1524
Scaled explained SS	254.0311	Prob. Chi-Square(20)	0.0002
R-squared	0.990626	Mean dependent var	2.353387
Adjusted R-squared	0.928135	S.D. dependent var	6.141455
S.E. of regression	1.328261	Akaike info criterion	3.092009
Sum squared resid	9.725278	Schwarz criterion	3.895089
Log likelihood	-41.00411	Hannan-Quinn criter.	3.419356
F-statistic	24.85231	Durbin-Watson stat	2.073661
Prob (F-statistic)	0.001889		

Source: Authors' analysis

Engle-Granger co integration examines the long term relationship between specified variables and the results for the same are mentioned in Table 7.

Table 7. EG co-integration test

Null hypothesis		Value	Prob.
Series are not co-integrated	Engle-Granger tau-statistic	-7.32155	0.0035
	Engle-Granger z-statistic	-23.34925	0.0010

Table7 shows that null hypothesis of no-co-integration to be rejected which means acceptance of alternative hypothesis. As a result it can be concluded that the economic variables are balanced and series are found to be co-integrated in long-run.

5. Conclusions and policy implications

The study has been envisioned to construct an empirical framework for assessing the determinants of FDI inflows in India by using a time series data. The proposed model's results show that economic growth, infrastructure development, openness and size of the tourism industry have significantly influenced the FDI inflows in India, while population which is a proxy of market size is statistically insignificant. The inferences of this finding suggest that market size's impact on FDI is not decisive in Indian economy. Market size may be significant in case of the local market. Finally, the empirical observations of the model suggest that the FDI has a positive and significant association with GDP growth, infrastructure and tourism industry. Therefore, policy perspective point of view, the present research suggests that to increase the inflows of FDI in Indian Economy the policy should be focused on infrastructure development and increasing economic growth. Furthermore, the policy of trade liberalization (openness) is also beneficial for Indian Economy which leading towards an increase in the FDI inflows.

The study tries to explore the various determinants of FDI in India. Further, the quality of data validates the results of the model and its results. Thus, a major limitation of the model is that it has incorporated limited variables, which are based on the review of the literature and past studies. Therefore, it opens avenues for future research using other macroeconomic determinants such as interest rate, inflation, domestic investment, political instability, etc. which may have a bearing on FDI inflows in India.

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