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## Inter Regional IEMs Investment Variations: An Analysis from Indian States

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### Abstract

*In the past decade world economies have witnessed growing economic and political uncertainties. During this phase Indian economy has maintained stable growth, but recently economy noticed slowdown in investment which casts doubt about the long-run sustained growth. The deviation in the proposed and implemented Industrial Entrepreneurs Memorandum (IEMs) across states has invited considerable interest of policymakers. The present study aims to understand the position of Indian states in terms of utilization of industrial investment and to explore the possible determinates explaining the investment behavior. It is found that the implementation rate of IEMs investment was substantial low but has improved in the recent past amid reforms oriented and ease of doing business environment approach of the Government. Across states, higher realization rate in industrial investment is observed in Goa, Gujarat, Jharkhand, Madhya Pradesh, Maharashtra, Rajasthan and West Bengal. The study finds states viz. AP, Chhattisgarh, HP, Karnataka, Orissa, Punjab and Uttaranchal as potential regions for improvement in implementation rate. The econometric modeling on panel data suggests that the population, bank credit and infrastructure affect the industrial investment significantly. The industrial share has negative bearings to the investment. Higher fiscal deficit is perceived as a serious concern for IEMs investment.*

**Keywords:** Bank credit, IEMs, India, Infrastructure, Investment

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### 1. Introduction

Since the onset of global financial crisis of 2008-09, the political and economical uncertainties have evolved at global level. Lower economic growth, stagnant global trade, subdued investment are reflections of uncertain environment. In 2016, global growth is reported at 2.3 percent amid stalled global trade, decelerated investment and increased policy uncertainty<sup>1</sup>. Investment growth in major emerging economies has been below the long-term average over the past couple of years<sup>2</sup>. The problem is exaggerated when private investment, having dominance in total investment (contributing around three fourth of total investment), has slowed down despite of counter-cyclical fiscal policies across emerging markets. Moreover, “investment-less” credit booms also add on the risk to global economies. With the growing uncertainties, the spillover effects will be visible in the emerging market economies also. In one of the estimate it was observed that for

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every 1 percentage point lower output growth in the United States or Euro Area, emerging market developing economics (EMDE) output growth fell 0.8-1.3 percentage points within a year.

The major factors associated with global uncertainties are political shift in USA, taper tantrum of federal bank of USA, currency manipulation by China, exit of Britain from European Union and most recent the trade protectionism approach of the USA. All these outcomes got their ground based on the poor delivery of economic principles for reviving the economies from recent economic shocks- financial crisis and European debt crisis. In this macroeconomic environment, world economies have well considered the need for revival of long term growth sources mainly investment and productivity along with growth-oriented reforms. In this regard Indian economy has been able to manage the global uncertainties partly, as economy grew with the rate of around 7 percent since the crises. The promising growth was largely assisted by acceleration of structural reforms, preferring a rule-based policy framework, low commodity prices, and increased foreign investment accompanied by the deregulation and improvement in ease of doing business. But Indian economy has reported the sluggish growth in investment recently. As per the NAS data, the growth in capital formation was 17.5 per cent during 2004–2008, but slowed down thereafter, reporting a growth of 4.3 per cent during 2012–2016, at 2011-12 base year<sup>3</sup>. The possible factors for weak investment are considered to be relatively high corporate income tax rates, complex land acquisition process, poor financial performance of corporate sector, bank credit constrains amid rising non-performing assets, and infrastructure bottlenecks<sup>4</sup>.

Theoretically and pragmatically investment is most important means of realizing the self sustained growth for an economy as it facilitates accumulation of capital and productivity growth. Investment enhances labor productivity thereby improves real wages and household incomes, and further facilitates the technological advances. To promote investment, Government of India has initiated few reforms towards the ease of doing business such as allowing single step incorporation, setting up of window portal e-Biz to integrate various government services regarding clearances, etc<sup>5</sup>. The other notable initiatives include development of industrial corridors and industrial clusters, boosting the agendas of smart cities<sup>6</sup>, setting up one additional National Investment and Manufacturing Zone (NIMZ), etc. The most recent initiatives include- movement towards more formal transactions after demonetization, actively pursuing the indirect tax reforms in the form of goods and services tax (GST), indigenization of defense sector, etc.

Despite of prudential initiatives, the investment statistics of India are not much soothing as there are huge deviations in proposed and realized industrial investment. According to DIPP, proposals in the industrial sector, in value terms, showed a decline of 23 percent in 2015 having an 11-year low. However the fall in actual investment was to the tune of one per cent

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<sup>1</sup> World Bank, (2017) Global Outlook: Subdued Growth, Shifting Policies, Heightened Uncertainty Global Economic Prospects January 2017.

<sup>2</sup> The falling investment is associated with the deterioration in terms of trade mainly to the oil exporting group, poor international capital flows, and debt overhang. This economic environment puts forth the challenges before policy makers to realize the targets of rapid urbanization and sustainable goals.

<sup>3</sup> Dilasha Seth, (February 23, 2016), Investment proposals in reverse gear, Business Standard.

<sup>4</sup> OECD (2017) OECD Economic Surveys India February 2017, <https://www.oecd.org/eco/surveys/INDIA-2017-OECD-economic-survey-overview.pdf>

<sup>5</sup> Press Information Bureau, Government of India, Ministry of Commerce & Industry, 08-September-2014, Improving Business Environment; Fast Tracking Manufacturing and Liberalization of FDI Policy

<sup>6</sup> Smart cities namely, Dholera in Gujarat; Shendra-Bidkin in Maharashtra; Integrated Industrial Township in Greater Noida (UP); Integrated Industrial Township near Ujjain (MP); Global City in Gurgaon, Haryana

from Rs. 787 billion to Rs 779 billion in the same period<sup>7</sup>. As per the DIPP statistics the value of proposed IEMs was Rs 8342 billion in 2007, however the implemented investment was Rs 193 billion indicating less than 2 percent of realization rate. Similarly, the statistics for year 2016 were Rs. 4140 billion and Rs. 1005 billion, respectively. The deviation in the proposed and implemented IEMs across states is matter of seriously pointed out recently. A serious attention towards this deviation can serve the purpose of countering the global uncertainties.

Keeping in view the larger spending of states on investment promotion events, Government is taking stock of the agreements signed and how many of them are materialized. It was also announced that Centre Government is mulling over the steps to put a mechanism in place to improve the realization rate for IEM investment. Lack or poor availability of funds and delay in clearances have been cited as major reasons for the failure of MOUs from materializing (Economic Times, April 17, 2017). This may be attributed to the hurdles in clearances and governance across states, tedious processes, poor infrastructure support, etc. These developments put forth the scope for assessment of industrial investment across states and exploring the possible factors for variations. The present study aims to identify the present status of industrial investment across states in terms of deviations between implemented and proposed investments under IEMs. It also explores the plausible factors associated with large deviations between the proposed and actual investments. Mainly, it intends to explore that how macroeconomic fundamentals influence the actual industrial entrepreneurial investment across Indian states.

## 2. Review of Literature

In economic literature, the determinants of investment have been observed theoretically and empirically. The investment decisions are influenced by the development of monetary, financial, and capital markets and the business environment. The rate of return on investment is a crucial factor the investment decision (Tang *et al.* 2017). The investment behavior is also determined by the external environment, which includes commodity price movements, expansion of cross-border trade, and investment flows (Global Economic Prospects 2017)<sup>8</sup>. In Indian context, Bajpai and Sachs (2000) pointed out that poor quality infrastructure is a major hindrance for investment. Chakravarti (2008) determined the investment drivers across Indian states considering the panel data of 18 states for the period 1998-2006. Maharashtra and Gujarat are found on top position to hold the pie of investment while other states have been much less successful. Using 'investment proposals per capita' an indicator for investment, it was hailed that the political stability and fiscal reforms largely affects the investment inflows across states. Also, the choices of investment destinations depend on contemporary socio-economic performance as opposed to their past images as investment destinations. In another study for data set of 32 Indian states for the period 1991–2009, it was observed that the inflow of investment proposals related to IEMs in one state is positively correlated with investment proposal inflows elsewhere<sup>9</sup>. Chatterjee (2013) addressed the wide-scale variations in FDI inflows across Indian States. Using a panel dataset of 16 groups of Indian states over the period from 2001-02 to 2005-06, it was identified that level and variability in profitability significantly influence the investment location choices. Contrary to theory, infrastructure was not found significant indicators for inter-state variations in FDI inflows. Kumar (2002) found the role of physical infrastructure and intensity of export for FDI inflows. Morris (2005) recognized that apart from infrastructure, quality governance

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<sup>7</sup> Dilasha Seth, (February 23, 2016), Investment proposals in reverse gear, Business Standard.

<sup>8</sup> World Bank (2017), Global Economic Prospects, January 2017: Weak Investment in Uncertain Times

<sup>9</sup> Krishna Chaitanya Vadlamannati (2011). A Race to Compete for Investment among Indian States? – An Empirical Investigation, <http://www.uni-heidelberg.de/md/awi/professuren/intwipol/regional.pdf>

is also important factor for FDI decisions.

Hosamane (2010) tried to assess the role of external and internal financing sources for affecting the investment decisions of Indian manufacturing sector. Using recently developed IPS panel unit root test (Im *et al.*, 2003) for panel data for period 1991-2005, it was concluded manufacturing sector's investment is affected by output, change in output (with one year lag) and profits, along with capital stock, change in capital stock (with one year lag) and cost of capital. Mallick (2012) analyzed the private investment behavior of the manufacturing sector in Indian states over the period from 1993–2008. There had been observed high variation in private investment across the major states though it was declining over the period of time, suggesting the pace of investment competition. The possible determinants for private investment were infrastructure, fiscal factors and labor factors. As per the report of CARE rating agency (2015), Investment proposals made across industries paint a promising picture, however the implemented investment has been on lower side. The big states such as Gujarat, Maharashtra, Andhra Pradesh and West Bengal are most attractive investment destinations. States like Madhya Pradesh, Chhattisgarh and Uttar Pradesh are experiencing improvement in actual investments. The discouraging factors for industrial investment have been persistent high interest rates, slow clearances of projects and a weak economic backdrop. The above review of literature highlights the role of infrastructure, fiscal policy, political stability, labor conditions and financial resources for explaining the investment variations across states in India. As the role of financial development is heightened in the wake of global financial crisis, countries have pursued actively to manage the financial system. Indian financial system predominated by banking sector has also seen significant changes in past decades. In this environment present study extends the existing literature by considering the role of financial development side as important factor for industrial investment. Moreover to the best knowledge of authors existing literature has considered the investment determinants through investment proposals. However the same represents the investment behavior partially. Present study considered the actual implemented industrial investment for Indian states.

The next section includes the macroeconomic performance and inter-temporal comparative analysis of industrial investment for Indian states. The inter-temporal behavior gives better picture of consistency in industrial investment scenario of a state as well as reflects the policy outcomes for the given state. The fourth section presents the plausible factors for differences in proposed and implemented investment. In the next section the major determinants of implemented IEMs investment across states are presented. The findings have enough abilities to understand the dynamics of investment in states for further advancements. Finally the study is concluded.

### **3. Economic Performance and Industrial Investment Scenario in Indian States**

#### **3.1. Economic Performance**

Table 1 indicates that most of states have reported impressive growth in net state domestic product (NSDP) in the past decade. In terms of composition, most of states have services dominance except Chhattisgarh, Jharkhand and Madhya Pradesh. The states Chhattisgarh, Gujarat and Jharkhand have much presence of industrial output. In economic structure, AP, Bihar, Kerala, UP and WB have lowest shares in industrial output. AP, Kerala and WB have highest fiscal deficit well above the 5.5 percent of GSDP. In terms of capital formation the leading states are Orissa, Gujarat and Jharkhand. Bihar, Kerala, WB and UP have substantial lower capital formation. This economic performance of Indian states prompts for a study to analyze the industrial investment pattern of Indian states. Enhanced investment will help to get momentum

**Table 1: Macro-economic Performance of Indian States (2004-14)**

State	NSDP Growth Rates	Shares in GSDP (%)			Fiscal Deficit (% of GSDP)	Gross Capital Formation (% of GSDP)
		Agriculture	Industry	Services		
Andhra Pradesh	7.8	18.9	22.4	58.6	6.6	11.5
Bihar	9.0	19.6	19.8	60.6	4.1	1.0
Chhattisgarh	6.5	15.3	44.5	40.2	2.6	11.9
Goa	11.1	2.4	37.3	60.3	4.3	7.6
Gujarat	9.4	11.2	40.5	48.2	3.4	15.4
Haryana	8.4	15.1	28.5	56.4	2.9	8.7
Jharkhand	7.8	13.6	40.0	46.4	4.9	12.9
Karnataka	7.0	13.4	28.6	58.1	3.9	10.3
Kerala	8.2	7.7	22.0	70.4	5.8	2.1
Madhya Pradesh	8.4	24.5	28.1	47.4	3.9	5.5
Maharashtra	8.8	6.4	30.0	63.7	2.5	7.0
Orissa	6.2	14.3	34.7	51.0	0.8	17.4
Punjab	6.1	21.1	29.2	49.7	4.7	6.1
Rajasthan	6.5	18.9	32.1	48.9	4.0	5.3
Tamil Nadu	9.3	6.7	30.2	63.1	3.1	7.5
Uttar Pradesh	6.3	20.8	22.9	56.3	4.4	4.8
West Bengal	6.4	13.8	19.9	66.3	5.7	3.8

Source: Compilation from Handbook of Statistics on Indian States 2015-16

in capital formation, parallel helping the state governments to reduce the fiscal burden and higher contribution towards industrial output.

### **3.2. Inter-temporal Behavior of IEMs Investment in India**

As per the regulation practices, all industrial undertakings have to file information in the prescribed Industrial Entrepreneurs Memorandum with DIPP, Ministry of Commerce. Followed by this, these undertakings also need to file information in Part 'B' of the Memorandum at the time of commencement of commercial production. The inter-temporal behavior of IEMs investment across states is presented in Table 2. It is found that the implemented to proposed investment ratio (in percentage term) was around 1.3 percent for India during triennium ending (TE) 2010 and the same has increased whopping to around 23 percent during TE 2016. This clearly evidences the reforms oriented approach and ease of doing business environment created by the present Government of India. It can be argued that the policy paralysis associated with the previous government might have rendered into lower ratio for actual investment out of proposed investment. During the TE 2010 period, the states such as Uttaranchal, Uttar Pradesh and Tamil Nadu have reported higher proportionate of implemented investment. In TE 2016 the higher realization rate

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is observed in states viz. Goa, Gujarat, Jharkhand, Madhya Pradesh, Maharashtra, Rajasthan and West Bengal. The high industrial share in the GSDP for states viz. Goa, Gujarat and Jharkhand (Table 1) may be attributed to higher utilization rate of industrial investment. Other states namely Assam, Bihar, Haryana and Tamil Nadu (TN) could utilize the one third of the proposed investment. Other states namely AP, Chhattisgarh, HP, Karnataka, Orissa, Punjab and Uttaranchal had still lower utilization rate. In terms of shares of different states in India's total IEMs implemented investment, the leading states were AP, Gujarat, Maharashtra and Tamil Nadu. For the period TE 2016, the investment destinations have been relatively diversified as few other states such as Karnataka, Orissa, and Rajasthan have showed their presence. States such as TN, Uttar Pradesh, Uttaranchal and WB have been less lucrative for the IEMs investment as they lost their shares in past decade (Table 2). In fact AP, Kerala, Bihar, UP and WB have low industrial share in respective state outputs. Most of these states have high fiscal deficit and lower level of capital formation (Table 1). This phenomena prompts for proliferation in IEMs investment in these states as they had lower shares in India's IEMs investment as well as lower realization rate of IEMs. Noticeable observation is that though Gujarat and Maharashtra hold the top positions in IEM investment but their shares out of total investment have come down to 22 and 24 percent in TE 2016 from the level of 32 and 28 percent during TE 2010, respectively. The least preferred investment destinations are Goa, HP, MP and UP. Surprisingly the states such as Haryana and Punjab each, also holds less than 1 percent of total IEM investment. Overall there is bit diversification in investment pattern across geography but still around 50 percent is directed towards Maharashtra and Gujarat. An attempt is also made to

**Table 2: State-wise Analysis for IEMs**

State	Implemented to Proposed Investment (%)			Shares in total Implemented IEMs (%)			IEMs Implemented per Application (Rs. Crore)		
	TE 2010	TE 2013	TE 2016	TE 2010	TE 2013	TE 2016	TE 2010	TE 2013	TE 2016
AP	1.56	14.99	22.47	12.50	11.86	6.91	23	83	110
Assam	2.62	26.36	36.88	0.51	0.71	0.82	8	30	55
Bihar	0.15	19.13	31.48	0.17	0.56	0.76	-	59	103
Chhattisgarh	0.33	0.03	13.09	3.40	0.01	2.19	119	-	-
Goa	0.82	18.46	59.78	0.07	0.16	0.02	3	22	14
Gujarat	1.89	19.08	42.45	13.67	32.27	22.64	43	185	227
Haryana	3.47	15.90	30.05	0.86	1.92	0.96	11	62	83
HP	1.24	7.15	21.87	0.30	0.37	0.18	7	37	60
Jharkhand	0.00	5.73	167.59	0.01	1.26	0.60	-	-	166
Karnataka	0.79	17.77	20.08	5.18	5.07	9.93	68	103	300
Kerala	0.39	0.00	-	0.00	0.00	0.05	-	-	-
MP	2.46	7.46	55.15	0.16	0.02	0.09	348	132	279
Maharashtra	2.84	23.62	59.24	15.93	28.00	24.07	16	147	335
Orissa	0.01	0.29	10.75	0.12	0.74	3.67	9	83	2853
Punjab	1.73	8.27	11.45	1.09	0.44	0.45	16	71	82
Rajasthan	2.49	6.78	69.18	2.70	2.57	4.74	29	76	170
Tamil Nadu	3.67	3.72	32.44	8.07	1.79	2.86	47	84	227
UP	6.63	374.74	-	6.76	0.80	0.03	41	22	-
Uttaranchal	15.89	18.14	8.80	6.15	3.37	1.31	17	82	78
West Bengal	1.45	36.25	78.75	3.24	1.56	2.36	13	28	80
Total	1.31	10.04	22.93	100	100	100	29	111	200

Source: SIA Statistics, Department of Industrial policy & Promotion, DIPP

assess the scale of investment across states. For the purpose, IEM investment per filled application is computed. In this indicator the promising states are Gujarat, Karnataka, MP, Maharashtra, Orissa and TN as these states' per application investment exceeds the national figure.

### 3.3. Sector-wise Behavior of IEMs Investment in India

Table 3 presents the sector-wise composition of IEMs in India. During TE 2010, the most attractive sectors for IEMs were textiles, sugar, cement and gypsum, absorbing about half of the total implemented investment in India. In the past decade there has been a shift in sectoral investment as the dominating sectors in TE 2016 include electrical equipments, paper and pulp, sugar and metallurgical industries. Textiles and cement sectors have lost their pie in the overall investment. Paper and pulp and metallurgical industries have received considerable investment in the recent past as the share has almost doubled from the level of 7.7 and 5.6 percent in TE 2010 to around 15.4 and 10 percent, respectively, in TE 2016. Misc mechanical & engineering industry and chemicals had low shares in the investment in TE 2010, but got momentum in TE 2013 before decline in TE 2016. Interestingly, paper and pulp and sugar had high implementation rate and also scored top position amid sectors. The other highest IEMs receiving sectors-electrical equipments and metallurgical industries have around 30 percent of realization rate out of total proposed investment. This implies that these sectors are very potential in terms of improvement for governance and reforms. Other sectors such as telecommunications, machine

**Table 3: Sector-wise Composition of IEMs in India (Top 15 Sectors)**

Sector	Implemented to Proposed IEMs (%)			Sectoral Shares in Total IEMs Implemented (%)		
	TE 2010	TE 2013	TE 2016	TE 2010	TE 2013	TE 2016
Paper and Pulp	23.68	17.18	550.34	7.66	5.12	15.39
Electrical Equipments	0.13	4.72	16.98	4.29	9.33	14.98
Sugar	27.13	90.94	328.55	11.35	5.52	14.59
Metallurgical Industries	0.31	11.41	36.47	5.57	19.89	9.64
Cement and Gypsum	7.32	15.78	51.59	28.02	12.48	7.94
Textiles	16.65	11.73	35.4	12.78	5.52	7.26
Chemicals(Except Fertilizers)	3.5	6.6	11.27	5.6	8.63	4.64
Others	1.41	10.21	8.17	6.78	8.6	4.36
Food Processing Industry	3.1	20.17	21.02	1.02	4.45	3.71
Misc.Industry	8.37	11.41	32.63	0.22	0.06	3.51
Rubber Goods	1.48	10.4	42.61	0.28	0.88	2.65
Transportation	1.33	14	19.92	1.75	1.71	2.03
Misc .Mechanical & Engg. .Ind	4.58	86.47	28.73	3.18	5.27	1.83
Drugs and Pharmaceuticals	7.07	14.72	21.73	1.54	2.26	1.76
Soaps, Cosmetics & Toiletries	7.35	10.11	108.66	0.75	1.28	1.26
Total	1.31	10.04	22.93	100	100	100

Source: SIA Statistics, Department of Industrial policy & Promotion, DIPP

tools, agricultural machinery, medical instruments, had high realization ratio but these sectors have miniscule shares in overall implemented investment. It identifies the potential sectors such as metallurgical industries, electrical equipments, chemicals, textiles and food processing industry.

#### **4. Factors Influencing the Larger Deviations in Proposed and Actual IEMs Investment**

Issues like excess capacities with the private sector and stressed assets, essentially on the infrastructure side are discouraging factors for industrial investment. Gujarat is often perceived for a favorable environment for investment as the state welcomed the Tata's new Nano car project way back in 2008 even when the project experienced serious hurdles related to land acquisition in the West Bengal. Gujarat state has been attractive due to timely access of land, enhanced infrastructure, and availability of trained employees (Business week 2008, Business Standard 2008). The state has also extended large tax and other fiscal incentives (Kanta, 2011). Even the Asian giants like Japan and China have also shown much interest in Gujarat as the state provides well connectivity to the Delhi-Mumbai Industrial Corridor (DMIC) passes through Gujarat. The high rate of implementation indicates there is a coordinated effort by the government to complete projects. According to the report of NCEAR, Gujarat topped in governance and political stability and perceptions among 21 states<sup>10</sup>. Maharashtra has focus on development of industrial centers in tier-II and tier-III cities along with Make-In-Maharashtra campaign where state Government has committed substantial investment. Other facilitating factors to the manufacturers are proper management related to subsidy and taxes, reimbursement of cost of water and energy audit, subsidy on capital equipment for conserving water, exemption in stamp and electricity duties and interest subsidies. Besides, the state has flexible labor reforms<sup>11</sup>. Orissa has got some strategic advantages as the state is very rich in resources such as coal, iron ore, limestone, bauxite as well as access of port facilities. Since the announcement of setting up of petroleum, chemicals and petrochemical investment region (PCPIR) at Paradip, Orissa has emerged as a hot destination for petrochemical industries<sup>12</sup>. Odisha an emerging sector for petrochemicals: Experts Karnataka enjoys multiple advantages in the manufacturing domain of the country. The availability of large pool of skilled human resources and Karnataka government's commendable efforts over the years puts forth ample opportunities for investment. Bangalore is well-known as the Silicon Valley of the East and recipient of highest venture capital funding in the country<sup>13</sup>.

Jharkhand state has shown much pace in IEMs and same will be deriving strength through recently set up of Jharkhand Investment Promotion Board (JIPB) formed on July 10, 2016. The state is blessed with ease of doing business in Jharkhand for investors through single window system<sup>14</sup>. Rajasthan is also performing better to get investment projects due to time-bound clearances for industrial projects, speedy land approvals, and efficient provision of linkage infrastructure as major incentives for setting up business in the State<sup>15</sup>. The industrial deprivation

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<sup>10</sup> Sohini Das (13 November, 2014) Gujarat, an investment hotspot for China, Japan, Business Standard.

<sup>11</sup> Assocham (3 April 2014). Maharashtra replaces Gujarat as top investment destination.

<sup>12</sup> Hemanta Pradhan (27 April, 2017), Odessa an Emerging Sector for Petrochemicals: Experts, Times of India.

<sup>13</sup> Chanderajit Banerji (13 February, 2017). Karnataka strengthens investment climate, Economy & Business.

<sup>14</sup> Ritu Kochar(16 July 2016). 5 Reasons Why Jharkhand is the Most Investment Ready State, Entrepreneur India.

<sup>15</sup> Surbhi (19 November, 2015). Rajasthan attracts 3.3-lakh crore investments at the summit, The Hindu.

<sup>16</sup> R. Krishna Kumar (1 December, 2006). Political stability is a key factor. Front Line

in West Bengal is much attributed to the unavailability of land in the state. For Kerala infrastructure facilities like roads and bridges and energy production has been much below the required levels. The high population density and high land value, lack of good governance policies and political instability are some basic reasons<sup>16</sup>. States such as Chhattisgarh and Uttaranchal experienced problems related to poor physical and social infrastructures, complex land acquisition, lack of clearances, financial constraints, promoters' hesitation, low penetration of skilled labor, poor supply of raw material and law and order. However the resource richness has been the constant attraction for investment especially in the mining sector. In case of Tamil Nadu, lack of diversity and restive labor in Sriperumbudur, the hub for major investments discourages the investment<sup>17</sup>.

## 5. IEMs Investment across States: Major Determinants

The study has major objective to explore the key determinants of industrial investment across Indian states. This section includes the research methodology and empirical findings.

### 5.1. Research Methodology

#### *Variables and Data Sources*

An extensive literature is referred for selection of key investment ingredients. Accordingly, the possible determinants for investment include the demand side, resource availability, structural composition and policy environment. The demand side is measured by population; and resource side by banking sector lending to the industry and availability of infrastructure facilities (proxy by per capita availability of power); structural composition by industrial shares in GSDP and policy environment through fiscal deficit as percentage of GSDP. The present study considers the sample of economically most active states contributing larger chunk of output in the economy. These include AP, Assam, Bihar, Chhattisgarh (CH), Gujarat, Haryana, Himachal Pradesh (HP), Jharkhand (JH), Karnataka, Kerala, MP, Maharashtra, Orissa, Punjab, Rajasthan, Tamil Nadu, Uttar Pradesh (UP), Uttrakhand and West Bengal (WB). The study is based on secondary data and extracts the data from "Handbook of Statistics on Indian States 2015-16", publication of Reserve Bank of India, and "SIA statistics", a publication of Department of Industrial Policy and Promotion (DIPP), Government of India.

#### *Research Method*

The present study is an attempt to identify the determinants of IEMs investment in India across states. For the purpose the empirical relationship is assessed through panel data econometric approach. The limited data space restricts authors to utilize the fixed effects (FE) and random effects (RE) model. The specification of ordinary least square technique for panel data under fixed effect model is as follows:

$$Y_{it} = \beta_{1i} + \beta_2 X_{2it} + \beta_3 X_{3it} + \varepsilon_{it} \quad (1)$$

Where  $i$  and  $t$  subscript are for each individual and time respectively.  $Y$  is the dependent variable and  $X_i$ s are explanatory variables. In this model slope coefficients remain constant across time and individual. Here intercept captures the behavioral differences between individuals. The intercept terms are denoted as fixed effects. But in many panel data sets the fixed effects may appear random also. In order to capture this effect, random effect model was introduced. More importantly, there is likely chance of finding correlation among explanatory variables and error terms as the individuals possess different characteristics, and consequently the precision of estimators get affected. This problem is relatively better handled in the random effects model. This model assumes that there is orthogonal condition meaning by no correlation between  $u_i$

<sup>17</sup> M Allirajan (31 March, 2016). TN ranks low in actual investments, The Times of India.

and explanatory variables. Random effects model is defined as:

$$Y_{it} = \alpha_1 + \alpha_2 X_{2it} + \alpha_3 X_{3it} + (\varepsilon_{it} + u_i) \quad (2)$$

$$= \alpha_1 + \alpha_2 X_{2it} + \alpha_3 X_{3it} + v_{it} \quad (3)$$

Where now  $\alpha_1$  is the intercept parameter, and  $v_{it}$  includes the random individual effect and the usual regression error term (Hill al. el, 2011). The selection of either of these two techniques is made on the basis of Hausman statistic.

The study specifies following models while considering the given explanatory variables as:

$$IEM_{it} = \gamma_1 + \gamma_2(LPOP_{it}) + \gamma_3(CREDIT_{it}) + \gamma_4(LINFRA_{it}) + \gamma_5(INDUSTRY_{it}) + \gamma_6(FD_{it}) + \varepsilon_{it} \quad (4)$$

Where IEM represents implemented industrial investment, LPOP: log value of population, CREDIT: Commercial Banks' lending to industrial sector, LINFRA: log values of infrastructure proxy by per capita availability of power, INDUSTRY: industrial shares in GSDP, FD: Fiscal deficit as percentage of GSDP.

#### Empirical Results

The empiric for determinants of industrial investment is measured through equation number 4 given above. The estimation requires the applicability of either random effects or fixed effects technique. Here, the conventional Hausman test is utilized for selection of respective technique.

**Table 4: Hausman Test Statistic**

Variable	(b) FE	(B) RE	(b-B) Difference	Sqrt (diag(V_b-V_B)) S.E.
Lpop	19.0050	0.9885	18.0165	9.3335
credit_gsdp	-0.0041	0.0121	-0.0162	0.0113
Linfra	-0.5136	1.0635	-1.5770	1.2160
Industry	-0.0062	-0.0247	0.0184	0.0149
fd_gsdp	0.0616	0.0373	0.0244	0.0178
$\chi^2(5)[(b-B)'[(V_b - V_B)^{-1}](b-B)] = 9.78, \text{Prob.} > \chi^2 = 0.0816$				

Test:  $H_0$ : difference in coefficients not systematic

The null hypothesis considers no systematic difference in coefficients. Rejection of null supports the fixed effects model. The Hausman test statistic is 9.78 and is distributed  $\chi^2(5)$  and accepts the null hypothesis (Table 4). Accordingly, random effects model is suitable technique for the given data set.

The estimated model is based on two important assumptions such as homoscedasticity and no contemporaneous correlation. But there may be the possibility of heteroscedasticity and correlation in error terms among individuals. The cluster-robust standard errors for random model relax these assumptions (Hill et. al, 2011). This method is utilized on the same set of variables, and its results are exhibited on the right side of Table 5. It leaves the coefficient values unchanged, however makes some adjustment in the standard error and consequently to the test statistic value. It can be inferred that the infrastructure facilities and banking sector advancement affects the industrial investment positively.

Table 5 presents the estimated results for the determinants of IEMs investment. The coefficient

values indicate that there is positive impact of population, bank credit to industrial sector and infrastructure. As per the robust standard error estimation these coefficient values are statistically significant at 1 percent, 6 and 3 percent, respectively. Population is reflecting the demand side whereas bank lending and infrastructure suggest the resource availability for the IEMs investment. The results indicate that a unit increase in the population increases IEM investment by 0.98 percentage points. The findings of the study in terms of role of infrastructure is aligned with the previous studies such as Banga (2003), Majumdar (2005), Moosa and Cardak (2006), Siddharthan (2008), and Rozas and Vadlamannati (2009). In the same regression, the industrial share to GSDP has negative coefficient value and statistically significant as well. It can be inference that IEMs look towards the untapped industrial states and hence lower possibility for already

**Table 5: Determinants of IEMs Investment (Random Effects Model)**

Variable	Coefficient	GLS Standard Errors			Cluster-Robust Standard Errors		
		Std. Error	T-Statistic	P. Value	Std. Error	T-Statistic	P. Value
lpop	0.9885	0.3775	2.6200	0.0090	0.3515	2.8100	0.0050
credit	0.0121	0.0103	1.1800	0.2390	0.0066	1.8300	0.0670
linfra	1.0635	0.5121	2.0800	0.0380	0.5106	2.0800	0.0370
industry	-0.0247	0.0083	-2.9800	0.0030	0.0102	-2.4200	0.0160
fd	0.0373	0.0405	0.9200	0.3570	0.0442	0.8400	0.3990
_cons	-4.7223	2.8927	-1.6300	0.1030	2.8256	-1.6700	0.0950

Source: Authors' Calculation

high industrial presence. Fiscal deficit as percentage of GSDP has negative bearings with the GSDP. It is to be noted that the coefficient value is positive but the indicator is presented in reverse order in the sense that positive value of this indicator implies deficit and negative value implies fiscal surplus. The fiscal policy indicator is not statistically significant however the sign of coefficient indicates that IEMs take higher fiscal deficit a serious concern.

## 6. Conclusion

The study concludes that the implementation rate of IEMs investment as compared to proposed investment was considerably low in India during triennium ending 2010. It can be argued that the policy paralysis environment associated with the previous government might have rendered into lower ratio for actual investment. The realization rate has increased whopping to around 23 percent during TE 2016 reflecting the reforms oriented approach and ease of doing business environment created by the present Government of India. Across states, higher realization rate is observed in Goa, Gujarat, Jharkhand, Madhya Pradesh, Maharashtra, Rajasthan and West Bengal. In fact states viz. Goa, Gujarat and Jharkhand had high industrial shares in GSDP accompanied by higher utilization rate of industrial investment. States namely AP, Chhattisgarh, HP, Karnataka, Orissa, Punjab and Uttaranchal considerably lack in utilization rate. This outcome puts forth the scope for improving utilization rate in these states to achieve the national target of boost in manufacturing share by 2025. India's industrial investment is skewed towards Maharashtra and Gujarat holding about 50 percent of total implemented IEMs, where as HP, MP, UP, Punjab and Haryana had lower pie in the investment. It is observed in the study that the effective governance coupled with sound infrastructure, human resources, efficient administration of tax and ease in land acquisition significantly makes the differences in investment across states. From the empirical estimation, it is found that the population, bank credit to

industrial sector and infrastructure affects the industrial investment significantly. The industrial share has negative bearings to the investment suggesting that IEMs investment looks towards the untapped industrial states. Higher fiscal deficit is perceived as a serious concern for the IEMs investment. The study concludes that enhanced infrastructure, developed banking sector and managed fiscal balances can contribute the industrial investment which will help to realize the goals of national manufacturing policy of India.

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