A Race to Compete for Investment among Indian States? – An Empirical Investigation

Krishna Chaitanya Vadlamannati

Alfred-Weber-Institute for Economics
University of Heidelberg, Germany
Krishna.vadlamannati@awi.uni-heidelberg.de

Abstract: India is a complex federal democracy where state level politics are dominated by state specific issues rather than national issues, making the economic development of the respective states the focal point of a potential electorate. As economic reforms are now driven by the states, due to the withdrawal of controls exercised by central government in key areas, states are forced to compete against each other in terms of attracting investment which would generate jobs and boost their respective economies. Using spatial econometric estimations on panel data on 32 states in India during the 1991–2009 period (19 years), I indeed find that the inflow of investment proposals in one state is positively correlated with investment proposal inflows elsewhere (i.e., investment proposals related to Industrial Entrepreneurs Memorandums coming from other states for approvals, increase the likelihood of Industrial Entrepreneurs Memorandum proposals coming from the state in question). While high income states compete for investment both among themselves (intra-group) and with low income states (inter-group), the competition is largely confined to within-group in the case of low income states. The results are robust to alternative weighting schemes, samples, methods, and controlling for the possibility of endogeneity.

Keywords: Investments, Spatial econometrics, India (F21; R58; O53).

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"India Looks to the States: While New Delhi idles, India's large and diverse states are competing for growth and investment."

– The Wall Street Journal, April 2011[1]

"When did we say that we would not touch American capital? Investments generate employment and so by wooing American investment the chief minister is not going beyond the party's line."

– Communist Party of India (Marxist)'s senior leader Shyamal Chakraborty defending West Bengal's CPI(M) Chief Minister Buddhadeb Bhattacharya in 2007[2].

1. Introduction

Do states in India compete for investment? As the opening quotes illustrate, in India today the state governments are desperate to attract private and foreign investment by removing policy bottlenecks that are often viewed as unattractive to firms (Aghion, Burgess, Redding and Zilibotti 2008). Many in the industry feel that this sort of competition is good for the respective states as it not only helps solve problems associated with excessive bureaucratic controls, corruption and creating an investment friendly atmosphere, but also creates enormous job opportunities which form huge political capital for incumbent politicians. Therefore, there is every reason to believe that states in post-reform India tend to compete for investment (The Wall Street Journal 2011, Kanta 2011). For instance, Kanta (2011), Schneider (2004) and Venkatesan (2000) cite examples of large tax and other fiscal incentives the states within India offer to attract investment. In this paper, I examine whether states in India compete for big ticket investment proposals. While there is a growing literature estimating the extent of the competition in international taxation and environmental policies, policy reforms and labour standards, to the best of my knowledge there is no empirical evidence examining the potential competition among states within India, a gap the current paper fills.

[1] See: http://online.wsj.com/article/SB10001424052748704099704576288611078352574.html?mod=WSJ_topics_obama
[2] See: http://www.indiastrategic.in/topstories57.htm

Spatial econometrics has been used in the literature to examine the race to the bottom arguments regarding taxes, environmental regulations, economic policy reforms and labour standards. The first group of work includes Davies, Egger and Egger (2003), Devereux, Lockwood, and Redoano (2008), Davies and Voget (2008), Overesche and Rinke (2008) and Klemm and van Parys (2009), who focused largely on tax competition to attract FDI between developed countries. Here, they find a positive spatial lag, meaning that as tax rates fall in one nation, this lowers tax rates elsewhere. Likewise, in the environmental literature, Markusen, Morey and Olewiler (1995), Fredriksson and Millimet (2002), Beron et al. (2003), Murdoch et al. (2003), Levinson (2003) and Fredriksson et al. (2004), Davies and Naughton (2006) and Perkins and Neumayer (2010) focused on the joint adoption of environmental agreements and interaction in environmental policies. These studies tend to find evidence consistent with the race to the bottom argument. Focusing specifically on spatially weighted third-country determinants of inbound and outbound FDI, Blongien et al. (2007) and Baltagi et al. (2007) provided empirical support for the existence of various modes of complex FDI. Extending the analysis to labour standards, Davies and Vadlamannati (2011) find strong evidence of the potential race to the bottom in labour standards, i.e., labour rights in one country depend on those elsewhere. On the contrary, Neumayer and de Soysa (2011) find support for a race to the top with respect to women's labor rights in foreign countries with which a country is connected via trade and FDI. Interestingly, Cho, Dreher and Neumayer (2011) also find evidence of a race to the top with respect to human trafficking policies across countries. Using the Economic Freedom Index as a measure of policy liberalization, Pitlik (2007) and Gassebner, Gaston and Lamla (2011) find strong evidence of a race to the bottom among European and developing countries to liberalize regulatory, monetary and trade policies. Similar such findings were echoed by Simmons and

Elkins (2004). Finally, Elkins, Guzman and Simmons (2006) also find evidence of a race to the bottom with respect to bilateral investment treaties.

While there is a growing literature estimating the extent of the competition in areas related to taxation, environment, labor standards, investment treaties and economic policy reforms internationally, evidence on the potential impact of competition to attract investments (domestic and foreign) within a country is scarce. Coughlin and Segev (2000) is an exception, testing for the existence of spatial heterogeneity and spatial dependence in FDI inflows within China. This is the gap the current paper fills by specifically focusing on competition among Indian states in new investment policy during the post economic reforms period. While several papers on India have considered the impact of factors at the local level in attracting FDI (Nunnenkamp and Mukim 2011a, b), empirical studies estimating whether there is indeed strategic interaction in investment policies, i.e., whether there is evidence of interstate competition within India for big ticket investments, is absent. Beginning with a simple conceptual note explaining why states in India compete for large investment proposals, the paper models spatial autoregressive relationships among states to attract investment proposals.

Using information on large investment proposal approvals in 32 Indian states during the 1991–2009 period, I find that the inflow of investment proposals in one state are positively correlated with the investment proposal inflows in other states. Furthermore, I find that industrial or high income states compete for investment among themselves, as well as with low income states. On the other hand, low income states seem to compete only among themselves. I interpret these results as direct evidence of interstate strategic interactions in investment policy. I find that investment policies are strategic complements, a key requirement for finding a 'race to the bottom/top' in attracting investments. Since there is a noticeable upward trend in investment

proposals being put up for approval over the sample period, one might consider this evidence as a race to the top. However, critics of globalization might well consider this as an evidence of race to the bottom, citing large anecdotal evidence reported in press, media and NGO reports on the side-effects (such as lapses in environmental regulations, labor standards, land acquisition policy and revenue foregone from tax incentives) emanating from such fierce competition to attract investment. Overall, if the benefits associated with such competition outweigh the costs, then such competition is welcome. On the other hand, if there are less overall benefits than costs, then such fierce competition might well be the path towards mal-development. I leave it to future research, perhaps by usefully employing the comparative case study method, to examine whether fierce competition among states is necessarily leading to race to the bottom, or otherwise.

The rest of the paper structured as follows. Section 2 illustrates why states in India compete for investments. Section 3 describes the methodology adopted and the data. Section 4 discusses the results and Section 5 concludes.

2. Competition between Indian States

In an extremely diverse country like India, when a private or foreign firm intends to undertake large scale investment, usually they narrow their options down, after extensive research, to a few specific potential destinations (states) for various reasons. Often, this results in intense competition among those potential states to attract big ticket investment. One such example is Tata's new Nano car project in 2008, which after withdrawing from the West Bengal state, was offered several packages by other states including Karnataka (in the outskirts of Bangalore), Maharashtra (in Pune), Andhra Pradesh (near Vizag) and Gujarat. After studying each possible location, the decision to locate the project in Gujarat was finally taken by the firm.

It was widely cited in the Indian media that the Gujarat state offered free land, commitment to construct new roads near the project site, and initiate employee training programs hosted at the site (Businessweek 2008, Business Standard 2008). Over the years, such incentives offered by states in India to attract large scale investment projects have not only increased drastically, but have become commonplace. In fact, Kanta (2011), Schneider (2004) and Venkatesan (2000) cite numerous examples of large tax and other fiscal incentives offered by states within India to attract investment.

It began in 1991, when the government of India embarked upon a series of economic liberalization measures, thus ending the 'license and permit raj' which required firms to obtain licenses from the central government of India, not only for setting up businesses, but even for expansion and increasing their production capacity. The objective behind such restrictive policy was to spread investment evenly across the states. Instead of creating a balanced regional development, however, the 'license-raj' did not allow firms to benefit from economies of scale. In addition, Biswas and Marjit (2002) find that industrial licences were granted to the states based on the political considerations of the central government. Thus, this licensing system was also subject to political manipulation leading to market distortions created by political incentives. The system was abolished in 1991 and since then, industrial firms with investments of Rs. 10 crores (20 US$ million) in the manufacturing sector, and Rs. 5 crores (10 US$ million) in the services sector, are now only required to file information in the Industrial Entrepreneurs Memorandum (IEMs hereafter) with the Secretariat of Industrial Assistance in New Delhi. Thereafter, no further approvals are required. The IEMs basically originate from each state every (month) year after finalizing business proposals, and acquiring all the required permission from

the respective state governments where investments are proposed. Thus, IEMs coming from state *i* in year *t* reflects the openness of the prevailing investment environment in that particular state.

Since economic liberalization, two things have changed dramatically. First, increasing reliance on markets, which has proven to be an enabling factor for the emergence of a market economy driven by the states and not by the center. This is result of a major shift in the role of the center and the states in the economic policy decision making process. Post 1991, the dominance of the center in economic policy decision making has significantly diminished, paving way for the state governments to design their own policies. This has effectively meant that economic reforms are now driven by the states, due to the withdrawal of controls exercised by the central government in key areas, including things like issuing industrial licenses and other types of control over private investment (Ahluwalia 2000)[3]. Rudolph and Rudolpah (2001) highlight the role of state governments in the Indian economy. According to them, in recent years, aggressive competition among states for private and foreign investment has attracted the attention of the media and policy makers locally and internationally. In addition, there was a marked decline in public investment, which coincided with a rapid increase in private investment. As a consequence, the center's financial leverage over the states declined steadily as states looked more and more towards attracting private and foreign investment to finance their investment requirements. Khemani (2007) and Arulampalam et al. (2009) show how the central government allocated financial transfers to the state governments purely based on political considerations, leading to equity and efficiency distortions[4]. As a result of opening their doors to investment, economic factors predominantly determined the number and magnitude of

[3] For instance, state governments started to play an active role in areas related to industrial promotion, releasing state-specific industrial policies which were previously absent, land acquisition for industrial purposes, provision of infrastructure, tax concession (excluding corporate taxes), approval of Special Economic Zones, among others.
[4] Also, see Singh and Garima (2004) for similar such arguments and analysis.

investment inflows into the states[5]. In the process, states which possessed location advantages such as larger markets, better infrastructure, a more skilled labor force, and the presence of a large investor base in comparison to less well-endowed states, started to benefit (Kanta 2011, Kohli 2004, 2006, Basley et al. 2007, Ahluwalia 2000). This in turn put more pressure on less developed states, and all states for that matter, to increase their competitiveness in order to gain investment. In addition, if the benefits associated with these investments do in fact spillover in to other states in the country, then this agglomeration (in the case of private and foreign investments) might lead to more investment proposals coming from the other states.

Second, in a complex federal democracy such as India, after the 1991 economic reforms, state level politics have been dominated by state specific issues rather than national issues, making the economic development of the respective states the focal point of a potential electorate (Ahluwalia 2000). In fact, the rewards of competing for investment can be derived from the basic international trade models such as 'Heckscher-Ohlin theory', Ricardo-Viner type models, and the 'ideology and inequality thesis' of Dutta and Mitra (2006), which predict that trade would extensively benefit those countries with abundant factors of production compared to countries with scarcer factors. Since developing countries like India are labor rich and capital poor, their openness to trade is expected to benefit the poor labor force, while hurting domestic rent seeking forces (Bhagwati 2004). The same logic also applies for private and foreign investment, and the barriers associated with them. As an economy opens up to private and foreign investment, current exploitative rent seeking forces start competing with new investors for market and labor (Jakobsen and de Soysa 2006, Srinivasan 1987). Since new investment, particularly high end investment and FDI, creates quality jobs that are associated with higher

[5] See Subramanian (2008) for an excellent analysis on India's recent growth and its integration into the world economy.

wages and better working conditions than existing local firms, as well as most likely altering labor market conditions in the long run (Brown, Deardorff and Stern 2004), there are significant benefits for the labor force associated with the process of attracting investment into the state. As large sections of the middle class stand to gain, the median voter too will prefer those governments or incumbents which support capital importation (Bhagwati 1999). Note that the post 1991 period also coincides with a dramatic surge in political participation of lower caste communities who remain economically backward with the highest rate of unemployment, putting pressure on state governments to provide employment opportunities[6]. Thus, state governments are forced to compete against each other in attracting investment which would not only generate jobs and boost their economies, but also increase their chances of reelection.

3. Empirical Methodology and Data

In this section, I describe both the data I use, which is a panel data set across 32 Indian states during the 1991–2009 period, and the estimation specification.

3.1 Estimation Specification

The baseline specification estimates the IEM proposals coming from state *i* in year *t* which were approved, as a function of a set of exogenous variables Z_{it}:

$$IEM_{it} = \phi_i + \beta Z_{it} + \omega_{it} \qquad (1)$$

Where, ϕ_i is the state-specific dummy and ω_{it} is the error term. The control variables are drawn from the existing literature on determinants of investment in general and FDI, and are described below. In line with the traditional FDI literature, to this baseline, I introduce the IEM proposals

[6] Scheduled Castes (SCs), Scheduled Tries (STs) and Other Backward Castes (OBCs) form the lower castes in India. According to Prakash and Chin (2009), 46% of the ST and 37% of the SC population is living below the official poverty line defined by the Indian government.

coming from other states for approvals in year *t*, a variable known in the literature as the spatial lag. Specifically, I estimate:

$$IEM_{it} = \phi_i + \rho \sum_{j \neq i} \varpi_{jit} IEM_{it} + \beta Z_{it} + \nu_i + \omega_{it} \qquad (2)$$

Where, $\sum_{j \neq i} \varpi_{jit} IEM_{it}$ is the spatial lag, i.e., the weighted average of IEM proposals of other states put up for approval. For weights, following Davies and Vadlamannati (2011), I utilize $\varpi_{ijt} = \frac{GDP_{jt}}{\sum_{k \neq i} GDP_{kt}}$. In words, the share that state *i* gives to state *j* is equivalent to *j*'s share of the total GDP across all states in India, not including state *i*.[7] It is, however, noteworthy that the sum of the weights across other states for state *i* observation will equal 1. This weighting scheme imposes the assumption that bigger states get higher weights. The rationale for using state GDP as the weight is two-fold. First, one might anticipate that state *i* pays more attention to what is taking place in larger states rather than small ones. Second, when the goal of manipulating investment policy is to attract investment, this will depend on the elasticity of investment to a given state's policies. Thus, if state *j* (Maharashtra, which attracts a large number of IEMs, see figure 1, and has a GDP share in India's total GDP of about 17%) is already attractive for investors relative to state *k*, then a change in *j*'s (Maharashtra's) investment policy has a larger impact on the allocation of investment than a comparable change in *k*. This, in turn, would make *i* more responsive to *j*'s (Maharashtra's) investment policies than to *k*'s, a difference that is reflected in equation (2) by giving a greater weight to *j*. In addition to this, traditional FDI literature also shows that FDI is attracted to larger countries (see Blonigen 2005), this would

[7] As described by Anselin (1988) and Plümper and Neumayer (2010), it is common to row standardize the weights so that the sum of the weights adds up to one.

imply a greater sensitivity on the part of state *i* to the investment policies of a large state in India. This apart, several papers in the race to the bottom or cross-country competition literature have used GDP as a weight (Devereux, Lockwood, and Redoano, 2008, Madariaga and Poncet 2007, Pitlik 2007). As mentioned before, I include state fixed effects to control for unobserved state specific heterogeneity in the panel dataset, and ω_{it} is the error term. It is noteworthy that I do not estimate the model using time dummies because of the way the spatial lag is constructed, which is strongly correlated across states in a given year. For example, when moving from the lag for Assam to that of Punjab, I am essentially taking Punjab's GDP weighted IEMs out of the spatial lag and replacing them with Assam's. Instead, I include a time trend to capture other factors which are not accounted for in the model such as efficiency gains through technological advancements or enhanced management skills. These usually grow over time and can be expected to have a positive correlation with attracting investment. This apart, the time trend applied here from 1991 also captures the trend in economic reforms which were launched in 1991. Finally, this baseline specification is then modified to explore the robustness of the main findings. The specifics of these modifications are described in the results section.

As the dependent variable here is a count of IEM proposals, the preferred estimates are those from the maximum likelihood negative binomial regressions reported as under:

$$E[IEM_{it} \mid Z_{jit}] = \theta \ \exp(Z_{it}\ \psi) \qquad (3)$$

Where, Z_{it} is the vector of other explanatory variables to be employed in the model including the spatial lag, and θ is a parameter that captures whether the data exhibits over dispersion. The variance of counts in the negative binomial model is:

$$Var[IEM_{it} \mid Z_{it}] = \theta^2 \ [1+(1/\theta)]\exp(Z_{it}\ \psi) \qquad (4)$$

So, the variance to mean ratio (i.e., the dispersion) in this model is given by: (θ +1). Where if $\theta > 0$, the variance grows faster than the mean and the data exhibits over dispersion, and where $\theta = 0$, the negative binomial model paves way for a Poisson model, which, by its very construction, restricts the variance equal to the mean. Since the resulting count variables here, namely the number of IEM proposals approved, show a distribution which is strongly skewed to the right (with an accumulation of observations at zero) and also display significant over dispersion (with the variance being greater than the mean, see descriptive statistics in appendix 3), I employ the negative binomial estimator over the poisson method (Lawless 1987, Cameron and Trivedi 1998) with heteroskedasticity consistent robust standard errors (Beck and Katz 1995). Furthermore, the results of the 'goodness-of-fit' test support using negative binomial over the poisson estimation method.

3.2 Data

I use annual data for 32 Indian states from 1991 to 2009. The list of states is in the appendix. For the dependent variable, I use the total number of investment proposals, namely the Industrial Entrepreneur Memorandums (IEMs) coming from each state *i* in India in financial year *t* approved by the Secretariat of Industrial Assistance (SIA hereafter) of the Department of Industrial Policy and Promotion (DIPP). These data are published every year in aggregate form by each state in DIPP's various annual report issues. Post 1991, with the inception of the New Industrial Policy Resolution 1991, all industrial undertakings (private or foreign) are exempt from obtaining an 'industrial license' to manufacture goods and services anywhere in India. However, a few industrial sectors are reserved for obtaining industrial licenses, namely (a) industries reserved for the Public sector, (b) industries retained under compulsory licensing, (c) items of manufacture reserved for the small scale sector, and (d) if the proposal attracts

locational restriction. Barring these few restricted sectors, industrial undertakings (private or foreign) are exempt from obtaining an 'industrial license.' Instead, firms are required to file an Industrial Entrepreneur Memoranda (known as IEM) (Part 'A') in the prescribed format of the Industrial Policy Resolution with the SIA. Upon filling Part A of the form, the undertaking would receive an acknowledgement receipt containing an SIA registration number. Beyond this form, there is no further approval which is required to start a business in a state. It is also noteworthy that prior to 1991, public, private or foreign firms would have required additional industrial licenses even to expand their business operations or increase their production. Under the new guidelines, expansion of business can be done by filling an IEM with the SIA. Immediately after commencement of commercial production, Part B of the IEM has to be filled out in the prescribed format. Thus, to start a business, investors must file IEMs giving details of the proposed project. The data on IEM proposals does not contain details of actual implementation.

A few important points are worth noting here. Biswas and Marjit (2002) show that the industrial licenses approved by the central government of India prior to 1991 (to set up businesses in respective states) were driven by political rather than economic considerations. Obviously, one might also presume that IEMs which are filed at the SIA in New Delhi are also subject to such political manipulation. There are several reasons why I believe that such concerns are not applicable to IEMs. First, IEMs are not like erstwhile licenses for which undertakings had to seek permission from the central government of India in the 'license raj' period. Rather, IEMs are simply a form providing information to the respective authorities (i.e., SIA) about the establishment and other details of the firm. Moreover, the SIA in New Delhi, a non-political institution, collects the information on IEMs approved for statistical purposes which are in no

way associated with political manipulation or state lobbying. Second, although IEMs are given token approvals by the SIA, many of the establishment deals related to land acquisitions, tax concessions, environment, pollution, electricity, water and other clearances, and other bureaucratic permissions related to stating businesses, are done through discussions and consultations with the respective state government agencies and departments. Therefore, in order to attract more investment into the state, the respective state governments are willing to provide numerous concessions to large industrial firms, reduce bureaucratic hurdles, and speed up the process of gaining permission and clearances required to set up a business. Naturally, the firm would also want to locate itself in the state which provides the maximum number of concessions to attract new investment (e.g., see Kanta 2011). Therefore, it is reasonable to expect that a firm would apply for an IEM only after obtaining the required clearances from the respective state governments. The SIA would however use its discretion in cancelling the IEM proposal only if is found that the specific proposal contained in the IEM is able to be licensed. Third, it would also be safe to presume that the number of IEMs originating from a particular state in year *t* mirrors the prevailing investment friendly environment created by that state government. Therefore, approval of IEMs originating from state *i* in year *t* must be seen more as a part of a 'push efforts' strategy adopted by respective state governments competing for investment, rather than an instrument which can be used to serve political interests.

The vector of control variables includes other potential determinants attracting IEM proposals into state *i* during year *t,* which I obtain from the extant literature on the subject. Since this is the first such study on IEMs in India, I follow other pioneer studies on determinants of FDI and FDI policy reforms: Blonigen et al. (2007), Blonigen (2003), Blonigen and Figlio (1998), Wheeler and Moody (1992), Coughlin et al. (1991) and other comprehensive evaluations

of these early studies on FDI (Kobrin 2005, Chakrabarti 2001). Dunning (1993) proposed that the location factor is the key to attracting foreign investment into a country. I believe this would also be similar in the case of private investment. Some of these location specific factors include: market growth, economic development, institutions, infrastructure, availability of natural resources, and government policies. Accordingly, the models control for the effects of market size by including respective state GDP (logged) in Indian rupees (1993-94 constant prices) and the states' economic growth rates obtained from the Reserve Bank of India's dataset. Following Dreher et al. (2010), I also consider the total population (log) as data on the total labor force is not available on a yearly basis for states in India.

Good infrastructure facilities increase the productivity of investment, which in turn helps in attracting more investment (Wheeler and Mody 1992, Asiedu and Lien 2004). Since there are various factors which contribute to the development of infrastructure like roads, ports, telecommunications, power, railways and so on, it becomes quite difficult to capture data for all of these variables for any given state due to a lack of data availability. I thus include the electricity consumption of state *i* in year *t* in kilowatts. The main reason for considering this variable is that it not only captures the availability of electricity, but also its cost. Likewise, I also include a proxy for industrialization by including the industry share in a state's GDP, seeing as most of the IEM proposals are big ticket industrial investment projects and are attracted to industrial states. The other contentious issue in India is the effect of labour market rigidities. Many argue that the effect of labor market rigidities is more pronounced and discourages FDI as well as domestic investment (Ashan and Pages 2009, Aggarwal 2007, Basely and Burgess 2002). Chief economic advisor to the Prime Minister of India, Kaushik Basu (2005), argues that apart from promoting other factors, India will needs to attempt to carry out drastic labor market

reforms. However, due to stiff political opposition, any major change in labor laws is often ruled out[8]. Following Teitelbaum (2011), Aghion et al. (2008), and Basely and Burgess (2002), I include man days lost in state *i* in year *t* due to strikes and lockouts as a proxy for labor market rigidities in India. Using the information from the SIA on new industrial policy adopted by the respective states, I code the value 1 for the year in which new industrial policy was adopted by states, and 0 otherwise. Finally, following Basely and Burgess (2000), I also capture the number of years in which either the Indian National Congress (INC hereafter) - centre-left in ideology, Bharatiya Janata Party (BJP henceforth) - centre-right, Left Front led by the Communist Party of India-Marxist (CPI-M) – leftists, and regional parties, often considered as soft left, were in power in state *i* in year *t,* in order to control for the 'ideology hypothesis' (Dutt and Mitra 2006). Accordingly, I expect that the number of years parties with a center-left ideology were in power will have a positive impact on IEM proposals coming from that state. Lastly, I include a dummy for President's rule imposed in the state by the central government to account for political uncertainty[9].

3.3 Endogeneity concerns

The difficulty with the spatial lag is that if investment policy in state *i* depends on that in state *j*, and vice versa, the spatial lag is endogenous. In order to address these endogeneity concerns, I utilize non-linear instrumental variable estimations. Following standard spatial econometric procedure, for the instruments I use $\sum_{j \neq i} \varpi_{jit} Z_{jt}$, that is, the weighted average of the other states' economic variables, namely the state GDP growth rate, the share of industry in

[8] For a detailed argument on labor market rigidities and required reforms, see Basu's (2005) article from the BBC: http://news.bbc.co.uk/2/hi/south_asia/4103554.stm.

[9] President's rule is often imposed by the central government based on the recommendations provided by the respective state's governor. Imposing President's rule requires dismissing the state legislative assembly, with powers vested to the state governor until fresh state legislative assembly elections are called.

total state GDP, a state's industrial policy, man days lost in strikes and lockouts, population, and infrastructure. The intuition behind using these variables is twofold. First, economic variables such as market size, industrialization, labor force and industrial policy are found to be very important in attracting investment into states. Second, for a given state *j*, its economic exogenous variables directly impact its investment policies but are not dependent on those in state *i*. Therefore they are correlated with the endogenous variable, but are themselves exogenous, making them suitable instruments.

The normal procedure in the next step would therefore be to utilize an instrumental variable method using two-stage least squares (2SLS – IV hereafter). However, employing instrumental variables in non-linear models such as negative binomial may not only be problematic, but also difficult to perform. Therefore, I manually run the instrumental variable regressions for negative binomial models by regressing endogenous variables – spatial lag (of IEMs) – on the selected instrumental variables by using the negative binomial models (which are the first stage regressions). I then predict the values of the endogenous variable and regress the dependent variable – IEM proposals approved – using negative binomial estimations, respectively (the second stage regressions). The 2SLS–IV estimations with state fixed effects are employed to check the validity of the instruments which are discussed below.

The validity of the selected instruments depends on two conditions. First, instrument relevance, i.e., they must be correlated with the explanatory variable in question – otherwise they have no power. Connected to this, Bound, Jaeger and Baker (1995) suggest examining the F-statistic on the excluded instruments in the first-stage regression. The selected instrument would be relevant when the first stage regression model's F-statistics meets the thumb rule threshold of being above 10 (Staiger and Stock 1997). Second, the selected instrument variable should not

vary systematically with the disturbance term in the second stage equation, i.e., $[\omega_{it} \mid IV_{it}] = 0$. In other words, the instruments cannot have independent effects on the dependent variable. As for the exclusion restriction, I know of no theoretical or empirical argument linking the exogenous variables of state *j* to a direct impact on the IEM proposals coming from state *i* for approval. Nevertheless, a Hansen J-test is employed to check whether the selected instruments satisfy the exclusion restriction (results provided at the end of the regression tables).

4. Empirical Results

4.1 Baseline Results

Table 1 presents the baseline results and the summary of data statistics are presented in appendix 4. While table 2 focuses exclusively on high income states, tables 3 examines the results related to low income states (also known as special category states), estimated using negative binomial regression estimations. Note that the results in all tables report marginal effects at the mean of explanatory variables[10]. Beginning with column 1 of table 1, I show results without including the spatial lag to ease the comparison between my results and any other study on determinants of IEMs. As expected, I find that industrial states, better infrastructural facilities, and having an industrial policy framework in place, tend to attract more IEM proposals. After controlling for state-specific fixed effects, however, other controls remain insignificant. In column 2, which forms my preferred specification, I include the IEM spatial lag term. As can be seen, I find a positive and significant spatial lag which is significantly different from zero, at the 1% level. To interpret the marginal effect, a standard deviation increase in the IEM approvals of all other states would increase the IEM approvals in state *i* by roughly three proposals. As seen from the last column of table 1, the positive significant effects of the spatial lag term remain robust in the

[10] I use the Stata 11.0 margins command to calculate marginal effects.

IV models (see column 3). The substantive effects here suggest that a standard deviation increase in the spatial lag of the IV models is associated with an increase in IEM approvals in state *i* by roughly three proposals. Since the spatial lag term is positive, this can be interpreted as evidence of strategic complementarity. While strategic complements can theoretically result in a meaningful race to the bottom or top, we leave it up to future research, perhaps usefully employing the comparative case study method, to examine whether fierce competition among states necessarily leads to race to the bottom or otherwise.

Before moving further, it is necessary to discuss the validity of the selected instruments, which depends on the two aforementioned conditions, namely instrument relevance and exclusion criteria. The instruments have passed in both cases as reported in table 1, which speaks to the strength of the instrument. As highlighted earlier, I estimate 2SLS-IV models that report the statistics which explore the strength of the instruments. As seen, the first-stage F-test and Anderson canon LR statistics report the test statistic used to test the null hypothesis; i.e., the parameter estimate for the instrument in the first stage regression is equal to zero. Based on Staiger and Stock (1997), I treat F-statistics greater than 10 as being sufficiently strong. In table 1, I find that in column 3, the F-statistic is greater than 10 and significantly different from zero, at the 1% level. Finally, the Hansen J-Statistic also shows that the null hypothesis of exogeneity cannot be rejected at the conventional level of significance.

4.2 Results for different regional categories

In Table 2, I divide the states into two different groups based on the classification of the Indian government, namely non-special category states and special category states. The non-special category states are basically high income states and are more advanced in terms of industrialization. While the special category states are low income states which are not only less

industrial, but also suffer from higher levels of poverty and chronic underdevelopment. There are a total of 14 special category and 18 non-special category states in the sample I use here. The first four columns of table 2 capture the results for non-special category states (high income states hereafter), and the last four columns report the results related to special category states (low income states henceforth). I divide the states into two because of the concern that the results may be driven by the high income states, i.e., relatively advanced states with high levels of industrialization and infrastructure readily available to attract investment, a point noted by Kanta (2011), Kohli (2006) and Ahluwalia (2000). Note that here (as well as in all subsamples below), I recomputed the spatial lag and the instruments using only those states in the subsample, i.e., assigning those outside of the subsample zero weight. This implicitly assumes that there is only competition within a subsample. To be more specific, when I estimate the models related to high income states, I create the spatial lag and instruments using only high income states. The same goes for estimating the low income states sample.

At first glance, it can be seen in table 2 that the results for the high income and low income subsamples are comparable to those for the main sample reported in table 1, indicating that the results are not being driven by either of the two samples. In column 1, I find a strong positive impact of the spatial lag term on IEM approvals in high income states, which is significantly different from zero, at the 1% level. The substantive effects show that a standard deviation increase in the spatial lag term is associated with roughly 34 more IEM approvals after holding other variables at their mean. After controlling for endogeneity in column 2, I find that the positive significant effects remain. The substantive effects, however, increase when the potential reverse feedback effects are controlled for. A standard deviation increase in the spatial

lag term of the IV estimations is associated with an increase of 84 IEM approvals in high income states after holding other covariates at their mean.

In column 3, I expand the analysis by also considering cross-group competition. In these regressions, the spatial lag for high income states is calculated using only the high income states, with the spatial lag of the low income state variables calculated in a comparable way. Note that in constructing these instruments, this means that I now have two versions of each weighted sum of an exogenous variable, with one corresponding to each group. As seen, I find higher levels of competition for IEM proposals, both within-group and cross-group, for high income states. Both the high income and low income IEM spatial lags are significantly different from zero, at the 1% level (see column 3). Likewise, after controlling for endogeneity, I find that these results remain robust and significant, at the 1% level. Note that the instruments used here pass both the test of instrument relevance and exclusion criteria. The next four columns in table 2 capture low income states. In column 5, I find that the spatial lag term is positive and significantly different from zero, at the 1% level. Controlling for endogeneity, the results also remain robust. After controlling for reverse feedback effects using IV estimations, a standard deviation increase in the spatial lag of low income states is associated with roughly 10 more IEM approvals by low income states. However, what is interesting is that low income groups seem to compete among themselves, rather than competing with the high income group. This is reflected in the insignificant effects of the high income group's spatial lag in column 7 (see table 2). However, after controlling for endogeneity in column 8, I see some statistical significance for the high income spatial lag term, at the 10% level. The low income spatial lag term is, however, positive

and strongly significant, at the 1% level, in both the non-IV and IV estimations (see column 7 and 8 in table 2)[11].

These results highlight two interesting points. First, it is noteworthy that the results from the high income sample group suggest that they compete both within-group and across the group to attract investment proposals. However, the competition is more intense among the high income group. The substantive impact suggests that a standard deviation increase in the spatial lag term of the low income group is associated with roughly 12 more IEM proposal approvals for the high income group. On the other hand, a standard deviation increase in the spatial lag term of the high income group is associated with roughly 113 more IEM proposal approvals for the same. This clearly suggests that although high income states compete with both income groups to attract investments, the competition appears to be more intense within-group. Second, the findings related to low income groups who compete for investment largely among themselves highlight the limits to competition. This is consistent with the notion that large firms base their location decisions on various factors. For example, it may be that some firms in the service sector look for a highly skilled workforce, whereas others seek cheap labor. Likewise, large manufacturing firms might be more interested in investing in highly industrial states which already have the existing infrastructure to support manufacturing activities. As such, these large investment firms might be unwilling to consider locating themselves in low income states, implying that low income states would be unable to allure them away from high income states.

4.3 Further checks for Robustness

I examine the robustness of our main findings in the following ways. First, I use an alternative weighting approach where I weigh the IEMs using the share of industry in total state GDP

[11] Note that the Hansen J-statistic is statistically significant, at the 5% level, in both columnd 6 and 8 (low income states) of table 2.

instead of state GDP itself, under the presumption that industrial states are well placed to attract more investment. The baseline results are the regional category results, and basically remain unchanged (although the magnitude of the results does change marginally). The main findings remain intact here, i.e., states compete for investment proposals, and while high income states compete both among themselves and with the low income group, low income states compete only among themselves. As further evidence, I weigh the IEMs with the respective inverse distance a state has from another instead of state GDP and the share of industry in total state GDP, under the presumption that a state closer to those states with more IEM proposals is well placed to attract IEMs. I use the distance in kilometres from state *i* as the weighting scheme so that the distant states receive smaller weights. Hence, we use inverse distance, not distance, with a weighting as follows: $\omega_{i,j,t} = \frac{\frac{1}{dist_{i,j,t}}}{\sum_{k \neq i} \frac{1}{dist_{i,k,t}}}$. The baseline results basically remain unchanged, although the magnitude of the results does vary marginally.

Second, following Brandt et al. (2000) and King (1988), I estimate all the results reported here using an alternative estimate technique, namely the zero-inflated negative binomial method. Although it is true that there is over dispersion in the IEM data, the possibility of two types of zero values for the IEM proposals is more or less absent. Thus it seems that it would provide a good test for the robustness of my main findings with alternative estimation techniques. The results from zero-inflated negative binomial estimations do in fact support my earlier baseline findings. This apart, the results also support my previous findings on competition among regions to attract IEM proposals. Third, as an additional test for robustness, following Dreher and Gassebner (2008), I exclude the observations with extreme values. The main results still remain qualitatively unchanged, suggesting that the results are not driven by extreme values.

Finally, I also replicate the results reported in table 1 and 2 by dropping out the 1991 financial year due to data omission and under reporting bias in 1991, which represents the commencement of IEM data filing and the end of the industrial licensing era. By and large, the results remain the same as those reported in tables 1 and 2. I do find that the spatial lag terms for both high income and low income groups are positive and significantly different from zero, at the 1% level, even after controlling for endogeneity concerns. The instruments used also pass the relevance and exclusion criteria of instruments tests, suggesting that the results are reasonably robust. Note that the robustness check results are not shown here due to brevity, but are available upon request. In summary, the results taken together seem to be very robust to sample size, specification, and testing procedure.

5. Conclusion

The aim of this paper was to present the first set of empirical results exploring the possibility of competition for investment among states in India. Using the data on Industrial Entrepreneurs Memorandum (IEM) proposals from each state annually, as well as other key variables determining investment proposals, I utilize a spatial econometrics approach to estimate the extent of interdependence among states in India with respect to attracting investment. Using negative binomial regression estimates in a panel dataset spanning the 1991 – 2009 period, I find a robustly positive and significant spatial lag which is consistent with strategic complements in IEM proposals. Since IEMs increased over time, I interpret this as competition for big ticket private and foreign investment, which would result in an improvement in investment laws, bureaucratic efficiency, the business climate in general, and the institutional quality in states which compete to attract more investment. However, my findings do not imply that such

competition prevails in all regions in India. In fact, I find that it is mostly concentrated in high income states, and that competition in this group is specifically focused, both within-group and across-group (i.e., with low income states). Low income states, on the other hand, tend to compete largely among themselves and not with high income states. Taken together, these results remain robust to alternative estimation techniques, sample selection, and controlling for possible endogeneity problems.

The states' attempts in attracting IEM proposals are part of a larger process in India's investment policy reforms that has been furthered by the dynamics of inter-state competition. This sort of competition among states might well generate the desired results, especially in addressing problems associated with excessive bureaucratic controls, controlling corruption, creating quality institutions and improving the investment environment as a whole. This competition to attract more investment is driven by the desire of the state governments to not only generate job opportunities for the existing pool of labor and unemployed in their respective states, but also to increase their chances of reelection. Although the competition among states to attract investment may be mutually beneficial for both the hosting state governments and the potential private and/or foreign investors, the overall welfare effect associated with this competition is questionable given its potential redistributive consequences.

Table 1: Baseline results (Dependent variable: IEM proposals)

Variables	(1) Negative Binomial	(2) Negative Binomial	(3) Negative Binomial -IV
State-GDP (log)	-1.781	3.106	-0.038
	(0.46)	(0.87)	(0.01)
State-GDP growth rate	0.008	-0.012	-0.007
	(0.30)	(0.46)	(0.24)
State Population (log)	3.067	4.288**	3.611
	(1.32)	(2.15)	(1.64)
Industry share in state-GDP	0.837***	0.749***	0.792***
	(4.97)	(5.06)	(4.79)
Infrastructure (log)	13.112***	12.117***	14.336***
	(4.29)	(4.52)	(4.28)
Man days Lost in Strikes and Lockouts	-0.168	0.271	0.528
	(0.11)	(0.21)	(0.35)
Industrial Policy dummy	8.804***	8.170***	10.281***
	(5.00)	(5.53)	(6.05)
INC ruling years	0.362*	0.157	0.129
	(1.89)	(0.98)	(0.70)
BJP ruling years	-0.034	-0.083	-0.100
	(0.11)	(0.32)	(0.33)
Left front ruling years	0.388	0.483*	0.434
	(1.27)	(1.85)	(1.42)
Regional parties ruling years	0.616***	0.662***	0.678***
	(3.52)	(4.30)	(3.94)
President's Rule	-0.346	-0.348	-0.701
	(0.14)	(0.17)	(0.28)
Time trend	-1.178***	-1.285***	-1.235***
	(4.02)	(4.75)	(4.20)
Spatial Lag – IEMs		0.045***	18.315***
		(8.19)	(6.09)
Goodness-of-fit test (Chi2 statistic)	14665***	11461***	12822***
First-stage F-Statistic {using 2-SLS}			126.3***
Anderson canon LR stat. {using 2-SLS}			341.3***
Hansen J-statistic {using 2-SLS}			0.6592
State dummies	YES	YES	YES
Total states	32	32	32
Total Observations	575	575	575

Notes: (a) Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1
(b) Reports average marginal effects of all explanatory variables.

Table 2: Results of States based on Income Category

Dependent variable: IEM proposals

	(1) High Income	(2) High Income	(3) High Income	(4) High Income	(5) Low Income	(6) Low Income	(7) Low Income	(8) Low Income
	Negative Binomial	Negative Binomial -IV	Negative Binomial	Negative Binomial -IV	Negative Binomial	Negative Binomial -IV	Negative Binomial	Negative Binomial -IV
State-GDP (log)	95.727**	48.047	117.036***	90.920**	-0.529**	-1.075***	-0.965***	-1.074***
	(2.46)	(1.24)	(2.96)	(2.26)	(1.97)	(3.66)	(2.83)	(3.15)
State-GDP growth rate	1.101	1.139	1.271*	1.051	0.001	0.002	0.003**	0.002
	(1.61)	(1.51)	(1.92)	(1.50)	(0.29)	(1.64)	(2.07)	(1.22)
State Population (log)	-645.09***	-585.960***	-636.55***	-570.799***	0.205***	0.141*	0.419***	0.193*
	(4.93)	(4.19)	(4.83)	(4.18)	(2.58)	(1.70)	(4.11)	(1.91)
Industry share in GDP	5.647***	5.622***	6.095***	5.771***	0.000	0.006	0.007	0.009
	(3.92)	(3.77)	(4.25)	(4.05)	(0.01)	(0.48)	(0.48)	(0.57)
Infrastructure (log)	44.972**	44.179**	45.950**	43.153**	0.214	0.416*	0.094	0.491*
	(2.48)	(2.12)	(2.57)	(2.10)	(1.02)	(1.89)	(0.39)	(1.90)
Man days Lost in Strikes and Lockouts	13.941	11.870	9.840	3.296	-2.269	-3.743**	-3.358*	-4.819**
	(1.06)	(0.80)	(0.78)	(0.23)	(1.34)	(2.14)	(1.87)	(2.46)
Industrial Policy dummy	46.882***	63.723***	43.345***	64.182***	0.409***	0.364**	0.378**	0.499***
	(3.76)	(4.39)	(3.52)	(4.65)	(2.75)	(2.39)	(2.45)	(2.65)
INC ruling years	-0.447	0.306	-0.149	0.305	-0.006	0.005	0.009	0.003
	(0.30)	(0.19)	(0.10)	(0.20)	(0.36)	(0.29)	(0.49)	(0.12)
BJP ruling years	-0.889	-0.174	-0.702	0.376	-0.030	-0.070	-0.057	-0.073
	(0.37)	(0.07)	(0.30)	(0.15)	(0.79)	(1.47)	(1.33)	(1.39)
Left front ruling years	0.836	-1.860	0.667	-0.578	0.022	0.051**	0.029	0.058*
	(0.30)	(0.57)	(0.25)	(0.19)	(0.81)	(1.96)	(1.18)	(1.87)
Regional parties ruling years	3.032***	2.664**	3.322***	3.342***	0.054***	0.070***	0.080***	0.085***
	(2.59)	(1.97)	(2.85)	(2.66)	(2.62)	(3.18)	(3.51)	(3.33)
President's Rule	6.562	10.432	6.972	8.942	-0.344**	-0.344*	-0.321	-0.379*

	(0.46)	(0.56)	(0.48)	(0.54)	(2.06)	(1.83)	(1.63)	(1.72)
Time trend	0.371	1.638	-3.002	-7.326*	0.044*	-0.008	0.044	-0.028
	(0.10)	(0.45)	(0.79)	(1.87)	(1.86)	(0.24)	(1.56)	(0.69)
Spatial Lag: IEMs High income states	0.399***	133.641***	0.326***	177.412***			0.0002	0.675*
	(8.79)	(3.66)	(6.52)	(4.73)			(0.25)	(1.69)
Spatial Lag: IEMs Low income states			0.827***	75.212***	0.001***	0.517***	0.015***	0.668***
			(2.71)	(5.03)	(2.91)	(4.02)	(4.28)	(4.31)
Log Pseudo likelihood	-1862	-1888	-5522	-1879	-566	-562	-556	-561
Goodness-of-fit test (Chi2 statistic)	9340***	11243***	8841***	10399***	1024***	1273***	799***	1113***
First-stage F-Statistic {using 2-SLS}		32.7***		47.8***/101.4***		10.4***		26.8***/66.5***
Anderson canon LR statistic {using 2-SLS}		101.9***		298.9***		46.8***		190.7***
Hansen J-Statistic (P-value) {using 2-SLS}		0.4721		0.7044		0.032		0.0386
State dummies	YES	YES	YES	YES	YES	YES	YES	YES
Total states	18	18	18	18	14	14	14	14
Total Observations	334	334	334	334	241	241	241	241

Notes: (a) Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

(b) Reports average marginal effects of all explanatory variables

Appendix

Appendix 1: States under study

Andaman & Nicobar Islands	Goa	Madhya Pradesh	Punjab
Andhra Pradesh	Gujarat	Maharashtra	Rajasthan
Arunachal Pradesh	Haryana	Manipur	Sikkim
Assam	Himachal Pradesh	Meghalaya	Tamil Nadu
Bihar	Jammu & Kashmir	Mizoram	Tripura
Chandigarh	Jharkhand	Nagaland	Uttar Pradesh
Chhattisgarh	Karnataka	Orissa	Uttaranchal
Delhi	Kerala	Pondicherry	West Bengal

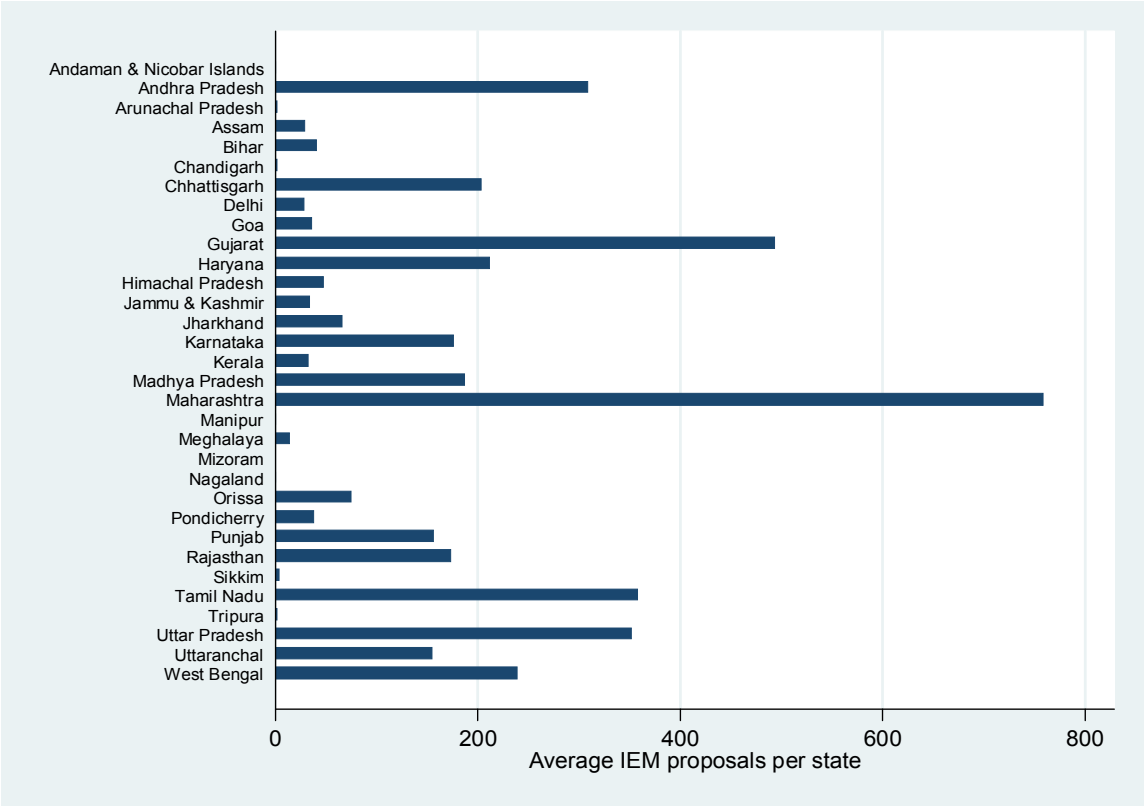
Appendix 2: Descriptive Statistics

Variables	Mean	Standard Deviation	Minimum	Maximum	Observations
IEM proposals	131.702	193.542	0.000	1347.000	581
GDP (log)	10.078	1.706	6.092	13.150	594
GDP growth rate	8.134	35.412	-85.115	39.914	591
Population (log)	15.049	1.067	11.567	17.250	592
Industry share in GDP	18.980	11.463	0.651	67.160	594
Infrastructure (log)	6.061	0.815	4.155	7.898	585
Man days lost	0.172	0.556	0.000	5.317	583
Industrial Policy dummy	0.517	0.500	0.000	1.000	584
INC ruling years	2.313	3.445	0.000	16.000	584
BJP ruling years	0.777	2.012	0.000	15.000	584
Left front ruling years	1.113	4.672	0.000	33.000	584
Regional parties ruling years	2.873	6.007	0.000	31.000	584
President's Rule	0.068	0.253	0.000	1.000	584
Spatial lag - IEMs	302.377	80.404	127.208	500.352	579
Spatial lag - IEMs (Predicted values)	5.693	0.190	5.041	6.109	579
Spatial lag (Special category states)	25.319	18.557	3.353	79.356	579
Spatial lag (Non-special category states)	318.965	85.434	136.539	533.890	579
Spatial lag (Special category states PVs)	5.753	0.161	5.128	6.096	579
Spatial lag (Non-special category states PVs)	3.053	0.640	1.052	4.461	579

Appendix 3: Data definitions and sources

Variables	Definitions and data sources
IEM approvals	IEMs approved from each state in a financial year obtained from SIA, New Delhi
GDP (log)	GDP in 1993-94 constant prices (Indian Rupees) from Reserve Bank of India
GDP growth rate	Yearly growth rate of GDP from Reserve Bank of India, Mumbai
Population (log)	Total population of each state obtained from Indiastat.com
Industry share in GDP	Share of Industry in State GDP from Reserve Bank of India, Mumbai
Infrastructure (log)	Electricity Consumption in khw by state obtained from Indiastat.com
Man days lost	Total man days lost in strikes and lockouts published by Ministry of Labor, Govt. of India
Industrial Policy dummy	Own construction based on the information provided by SIA, New Delhi
Political Parties in power	Own construction based on the information published by Election Commission of India
President's Rule	Own construction based on the information published by Parliament of India
Spatial lag - IEMs	Own construction as described in section 3.1

Figure 1: Development of IEM proposals over States during 1991–2009 period



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