

# FDI based Industrialisation and Regional Imbalance: Evidence from Indian States

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This paper provides empirical evidence on the link between FDI and Total Factor Productivity of industries in various Indian States. The parameters examined for measuring TFP are total no. of persons engaged, net value added and capital invested. The entire data is for the time period is 2000-01 to 2010-11.

This paper tries to quantify the reasons behind the skewed distribution of FDI among Indian states. The results show significant differences in TFP growth between various states confirming that regional imbalance in India has widened in context of FDI based industrialisation. Also, the results obtained confirm the presence of agglomeration effect, infrastructure, labour condition and a strong impact of policy environment in the region.

**Keywords:** FDI, TFP, Net-Value Added, Regional Disparity.

Following the liberalisation of the foreign direct investment (FDI) policy in India in the early 1990s, FDI to India has increased significantly in the last decade. However, the growth in FDI flows has been accompanied by strong regional concentration thereby depriving a large number of Indian states from the benefits of a liberalised FDI regime. In view of this, the paper examines what are the major determinants affecting regional distribution of FDI flows in India. The analysis reveals that market size, agglomeration effects and size of manufacturing and services base in a state have significant positive impact on FDI flows. The impact of taxation and cost of labour is negative. While the impact of quality of labour is ambiguous, infrastructure, however, has significant positive influence on FDI flows.

In view of this, an attempt has been made in this paper to examine the major determinants affecting regional distribution of FDI flows to India.

From the following table it is clearly indicated that destination wise, economically advanced states have attracted the lion's share of FDI flows to India. The top six Indian states, viz., Maharashtra, Delhi, Karnataka, Tamil Nadu, Gujarat and Andhra Pradesh together accounted for over 70 per cent of FDI equity flows to India during the period April 2000 to June 2011 reflecting distinct signs of FDI concentration at the state level. The FDI policy in India was liberalised in the early 1990s as a part of economic reforms to attract the foreign capital and also to take advantage of the spill over of technology and knowledge. It is, therefore, essential to derive maximum benefit from the FDI flows and ensure that the rising FDI flows do not lead to an increase in regional inequality.

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**Table-1 Share of various states in FDI inflows 2000-2011**

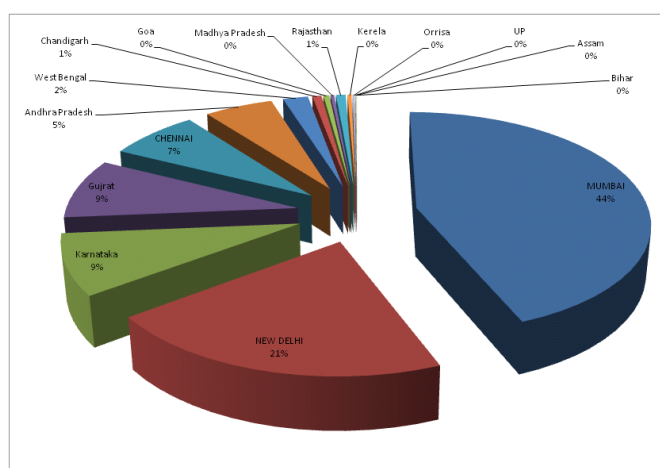
Year	States															
	Mumbai	New Delhi	Karnataka	Gujrat	Chennai	Andhra Pradesh	West Bengal	Chandigarh	Goa	Madhya Pradesh	Rajasthan	Kerala	Orrisa	UP	Assam	Bihar
2000-03	124,593.60	144,748.71	37,848.88	14,695.56	37,405.11	11,559.57	3,789.02	10,279.08	3,231.15	479.08	108.62	2,231.97	0	0	217.41	27.35
2003-04	32,464.95	33,036.09	10,642.53	6,884.64	3,660.99	8,580.89	4,595.60	718.95	798.52	616.36	42.74	495.5	0	0	200.02	0
2004-05	22,729.01	42,976.05	16,069.85	6,352.13	10,964.87	7,232.79	4,054.19	3,777.87	814.05	538.24	26.56	262.47	2,616.64	0.3	0	0
2005-06	159,073.24	97,848.07	28,192.09	16,387.57	51,925.27	25,174.72	2,882.89	848.63	3,508.82	749.42	2,308.53	944.49	1,035.94	556.15	0	6
2006-07	143,843.35	106,978.27	38,050.37	8,181.34	26,915.02	22,409.21	16,172.42	1,922.65	80.15	2,045.45	450.4	453.6	302.63	20.83	110	0
2007-08	628,425.75	93,542.60	96,529.63	173,302.78	58,155.86	62,029.81	21,508.30	0	2,497.31	1,226.11	16,808.76	3,516.57	0	0	1,764.66	0
2008-09	57,066	7,943	9,143	7,757	7,757	5,406	2,089	0	134	209	1,656	355	42	0	176	0
2009-10	39,409	46,197	4,852	3,653	3,876	5,710	531	1,038	808	255	149	606	702	227	51	0
2010-11	27,669	12,184	6,133	6,115	3,294	5,753	426	1,892	1,376	2,093	230	167	68	514	37	25
2011-12	3,381	4,495	576	2,177	559	575	550	24	0.08	1	3	268	90	247	0	0

Source: SIA Newsletter, Nov 2007, 2009 and various issues of SIA Newsletter.

**Note:**

1. The FDI inflows data are region office wise as per RBI recommendation.
2. One region covers more than two states in few cases. The author has considered the regionwise inflows as state specific due to calculation requirements. The selection of the state as main state is based on the weightage of states in terms of FDI inflows.
3. The RBI's Region specific amount includes the Inflows through SIA/FIPB route and RBI's automatic route only.
4. Inflows through ADRs/GDRs/FCCBs, against FDI approvals have not been included
5. Inflows Includes 'Equity Capital Components' only
6. The State-wise FDI Inflows are classified as per RBI's – Region-wise inflows furnished by RBI, Mumbai.

The pie chart states very clearly the share of each state in total FDI inflows to states. Mumbai with 44% enjoys the majority of the total inflows. Delhi is at second with 21% shares and is followed by Karnataka with 9%, Gujrat with 9%, Chennai with 7% & Andhra Pradesh with 5%. Rest of the states fail to receive appropriate FDI inflows which is a area of major concern.

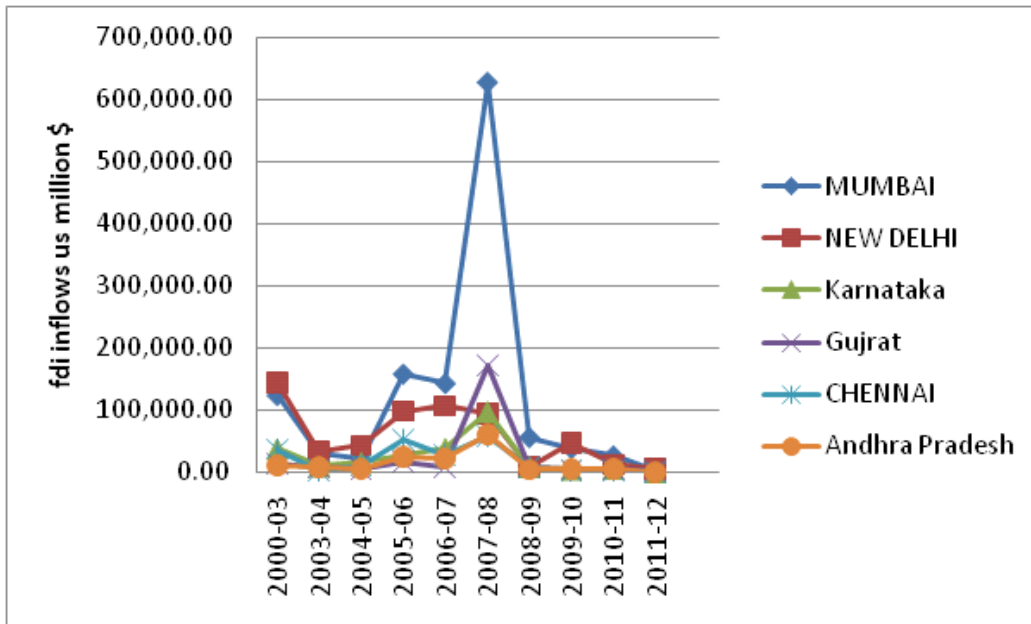
**Pie chart 1 share of states in total FDI inflows 2000-2011**

Source: SIA Newsletter, Nov 2007, 2009 and various issues of SIA Newsletter.

Compiled and computed by author

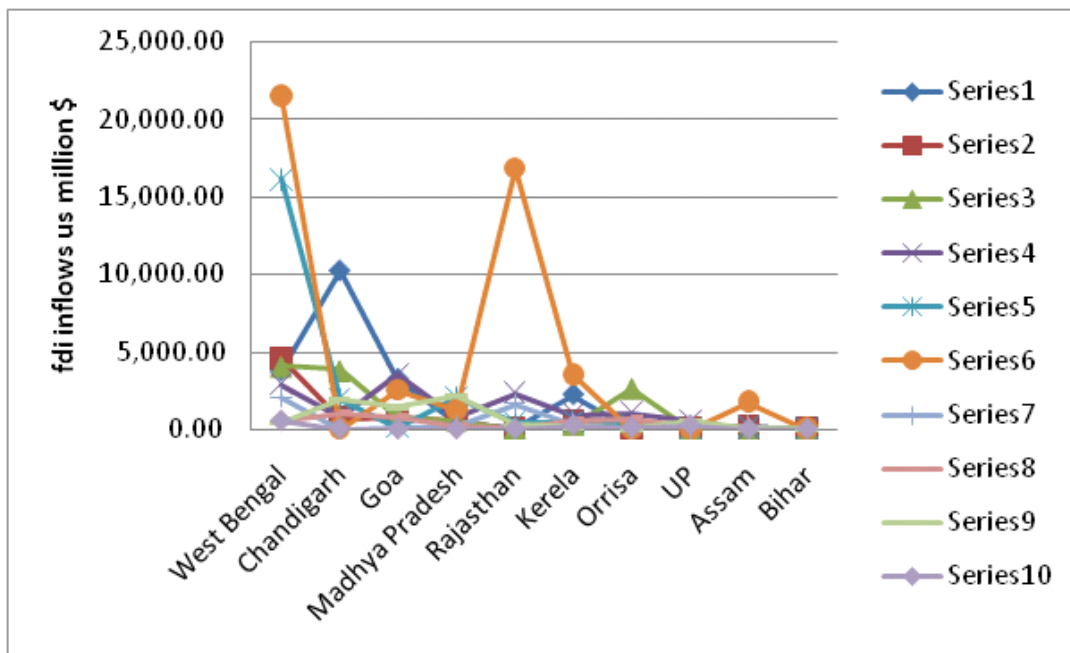
Both the trend line showing the trend of FDI inflows within various states for the time period 2000-2011 also supports the general view that industrialised states are qualified to attract major chunk of FDI inflows. And the non-industrialised states have been successful in attaining just a marginal share in these years.

**Fig. 2 Trend line of FDI inflows in states receiving highest FDI 2000-2011**



Source: SIA Newsletter, Nov 2007, 2009 and various issues of SIA Newsletter.  
Compiled and computed by author

**Fig. 3: Trend line of FDI inflows in states receiving smaller FDI 2000-2011**



Source: SIA Newsletter, Nov 2007, 2009 and various issues of SIA Newsletter.  
Compiled and computed by author

As regards location choice, the Multi National Enterprises (MNEs) tend to set up their plants in big cities in the developing countries, where infrastructure facilities are easily available. Therefore, in order to attract FDI flows, the recipients countries/regions were required to provide basic facilities like land, power and other public utilities, concessions in the form of tax holiday, development rebate, rebate on undistributed profits, additional depreciation allowance and subsidized inputs, etc.

## REVIEW OF LITRATURE

India's closer integration into the world economy which was helped by the reform program enabled the country to better exploit its comparative advantages. Developing countries witnessed a surge in FDI inflows post 1990's. The efforts of the government shifted towards designing investor friendly policies to attract FDI inflows. Economists and experts believe that FDI generates substantial benefits to the local economy. There is also sizeable empirical evidence to show that the macroeconomic growth and development is spurred by rapid FDI inflows. Also, FDI generate considerable direct and indirect positive spillover effects in the form of transfer of technology.

Empirical studies offer evidence on the role of FDI on productivity growth or spillovers of productivity at industry/sector level or at firm level.

**Table: 2 Empirical Studies on Impact of FDI on Productivity Growth and Spillovers: Sector and firm level studies**

Sl. No.	Researchers	Country	Period	Data	Aggregation	Results
1	Miguel D. Ramirez	Mexico	1960-2000	Error-Correction Model	Industry	Positive
2	Caves (1974)	Australia	1966-1974	CS	Industry	Positive
3	Chandana Chakraborty, Peter Nunnenkamp	India	1991-2000	Panel co integration	Industry	Positive in manufacturing, casual relationship absent in primary sector
4	Globerman	Canada	1972-1979	CS	Industry	Positive
5	Alfaro	Cross country	2003	Panel data	Sectoral level	Effects various across sectors with positive and significant effect only visible in manufacturing
6	Blomstrom and Persson	Mexico	1970-1983	CS	Industry	Positive
7	Kathuria (2002)	India			Firm level	Only those domestic firms which invested in R&D in order to make use of foreign technologies, benefited from FDI
8	Haddad and Harrison	Morocco	1985-1989	Panel	Firm & Industry	Negative
9	Lisa De Propis & Nigel Driffield (2006)	Inter-country study				Firms in clusters gain significantly from FDI in their region, both within the industry of the domestic firm and across other industries in the region

contd...

10	Blomstrom and wolf	Mexico	1970-1975	CS	Industry	Positive
11	Goldar et. al.	India	1991-2000	Panel	Firm	Issue of convergence
12	Sasidharan	India	1994-2002	Panel	Firm	The study finds no evidence of horizontal spillover effects. However, the study finds vertical negative effects
13	Kokko	Mexico	1970-1990	CS	Industry	Positive
14	Aschaur(1989) & Ramirz(2000)	Inter country study			Firms	FDI generate considerable direct and indirect positive spillover effects in the form of transfer of technology. This in turn leads to increased productivity of domestic firms in the host country.
15	Kokko et.al	Uruguay	1990-1996	CS	Firm	Insignificant
16	Kathuria	India	1990-1997	Panel	Firm	Limited to scientific firms
17	Aitken & Harrison	Venezuela	1976-1989	Panel	Firm	Positive but more in joint ventures than domestic firms.
18	Djankey and Heckman	Czech Republic	1993-1996	Panel	Firm	Positive but limited
19	Chuang & Lin	Taiwan	1991-1998	CS	Firm	Positive
20	Sjoholm	Indonesia	1980-1991	CS	Firm	Positive

Miguel D. Ramirez (2006) in his learn “Is Foreign Direct Investment Beneficial for Mexico? An Empirical Analysis” examines the blow of Foreign Direct Investment on labour productivity function for the 1960- 2001 period is anticipated that includes the impact of changes in the stock of private and foreign capital per worker. The error correction model estimates recommend that increase in both private and foreign investment per worker have a positive and economically significant effect on the rate of labour productivity growth. However, after taking into account the growing remittances of profits and dividends, there is a marked decrease in the economic effect of foreign capital per worker on the rate of labor productivity growth.

Caves (1974) in his study on the manufacturing sector of Australia for the time period 1966-1974 used CS ( cross section) analysis for testing the impact of foreign capital on labour productivity. He observed that the spillover effects were positive in the Industry.

Chandana Chakraborty, Peter Nunnenkamp in their study for India for the time period 1991-2000 applied Panel co integration for Industries. They observed Positive impact in manufacturing, on the other hand casual relationship was absent in primary sector.

According to Globerman the impact of FDI on Canadian Industries for the time period of 1972-1979 was positive.

Alfaro(2003) used Cross country Panel data Sectoral level to study the various Effects across sectors in heterogeneous group of countries. Alfaro declares that growth impact of FDI varies across sectors with positive and significant effect only visible in manufacturing.

Blomstrom and Persson in their study on Mexico for the time period 1970-1983 used cross section analysis (CS) on Industries stated Positive impact of FDI.

Kathuria (2002) for India conducted his study at Firm level and revealed that only those domestic firms which invested in R&D in order to make use of foreign technologies, benefited from FDI.

Haddad and Harrison (1993) estimated the effect of FDI on productivity of firms and its spillover effects on domestic firms stated that although foreign firms pay higher real wages than the domestic firms, they are neither greater outward oriented nor reflect higher labour productivity.

Lisa De Propis & Nigel Driffield (2006) in their Inter-country study revealed that Firms in clusters gain significantly from FDI in their region, both within the industry of the domestic firm and across other industries in the region.

Blomstrom and Wolf in their study on Mexico for the time 1970-1975 using CS revealed that impact of FDI on Industry tends to be Positive.

Goldar et. al. for India studied for the time period 1991-2000. Using Panel data they estimated the TFP effects for Indian manufacturing sector. However the effects of FDI were not significant.

Sasidharan for India 1994-2002 used Panel data on Firm level. The study finds no evidence of horizontal spillover effects. However, the study finds vertical negative effects.

Kokko examined the impact of FDI on Mexican industries for the time period 1970-1990 using CS. He revealed that the impact of FDI was positive and on the other hand in his same nature of study for Uruguay for the time period 1990-1996 he found that the impact of FDI on Firm was insignificant.

Aschaur (1989) & Ramirez (2000) in their Inter country study revealed that on Firms, FDI generate considerable direct and indirect positive spillover effects in the form of transfer of technology. This in turn leads to increased productivity of domestic firms in the host country.

Kathuria studies Indian manufacturing sector to examine the impact of FDI on the productivity of firms. He revealed that the positive impact is there but the condition of technology absorption exists. The time period of the study was 1990-1997

Aitken & Harrison for Venezuela considering the time period 1976-1989 using Panel data for manufacturing Firms revealed that FDI and firms performance are positively and strongly linked but foreign firms are comparatively better than domestic counterparts cause of their technological capability.

Djankey and Heckman in their study on Czech Republic for the time period 1993-1996. The study found that FDI has a positive impact on the recipient firm. Further the study revealed that the domestic firms would have gained better if trained properly so that the absorption of techno transfer would have taken place in efficient manner.

Chuang & Lin Taiwan (1999) for time period 1991-1998 examined the effects of FDI on Taiwan's manufacturing firm. The result of the study confirmed positive impact of FDI on TFP of firms.

Sjoholm for Indonesia conducted research for the time period 1980-1991. Using CS he conducted a Firm level study and revealed that FDI has Positive impact but comparatively more in case of foreign firms than domestic firms.

In short, we find that the existing literature on FDI in India falls short of providing a comprehensive understanding of the nature and the context of FDI in India. It is in this context that the need to study the history of FDI in India arises. The character and content of FDI in India and how India as a host country have evolved during the twentieth century is the focus of this paper.

It is also imperative to note that there is rarely any study that analyses the impact of FDI on Indian industrial growth. Since FDI is the major factor in liberalization and globalization policy of all the transitional economies including India, the present study is an endeavor since it examines the impact of FDI in Indian industries in pre and post liberalized era.

## Hypotheses of the Study

### Null Hypotheses

H0: It is hypothesized that Regional imbalances in India have not been widened in context of FDI-based industrialization.

### Alternative Hypotheses

H1: It is hypothesized Regional imbalances in India have been widened in context of FDI-based industrialization.

## 6. Estimation procedure

Cobb-Douglas Production Function is one of the most widely used production function in Economics and Management research. This production function not only satisfies the basic economic law but also easy in its computation and interpretation of the estimated parameters. The objectives of applying Cobb-Douglas production function is to estimate the co-efficient of inputs, their marginal productivities, factor shares in total output and degree of returns to scale. It is based on unitary elasticity of substitution of inputs and this production function has been widely applied in empirical studies. In the analysis unrestricted Cobb-Douglas Production Function has been used.

## 7. Data Description

In order to analyze the impact of FDI Inflows on Total Factor Productivity of industries state wise the data is extracted from Annual Survey of Industries Various Issues on Total No. of Persons Engaged, Net Value Added and Capital Invested. The entire data is for the time period 2000-01 to 2009-10. The calculation and compilation is done by the author.

## 8. Model Specification:

The analysis is based on following Cobb-Douglas production function:-

$$V = AL^{\alpha}K^{\beta}$$

In order to evaluate the total factor productivity of industries statewise the following model has been used.

$$v = AL^{\alpha}K^{\beta}FDI^{\gamma}\mu$$

Where  $v$  = value addition

$K$  = capital invested

$L$  = total persons engaged

FDI = Foreign Direct Investments

$A$  = States Efficiency ( value addition) parameter

$\alpha$  = Co- efficient of capital invested

$\beta$  = Co- efficient of Total Persons Engaged

$\gamma$  = Co –efficient of FDI

$\mu$  = error term

The anti log of both sides of the above model was taken to convert the equation into linear form; its log transformation is specified below:

$$v/L = A + \beta \text{LN}(K/ L) + \gamma \text{LN}(\text{FDI}/L) + \mu \dots\dots\dots \text{(I)}$$

After taking Dummy Variables the equation is:

$$v/L = \sum \theta_i S_i + \beta \text{LN}(K/ L) + \gamma \text{LN}( \text{FDI}/L) + \mu \dots\dots\dots \text{(II)}$$

Where  $\theta_i$  = Dummy Variables

$S_i$  = States

$i = ( 1, 2, 3, 4, 5 \dots\dots\dots 16)$

The efficiency parameter ( $A$ ) and the co-efficient of the inputs were estimated by applying the above equation.

Parameters ‘ $\alpha$ ’, ‘ $\beta$ ’ and ‘ $\gamma$ ’ represent individually the proportionate change in value addition for a proportionate change in Capital Invested, Total Persons Engaged and Foreign Direct Investments. The three co-efficients taken together to measure the aggregate proportionate change in value addition of states for a given proportionate change in labour, capital and FDI. This implies that  $\alpha + \beta + \gamma$  shows the degree of returns to scale.

If  $\alpha + \beta + \gamma > 1$ , it would imply that the output increase would be more than proportionate to the increase in inputs, if  $\alpha + \beta + \gamma < 1$ , it would imply that the output increase would be less than proportionate to the increase in inputs and if  $\alpha + \beta + \gamma = 1$  the output would just increase proportionately to the rate of increase of inputs. Therefore there will be economies of scale, constant returns to scale or diseconomies of scale depending upon whether  $\alpha + \beta + \gamma$  is less than 1, equal to 1 or greater than 1. This implies that the CD production function can represent any degree of returns to scale.

Theoretically we expect that all the input co-efficients shall have a positive sign and greater than zero i.e.,  $\alpha > 0, \beta > 0, \gamma > 0$ .



## 9. Result & Discussion

The Results of Equation  $V/L = \sum \theta_i S_i + \beta \ln(K/L) + \gamma \ln(FDI/L) + \mu \dots \dots \dots II$

**Table: 5.5.9**

Statistics		Coefficients	T-Ratios
R	.971	-	-
R-Square	.943	-	-
Adj R-Square	.933	-	-
F-Value	100.485	-	-
DW	1.612	-	-
df	18, 110	-	-
LN (L/L) ( $\alpha$ )	-	.525	6.354
LN K /L ( $\beta$ )	-	1.382	9.168
LN FDI/L ( $\gamma$ )	-	.004	.118
New delhi (01)	-	-.067	-1.832
Maharashtra (02)	-	-.040	-.820
Karnataka (03)	-	-.089	-1.980
Gujarat (04)	-	-.114	-2.186
CHENNAI (05)	-	-.143	-3.737
Andhra Pradesh 06	-	-.182	-4.220
West Bengal (07)	-	-.163	-3.985
Chandigarh (08)	-	-.105	-2.693
Goa (09)	-	.001	.027
Madhya Pradesh (010)	-	-.100	-2.193
Rajasthan (011)	-	-.099	-2.344
Kerala (012)	-	-.135	-4.071
Orissa (013)	-	-.146	-2.714
UP (014)	-	-.134	-3.103
Assam (015)	-	-.119	-3.024
Bihar (016)	-	-.250	-6.207

The Table shows the regression results of Equation II. The high F-Value shows that overall regression is significant due to joint significant of all the coefficients. The selected independent variables are able to explain 94 per cent variation in the value-added per unit of labor as reflected from  $R^2$  and Adjusted  $R^2$ . Although, FDI differ considerably among the regions and therefore could have led to the problem of heteroscedasticity but in the present analysis for simplicity this problem has been ignored. The problem of autocorrelation is present as reflected from Durbin-Watson (DW) ratio i.e. 1.62 but not severe. The values of the estimated coefficients are significantly larger than their standard errors as reflected by high t-ratios except the coefficients of Maharashtra, Goa and FDI per head labor.

The Total Factor Productivity of the States has been computed by taking antilog of  $\theta_i$ , in the Equation II. The average TFP for all India for the selected period is 0.88. It is observed that eleven states lie

above the India average with 1.02 times of average TFP and five states are below the all India average, out of which two states Andhra Pradesh and Bihar have very low TFP. The TFP across States shows considerably moderate variation. Therefore, we can that the states with high TFP have less need of FDI absorption rather than states with low TFP accepting the Alternative Hypothesis and rejecting the Null Hypothesis.

The results obtained from this study imply that government must focus on development of human resource, primary infrastructure, transportation facilities and policy framework of the regions receiving small share of foreign capital investments. Government should provide incentives and better infrastructure for investors to invest in the disadvantaged regions which are landlocked or presently less developed. Considering the huge potential of India some structural changes can attract huge foreign investments and can lead to a stable growth.

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