

Equity and Efficiency of Foreign Direct Investment in Indian States

K. V. Bhanumurthy*, Manoj Kumar Sinha**

Abstract

The two relevant criteria for evaluating the performance of the Indian economy in regional terms, in respect of FDI flows, according to our understanding are efficiency and equity.

Since FDI is primarily a relocation of international production it is based on the principle of optimal resource allocation. The notion of efficiency, in this context, refers to the tendency of FDI to flow to those regions or States which have efficient production. The other side of the coin is that an efficient State deserves to get a greater share of FDI. This spells out the notion of equity.

The paper uses set of new indices, including index of rank dominance, which shows that the most dominant centre is Mumbai. The paper also uses a 2-Stage Least Square (2SLS) estimation procedure, with two panel regression fixed effects models. There is a very high elasticity of FDI flows w.r.t. SDP growth. Also the results show that there is an extremely high negative correlation (-0.996) between equity and efficiency. The states that are more efficient receive less of FDI flows. This points towards non-economic forces in operation that influence FDI flows and regional development.

Keywords: Efficiency, Equity, FDI, SDP, Dominance, Growth

Introduction

With globalisation, flows of foreign direct investment (FDI) in India have been increasing since 1991, in an overall sense. However the FDI flows into different States in India have not grown uniformly. The Paper has tried to study pattern of states-wise distribution of FDI in India. The two relevant criteria for evaluating the performance of the Indian economy in regional terms, in respect of FDI flows, according to our understanding are;

- (i) Efficiency; and
- (ii) Equity.

The notion of efficiency, in this context, refers to the tendency of FDI to flow to those regions or States which have socio-economic propensities that would lead to efficient production since FDI is primarily a relocation of international production. This implies that those regions or States that have low cost economic production structure, along with other factors, which lead to efficiency, should ideally attract larger investible funds, in keeping with the principle of optimal resource allocation. Efficiency, therefore, implies that they are able to produce more from the resources that they command and use. Hence, State Domestic Product (SDP) of an efficient State would be higher in relative terms.

If a State is efficient it is bound to have an effect on resource allocation. Consequentially, the domestic product would grow more than proportionately. Hence, SDP will grow. This represents efficiency aspect.

* Professor, Department of Commerce, University of Delhi, New Delhi, India. Email: bhanumurthykv@yahoo.com

** Assistant Professor, Department of Commerce, PGDAV College, University of Delhi, New Delhi, India.
Email: mkdsesinha@yahoo.co.in

Efficiency Aspect

A functional relationship exists between growth of domestic product and investment, along with other factors, as follows:

$$(SDP)_t = f(\lambda - \text{Scale Parameter}, \gamma - \text{Efficiency Parameter}, \text{State Resources}, \text{Investment including FDI})_t$$

If a particular state is able to produce output more than the proportionate use of inputs, given constant return to scale (that is $\lambda = 1$ (the underlying assumption of a Cobb-Douglas type production function), it is efficient. The scale parameter ($\lambda = 1$) is common to all states.

Any production over and above the output, as per input use, will be due to all other factors, namely, technical or managerial efficiency (γ). The efficiency parameter (γ) will take different values for different states, depending on their relative efficiency.

In an actual production function, this can be captured by the intercept, through difference dummies for different states.

On the other hand, a Centre that displays growth rate in terms of SDP shows that it has performed well. Hence, it deserves to get a greater share of FDI. However, this effect would be felt with a lag because FDI flows are not instantaneous. Therefore, in previous year if SDP increases the centre should attract more FDI in current year. Hence this is a normative criterion for the justification of the pattern of capital flows. This represents equity aspect of FDI.

Equity Aspect

$$FDI_t = f(\lambda - \text{Scale Parameter}, SDP_{t-1}, \alpha - \text{Equity Parameter})$$

λ – Scale Parameter is once again treated as ‘1’, for all States. This implies that larger States may attract more of FDI in any case. But this would not be more than proportionate in the ordinary case.

Equity (α) is based on the notion that states or regions that have performed better, in terms of growth of SDP, need to be duly rewarded, through a greater allocation of FDI in their favor.

Therefore, Equity Parameter (α) must be >0 for the equity criterion to be satisfied, in the case of more efficient States.

Equity, on the other hand, it has been argued in this paper, is based on the notion that States or regions that have performed better, in terms of growth of State Domestic Product (SDP), need to be duly recognized and rewarded, through a greater allocation of FDI in their favour. This paper shall measure the distribution of FDI amongst the States of India with a focus on the “equity aspect”, as defined above.

Plan of the Study

The article is organised as follows. Section 2 gives the literature review. Section 3 lays methodology and model specifications followed by results and summary in Section 4.

Literature Review

It is surprising that there are not many studies that talk of the regional aspects of FDI inflows, especially in Indian context.

Jha (2003) points out that unless FDI makes its own contributions towards technology progress, productivity spillovers and a consolidation of niche export markets, it may be considered as a part of the level of general investment in the economy. FDI needs certain types of domestic policy support in order to flourish. This paper emphasizes the view that an enlightened FDI policy, both at the national and the states level, is to be seen as part of a general policy of enhancing investment in this economy under condition of sustained production efficiency.

Kumar (2003) -This paper has overviewed the evolution of Indian government's attitude towards FDI, examined the trends and patterns in FDI inflows during the 1990s and has considered its impact on a few parameters of development in a comparative East Asian perspective. The paper finds a good correspondence between industrial growth rate in a year and the FDI inflows in the following year. The industrial growth seems to signal to the foreign investors about the prospects of the economy. Therefore, it appears that policy liberalization may be a necessary but not a sufficient condition for FDI inflows.

Rao and Murthy (2006) – This paper has overviewed the state-wise distribution of foreign direct investments in the post liberalisation period. It may be said that states in the western and southern regions attracted much of the approved FDI. Even if some of the backward states attracted foreign investment proposals based on their natural resources. However the manufacturing FDI would not go to the relatively backward states except in case of extractive activities and those based on natural resources. Overall, it does appear that, in line with experience elsewhere, FDI has shown a preference for developed states. The two factors combined may accentuate the differences between the developed and backward states. The backward states may neither be in a position to offer the incentives to offset disadvantages and even if they do, the net benefit for their economies is not guaranteed. States have to improve the overall investment climate to be able to attract investment, whether domestic or foreign. The private sector would not always be forthcoming to meet this basic requirement. The role of public investment is thus obvious:

“Although attracting FDI can be an important element of a regional development strategy, the key to successful development will ultimately be sound domestic macroeconomic and structural policies, adequate and efficient domestic savings and investment and human capital accumulation, supported by sound and strong domestic institutions. FDI is not a substitute for getting domestic policies “right”. Appropriate domestic policies will help attract FDI and maximise its benefit, while at the same time removing obstacles to local business (Ögütçü, 2002)”.

Targeting FDI, or expecting it to deliver the goods on its own, may thus not always be the right choice for the states. This is more so because, crowding in effects of FDI on domestic investment are not always guaranteed. Further, with performance requirements no longer significant and mergers and acquisitions (Mass) playing a major role in FDI flows, the need for looking at the disaggregated picture to understand the contribution of FDI to regional development becomes quite obvious.

In the Indian Context, FDI is expected to play a crucial role in financing the investment gap. Increasing, there is a higher level of competition amongst developing countries (essentially rules based and incentives based) to attract FDI. The Indian case is more interesting because fifteen of the India's twenty five states are nation like. With

the advent of liberalization, almost all Indian states are actively competing to attract foreign direct investment for their development. The intensity of inter-state competition for FDI can be analyzed by incentive index of states. The ranking of states, according to incentive index indicate:

- prevalence of incentive based competition amongst states
- the level of incentives is increasing over the time period
- There is not much correlation between the level of incentives offered and investments attracted.

When the relative importance of incentives vis-à-vis infrastructure in attracting private investment was gauged, it was found that the infrastructure status plays a significant role, (Venkatesam and Varma, 1998; Padhi, 2002).

Data and Methodology

Data

Data on centre-wise (or state-wise) FDI has been collected from Department of Industrial Policy and Promotion, Ministry of Industry and Commerce, Government of India (<http://dipp.gov.in/>). Data related to State Domestic Products (SDP) and other socio-economic variables have been taken from reports/publications of Central Statistical Organisation (CSO) (http://mospi.nic.in/mospi_cso_rept_pubn.htm).

Methodology

The methodology involves a number of empirical exercises, employing a number of statistical and econometric tools for analysing equity aspect of FDI distribution in India. For this purpose a number of indices have been developed.

Indices

This paper is measuring ‘equity’ aspect of distribution of FDI amongst centres. There has been given a set of formalised and stylized indices at four point of time for FDI and SDP across centres. These indices are based on Bhanu Murthy, et al. (1999).

There are two set of indices at the first level- one for FDI and another for SDP.

First level of indices- is based on the ratio of FDI and SDP in a particular centre with respect to national average of FDI and SDP respectively.

Relative Index of FDI

$$F_{rf}^c = \frac{f_t^c}{\left[\sum_{c=1}^n f_t^c / n \right]}$$

Where, t = 1991, 1995, 2002 and 2007.

c = 1, 2,13

n = 13

F_{rf}^c = FDI ratio of c^{th} Centre with respect to national average FDI in

t^{th} period.

Relative Index of SDP

$$P_{rf}^c = \frac{p_t^c}{\left[\sum_{c=1}^n p_t^c / n \right]}$$

P_{rf}^c = SDP ratio of c^{th} Centre with respect to national average SDP in

t^{th} period.

Second level of Indices – is a temporal ratio of first ratio at two point of time for both FDI and SDP

Temporal Index of FDI

$$RF_{t't}^c = \frac{F_{rt'}^c}{F_{rt}^c}; \text{ where } RF_{t't}^c = \text{Relative Index of FDI.}$$

This measures change in relative position of the FDI index of a particular centre over between two periods of time. This yields three indices between 1995 and 1991; between 2002 and 1995 and between 2007 and 2002.

Average Ratio of Relative FDI

$$ARF_T = \frac{\sum_{c=1}^n RF_t^c}{n}$$

ARF_T = Average of ratio of relative FDI between two points of time

Change in FDI average

$$ARF_{T'T} = \frac{ARF_{T'}}{ARF_T}$$

$ARF_{T'T}$ = Change in average between two points of time.

Temporal Index of SDP

$$RP_{t't}^c = \frac{P_{rt'}^c}{P_{rt}^c}; \text{ where } RP_{t't}^c = \text{Relative Index of SDP.}$$

This is index of the ratio between SDP indices at two points of time. This measures change in relative position of the FDI index of a particular centre between two points of time. This yields three indices between 1995 and 1991; between 2002 and 1995 and between 2007 and 2002.

Average Ratio of Relative SDP

$$ARP_T = \frac{\sum_{c=1}^n RP_t^c}{n}$$

ARP_T = Average of ratio of relative SDP between two points of time

Change in SDP average

$$ARP_{T'T} = \frac{ARP_{T'}}{ARP_T}$$

$ARP_{T'T}$ = Change in average between two points of time.

Third level of Indices – is ratio between the temporal indices of FDI and corresponding temporal indices of SDP.

$$RR_t^c = \frac{RF_{t't}^c}{RP_{t't}^c}$$

$$ARR_T = \frac{\sum_{c=1}^n RR_t^c}{n}$$

$$ARR_{T'T} = \frac{ARR_{T'}}{ARR_T}$$

Power of these indices lies in exposing what is the relative position of each centre with respect to national average both in terms of FDI and SDP. Also it tells us the change in relative position over time with the help of temporal indices. Overall change is measured by average across the centres.

Dominance Pattern

Among the top five centres which of the centre has the dominant position (i.e. highest rank) for the longest period is estimated with the help of index of rank dominance (Bhanumurthy, 2011).

$$I_{RD} = \frac{\sum_{i=1991}^{2008} (\text{Rank Score})_i}{\text{Maximum Rank Score} \times \text{No. of years}}$$

I_{RD} = is the index of Rank Dominance.

Rank Score = 5, 4, 3, 2, 1 (in decreasing order of rank).

The value of I_{RD} lies between 0 and 1, that is,

$$0 < I_{RD} \leq 1$$

I_{RD} measures in relative terms the position of the most dominant centre over period from 1991 to 2008 for attracting FDI. The value of I_{RD} lies between zero and one but never become zero because in this index, centres included must be at least one time has placed in top five position over period 1991 to 2008. The maximum value of I_{RD} shall be one provided a centre has been at top position in all years from 1991 to 2008 in attracting FDI.

Panel Data Approach

The paper has used a panel regression approach. Delhi has taken as the base amongst 13 centres. The effects of 12 other centres are captured with the help of a Least Square Dummy Variables (LSDV) approach. This is a fixed effects model. The fixed effects model has been used because it captures the specific effects of each centre rather than a generalised effect which requires a random effects model using Generalised Least Squares (GLS) techniques.

As laid out earlier the first question is as to how efficiency varies across different states. With the help of a two equation simultaneous panel regression (fixed effects model), the paper uses a 2- Stage Least Square (2SLS) estimation procedure. This involves obtaining the predicted values from the first equation and plugging it into the second equation¹. The equations are:

Efficiency Equation

$$SDPt = e^{\{\gamma_0 + (\gamma_0 + [\gamma_i]) + \beta_1 * (t) + (\beta_1 + [\beta_{2i}]) * (t)\}} [Input(t)]^{[\beta_{3j}]} \dots\dots\dots (i)$$

γ_0 = Efficiency parameter of Delhi State.

$[\gamma_i]$ = Vector ((n-1) x1) of Δ in efficiency parameter of other states w.r.t. Delhi State.

β_1 = Delhi's growth rate;

$[\beta_{2i}]$ = Vector ((n-1) x1) of Δ in growth rate of other states w.r.t. Delhi State.

$[\beta_{3j}]$ = Vector (kx1) of elasticities of output w.r.t. inputs;

Where; i=2, 3...13; and

j=1, 2, 3...9.

Taking log on both sides and adding an error term:

$$LSDP (it) = \gamma_0 + (\gamma_0 + [\gamma_i]) + \beta_1 * (t) + (\beta_1 + [\beta_{2i}]) * (t) + [\beta_{3j}] * (LInput (t)) + U_{it} \dots\dots\dots (ia)$$

Equity Equation:

$$(FDI)_t = e^{\{\alpha_0 + (\alpha_0 + [\alpha_i]) + \{\beta_1 * (t) + (\beta_1 + [\beta_{2i}]) * (t)\}} \cdot (SDP)_{t-1}^{\beta_3} \cdot (SDP)_{t-1}^{(\beta_3 + [\beta_{4i}])} \dots\dots\dots (ii)$$

α_0 = Equity parameter of Delhi.

$[\alpha_i]$ = Vector ((n-1) x1) of intercept dummies (in Δ form – with Delhi as base)), representing equity parameter;

β_1 = growth rate of FDI in Delhi;

$[\beta_{2i}]$ = Vector ((n-1) x1) of Δ in growth rate of other states w.r.t. Delhi State.

β_3 = Accelerator (or elasticity) of FDI in Delhi (w.r.t. $(SDP)_{t-1}$);

$[\beta_{4i}]$ = Vector of ((n-1)x1) accelerators (or elasticities) in Δ form for other states;

Where; i=2, 3...13.

Taking log on both sides and adding the error term:

$$LFDI (t) = \alpha_0 + (\alpha_0 + [\alpha_i]) + \beta_1 * (t) + (\beta_1 + [\beta_{2i}]) * (t) + \beta_3 * (LSDP)_{(t-1)} + (\beta_3 + [\beta_{4i}]) * (LSDP)_{(t-1)} + V_{it} \dots\dots\dots (iia)$$

¹ This has been proposed by Hayashi and Sims (1983).

Results and Conclusions

Indices

The aggregate level changes can be understood with the help of average, change in average, standard deviation, coefficient of variation (CV) of the individual indices and ratio of coefficient of variation at four points of time. Further, the aggregate changes can be understood by taking the minimum CV as the base.

Table 1 shows that in terms of absolute amount of FDI, the national average of FDI in 1995 is hundred and forty seven time over national average of FDI in 1991. But national average of absolute amount of FDI in 2002 has decreased over 1995 and it represents less than one-half of national average of FDI in 1995. And national average of absolute amount of FDI in 2007 has increased by more four times over national average of FDI in 2002. As the amounts of inflows of FDI in states have increased significantly in 1995 as compared to 1991, variation (Standard deviation) of inflows of FDI among states also significantly increases. And as amount of FDI inflows decrease in 2002 as compared to 1995, the variation (Std. Deviation) of inflows of FDI amongst states also decreases. In 2007, amounts of FDI inflows increase as compared to 2002 and the variation of FDI inflows across states also increases. It can be concluded that as inflows of FDI among the states increase, the variation of inflows of FDI among the states also increase, and vice-versa. Coefficient of variation (CV) and CV ratio of FDI inflows among states also follow the trend of standard deviation.

Average of temporal index of 2002/1995 has shown significant increase as compared to average of temporal index of 1995/1991. And average of temporal index of 2007/2002 has less than one-third of average of temporal index of 2002/1995. Standard deviation of temporal index of 2002/1995 is 65 percent more than that of 1995/1991 and standard deviation of temporal index of 2007/2002 is only 35 percent of 2002/1995. It means that even with a small change in the average, there is a significant increase in the variation. But the coefficient of variation (CV) of the temporal index shows a different picture. It shows that the CV decreases from 1995/1991 to 2002/1995 but it increases from 2002/1995 to 2007/2002. The ratios of CV also follow the trend of the CV (Table 1).

The comparison between temporal indices of FDI and absolute amount of FDI show a different pattern. In absolute terms it shows that the average, standard deviation, CV and CV ratio are moving in same direction when average increases, and vice-versa. Temporal indices show that the average and standard deviation are moving in same direction- a small increase in average leads to significant increase in standard deviation. However CV of temporal decreases continuously during this period.

In case of absolute amount of SDP, the standard deviation increases significantly. However the CV and CV ratio are almost constant with a small variation for this period. In case of Temporal Index of SDP, the average and standard deviation are almost constant with a small change for all this period. However the CV changes significantly with a marginal change in the average or standard deviation. The ratios of CV also follow the trend of the CV.

The ratio between temporal index of FDI to temporal index of SDP helps to know which states are attracting proportionate share of FDI inflows with respect to SDP. The scale of measure this is as:

- If Ratio of FDI and SDP $> 1 \rightarrow$ more elastic
- If Ratio of FDI and SDP $= 1 \rightarrow$ Unit elasticity
- If Ratio of FDI and SDP $< 1 \rightarrow$ Inelastic

Table 1 shows that some of the states are receiving more FDI inflows than their proportionate share and the remaining states are receiving less FDI inflows than their proportionate share with respect to SDP. The SDP of a state represents general growth. This shows that allocation of FDI inflows amongst states is not made on equity basis. The estimated average of the third level of indices in 1995/1991, 2002/1995 and 2007/2002 are more than one. It means on an average states attracting FDI inflows greater than their due share. It is against the 'equity' aspect of distribution of FDI amongst states (Sinha 2004).

Dynamic changes in the pattern of flow of FDI would result in changing ranks of different centres in terms of the flows. This represents a state of competition amongst different region. It is not possible for any single centre to dominate the investment pattern for whole period 1991 to 2008. Even if a centre is not at top for one or more years it should be possible to capture the dominating centre. It is interesting to know whether there is any dominant centres or whether changing economic and social condition lead to a constant flux in the ranking of different centres. The

Table 1: Indices of State-wise Distribution of FDI and SDP

RBI's Centre	FDI (Rs. Million)				Relative Index				Temporal Index		
	1991	1995	2002	2007	1991	1995	2002	2007	1995/1991	2002/1991	2007/2002
Ahmedabad	95	4263	11361	11834	0.89	0.27	1.49	0.33	0.3	5.54	0.22
Bangalore	17	13324	23861	49632	0.16	0.84	3.12	1.38	5.24	3.72	0.44
Bhopal	69	668	1102	2046	0.64	0.04	0.14	0.06	0.07	3.43	0.39
Chandigarh	12	4809	12627	27961	0.11	0.3	1.65	0.78	2.71	5.45	0.47
Chennai	29	16099	8397	28919	0.27	1.01	1.1	0.8	3.74	1.08	0.73
Hyderabad	21	4347	5509	31847	0.19	0.27	0.72	0.88	1.41	2.63	1.23
Jaipur	81	1299	3582	777	0.75	0.08	0.47	0.02	0.11	5.73	0.05
Kanpur	313	6366	1601	26986	2.92	0.4	0.21	0.75	0.14	0.52	3.57
Kochi	29	116	488	1028	0.27	0.01	0.06	0.03	0.03	8.71	0.45
Kolkata	339	11684	2341	16192	3.16	0.74	0.31	0.45	0.23	0.42	1.47
Mumbai	128	24762	19666	185172	1.19	1.56	2.57	5.14	1.31	1.65	2
New Delhi	211	118353	7884	85706	1.97	7.46	1.03	2.38	3.79	0.14	2.3
Panaji	53	220	911	364	0.49	0.01	0.12	0.01	0.03	8.62	0.08
Average	107	15870	7641	36036	1	1	1	1	1.47	3.66	1.03
Change in Average		147.78	0.48	4.72						2.49	0.28
Std. Deviation	111.64	31652.54	7482.31	50814.1					1.8	2.97	1.05
CV	103.96	199.45	97.93	141.01					122.58	80.97	102.04
CV Ratio	1.06	2.04	1	1.44					1.51	1	1.26

RBI's Centre	SDP(Rs. Million)				Relative Index				Temporal Index			Ratio of Temporal Index of FDI & SDP		
	1991	1995	2002	2007	1991	1995	2002	2007	1995/1991	2002/1991	2007/2002	1995/1991	2002/1995	2007/2002
Ahmedabad	306317	718856	1415340	2892860	0.88	1.05	1	1.1	1.19	0.96	1.1	0.26	5.79	0.2
Bangalore	300917	562146	1179187	2152816	0.87	0.82	0.83	0.82	0.94	1.02	0.99	5.55	3.65	0.45
Bhopal	326086	650179	1193246	2135053	0.94	0.95	0.84	0.81	1.01	0.89	0.97	0.07	3.85	0.41
Chandigarh	433983	772231	1802404	3312888	1.25	1.12	1.27	1.26	0.9	1.13	0.99	3.01	4.81	0.47
Chennai	376289	795258	1630750	2984148	1.08	1.16	1.15	1.14	1.07	1	0.99	3.5	1.09	0.74
Hyderabad	417508	798536	1681426	3125090	1.2	1.16	1.19	1.19	0.97	1.02	1	1.46	2.57	1.22
Jaipur	230116	473135	885501	1666287	0.66	0.69	0.63	0.63	1.04	0.91	1.02	0.11	6.3	0.05
Kanpur	646772	1137785	2255763	3776939	1.86	1.65	1.59	1.44	0.89	0.96	0.9	0.15	0.54	3.96
Kochi	175297	387623	868948	1624147	0.5	0.56	0.61	0.62	1.12	1.09	1.01	0.02	8	0.44
Kolkata	408526	750600	1705487	3148419	1.17	1.09	1.2	1.2	0.93	1.1	1	0.25	0.38	1.47
Mumbai	734061	1578181	3004763	5806541	2.11	2.29	2.12	2.21	1.09	0.92	1.04	1.21	1.78	1.91
New Delhi	148868	283901	710696	1346803	0.43	0.41	0.5	0.51	0.96	1.22	1.02	3.94	0.11	2.25
Panaji	15512	33192	80996	156919	0.04	0.05	0.06	0.06	1.08	1.18	1.05	0.03	7.27	0.08
Average	347712	687817	1416500	2625301	1	1	1	1	1.01	1.03	1.01	1.5	3.55	1.05
Change in Average		1.98	2.06	1.85						1.02	0.97		2.36	0.3
Std. Deviation	194369.5	384724	738530.7	1377080					0.09	0.11	0.05			
CV	55.9	55.93	52.14	52.45					8.98	10.26	4.62			
CV Ratio	1.07	1.07	1	1.01					1.94	2.22	1			

Sources: (<http://dipp.gov.in/>) & (http://mospi.nic.in/mospi_cso_rept_pubn.htm)

index of rank dominance (IRD) is an innovative measure which tells us a coefficient that expresses the degree of dominance of an ordinal measure such as rank. IRD has been further refined as a relative measure- Relative Index of Rank Dominance (RIRD), which measures dominance in a relative sense. This gives the proportionate weight of the rank dominance index. Table 2 shows that the most dominant centre is Mumbai. However, next best centre Delhi has an IRD almost half of Mumbai. The RIRD shows that FDI inflows are top heavy. The first five centres dominate the pattern of inflow such that they represent 80 percent of the inflows. Kolkata, which was a major industrial centre in earlier years, has lost its importance. Also, Uttar Pradesh and Andhra Pradesh have been marginalised. RIRD shows that FDI inflows are highly skewed.

Dummy Variable (Panel Data Approach)

Interpretation of Efficiency Result:

Table 3 indicates Number of workers is not found to be a significant variable. However it has desirable sign which is negative. Labour intensive technologies are less efficient. Fuels Consumed is also not significant. However sign is positive. The interpretation is similar to number of workers because higher fuel consumption may represent mechanised processes which are more efficient. Input is also not significant but it got negative sign. This indicates that higher input use represents inefficient production; Therefore, SDP would be lower. Salary of skilled labour is significant but it got negative sign.

Perhaps the preference is for bulk productivity of workers (as per Wages to Worker variable) rather than high paid managers. This needs to be read along with an aversion to a large workforce. It means that a lean and efficient workforce is more productive. Other variables such as number of factories, capital invested, skilled labour and PF & other welfares expenses have desirable sign and are also significant. They all are bound to increase SDP.

The dummy from D2 to D13 represent difference dummies. They show that the efficiency in the different states is better than Delhi with the exception of D13 (i.e. Goa). The annual growth of SDP is nearly 13 percent on account of all other omitted variables. This could also be interpreted as a policy impact. So in general all other states are more efficient than Delhi. Although the difference is small but it is significant. The difference in growth rates did not show up. Some precaution needs to be taken with the results since the Durbin-Watson statistic is low (Table 3).

Interpretation of Equity Result:

Table 4 shows that the elasticity of FDI with respect to SDP is 8.30 which show that one percent increase in SDP leads to 8.30 percent increase in FDI. In general the intercept dummies are negative and significant with exception of Goa. Some precaution needs to be taken with the results since the Durbin-Watson statistic is low. This shows that all other states are receiving less of FDI than the base which is Delhi. This result needs to be correlated with result on efficiency. Broadly speaking,

Table 2: Index of Rank Dominance for 1991-2008

<i>RBI's Centre</i>	<i>States</i>	<i>Weighted Score</i>	<i>IRD</i>	<i>RIRD</i>
Mumbai	Maharashtra, Dadra & Nagar Haveli, Daman & Diu	74	0.82	0.27
New Delhi	Delhi	44	0.49	0.16
Chennai	Tamil Nadu, Pondicherry	38	0.42	0.14
Bangalore	Karnataka	37	0.41	0.14
Ahmedabad	Gujarat	24	0.27	0.09
Chandigarh`	Chandigarh, Punjab, Haryana, Himachal Pradesh	12	0.13	0.04
Kanpur	Uttar Pradesh, Uttranchal	11	0.12	0.04
Hyderabad	Andhra Pradesh	11	0.12	0.04
Kolkata	West Bengal, Sikkim, Andaman & Nicobar Islands	10	0.11	0.04
Bhubaneshwar	Orissa	5	0.06	0.02
Bhopal	Madhya Pradesh, Chattisgarh	4	0.04	0.01
	Sum		3	1

Table 3: Regression Statistics of Efficiency Aspect

Model Summary					
R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson	
0.996	0.993	0.993	0.090	0.871	
Coefficients					
Model	Unstandardized Coefficients		Standardized Coefficients	T	p-value
	B	Std. Error	Beta		
(Constant)	-247.52***	4.85***		-50.99	0
No. of Factory	0.096**	0.04	0.092**	2.402	0.017
Invested Capital	0.037	0.023	0.058	1.642	0.102
No. of Workers	-0.069	0.085	-0.06	-0.817	0.415
No. of Skilled Persons	0.237***	0.073	0.222***	3.245	0.001
Wages to Worker	0.076***	0.024	0.116***	3.219	0.002
Salary of Skilled Persons	-0.098***	0.032	-0.144***	-3.095	0.002
PF & Welfare Exp.	0.032	0.02	0.051	1.583	0.115
Fuels Consumed	0	0.021	0	-0.016	0.987
Inputs	-0.036	0.033	-0.054	-1.076	0.283
D2	0.356***	0.093	0.089***	3.816	0
D3	0.326***	0.077	0.082***	4.254	0
D4	0.481***	0.067	0.121***	7.181	0
D5	0.554***	0.091	0.139***	6.102	0
D6	0.424***	0.119	0.106***	3.57	0
D7	0.547***	0.118	0.137***	4.643	0
D8	0.265***	0.058	0.066***	4.591	0
D9	0.903***	0.089	0.227***	10.138	0
D10	0.121	0.082	0.03	1.486	0.139
D11	0.588***	0.097	0.148***	6.059	0
D12	0.948***	0.113	0.238***	8.395	0
D13	-1.653***	0.104	-0.415***	-15.92	0
Year	0.129***	0.002	0.56***	52.521	0

Source: Authors Own Estimation

Dependent variable is SDP

Note: p-values are in last column of the table. *, ** and *** represent significance at the 10, 5 and 1 percent levels, respectively.

all states were seen to be more efficient than Delhi. The correlation exercise between the dummies for efficiency and equity shows an extremely high negative correlation (i.e. -0.996) between equity and efficiency which is highly significant at the one percent level (Table 5). This may be interpreted in the following manner. Firstly it shows that FDI allocation amongst Indian states is not happening in accordance with the efficiency principle. This means that it is not leading to allocative efficiency. Secondly the allocation is inequitable between those states which have grown faster than deserve higher FDI inflows, whereas the converse has taken place. This shows that the FDI

inflows are inequitable. If FDI inflows do not take place in an efficient manner then it may be concluded that liberalisation of the domestic economy has not made market forces to determine the FDI inflows. Also it implies that political economy and expedient are more dominant in determining FDI inflows amongst Indian states. Finally if there is a persistence of this distribution in the economy, it may adversely affect the incentives structure in the long run. Those states which have demonstrated efficient production will not be rewarded with greater FDI inflows. On the whole, this would lead to allocative inefficiency in the long run.

Table 4: Regression Statistics of Equity Aspect

R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson	
0.787369	0.61995071	0.59238	1.18618256	0.59238	
Coefficients					
Model	Unstandardized Coefficients		Standardized Coefficients	T	p-value
	B	Std. Error	Beta		
(Constant)	1907.11***	338.11		5.64	0.00
LPreSDP	8.30***	1.38	4.74***	6.00	0.00
D2	-7.35***	1.17	-1.06***	-6.29	0.00
D3	-5.50***	0.93	-0.79***	-5.92	0.00
D4	-8.44***	1.06	-1.21***	-8.00	0.00
D5	-9.20***	1.40	-1.32***	-6.56	0.00
D6	-7.94***	1.35	-1.14***	-5.87	0.00
D7	-8.71***	1.36	-1.25***	-6.42	0.00
D8	-6.85***	0.70	-0.98***	-9.75	0.00
D9	-12.34***	1.83	-1.77***	-6.73	0.00
D10	-5.30***	0.51	-0.76***	-10.42	0.00
D11	-9.17***	1.35	-1.32***	-6.82	0.00
D12	-12.42***	2.20	-1.79***	-5.65	0.00
D13	14.30***	3.01	2.06***	4.75	0.00
Year	-1.00***	0.18	-2.49***	-5.63	0.00

Source: Authors Own Estimation.

Dependent variable is FDI.

Note: p-values are in last column of the table. *, ** and *** represent significance at the 10, 5 and 1 percent levels, respectively.

Table 5: Correlation between Equity Dummy Variable and Efficiency Dummy Variable

Correlations			
		Dummy Equity	Dummy Efficiency
Dummy Equity	Pearson Correlation	1	-.996***
	Sig. (2-tailed)		0
	Sum of Squares and Cross-products	530.326	-50.723
	Covariance	48.211	-4.611
	N	12	12
Dummy Efficiency	Pearson Correlation	-.996***	1
	Sig. (2-tailed)	0	
	Sum of Squares and Cross-products	-50.723	4.886
	Covariance	-4.611	0.444
	N	12	12

Source: Authors own estimation

Note: p-values are in last column of the table. *, ** and *** represent significance at the 10, 5 and 1 percent levels, respectively.

Table 5 shows that there is an extremely high negative correlation (i.e. -0.996) between equity and efficiency.

Table 6 explains about intercept, rate of growth and elasticity's of SDP of different RBI's centre.

Table 6: Equity Aspects of Different RBI's Centres

<i>RBI's Centre</i>	<i>States Covered</i>	<i>Intercept</i>	<i>Rate of Growth</i>	<i>Elasticity of SDP(ε)</i>
New Delhi	Delhi	1907.11	-1.00	8.30
Ahmedabad	Gujarat	1899.76	-1.00	8.30
Bangalore	Karnataka	1901.61	-1.00	8.30
Bhopal	Madhya Pradesh, Chattisgarh	1898.67	-1.00	8.30
Chandigarh`	Chandigarh, Punjab, Haryana, Himachal Pradesh	1897.91	-1.00	8.30
Chennai	Tamil Nadu, Pondicherry	1899.17	-1.00	8.30
Hyderabad	Andhra Pradesh	1898.40	-1.00	8.30
Jaipur	Rajasthan	1900.26	-1.00	8.30
Kanpur	Uttar Pradesh, Uttranchal	1894.77	-1.00	8.30
Kochi	Kerala, Lakshadweep	1901.81	-1.00	8.30
Kolkata	West Bengal, Sikkim, Andaman & Nicobar Islands	1897.94	-1.00	8.30
Mumbai	Maharashtra, Dadra & Nagar Haveli, Daman & Diu	1894.69	-1.00	8.30
Panaji	Goa	1921.41	-1.00	8.30

Source: Authors Own Estimation

Table 7: Equity Equation of Different RBI's Centres

<i>RBI's Centre</i>	<i>States Covered</i>	<i>Double-log Equation</i>
New Delhi	Delhi	$L(FDI) = 1907.11 - 1*T + 8.30*L(SDP)$
Ahmedabad	Gujarat	$L(FDI) = 1899.76 - 1*T + 8.30*L(SDP)$
Bangalore	Karnataka	$L(FDI) = 1901.61 - 1*T + 8.30*L(SDP)$
Bhopal	Madhya Pradesh, Chattisgarh	$L(FDI) = 1898.67 - 1*T + 8.30*L(SDP)$
Chandigarh`	Chandigarh, Punjab, Haryana, Himachal Pradesh	$L(FDI) = 1897.91 - 1*T + 8.30*L(SDP)$
Chennai	Tamil Nadu, Pondicherry	$L(FDI) = 1899.17 - 1*T + 8.30*L(SDP)$
Hyderabad	Andhra Pradesh	$L(FDI) = 1898.4 - 1*T + 8.30*L(SDP)$
Jaipur	Rajasthan	$L(FDI) = 1900.26 - 1*T + 8.30*L(SDP)$
Kanpur	Uttar Pradesh, Uttranchal	$L(FDI) = 1894.77 - 1*T + 8.30*L(SDP)$
Kochi	Kerala, Lakshadweep	$L(FDI) = 1901.81 - 1*T + 8.30*L(SDP)$
Kolkata	West Bengal, Sikkim, Andaman & Nicobar Islands	$L(FDI) = 1897.94 - 1*T + 8.30*L(SDP)$
Mumbai	Maharashtra, Dadra & Nagar Haveli, Daman & Diu	$L(FDI) = 1894.69 - 1*T + 8.30*L(SDP)$
Panaji	Goa	$L(FDI) = 1921.41 - 1*T + 8.30*L(SDP)$

Source: Authors Own Estimation

Table 7 shows equity equation in double log form of different RBI's centre.

Conclusion

This paper argues that those regions or States that have low cost economic production structures, along with other factors, which lead to efficiency, have utilized the FDI investment efficiently, as FDI is a part of total investment in the State. FDI acts as a complement to 'own

investment'. In keeping with the principle of optimal resource allocation, the States that are more efficient, in general, would display a higher efficiency parameter, in comparison to the base State which is Delhi. This spells out the notion of efficiency. On the other hand, a Centre or State that displays extra output in terms of SDP and shows that it has performed better or more efficiently deserves to get a greater share of FDI, in the next round of FDI allocation. This spells out our notion of equity. Efficient States must be rewarded!

The paper uses set of new indices, including index of rank dominance, to show the relationship between development in Indian States and FDI flows. The most dominant centre is Mumbai. The two equation simultaneous panel regression fixed effects model show that there is a very high elasticity of FDI flows w.r.t. SDP growth. The elasticity is 8.3. The correlation between equity and efficiency has an extremely high negative (i.e. -0.996). The States that are more efficient receive less of FDI flows. This points towards non-economic forces in operation that influence FDI flows and regional development. It perhaps means that some political forces are at work. This would adversely affect the purpose and expected impact of FDI flows.

References

- Bhanumurthy, K. V. (2011). State of Environment in South Asia. In R. Jha (Ed.), *Handbook of South Asian Economics*, (pp. 289-08). London: Routledge.
- Hayashi, F., & Sims, C. (1983). Nearly efficient estimation of time-series models with predetermined, but not exogenous. *Instruments Econometrica*, 51(3), 783-798.
- Jha, R. (2003). Recent trends in FDI Flows and Prospects for India. Retrieved from <http://www.ssrn.com>
- Kumar, N. (2003). *Liberalisation, Foreign Direct Investment Flows and Economic Development: The Indian Experience in the 1990s*. Retrieved from <http://www.ris.org.in>
- Morris, S. (2004). A Study of Regional Determinants of Foreign Direct Investments in India, and the case of Gujarat. *Working Paper No. 2004/03/07*, Ahmedabad: Indian Institute of Management.
- Ögütçü, M. T. (Eds). (2002). *The International Conference on Regional Development and Foreign Investment*. Article presented at RDFI '02, Fortaleza, Brazil.
- Padhi, S. P. (2002). Attracting Foreign Direct Investment: A Regional Perspective. *Foreign Trade Review*, 37(3-4), 32-47.
- Rao, K. S., Chalapati, & Murty, M. R. (2006). Towards Understanding the State-wise Distribution of FDI in Post Liberalization periods. Retrieved from <http://isid.org.in>
- Sinha, M. K. (2004). *An Analysis of Regional and Sectoral Distribution of FDI in India*. Unpublished M.Phil Dissertation, University of Delhi, Delhi.
- Venkatesan, R., & Verma, S. (1998). Study on Policy Competition among States in India for Attracting Direct Investment. *NCAER Working Paper*, Delhi.