
An Integration of FDI Inflows and Macroeconomic Variables: An Indian Perspective

Dr. Manu K S

Assistant Professor,

Department of Management Studies,

Christ University, Bengaluru.

Abstract

The study investigates the relationship between and economic variables and FDI inflows in India over the period 1978-2014. The Johansen co-integration test (Trace statistic and Maximum Eigen value) results found stable relationship between FDI inflows and economic variables (GDP, GDS, Imports, Exports and Total Reserve). The Granger causality test results found existence of bidirectional causality between FDI and exports. The causality runs from GDP to FDI inflows direction and not from FDI to GDP. Causality runs from FDI to imports and not from Imports to FDI. Finally observed bi directional causality exist between FDI to Total revenue.

Keyword: FDI, Economic Variables, Johansen co-integration test and Granger causality test

Introduction

The FDI inflows are paramount for progress of any developing country of the world through capital inflow, transferring advanced technology, creating employability and improve the overall productivity. Many researchers found significant positive relationship between FDI inflows and economic growth of the host country. Generally, the country with fastest economic growth rate attracts more FDI inflows. The Indian economy is one of the fastest growing economy in the world especially in service sectors. FDI Inflows are growing an annual growth rate of 23.35% since 1978. In the last three years, the center government of India has changed 87 FDI policies across 21 different sectors to enhance the economic growth of the country. FDI inflows are now reached all-time high of \$ 60.1 billion in 2016-17 and retained world's highest FDI recipient crown (commerce and industry ministry of India). Many researchers clearly shown the greater influence of macro-economic factors on the FDI inflow to the country.

Review of Literature

AssioboKomlanMawugnon, Fang Qiang found unidirectional relationship between FDI and GDP of the country. The causation direction ran from FDI to GDP not from GDP to FDI. ArfanShahzad& Abdullah Kaid Al-Swidi (2013) pointed out that balance of payment, exports, imports and GDP growth rates have positive impact on FDI inflows of Pakistan. Further the study suggested that political stability of the country place a very important role for economic growth of the country. Abdul Khaliq and IlanNoy(2007) overall observed that FDI inflows have positive effect on economic growth of the country. FarukGürsoy, Ahmet Sekreter, HüseyinKalyoncu (2013) pointed out that FDI and Economic growth of for Azerbaijan and Turkmenistan are cointegrated. Further, Granger Causality test results found existence of bidirectional causality between FDI and economic growth for Turkmenistan and FDI causes GDP for Azerbaijan. Baig MM, Kiran S and Bilal M (2016) observed existence of cointegration relationship between FDI and GDP. The granger causality test pointed out unidirectional causality between FDI GDP for Nepal. Alfaro (2004) found positive effect between FDI and Economic growth for 71 developed and developing countries. Solomon(2011) pointed out negative impact between FDI and economic growth of panel of 111 countries. Umoh, Jacob and Chuku (2012) found positive feedback between FDI and economic growth in inNigeria. Shaikh, F. M. (2010) found positive

relationship between economic growth and FDI inflows for manufacturing sectors. The study further found negative effect for primary sectors. There is significant relationship between economic growth and foreign direct investment inflows (FDI) in Malaysia. Vu, Gangnes and Noy (2008) investigated and found FDI inflows have positive effect on labor on growth in the Industrial sector.

Maskus, K. E. (2002). Intellectual property rights and foreign direct investment. *Journal of International Economics*. Australia.(Maskus, 2002); (Haile &Assefa, 2006) pointed out FDI can be divide into Horizontal and Vertical.Konstantinos Dellis, David Sondermann, Isabel Vansteenkiste (2017) found existence of empirical relation between quality of a host country’s economic structures to FDI inflows in euro zone countries. Dr. A. Jayakumar , Kannan .L and Anbalagan .G (2014) found significant positive effect between FDI and Exports and imports of INDIA. Zafar Ahmad Sultan (2013) found stable long run equilibrium relationship between FDI and exports growth . Further the study observed granger causality direction runs from exports growth to FDI inflow. No causality exist between either from FDI to exports or from exports to FDI inflows in the short run in India.

3.1 Objectives of the study:

1. To assess the relationship between selected economic factors and FDI inflows
2. To analyze the level of co-integration between Net FDI inflows and economic variables.

Hypothesis

H0: Net Foreign Direct Investments and selected economic variables have unit root

H0: No cointegration relationship exists between Net FDI Inflows and selected economic variables

H0: No granger causality exists between FDI inflow and other Economic variables.

Research Methodology

Data: The study used yearly net foreign direct investments (US\$) and selected economic variables (US\$)

Period of Study: The study collected Net Foreign Direct Investments (US\$) and selected economic variables from 1978 to 2014.

Variables: To study selected five economic factors like Gross Domestic product (GDP), Gross Domestic Savings (GDS), Total Reserves (Including Gold) (TR), Total Imports (TI) and Total Exports (TE) as dependent variables and Net Foreign Direct Investments (NFDI) as dependent variable. The study converted FDI, Exports and Imports into their log values for applying econometric models.

Sources of Data: The study collected yearly NFDI and Economic variables from World Bank.

Statistical Tools:

Augmented Dickey–Fuller test (ADF): The study used an ADF to test the presence of a unit root in the selected variables during sample period.

Johansen Cointegration Test: The study used Johansen Cointegration test to test whether Indian economic variables and Net Foreign Direct Investment inflows to India are co integrated or not. Generally the cointegration test will be carried out when selected variables of the study are stationary at first order. Thus, though, individual variables are has unit root, a linear combination of two or more time series variables do not have unit root.

Johansen’s co- integration methodology derived from initial stage of vector autoregression (VAR) of order p is as follows

$$y_t = \mu + A_1 Y_{t-1} + \dots + A_p y_{t-p} + \epsilon_t$$

Where y_t is an $n \times 1$ vector of variables that are integrated at first order denoted by $I(1)$

and ϵ_t is an $n \times 1$ vector of innovations. This VAR can be expressed as

$$y_t = \mu + y_{t-1} + 1 \sum_{i=1}^{p-1} T y_{t-i} + \epsilon_t$$

where

$$= \sum_{i=1}^p A - I \text{ and } T_i = - \sum_{j=i+1}^p A$$

If the rank 'r' less than n due to the coefficient matrix of (= and y_t) then it can be expect to have $n \times r$ matrices of and which have rank r such that coefficient matrix of is stationary. The number of cointegration relationships can be represented by r , adjustment parameter in VECM and can be represented by and is represented as cointegrating vector.

The Granger causality test

The Granger Causality test states the element of prediction two variables (X and Y) . The variables generally time series data and requires the one day luffed values of iys own variable and another variable.

$$y_t = \beta_{1,0} + \sum_{i=1}^p \beta_{1,i} y_{t-i} + \sum_{j=1}^p \beta_{1,p+j} x_{t-i} + e_{1t} \quad (1)$$

$$x_t = \beta_{2,0} + \sum_{i=1}^p \beta_{2,i} y_{t-i} + \sum_{j=1}^p \beta_{2,p+j} x_{t-i} + e_{2t} \quad (2)$$

Where, it is assumed that the errors e_{1t} and e_{2t} are not correlated. Further, because there are two variables, the study deals with bilateral causality. Equation (2) explains that current X is related to past values of itself as well as that of Y, and (1) explains a similar behavior for X.

Table 1. Shows descriptive Statistics

	EXPORTS	FDI	GDP	GDS	IMPORTS	TR
Mean	118723246994	8684923245	648619953230	185308388825	149343351063	91159588946
Median	42386680921	2168591054	399787263892	91262015076	59626600012	24889366112
Maxi	498219673269	43406277075	2042438591343	635475821057	610650438038	325081060905
Mini	8514619552	5640000	139708688961	27575572833	9449307673	5637446977
Std.Dev.	154563461829	13167947007	571055197270	193718866402	193432334675	114859778793
Skewness	1.42	1.38	1.28	1.26	1.45	1.07
Kurtosis	3.56	3.36	3.22	3.09	3.61	2.42
Jarque-Bera	12.93	11.90	10.19	9.86	13.53	7.56
Probability	0.00	0.00	0.01	0.01	0.00	0.02
N	37.00	37.00	37.00	37.00	37.00	37.00

(Note: Researcher's Own Calculation)

The Table (1) shows the descriptive statistics summary of the FDI and selected macro-economic variables. The

skewness values are clearly indicating that the selected data series are positively skewed. The kurtosis values ($K > 3$) are indicating that the data series are leptokurtic. The normality test results are clearly indicating that the selected data series are not normally distributed.

Table2. Shows Augmented DickeyFuller Test results

At Level				
Particulars	η_i		η_t	
	t statistic	Prob	t statistic	Prob
Log Exports	0.7396	0.9917	2.3000	1.0000
Log FDI	-1.1391	0.6896	2.6895	1.0000
GDP	3.6893	1.0000	-3.0987	0.1243
GDS	2.2788	0.9988	-0.1936	0.9910
Log Imports	0.0385	0.9567	3.3255	1.0000
Total Reserves	1.5965	0.9994	-07865	0.9582
At First Difference				
Particulars	t statistic	Prob	Conclusion	
Log Exports	-4.8358 ***	0.0003	I (1)	
Log FDI	-5.1527***	0.0002	I (1)	
GDP	-4.0627***	0.0031	I (1)	
GDS	-5.0758***	0.0002	I (1)	
Log Imports	-4.5111***	0.0009	I (1)	
Total Reserves	-5.1747***	0.0001	I (1)	

Note: η_i represent intercept and η_t represent intercept and trend. Note: *** Significant at 1% level

Table (2) shows results of ADF test results. The results clearly indicate that all the variables (FDI and economic variables) are non-stationary at level and stationary at first order. Thus, the study used JohansenCointegrationtest to test the existence of cointegration between FDI and other economic variables (GDP, GDS, Imports, Exports and Total Reserve)

Table3. Shows the results of Johansen Co-integration test (Trace Statistic Test)

Number of Co Integration equations	Eigenvalue	Statistic	Critical value	Prob.
One	0.7536	154.1319	94.75	0.0000
Two	0.7141	103.6464	69.81	0.0000
Three	0.5486	58.57584	46.85	0.0026
Four	0.4167	29.99672	29.79	0.0366
Five	0.2483	10.47446	14.99	0.1838
Six	0.0184	1.0053	3.841	0.3144

Trace test shows presence of four cointegrating equations

Note: Researcher's Own Calculation)

Table (3) shows the result of Johansen co-integration test (trace statistics). The results indicate that there are at least

four cointegrating equations or relationship between FDI and macroeconomic variables. It's clearly reveals that FDI inflows and economic variables of India are highly co-integrated.

Table 4. Shows the results Johansen Co-integration test (Maximum Eigen Value Statistic Test)

Number of Co Integration equations	Eigenvalue	Statistic	Tabulated value	Prob
One	0.753650	49.99	39.98	0.0025
Two	0.714103	44.07	33.88	0.0017
Three	0.548676	27.92	29.59	0.0367
Four	0.416702	18.42	21.14	0.0841
Five	0.248392	9.99	13.27	0.1834
Six	0.018493	1.01	3.75	0.3144

Max-eigenvalue test shows presence of three cointegrating equations

(Note: Researcher's Own Calculation)

Further, table (4) shows results of Johansen co-integration test (Max-Eigen Statistics.) results indicate that there are at least three cointegrating equations or relationship between FDI and economic variables of India. Finally, the statistics results of Johansen Co-Integration test failed to accept the null hypothesis and found high degree of cointegration between FDI and macroeconomic variables.

Table 5. Shows Granger causality test results

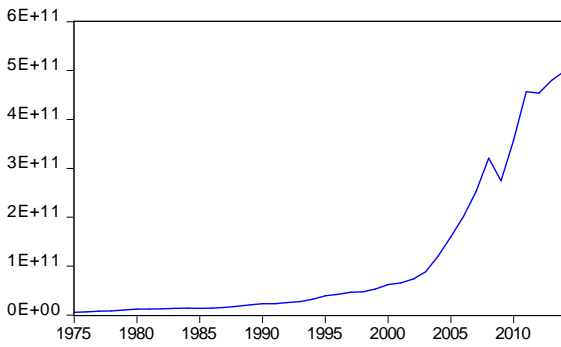
Null Hypothesis (Does not Granger Cause)	N	F – Statistics	Prob
FDI and EXPORTS	38	8.31752 ***	0.0012
		8.31752 ***	0.0367
GDS and FDI	38	11.8685 ***	0.0001
		1.966098	0.1549
GDP and FDI	38	17.1915 ***	8.E-06
		2.42839	0.1048
IMPORTS and FDI	38	2.46017	0.1004
		6.6869 ***	0.0037
TR and FDI	38	24.4455 ***	3.E-07
		4.78745 ***	0.0140

Note: Researcher's Own Calculation)

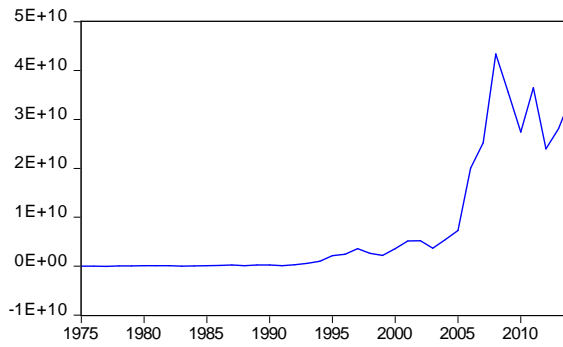
Table (5) shows Granger causality test results between FDI and all the other macro-economic factors of the country. It clearly indicates bi directional causality exist between FDI and Exports of the country. The causality runs from both FDI to Exports and Exports to FDI. The causality runs from GDS to FDI and not from GDS to FDI. Similarly, the causality runs from GDP to FDI and not from FDI to GDP. Further, causality runs from FDI to imports and not from Imports to FDI. Finally bi directional causality exist between FDI to Total revenue.

Figures shows the graphical representation of Indian economic variables and Foreign Direct Investment inflows from 1978 to 2014.

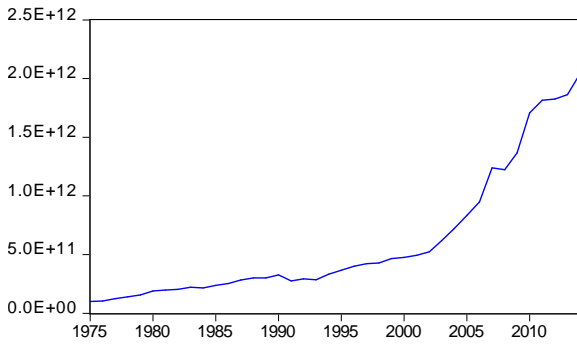
EXPORTS



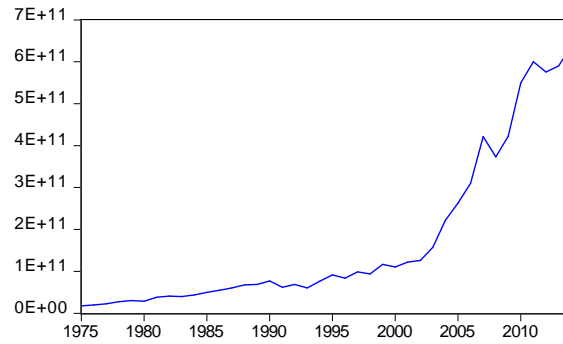
FDI



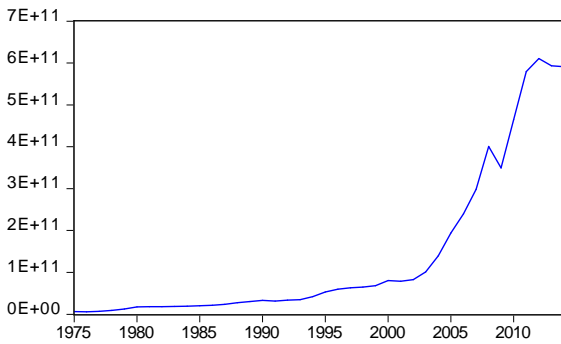
GDP



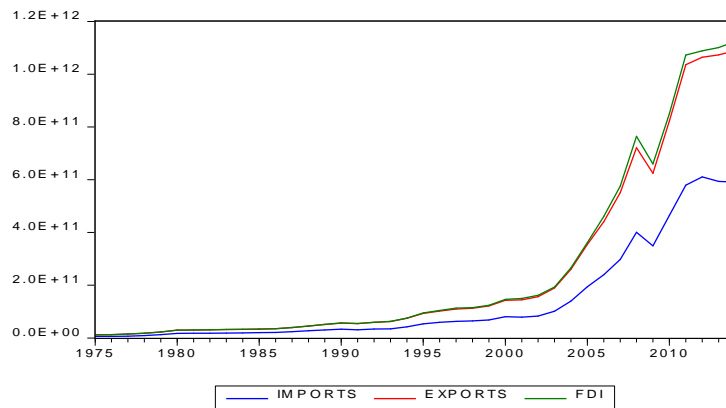
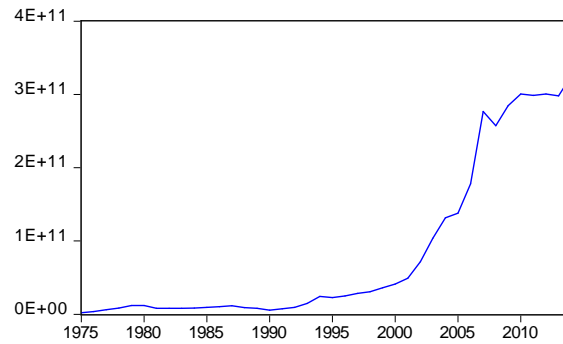
GDS

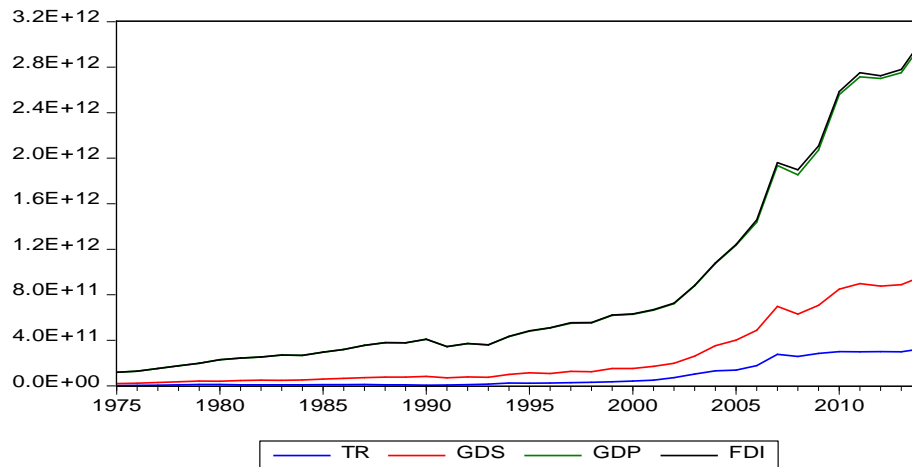


IMPORTS



TR





The graphical representing of NFDI inflows and economic variables are clearly shows they are gradually cointegrated in the long run from 1978 to 2014.

Conclusion

The study pertains to analyze the relationship between FDI and macro-economic variables of the country. As the selected macroeconomic variables and FDI are stationary at first order, the study used Johansen Co-Integration test to verify degree of Co – integration between FDI and selected macroeconomic variables. The results of trace test statistic found that there are at least three co integrating relations between FDI and five selected macroeconomic variables. Further the results of maximum eigen value statistic found that there are at least two cointegrating relations between FDI and five selected economic variables. In order to attract more FDI into India, the country's economic factors places a paramount role. All the economic activities of the nation are highly integrated. Thus, policy makers and investors can certainly focus for enhancing GDP, Exports and GDS of the country.

References

1. Proceedings of the 8th International Conference on Innovation & Management., The Relationship Between Foreign Direct Investment and Economic Growth in Togo [1991-2009], 1269-1273.
2. ArfanShahzad & Abdullah Kaid Al-Swidi (2013) Effect of Macroeconomic Variables on the FDI inflows: The Moderating Role of Political Stability: An Evidence from Pakistan, *Asian Social Science*, 9(9), 270-279.
3. Abdul Khaliq and Ilan Noy (2007), Foreign Direct Investment and Economic Growth: Empirical Evidence from Sectoral Data in Indonesia, http://www.economics.hawaii.edu/research/workingpapers/WP_07-26.pdf
4. Faruk Gürsoy, Ahmet Sekreter, Hüseyin Kalyoncu (2013), FDI and Economic Growth Relationship Based on Cross-Country Comparison, *International Journal of Economics and Financial Issues*, 3(2), 19-524
5. Baig MM, Kiran S and Bilal M (2016), Relationship between FDI and GDP: A Case Study of South Asian Countries, *Journal of Business & Financial Affairs*, 5(3).
6. Solomon, E. M. (2011). Foreign Direct Investment, Host Country Factors and Economic Growth. *Ensayos Revista de Economia*, 30(1), 41–70
7. Alfaro, L., Chanda, A., Kalemli-Ozcan, S., & Sayek, S. (2004). FDI and economic growth: the role of local financial markets. *Journal of international economics*, 64(1), 89–112.
8. Umoh, O., Jacob, A., & Chuku, C. (2012). Foreign Direct Investment and Economic Growth in Nigeria: An Analysis of the Endogenous Effects. *Current Research Journal of Economic Theory*, 4(3), 53–66.
9. Zafar Ahmad Sultan (2013), A Causal Relationship between FDI Inflows and Export: The Case of India, *Journal of Economics and Sustainable Development*, 4(2),
10. Shaikh, F. M. (2010). Causality Relationship between Foreign Direct Investment, Trade And Economic Growth In Pakistan. In *International Business Research* (Vol. 1, pp. 11–18). Harvard Business School.
11. Vu, T. B., Gangnes, B., & Noy, I. (2008). Is foreign direct investment good for growth? Evidence from sectoral analysis

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- of China and Vietnam. *Journal of the Asia Pacific Economy*, 13(4), 542–562.
12. Haile, G. A., & Assefa, H. (2006). Determinants of Foreign Direct Investment in Ethiopia: A time-series analysis. In 4th International Conference on the Ethiopian Economy, 10-12 Jun (pp. 1–26).
 13. Kentor & Boswell, (2003) observed the top FDI contributing countries shows long term negative effect on economic growth.
 14. Kentor, J., & Boswell, T. (2003). Foreign capital dependence and development: A new direction. *American sociological review*, 68(2), 301–313.
 15. Konstantinos Dellis, David Sondermann, Isabel Vansteenkiste (2017), Determinants of FDI inflows in advanced economies: Does the quality of economic structures matter?, Working Paper Series, 1-28 <https://www.ecb.europa.eu/pub/pdf/scpwps/ecb.wp2066.en.pdf?036856d872808da8030f2f06611449c4>
 16. Dr. A. Jayakumar, Kannan .L and Anbalagan .G (2014), Impact of Foreign Direct Investment, Imports and Exports, *International Review of Research in Emerging Markets and the Global Economy (IRREM)*, 1(1),
 17. TheWorldBank.(n.d.).*Exportsofgoodsandservices(%ofGDP):data.worldbank.org*.Retrieved from [data.worldbank.org:http://data.worldbank.org/indicator/NE.EXP.GNFS.ZS](http://data.worldbank.org/indicator/NE.EXP.GNFS.ZS)
 18. TheWorldBank.(n.d.).*Importsofgoodsandservices(%ofGDP):data.worldbank.org*.Retrieved from [data.worldbank.org:http://data.worldbank.org/indicator/NE.IMP.Gdata.worldbank.orgNFS.ZS](http://data.worldbank.org/indicator/NE.IMP.Gdata.worldbank.orgNFS.ZS)
 19. TheWorldBank.(n.d.).*Worldbank.org*.RetrievedfromTotalreserves(includesgold,currentUS\$):<http://data.worldbank.org/indicator/FI.RES.TOTL.CD>
 20. Investopedia.(n.d.).*Investopedia.com*.RetrievedfromForeignDirectInvestment-FDI:<http://www.investopedia.com/terms/f/fdi.asp>
 21. Investopedia.(n.d.).*Investopedia.com*.RetrievedfromGrossDomesticProduct-GDP:<http://www.investopedia.com/terms/g/gdp.asp>
 22. GOVERNMENTOFINDIA.(n.d.).*GrossDomesticSavingsandGrossDomesticCapitalFormation:data.gov.in*.Retrievedfrom [data.gov.in:https://data.gov.in/catalog/gross-domestic-savings-and-gross-domestic-capital-formation](https://data.gov.in/catalog/gross-domestic-savings-and-gross-domestic-capital-formation)