



SUB-NATIONAL LOCATION DETERMINANTS OF INWARD FOREIGN DIRECT INVESTMENT: A STATISTICAL APPRAISAL ACROSS REGIONS IN INDIA



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ABSTRACT

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There is a general proposition that availability of infrastructure facilities largely determines the locations of investment projects and also that Foreign Direct Investment (FDI) can be Resource seeking, Efficiency seeking and clusters in a region where there is already existing FDI. I employed a panel dataset consisting of 16 groups of Indian states over the period from 2001-02 to 2016-17, with the aim to identify the infrastructure, resource, market, and agglomeration specific factors that contribute to the wide-scale heterogeneity in the per capita FDI inflows across the Indian States. My results suggest that the availability of roads, ports and telecommunication infrastructure predominantly influenced the variations in the FDI inflows across states than any other infrastructure specific determinant. The findings indicate that the efficiency of labor was the highest motivation among resource specific factors for investors. Moreover, higher tax disincentive, the presence of the SEZs, and agglomeration economies are found to be statistically significant. Lastly, the per capita FDI is not found to be market seeking in nature.

Contribution/ Originality: This paper is one of the few studies that have investigated the factors that cause the skewed concentration of FDI among states in India. It also contributes to the existing literature by normalizing the values of the determinants that are used in the estimation models.

1. INTRODUCTION

The global economy has changed profoundly over the past six decades, especially over the last two. The charm of the fierce anti-imperialist narrative has waned in the former colonies while these transitions and emerging economies integrate with the rest of the world. The Government of India (GOI), for instance, had pursued a state-led Import-Substitution-Industrialization (ISI) model in the initial years since her tryst with destiny in 1947. FDI inflows into India have soared from 0.10 percent of India's Gross Fixed Capital Formation (GFCF) in 1991 to 10.80 percent in 2008. In keeping with that framework, the GOI followed a policy of anti-FDI inflows, from the years 1965 to 1975, and subsequently a regime of selective-FDI inflows between 1975 and 1991. Since the Balance of Payments (BOP) crises in 1991, the new economic policy (NEP) in India turned pro-FDI (Shin, 2014).

However, the FDI inflows have declined significantly to constitute about 4.30 percent of the GFCF in 2012 (United Nations Conference on Trade and Development, 2013). The GOI had recently eased the quantitative restrictions on FDI, across various industries and segments of the economy, and had also amended regulations (Ernst and Young (E&Y) India, 2014; Arun, 2015) towards the twin objects of economic growth and employment generation (Invest India, 2014). It is important to note that despite entering the pro-FDI regime, the policy decisions of the GOI exhibit traits of selective FDI practice whereas several non-state interests oppose easing of FDI restrictions. In fact, the debate on globalization and FDI has intensified over the last decade. It holds enormous relevance in a high growth economy like India that has a vast population suffering from abject poverty. The disparate development in India is antithetical to the mainstream thesis that global capital inflows impart efficiency to deliver growth (Chakraborty and Basu, 2002) and engender development (Mayhew, 1996; Organization for Economic Cooperation and Development (OECD), 2002; Sahoo *et al.*, 2002)¹. However, Dreze and Sen (2013) stated that only a minority of extremely rich have prospered. Fernandez (2006) and Vijayakumar *et al.* (2010) presented a new and emerging middle class to be the principal beneficiary (Omkarnath, 2012) argued that despite the constraints to growth in the Nehru-Mahalanobis strategy, India had attained a wide industrial base while the prescriptions of the 'Washington Consensus' may fritter the benefits of the earlier 'Development Consensus'. In fact, the concentrated nature of the FDI inflows within India has benefited few regions (Purfield, 2006). Regardless of the widespread notion that FDI is an extremely important source of external and stable finance to a developing country (Mallampally and Sauvart, 1999) inequitable spatial distributions for FDI inflows within emerging economies have caused and consolidated economic disparity among geographies in those developing countries (Xu *et al.*, 2008). Although, Huang and Wei (2016) argued that in a *neoclassical* economics framework of *comparative advantage*, when FDI's cluster and agglomerate, the diseconomies of scale will impede the inflows around the clusters and the inflows will locate to economies with lower costs. However, the skewed sub-national distribution of India's inward FDI's has acutely widened and aggravated the inter-regional disparities after 1993-94 and is likely to perpetuate the imbalances in the future (Nunnenkamp and Stracke, 2007; Pal and Ghosh, 2007; Chowdhury, 2014). Hence, in the context of India, it is imperative that while the GOI in coordination with the state government frames policies to enhance inbound FDI's, the inflows should not be spatially skewed to perpetuate the disparities.

This paper is organized into six sections. We define the process of FDI and explain India's policy regime briefly in Section 2. We outline the determinants of FDI inflows in a theoretical framework later in this section. The following section reviews the empirical literature on the reasons for uneven inflows across geographies. The data and research methodology are explained in section 4. Section 5 interprets the results. Finally, the concluding remarks are provided in the last section.

2. PRELIMINARIES

2.1. Nuances in the Interpretations of FDI

In the event of a foreign direct investment (FDI), the direct investor directly invests in the direct investment enterprise. In other words, the former does not employ any of its other resident affiliates to acquire ownership in the latter (Department of Industrial Policy and Promotion (DIPP), 2013). It thus denotes the export of usually non-loan productive capital from one economy to another and accommodates rights to assets that remain outstanding for over a year. While FDI inflows comprise of investments under paid-up capital and earnings that are reinvested from overseas operations, international statistics record other direct capital such as inter-company debt from the direct investor to its foreign affiliate as FDI inflows (Harvey and Milios, 1998; OECD, 2008). However, in India, the

¹ However, OECD (2002) and Sahoo *et al.* (2002) qualify the observation by stating that the FDI inflows are uniformly distributed among the countries and the salubrious effects of FDI on the welfare-enhancing outcomes will depend on the efficiency of the benefit's distribution channels.

Reserve Bank of India (RBI) reports FDI inflows that qualify as equity² and preference capital only and excludes the reinvested earnings in its FDI data (Reserve Bank of India (RBI), 2003).

2.2. FDI Policy Regime

The FDI policy, especially in relation to the quantitative restrictions of equity caps across various industrial sectors and industries in India is framed by the Government of India. The policy regime is implemented through technical and financial evaluation of FDI proposals prior to approval. In one kind of the approvals for FDI proposal in select industries, known as those of the automatic route³, the foreign direct investor reports to the RBI. The RBI also notifies the FDI policy regime under the aegis of the Foreign Exchange Management Act (FEMA), 1999. In the second kind, referred to as the government approval, the Foreign Investment Promotion Board (FIPB) within the Department of Economic Affairs (DEA) of the Ministry of Finance (MOF) examines proposals that concern the remainder of sectors that are not eligible for FDI under the automatic approval and recommends for the MOF's approval. The Secretariat of Industrial Assistance (SIA) within the Department of Industrial Policy and Promotion (DIPP) in the Ministry of Commerce and Industries, in particular the Foreign Investment Implementation Authority, its specialized division, provides multifarious assistance to direct investors for faster approval and implementation of FDI projects in India (Secretariat for Industrial Assistance, 2003).

2.3. Determinants of FDI: Evolution of Conceptual Framework

FDI route is expensive than the exports and licensing, for a business unit, to gain access to foreign markets. At the first glance, it appears challenging to explain the motives behind FDI. Over time the body of theory has advanced to provide rational explanations for the motives. The course the motives and theories are abstract and often cannot explain FDI trends. FDI inflows can be classified into three fundamental types with regard to motives of investment: *market-seeking*, *asset- or resource-seeking* and *efficiency-seeking*. The seminal literature can be categorized into theories: concerning international trade, assuming *perfectly competitive markets*, hypothesizing *imperfect competition* in markets, and relying on the strength of currencies.

Ricardo (1817) theory of *comparative advantage* and Ohlin (1933) *factor proportion* theory that was credible explanations for international trade could not explain investment flows for production across nations. Prior to the 1960's, the dominant *neoclassical (capital arbitrage)* theory (of portfolio flows) or *interest-rate* theory in *perfectly competitive markets* attributed superior returns or rates of interest or profitability as the chief motive for FDI by enterprises domiciled in the industrialized nations. Capital emigrates from economies preponderant with capital stock to those where it is scarce until the rates of returns - the factor prices for capital equalize across economies (MacDoughall, 1960; Kemp, 1964). However, markets are not perfect in reality. In fact, Mundell (1957) model assumed trade and FDI to be substitutes and the *import-substituting* or *tariff-jumping* FDI to be a response to the barriers to trade that distorts the equilibrium in perfectly competitive markets. Capital emigrates from economies preponderant with capital stock to those where it is scarce until the rates of returns - the factor prices for capital equalize across economies. The United States of America (USA) emerged as the major economic power and creditor after World War II and FDI's from the USA to war-ravaged Japan and Europe gained prominence with the rise of US Multinational Enterprises (MNE's). Besides, the advances in transportation and communications technology

² Indian companies are permitted to acquire equity capital through Global Depository Receipts (GDRs), American Depository Receipts (ADRs), and Foreign Currency Convertible Bonds (FCCBs), which qualify as FDI that are not subject to any ceilings in investment (SIA, 2003).

³ Activities that are eligible for 100 percent FDI usually qualify for the automatic approval. Approval for 100 percent Export Oriented Units (EOUs) and units in the Export Processing Zones (EPZs) or the Special Economic Zones (SEZs) and Electronic Hardware Technology Park (EHTP) and Software Technology Park (STP) are granted under the approval route subject to certain exceptions.

had rendered the *control* of direct investor enterprise considerably easier. The *capital arbitrage* theory could not explain these two phenomena.

Later, Kindleberger (1969) and Hymer (1976) too argued that FDI cannot happen in perfect competition. They disputed the prevalent mainstream thinking with hypotheses that constitute the *market imperfection theory* or *monopolistic advantages* theory. This theory used *industrial organization* framework and argued that a direct investor fundamentally aims to control the production of its international operations and the level of control in the direct investment enterprise that is available to the direct investor determines the volume of inflows. The market imperfections in the host country such as the lack of differentiated products, skilled labor, cheaper material inputs, access to capital markets, organizational skills, managerial expertise and superior technology or knowledge to the domestic rivals. FDI towards vertical and horizontal integration to achieve economies of scale and scope, secure resources, and markets) inhibit the competition and enable the direct investors to enjoy *monopolistic* (later *oligopolistic* Dunning (1995)) *advantages* that are *firm-specific* (Hymer, 1976) or *ownership* (O) specific. Kindleberger (1969) argued that 'O' advantages can be best exploited in imperfect markets. Hymer (1976) held the superior technology possessed by the MNE's was the most important *firm-specific* advantage. Thus the FDI may be motivated by efficiency in production, the market for products, knowledge and managerial expertise and non-interference from political interests in the host nation. Caves (1971) too advanced the literature by attributing the industry structure of the host economy. The salient features that attracted FDI inflows were the possession of superior information or technology to the direct investor, vertical integration to avoid uncertainty in a market with few vendors, and the objective to create entry barriers.

Caves (1993) extended Knickerbocker (1973) *oligopolistic reaction* (OR) hypothesis to FDI. When the industry structure in a high-income source country resembles an oligopoly and a constituent firm – an MNE makes an FDI in a foreign market with an object to realize the first-mover advantages, then the rival firms would also tend to make an FDI in the same foreign economy to deny the first mover firm any comparative advantage and mitigate their perceived *business* and *market* (loss) *risks*. This may trigger a *bandwagon effect* (Caves, 1993).

Aliber (1970) stated that MNE's can borrow at lower interest rates in wealthy parent countries like the USA, United Kingdom (UK) and Canada that have stronger currencies and earn high rates of returns from FDI's in weaker currency economies. The MNE's can thus benefit from and imperfections in market capitalization rates within international capital and foreign exchange markets.

The *location* (L) theory of FDI addresses questions during the comparison of *a priori* input factor costs and transportation costs to markets to optimal production location that can be applied to decide on the characteristics of optimal production location. It asserts that in order to attract FDI inflows a host economy must possess *location-specific* (L) endowments that shall enable foreign direct investors to retain their comparative advantage in that market. The L-advantages imply lesser costs and greater benefits vis-à-vis political, social, and economic attributes. *Social* advantages denote the proximity of the host country with the home country as regards the culture, language, habits, and customs that improves the 'business culture'. *Political* advantages refer to the host country's political stability and the regulatory set-up that concerns MNE's, anti-trust, international trade, foreign exchange transactions and FDI. *Economic* advantages are *demand side* (such as market size and its potential) and *supply side* (geographical features, quality and prices of input factors, the infrastructure of the host country for energy, communications and transportations and commercial, legal and educational services, and agglomeration economies that result from close access to suppliers, producers and consumers). Wheeler and Mody (1992) classify the first three classical supply-side variables into the *ergodic* system and the rest into the *non-ergodic* system (Dunning, 1995) termed the agglomeration economies into 'network-related' advantages and the rest into hierarchical advantages. Horst (1972) asserted the presence of natural resources as an important 'L' determinant for FDI inflows. Aggarwal (1980) argued that the *market size* of the host economy is an important determinant of inward FDI, especially in emerging economies. Porter (1985) suggested the various crucial natural and anthropogenic attributes that increase

the competitive advantages of business enterprises that operate in an area and improve the location-specific attractiveness of that region. Marsahll (1920); Krugman (1991) and lately (Beenstock and Felsenstein, 2010) heralded the *centrifugal* or *positive externalities*⁴ as the principal factors that attract FDI inflows in a location within a country. This leads to the feedback processes of *agglomeration* or *clustering effects* such that particular regions that specialize in certain activities have strong supply chains and knowledge spillovers. This minimizes of information costs and these aids provinces with *clustering effects* to draw FDI inflows more than the others. Thus 'L' theory explains which goods and services are produced in which location and why. Hence, governments of host locations alter policies to draw FDI's it is imperative to evaluate the initial conditions of locations and possible positive effects of the policy change.

Dunning (1980;1981;1988;1995) coalesced the 'O', 'L' and 'T' theories to propose an *OLI Framework* or the *Eclectic Paradigm* of International Production. It is a widely used and referred organizational context to understand the phenomenon of FDI. It postulates that the 'O', 'L' and 'T' advantages are the three necessary but not sufficient preconditions that should be satisfied simultaneously before a potential direct investor could commit to FDI.

3. REVIEW OF SELECT EMPIRICAL LITERATURE

The seminal works that laid the foundation for further empirical studies in this area have been discussed in the previous section. This section explores the studies that have investigated the spatial determinants of distributions of FDI. It lays emphasis on empirical works that examine FDI's into transition economies with a thrust on researches that concern the regional distribution of inflows across regions in India. □

Bevan and Estrin (2004) incorporated comparative advantages and institutional factors into general *gravity* model framework and examined the FDI inflows into eleven transition economies in Central and Eastern Europe (CEE) from eighteen (continental) European Union (EU) nations from the year 1994 to 2000. The study demonstrated that unit labor costs, market size and proximity between home and host economies are the most influential spatial determinants. Previously some studies (Wheeler and Mody, 1992; Jun and Singh, 1996; Resmini, 2000) among several location-specific factors, assess the negative impact of macroeconomic riskiness on the FDI inflows into emerging economies.

Garretsen and Peeters (2008) studied the FDI outflows from the United States of America (USA) from 1980-2000 and the Netherlands from 1994-2004 into the emerging economies and found considerable spatial linkages of FDI outflows from *third-country effects*. Thereafter, notably (Martin, 2011) applied spatial (panel) lag and error models that employ Maximum Likelihood (ML) estimation procedures over the outbound FDI's from Spain to 50 host economies between 1993 and 2004 and also found evidence of spatial interdependencies among the outflows.

Studies such as Cheng and Kwan (2000); Wei *et al.* (1999) and Zhang and Po Yuk (1998) argued that labor costs are an important 'L' determinant for investment decisions across China. In addition, empirical works (such as (Sun *et al.*, 2002; Li and Park, 2006; Du *et al.*, 2008; Luo *et al.*, 2008; Xu *et al.*, 2008; Boermans *et al.*, 2011)) investigated the role of determinants such as labor costs, institutional quality, geographical endowments, market size and agglomeration economies in the skewed distribution of inward FDI in China. It is noteworthy that from 1999 through 2005, Luo *et al.* (2008) found that the 98 hinterlands of China failed to attract FDI inflows despite cheaper labor and natural endowments while the 5 coastal regions thrived due to policy incentives and agglomeration economies. In fact, Xu *et al.* (2008) observed that during 1998-2007, Hong-Kong and Shanghai were the pivotal agglomerates that attracted FDI. Quality of labor was more important than the cost of labor as a determinant. Yin *et al.* (2014) investigated the sub-national 'L' determinants of FDI inflows for 17 Chinese

⁴ These externalities are the unintentional and intentional knowledge and pecuniary benefits that spill over to the follower firms when they locate in the proximity of extant production or first mover units. The benefits show up a decline in production costs due to savings in information costs and those from more specialized and divided labor markets, greater forward and backward industry linkages and higher competition among multiple vendor networks.

provinces and cities during 2000-2010 into the manufacturing and services sectors. It found most effective explanatory variables such as agglomeration economies and disparate economic policies to be similar. Infrastructure provisions and labor costs (and not quality) were crucial for *export-platform* manufacturing but not for services that sought domestic markets. Besides, consistent to previous studies coastal regions and large cities attracted overwhelmingly greater inflows than inland areas. Furthermore, as regards the regional distribution within China, some works (Zhao and Zhu, 2000; Belderbos and Carree, 2002; Hu and Owen, 2005) suggest that the determinants of FDI inflows depend on the mode of entry and the home country of the direct investor.

There appears to be a renewed interest in the investigation into the reasons for the highly unequal spatial distribution of FDI's in India. Ramachandran and Goebel (2002) analyzed the *location-specific* advantages of Tamil Nadu as a highly favored FDI recipient region in India conspicuously in Information Technology (IT), automobile manufacturing and garments. The spatial determinants were supply side and mostly non-ergodic and state-induced. Aggarwal (2005) applied 'panel corrected standard estimates' and 'count model' techniques to regress export-oriented and domestic-making FDI inflows over the spatial determinants across 25 Indian states from 1991 through 2001. It incorporated a composite measure for the rigidities in India's labor markets. It found that these rigidities and higher labor costs depressed inward FDI especially in (labor-intensive) export-oriented FDI. Rao and Murthy (2006) observed that the FDI inflows were increasingly getting concentrated in the western and southern states. It cited that almost in every Indian state the top two industries received the majority of inflows. Nunnenkamp and Stracke (2007) found that, in general, the FDI inflows into India were concentrated in more advanced states, especially in the larger cities. Yet, the investors' desire for raw materials overrides their regard for economic development and infrastructure quality. In addition, variables like per capita income and transportation infrastructure were significant determinants for FDI in manufacturing and services. In an econometric study of 100 largest cities across 17 provinces within India, Goldar and Banga (2007) found that most of the spatial determinants of FDI across states in India namely the size of cities, presence of a metropolitan city, human capital and incentives for investment and business in a state is similar to those for domestic investment. Similarly, Morris (2007) found that FDI's were heavily concentrated in states with the metropolitan cities that hosted the country headquarters for operations in India. Siddhartan (2008) 's econometric comparison of 'L' determinants for heterogeneous regional distribution of FDI inflows into India and China revealed that economically developed states of India that offer (especially knowledge-based) *industrial linkages* within a strong industrial base and have marine coastlines received gigantic inflows similar to provinces in China. In relation to India, Siddhartan (2008) found considerable positive externalities in the form of technology and cost benefits reaped by automobile components' manufacturing agents in the National Capital Region (NCR) and the Information Technology Enabled Services (ITES) industry in the Bangalore region (Mukherjee, 2011) argued that states that have large markets, lower labor costs, robust infrastructure and industrial base for manufacturing and services exhibited strong agglomeration effects and received the gigantic shares of India's inward FDI's. In fact role of quality of labor force was not found to be significant (Nunnenkamp and Mukim, 2011) used conditional logit model technique to study peer effects on the location choices of 6020 foreign and non-resident Indian (NRI) investors among 542 districts in India. It found that FDI's (apart from Germany) tend to agglomerate at districts previously favored by compatriot peers. In a panel study on 600 districts in India, Chakrabarti *et al.* (2012) found that the FDI inflows are clustered into districts with better physical infrastructure. The non-linear relationship is significant beyond a certain threshold of physical infrastructure. However, Chatterjee *et al.* (2013) argued that physical and social infrastructure did not significantly influence the inter-regional distribution of inward FDI across the states in India. More importantly, the study found that the higher (against lower) profitability and variability of profitability of existent firms engender higher (against lower) subsequent FDI's. In an exploratory study, Ernst and Young (E&Y) India (2014) cited the burgeoning domestic market and inexpensive and skilled labor force as the prime determinants of the high share of India in global inflows while telecommunications infrastructure is an important causal factor. It also suggested that

while the metropolitan cities in India will draw the majority of inward FDI, tier II and tier III cities such as Ahmedabad, Jaipur, Chandigarh, Coimbatore, Kochi, Nagpur, and Aurangabad can attract substantive flows in the future. Chattopadhyay (2014) performed a random effect (R.E.) generalized least square (G.L.S.) panel regression of the FDI inflows from the years 2001 to 2013 and attributed the existence of substantive *clustering effects* as the principal underlying factor for the regional concentration of the inflows in some economically advanced states in India. Besides, the effects of *market size*, road route density and access to electricity in a state were positive and significant. The study also found that tax rates in a state lowered its share in inward FDI. However, wage rates and a basic education of the labor force did not make any significant impact on the spatial distribution of FDI's against *a-priori* expectations. Chattopadhyay (2014) ascribed that to the highly mobile nature of labor within India.

The empirical works that have studied the distribution of inward FDI across the provinces in India have been few in number. Since the 1992 economic reforms, not only in India progressively moving towards a market economy, the supremacy of the union government as regards economic policy formulation and courting foreign capital has been waning over time. At the same time, the provincial governments have greater autonomy in fiscal policy matters and therefore have to compete with one another to attract foreign capital. This limited literature warrants expansion with theoretical and empirical perspectives. I aim to identify the various kinds of *location-specific* (L) features that attract FDI inflows across different provinces in India.

Table-1. Definition of Variables.

I.	Dependent Variable	Calculated as Normalized value of
	Per Capita FDI (PCFDI) inflow of each region.	Total FDI Inflows (in Rs. Crore)/Total Population
	Determinants (Explanatory Variables)	
II.	Infrastructure Specific	Calculated as the Normalised value of
1.	Road Density (RoD)	Length of Roads (PWD, Project, and Urban)/Total Area of Roads (Km per '000 sq. km)
2.	Rail Density (RaD)	Length of Rail-Roads /Total Area of Rail-Roads (Km per '000 sq. km)
3.	Tele-density (TD)	Subscriber base available in percentage (the sum total of mobile & wireline tele-density)
4.	Port Efficiency (PE)	Average of Normalised Port Physical performance (Total Traffic at major & minor Ports in '000 tonnes) and Port Financial Performance (total income in Rs. Million)
5.	Civil Aviation (CA)	Total Aircraft Movement.
6.	Bank Penetration (BP)	Average of Normalised Bank offices per million population & Normalised Bank offices per '000 sq.km
III.	Resource Specific	Calculated as the Normalised value of
7.	Coal (C)	Coal Reserves (Coking and Non-Coking) in '000 tonnes
8.	Crude Oil (O)	Total Crude Oil Reserves '000 tonnes
9.	Natural Gas (NG)	Total Natural Gas Reserves '000 tonnes
10.	Lignite (L)	Total Lignite Reserves '000 tonnes
11.	Mining and Quarrying (M)	Total Mining & Quarrying (Total Establishments)
12.	Labor Productivity (LP)	Average of the Normalised value of (Employee related ratios Profits per Persons Engaged: All Industries and Net Value Added per Persons Engaged: All Industries)
13.	Labor Quality (LQ)	Composite of literacy rate, high school enrolment and the number of higher educational institutions.
IV.	Market and Agglomeration Specific	Calculated as the Normalised value of
13.	Market Size (MS)	Per Capita Net State Domestic Product (PCNSDP) with the 2004-05 base year (data prior to years prior 2004-05 which is available in 1999-00 as the base have been converted too)
14.	Market Growth (MG)	Growth of Per Capita Net State Domestic Product (PCNSDP) with the 2004-05 base year.
15.	Market Economic Intensity (MEI)	Industry per capita NSDP/Overall per capita NSDP.
16.	Government Size (GS)	Revenue Expenditure/ GDP per year
17.	Tax Revenues (STAX)	Tax Revenue /NSDP
18.	Patents (P)	No of patents' applications filed from states aggregated at the regional level.
19.	Special Economic Zones (SEZ's)	Number of SEZ's.
20.	Lag FDI	Lagged value of per capita FDI.

(All variables except the government size are expected to improve the FDI inflows)

Source: Census of India (2001; 2011) Centre for Monitoring of the Indian Economy (CMIE) state-level database, Central Statistics Office (CSO), DIPP database, the RBI.

4. RESEARCH METHODOLOGY: Data and Model Specification

I performed panel regressions on a dataset of 16 regions that group the 31 Indian states and Union Territories over the period from 2001-02 till 2016-17. We have put the groups with constituent states in Appendix A. This classification is consistent with the descriptive statistics and methodology for FDI inflows followed by the Reserve Bank of India (RBI)⁵. Above table 1 lists the variables selected for the Study.

The third set of variables consists of the variables that are specific to the market and agglomeration economies. The scale and growth of a region's economic output represent the economic opportunities in a market. The size of the local market indicates the potential demand for a foreign firm's output. This justifies the assumption that the attractiveness of a market is an important locational determinant for an FDI decision. I consider variables described in Table 1 to capture the attributes of local markets across regions, with an a priori expectation that the regions that have higher market coefficient values have attracted more FDI inflows.

Dunning (1980;1995) suggest that the MNC's seek to leverage their ownership advantages such as innovations from a facility in one location to operations in other locations. Patents are a priori expected to positively influence the FDI inflows across states. I have considered patents as a variable in the third model.

Rational investors chose to set up a production facility in locations with reliable and readily available physical infrastructure. Ancillary industrial units subsequently gravitate around the first movers, usually the larger units as vendors and to exploit inherent synergies in the supply chain. This spatial diffusion of industrial units in the geographical area leads to an industry cluster that specializes in certain activities. The literature identifies *agglomeration*, i.e. clustering of firms has emerged as an important determinant of the regional distribution of FDI flows within a country during the last two decades. I have adopted the presence of Special Economic Zones (SEZs) and one period lagged value of FDI to account for agglomeration economies.

I have obtained the data on the various explanatory variables from multiple sources. The DIPP releases the annual state-level FDI flows. The data on annual FDI flows to Indian states was accessed from the DIPP database. However, the data are not available at the disaggregated state level but for 16 regions. All explanatory variables are averaged while aggregation at the group. The precursor elements for the majority of the explanatory variables from 1 to 9 and 16 and 18 are acquired from the Centre for Monitoring of the Indian Economy (CMIE) state-level database. The variables relating to economic structure (13 to 15) are computed from the RBI Handbook of Statistics on Indian Economy. The variables 17, 19 and 20 are sourced from www.indiastat.com. The information on the per capita income and variables is available in the National Accounts Statistics (NAS) published by the Central Statistics Office (CSO). The Annual Survey of Industries (ASI) published by the CSO is a reliable source for variable 13, i.e. labor quality. Moreover, I have assumed exponential growth of the populations in all states to estimate the annual population of each from the figures in the *Census of India (2001; 2011)*. The states in India are largely heterogeneous in terms of their socio-economic-political characteristics and we recognize the possibility of omitted variable bias due to the dropping of state-specific variables that cannot be averaged while grouping. I decided on this period of study to examine the substantive appreciation in the FDI inflows upon several deep policy changes. I have used the following normalization technique similar to that followed by the UNDP to calculate relative position of countries in Human Development Index components to compute the normalised value for all variables for each particular period. This normalization technique estimates the relative position of each state with respect to each determinant.

$$I_{ij} = S_{ij} - \min(S_{i1}, S_{i2}, \dots, S_{in}) / \max(S_{i1}, S_{i2}, \dots, S_{in}) - \min(S_{i1}, S_{i2}, \dots, S_{in})$$

where S_{ij} and I_{ij} denote the value of the variable before and after normalization for the state 'i' in the year 'j'.

⁵ However, OECD (2002) and Sahoo et al. (2002) qualify the observation by stating that the FDI inflows are uniformly distributed among the countries and the salubrious effects of FDI on the welfare-enhancing outcomes will depend on the efficiency of the benefit's distribution channels.

I constructed three panel regression models to examine whether we can explain the differences in the per capita FDI inflows across states (regions) with the following location-specific determinants viz. (i) infrastructure specific, (ii) resource specific and (iii) Market and agglomeration economies specific determinants. I specify the econometrics in the Equations (1), (2) and (3) respectively:

$$PCFDI_{it} = RoD_{it} + RAD_{it} + TD_{it} + PE_{it} + CA_{it} + BP_{it} + \varepsilon_{it} \dots(1)$$

$$PCFDI_{it} = C_{it} + O_{it} + NG_{it} + M_{it} + L_{it} + LP_{it} + LQ_{it} + \varepsilon_{it} \dots(2)$$

$$PCFDI_{it} = MS_{it} + MG_{it} + MEI_{it} + GS_{it} + P_{it} + DFM_{it} + SEZ_{it} + AE_{it} + \varepsilon_{it} \dots(3)$$

In regression with panel data, the random effects models (REM) and the fixed effects models (FEM) are estimated to control for individual specific and temporal effects, and the choice between the two is a critical issue. At first, I assume the absence of any significant state specific or temporal effect during the estimation of the pooled regression model. The present paper estimates a REM because the states are likely to be heterogeneous within a group in terms of their socio-economic-political structure. Second, the states are grouped on geographical proximities. Therefore, the groups too seem to be heterogeneous in nature and the group-specific effects are unlikely to be systematic. Furthermore, since the number of variables (20) is greater than time observations (16), the FEM will suffer considerably from the problem of low degrees of freedom as it requires estimating state specific parameters to capture individual effects. The REM, on the other hand, does not suffer from such problems as it does not require estimation of separate parameters to characterize the individual regions. Besides, the REM also retains the observed characteristics that remain constant for each individual that is dropped in the FEM. □

I carried out the restricted F-test and the Hausman (1978) test in order to statistically examine the suitability of the REM or FEM.

Table-2. Results of Likelihood Ratio Test and Hausman Test for appropriate specification of models.

(a) Selection between the pooled regression model and fixed effects model (FEM) (Restricted F-test). □ [H ₀ 's: All coefficients in the three pooled regression model are equal to zero.]		
Infrastructure Specific Determinants	Resource Specific Determinants	Market and Agglomeration Economies Specific Determinants
F (15,186) = 9.66**	F (15,185) = 62.81**	F (14,157) = 9.44***
(b) Selection between random effects model (REM) and fixed effects model (FEM) (Hausman Test). [H ₀ : Difference in entities for the three REM's is random and uncorrelated with independent variables]		
Infrastructure Specific Determinants	Resource Specific Determinants	Market and Agglomeration Economies Specific Determinants
$\chi^2 (6) = 65.98**$	$\chi^2 (7) = 2.30**$	$\chi^2 (8) = 132.22***$

*, ** and *** imply that the χ^2 coefficients are statistically significant at 10 %, 5 % and 1% significance level respectively.

Since in Restricted F test conducted for choosing between the constant coefficients model (CCM) and the FEM, F statistic is statistically significant for all the three Models, hence I reject the CCM. The Hausman test results advises one to consider the FEM as a suitable candidate for Models 1 and 2 and recommend that the REM is suitable for Model-2.

5. EMPIRICAL FINDINGS AND DISCUSSION

It is noticed that 6 out of 16 regions absorb around 70 percent of the cumulative FDI inflows from 2001-02 to 2016-17. New Delhi accounts for highest cumulative per capita FDI inflows followed by Mumbai, Bangalore, Ahmedabad, Chennai, Hyderabad, and Goa. Kochi has shown good performance likely because of the existence of ports. On the other hand, regions such as Guwahati, Kanpur, and Patna have pulled in meager inflows. In fact, Kanpur and Patna regions have displayed lackluster performance than the north eastern states clubbed in the Guwahati region. This highly imbalanced concentration of the FDI in particular region may jeopardize the politico-socio-economic stability of India.

In this study, the coefficients for road density, port efficiency, and telecom density were found to be significant. This suggests that FDI inflows aim to exploit the hard infrastructure of the states. Nonetheless, the direct relationship need not imply causality. In fact, although this might appear counter-intuitive at first, infrastructure in many instances is not the agency behind Greenfield or Brownfield investments. Chatterjee *et al.* (2013) for instance, argued that as regards FDI's in Indian states, infrastructure stock is often an outcome rather than a determinant of the inflows. Foreign investors may develop physical infrastructure independently of government in an emerging economy such as India where the physical stock is deficient. This hypothesis gains traction if one were to just see the segments of industries in the cumulative inflows for the two most dominant attractive FDI destinations in India in Table 4.

Table-3. Regression Results.

Model I: (Fixed Effects)		Model II: (Random Effects)		Model III: (Fixed Effects)	
Infrastructure Specific Determinants		Resource Specific Determinants		Market and Agglomeration Economies' Determinants	
Variable	Coefficient	Variable	Coefficient	Variable	Coefficient
Intercept	-0.297 (-2.034)	Intercept	0.078 (0.756972)	Intercept	-0.087 (-0.813)
RoD	1.373** (2.458)	C	-0.037 (-0.11203)	MS	0.111 (0.632)
RaD	-0.020 (-0.293)	O	-0.280 (-1.10291)	MG	0.012 (0.428)
PE	1.375*** (3.671)	NG	0.291 (0.87378)	MEI	0.191 (0.504)
CA	0.232 (0.870)	M	0.018 (0.032941)	GS	-0.159 (-0.896)
BP	-0.241 (-0.236)	L	0.039 (0.394158)	STAX	-0.456** (-1.982)
TD	0.414** (1.978)	LP	0.119** (2.124883)	P	-0.024 (-0.174)
		LQ	0.005 (0.062671)	AE	0.743*** (4.569)
				SEZ	0.787*** (3.367)
Adjusted R ²	0.84	Adjusted R ²	0.38	Adjusted R ²	0.91
F - Statistic	52.59	F - Statistic	23.39	F - Statistic	78.98
Prob (≥ F-Stat)	0	Prob (≥ F-Stat)	0.04	Prob (≥ F-Stat)	0

Number of years = 16; Number of Regions = 16; Number of Observations = 256

Note: () denotes observed t-values. *, ** and *** imply that the coefficients of the explanatory variables are statistically significant at 10 %, 5 % and 1% significance level respectively.

Table-4. Segments of the industries with high FDI inflows.

	Region	Segments of Industry
1.	National Capital Region (NCR)	Automobile, Electrical Equipment, Services and Telecommunication
2.	Mumbai	Automobile, Electrical Equipment, Energy, Services and Telecommunication

Source: Adapted from the DIPP database and the RBI.

As regards the resource-seeking FDI, in the second model, none of the coefficients for natural resource variables was significant. These findings are consistent with the understanding that metals and minerals are deemed strategic assets of the economy. This proposition is reinforced by the notion that the GOI has been historically averse to allowing foreign investment in the mining sector. While the GOI has been gently relaxing restriction limits in this sector; the FDI in mining, however, is a miniscule proportion of total inflows into India. In fact, most inflows are in the realm of mergers and acquisitions rather than the Greenfield or Brownfield investments. It is interesting to find the coefficient for the productivity of labor statistically significant. The labor

productivity implies cheaper labor with a high return on wages. However, while the relationship between the labor quality and FDI is positive, the coefficient for labor quality was not found significant in this study. This strongly indicates that the foreign investors are less concerned with the educational quality of the labor; rather they want more return generating labor. This presents a paradox. Ideally, the regions with superior human capital should pull in greater FDI inflows within a country. Yet if inflows migrate into regions with inferior education outcomes then the FDI is efficiency seeking. The detail lies in the basic attributes of the recipient industry. The NCR and Mumbai regions also have the largest concentration of finest institutions and migration of human capital in India. In light of this ambiguous relationship of the FDI inflows and the quality of labor it is quite likely that the FDI is not into high-end technology processes but low-end manufacturing and services sector that do not require sophisticated technical-know-how and critical skill sets. This understanding gains currency because the relationship between the FDI inflows and the patents is not significant. To address this lacuna, in addition to other objectives, the GoI has instituted the Make in India initiative in 2014 and progressively easing away the upper limits for FDI's across many industries. Prima facie, the results are encouraging.

In the third model, the presence of Special Economic Zones (SEZ's) and lagged FDI that represent the *agglomeration economies* are found to be highly significant factors, among all these factors, which cause differences in the FDI inflows across states. The National Capital Region (NCR) is one of the largest agglomeration economies in the world. The study In fact, given that the results are consistent with those of Okada and Siddharthan (2008) only fosters the hypothesis that the desire to exploit *clustering effects* within India has been an overriding objective among FDI investors. Moreover, the SEZ's also reflect the export-oriented nature of production. Extant literature is replete with the transition of the FDI from seeking markets before the World Trade Organization (WTO) arrangement. Post-WTO mechanisms efficiency-seeking FDI has become more notable. Thus, consistent with the empirical findings and literature it can logical to state that this export-oriented FDI is efficiency seeking. The statistical results in model 1 and 2 also indicate in that manner. Importantly, Market Growth and Market Size which are crucial factors of FDI as per the popular model are not found to be significant. In addition, the higher share of taxation in the gross NSDP is also a significant determinant. Incidentally, the Goods and Services Tax (GST) regime that purports to unify the fragmented goods and services markets across states India was introduced in the financial year 2017-18. It is perplexing that the coefficients of banking penetration in the model 1, coal and crude oil reserves in model 2 and patents in model 3 are negative although the coefficients are not significant. □

6. CONCLUSION

FDI inflows have increased significantly in India in the last decade. However, the growth in FDI flows has been accompanied by strong provincial concentrations. Our findings are threefold. First, the initial observation indicates that the states that lie along the coastline of India have a natural advantage over states in competing for FDI inflows. In addition, if such regions have more efficient ports and vast road networks then they are magnets for inflows. These factor endowments are more effective in the presence of robust telecommunication networks. On the contrary, provinces with deficient hard infrastructure attracted scanty FDI. Second, it suggests labor efficiency, among resource specific factors, is a highly important factor causing differences in FDI inflows across states. The findings suggest that the FDI inflows aim to seek higher productivity in low-skilled or semi-skilled labor rather than in highly skilled labor. In fact, I did not find evidence that FDI inflows are attracted by skilled labor. This propensity is more pronounced in the automobile manufacturing industry and is lower in the Information Technology allied industries. This is a suboptimal outcome from the employment objectives of the state. It does not augur well if the GOI or state governments wish to use FDI policy as a tool to mitigate unemployment. Third, this work finds that the states with more number of Special Economic Zones (SEZ's) that are dedicated towards exports offer substantive agglomeration economies that contribute towards spatial disparity in FDI inflows within India. Also, higher commercial tax slabs in a region is a strong disincentive for investors to pump FDI in it. We will have

to see how the new GST regime alleviates the situation. Finally, the coefficients for certain variables in the models are negative although contrary to *a priori* beliefs. Although these outcomes are likely related to deficiencies related to model selection and variable construction rather than due to economic relationships.

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Appendix I:

Here, the states are combined into 16 groups as per the data on FDI inflows provided by the regional offices of the Reserve Bank of India. Table 3 lists the groups of States and Union Territories (U.T.'s) only as per the RBI's operations by Regions. The Standalone state regions that are excluded from the groups are: Andhra Pradesh, Gujarat, Goa, Karnataka, Odisha and Rajasthan.

Table-3. A. Description of the classification of the Indian states into groups as per the RBI.

Sl. No.	Region	States and U.T.'s Covered
1	Ahmedabad	Gujarat
2	Bangalore	Karnataka
3	Bhopal	Chattisgarh and Madhya Pradesh
4	Bhubaneswar	Orissa
5	Chandigarh	Chandigarh, Haryana, Himachal Pradesh and Punjab
6	Chennai	Puducherry and Tamil Nadu
7	Guwahati	Assam, Arunachal Pradesh, Manipur, Meghalaya, Mizoram, Nagaland, Tripura
8	Hyderabad	Andhra Pradesh and Telangana
9	Jaipur	Rajasthan
10	Kanpur	Uttarakhand and the rest of Uttar Pradesh beyond National Capital region (NCR) adjoining New Delhi.
11	Kochi	Lakshwadeep [U.T.] and Kerala.
12	Kolkata	Andaman and Nicobar Islands [U.T.], Sikkim and West Bengal.
13	Mumbai	Dadra and Nagar Haveli [U.T.], Daman and Diu [U.T.] and Maharashtra
14	New Delhi	Delhi, Haryana and National Capital Region of Uttar Pradesh
15	Panaji	Goa
16	Patna	Bihar and Jharkhand

Source: The RBI database.

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