

**An Empirical Analysis into Relationship between FDI and Economic Growth for India and China (1991-2013)**

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**Abstract:**

Foreign Direct Investment (FDI) is a powerful element in the economic development of any country. FDI brings in funds for investment along with advanced technology. FDI thus strengthens development of host countries. Some of the largest beneficiaries of inward FDI have been China and India. So there is growing interest to understand the correlation between FDI and economic growth within this region. The causality between growth and FDI for India and China for the time period 1991-2013 is examined by conducting time-series examinations using Augmented Dickey Fuller and Phillips-Peron unit root tests, co-integration tests and the Granger causality tests. The results point towards presence of bi directional causality between FDI and GDP for both India and China.

**Keywords:** Foreign Direct Investment, GDP, Causality, India, China

**JEL Classification:** F21

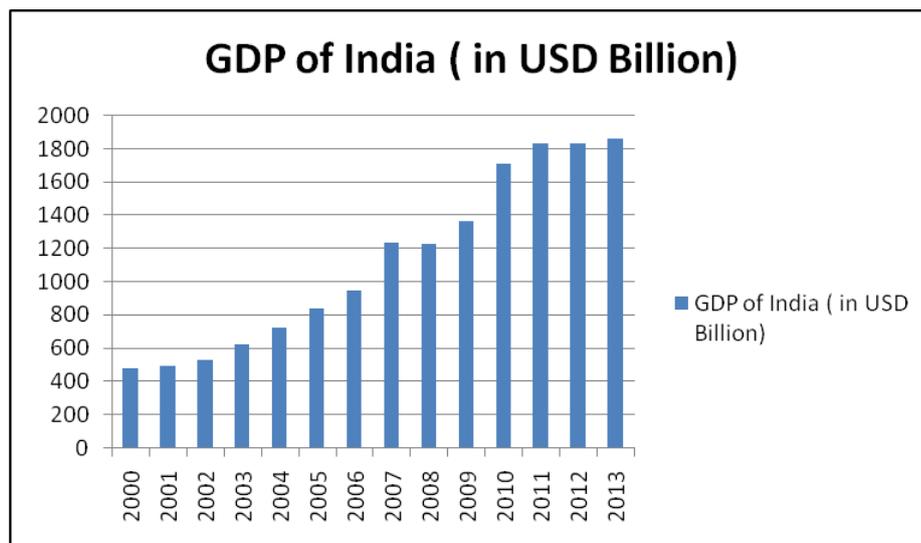
**Introduction**

There has been dramatic change in the global economic environment since last three decades. The importance of FDI was not understood till late 1970s. Many countries understood the importance of FDI and embraced them. These countries brought about considerable changes in their policy to attract inward FDI (Oxelheim & Ghauri, 2008).

The impact of FDI on Economic growth has been found to be extremely important and various channels have been identified through which growth is influenced by FDI (Vadlamannati and Tamazian 2009). According to them, FDI in the short run provides liquidity to capital constraint developing economies. This capital can be invested in physical and human capital. In the long run, investments result in generation of employment and transfer of technology.

India opened up the economy in 1991. India however started receiving decent FDI from late 1990s. It took some for India to realize the importance of FDI and embrace it. It was only in late 1990s that India realized its importance and policy initiatives were directed towards attracting FDI to India. The study considers data from 1991 to 2013. However, in the figure 1 &2, GDP and FDI has been shown from 2000 onwards. GDP of India in 1991 was 274.8 billion USD. It went upto 476.6 billion USD in 2000. In 2013, GDP of India has become 1861 billion USD. India has become a trillion dollar economy.

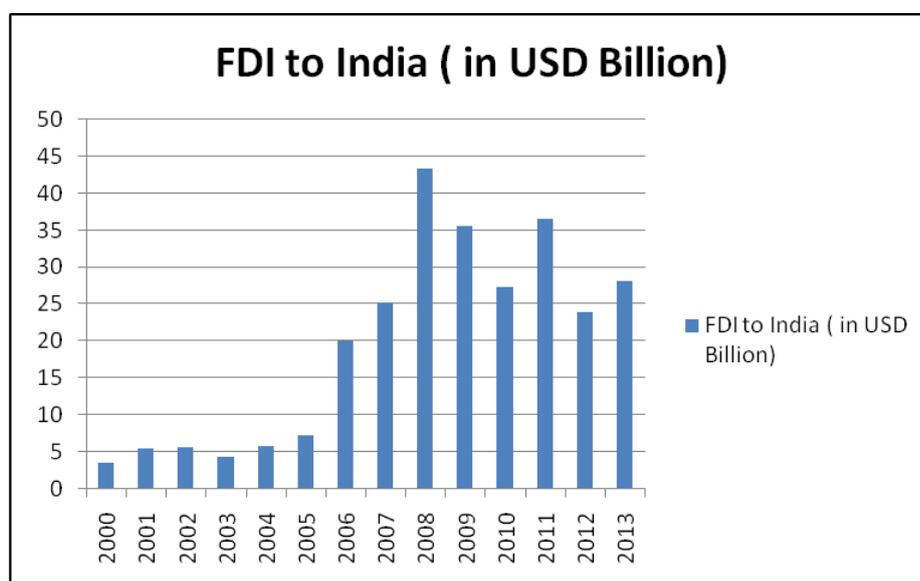
**Figure 1: GDP of India (in USD Billion)**



**Source:** World Bank

The inflow of FDI to India is shown in figure 2 below. FDI to India was less than 1 billion USD in 1991. It went up to 2 billion USD in 1995. In 2000, FDI to India was only 3.5 billion USD. In last thirteen years, it has seen substantial increase to 28 billion USD in 2013. In 2008, It went up to as high as 43 billion USD. It went down after that due to global meltdown.

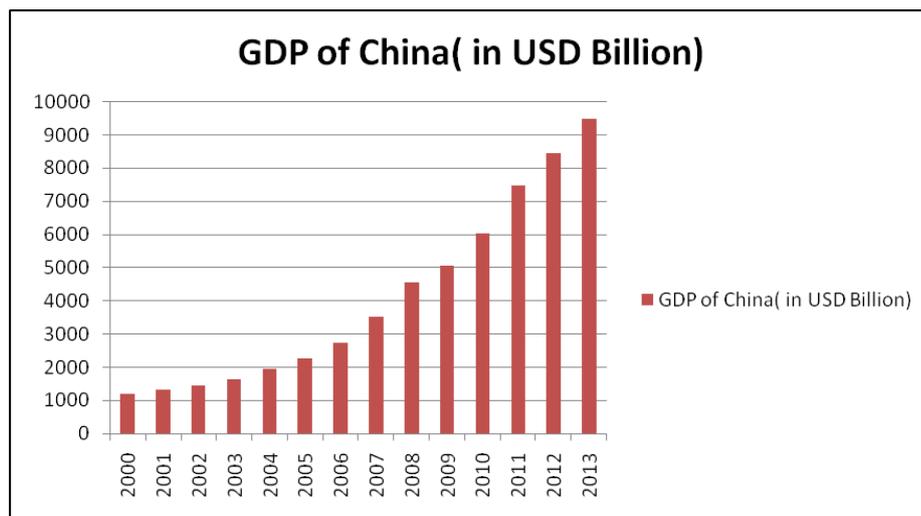
**Figure 2: FDI to India (in USD Billion)**



**Source:** World Bank

China opened up the economy in late 1970s more than a decade before India opened up. China embraced FDI right from the beginning because Chinese policy was directed towards attracting FDI in the production of exportable. GDP of China is shown in figure 3 below. In 1991, GDP of China was 381.4 USD billion. It went upto 1205 billion USD in 2000 and in 2013, it is 9490 billion USD.

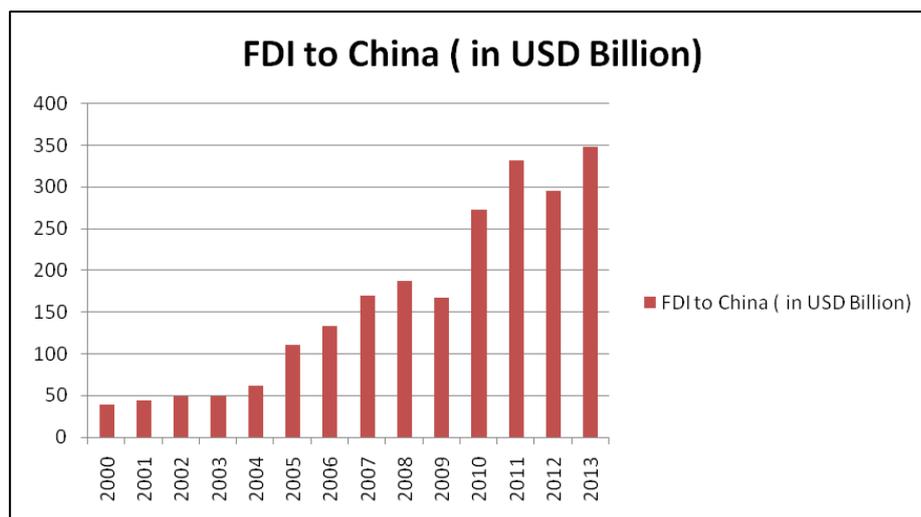
**Figure 3: GDP of China ( in USD Billion)**



**Source:** World Bank Data

As pointed out earlier, Chinese policy was always directed towards attracting FDI.

**Figure 4: FDI to China (in USD Billion)**



**Source:** World Bank Data

As it can be seen from the above figure, FDI to China has been quite substantial. FDI was around 38 billion USD in 2000. In 2013, it increased almost ten times to 347.8 billion USD.

Thus, it can be seen that policy towards FDI has not been same for these two important economies of the World. While China was always in favour of FDI, it took some time for India to realize its importance. This study is unique in the sense that both India and China are being considered together and causal nexus between FDI and GDP is being considered.

The paper is divided into following sections. Section 1 deals with review of literature. Section 2 deals with data and Econometric method. Section 3 deals with empirical results and section 4 with conclusion and policy implications.

## 1. Literature Review

Relationship between FDI and economic growth of a country has been a topic of research for many years. Researchers such as Bende-Nabende and Ford (1998) and Bang Vu et al. (2009) have pointed out that positive relationship exists between FDI and growth. De Mello (1999) observed that FDI contributes towards economic development. Basu et al. (2003) carried out study on 23 countries situated all across the world and observed that FDI & GDP relationship is unidirectional in case of closed economies while in case of open economies, bi-directional relationship is observed. Feridun and Sissoko (2011) found out that unidirectional relationship exists between FDI and growth in case of Singapore. Kaur et al. (2013) found out that GDP per capita is one important determinants of Foreign Direct Investment after liberalization. They found bivariate causality between FDI and economic growth for India after liberalization. Dube (2009) however pointed out that that FDI may not always have positive impact on growth. Dutta Gupta and Talwar (2012) carried out the study for India and ASEAN countries. They found out bi-directional causality for Malaysia, Philippines and India. They found out unidirectional causality for Thailand, Singapore and Indonesia. It is not that everyone found positive relationship between FDI and growth. Dube (2009) pointed out that FDI may not always positive impact on growth. Carkovic and Levine (2002) found no impact of FDI on GDP growth. Thus from the brief review of literature, it can be seen that some researchers have found out positive relationship between FDI and economic growth while they are many who did not find positive impact of FDI on growth. The analysis about relationship between FDI and economic growth has been carried out separately for India and China. This study however considers both India and China and carries out analysis for both the countries during the same period. The purpose of this study is to contribute to this academic debate around causality by examining the relationship between FDI and economic growth within the context of India and China.

## 2. Data and Methodology

To determine whether causality between FDI and Economic growth exist in India and China for the period 1991-2013, Johansen's Cointegration and Granger Causality tests are used (Srinivasan, 2010). The stationarity of each series is being ascertained because there is always a possibility of time series data being non-stationary. The stationarity of the series is being ascertained through Augmented Dickey Fuller Test and Phillips-Peron test. The non-stationary data can be made stationary by differencing. The order of integration is given by the number of differencing. To determine the long run relationship between FDI and Economic growth, Johansen's Cointegration test is applied provided the order of the integrated series is same. Granger causality can be applied in absence of Cointegration also. Granger causality provides the direction of causality.

If GDP can be explained with the help of lagged values of FDI, then GDP is said to granger cause FDI and vice versa.

The data on GDP and FDI in US Billion Dollar was taken from World Bank reports.

## 3. Empirical Results

To apply Cointegration and causality tests, checking of unit root of the data series needs to be ascertained. Standard Augmented Dickey Fuller and Phillips-Perron tests are applied to check the stationarity of the time series data on GDP and FDI. Table 1 shows results of Augmented Dickey Fuller (ADF) and Philips-Perron (PP) test for both GDP and FDI in case of India at first difference. The null hypothesis of unit root is not rejected at level for India. It is rejected at first difference. In case of India, both GDP and FDI are stationary at first difference and are integrated of order one I(1).

**Table 1: Result of ADF and PP test for unit root at first difference for India**

VARIABLE	ADF Statistic	PP Statistic
GDP	-3.392125 (-3.01236)	-3.379384 (-3.01236)
FDI	-5.264761(-3.01236)	-5.260546 (-3.01236)

Source: Authors' Calculations

**Note: Figures in parentheses indicates critical values**

The null hypothesis of unit root is not rejected at level or at first difference for both GDP and FDI in case of China. It is rejected at second difference. Thus in case of China, both GDP and FDI are found to be stationary when they are differentiated twice and integrated of order two I (2). The result of ADF and PP at second difference for China is shown in table 2.

**Table 1: Result of ADF and PP test for unit root at second difference for China**

VARIABLE	ADF Statistic	PP Statistic
GDP	-7.112341(-3.0299)	-7.589694(-3.0206)
FDI	-9.47 9437( - 1.9601)	-11.33771( -3.0206)

Source: Authors' Calculations

**Note: Figures in parentheses indicates critical values**

FDI and GDP for both India and China are integrated of same order .So the Johansen's Co-integration test is performed to ascertain whether long term relationship between FDI and GDP exists or not. (Srinivasan 2010). The result of Cointegration test is shown in table 3.The Johansen's maximum Eigen and trace statistics for India reject the null hypothesis of no cointegrating vector ( $r = 0$ ) Thus it implies that FDI and GDP are not cointegrated and there is no long run relationship between the two. However in case of China FDI and GDP are found to be cointegrated implying long run relationship. The standard Granger causality test is applied to determine the direction of causality.

**Table 3: Results of Johansen's Cointegration Test**

Countries	Vector ®	Trace Statistics	Max-Eigen Statistics	5% Critical Value for Trace Statistics	5% Critical Value for Max-Eigen Statistics	Conclusion
China	$H_0: r = 0$	<b>26.39086</b>	<b>15.23519</b>	<b>15.494</b>	<b>14.264</b>	Cointegrated
	$H_1: r \geq 1$	<b>11.15567</b>	<b>11.15567</b>	<b>3.8414</b>	<b>3.8414</b>	
India	$H_0: r = 0$	<b>13.3896</b>	<b>12.69602</b>	<b>15.494</b>	<b>14.264</b>	No Co-integration
	$H_1: r \geq 1$	<b>0.693575</b>	<b>0.693575</b>	<b>3.8414</b>	<b>3.8414</b>	

Source: Authors' Calculations

The Null hypothesis of 'FDI does not Granger Cause GDP' and 'GDP does not Granger Cause FDI' are rejected implying that there is both way causality between FDI and GDP for both India and China. The result is shown in Table 4.

**Table 4: Result of Standard Granger Causality Test**

Country	Null Hypothesis	F-Statistic	Inference
China	FDI does not Granger Cause GDP	<b>4.74108**</b>	FDI $\square$ GDP
	GDP does not Granger cause FDI	<b>7.38234***</b>	GDP $\square$ FDI
India	FDI does not Granger Cause GDP	<b>6.97585**</b>	FDI $\square$ GDP
	GDP does not Granger cause FD	<b>2.7329*</b>	GDP $\square$ FDI

Source: Authors' Calculations

**Note:** \*, \*\*, \*\*\* denotes significant at 10%, 5% and 1% respectively.

#### 4. Conclusion and Policy Implications

The study tried to find the relationship between FDI and GDP for both India and China. Johansen Cointegration technique and standard Granger Causality test were used to investigate the relationship between FDI and Growth in India and China. This study is unique in the sense that causality is examined in the context of both India and China. FDI is important for development of two important growth oriented economies of the world. The results reveal bidirectional causal link between GDP and FDI for both India and China. Thus, it can be stated that FDI influence GDP growth and GDP also influences inflow of FDI.

Our research has significant research implications due to the presence of bi-directional causality. Role of FDI as an important determinant of growth points towards the fact that policy guidelines should be oriented towards attracting FDI to the country. China has realised that long back. India should try to attract FDI for growth.

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