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## Foreign direct investment in post-reform India: Likely to work wonders for regional development?

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**Foreign Direct Investment in Post-Reform India:  
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**Foreign Direct Investment in Post-Reform India:  
Likely to Work Wonders for Regional Development?**

Peter Nunnenkamp and Rudi Stracke\*

**Abstract:**

We make use of a new and detailed database on FDI approvals since the early 1990s to address two major issues related to FDI and regional development in India in the post-reform period. First, we analyze the location choices of foreign investors. The evidence indicates that the concentration of FDI in a few relatively advanced regions may have prevented FDI effects from spreading across the Indian economy. Second, we evaluate whether the link between FDI and economic growth has become stronger in the aftermath of reforms. Various categories of FDI are indeed positively correlated with per-capita income growth across Indian states. However, it is only for the richer states that FDI appears to be associated with higher growth. FDI is thus likely to increase regional income disparity in India.

Keywords: FDI approvals, sub-categories of FDI, location choice, economic growth, regional divergence

JEL classification: F23, O18, O53

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## 1. Introduction

The stock of foreign direct investment (FDI) in India soared from less than US\$ 2 billion in 1991, when the country undertook major reforms to open up the economy to world markets, to more than US\$ 45 billion in 2005 (UNCTAD 2006: 305).<sup>1</sup> Policymakers in India as well as external observers attach high expectations to FDI. According to the Minister of Finance, P. Chidambaram, “FDI worked wonders in China and can do so in India” (*Indian Express*, November 11, 2005). Bajpai and Sachs (2000: 1) advise policymakers in India to throw wide open the doors to FDI which is supposed to bring “huge advantages with little or no downside.”

However, the currently prevailing euphoria is in striking contrast to the previous literature on FDI effects in India. It is for several reasons that FDI may fall short of high expectations in promoting growth and alleviating poverty (Section 2). In particular, it is open to question whether FDI helps poorer regions in India to catch up with more advanced regions.

The present paper draws on an extensive and detailed database on FDI approvals since the early 1990s that can help resolve at least some of the disputed issues concerning FDI in the post-reform era (Section 3). We make use of these data to address two major topics related to FDI and regional development in India during the post-reform period. In Section 4, we analyze the location choices of foreign investors. In particular, we argue that the concentration of FDI in a few relatively advanced locations may have prevented FDI effects from spreading across the Indian economy. Section 5 turns to the question whether FDI has been associated with higher growth and less poverty in Indian states. The evidence suggests that FDI has led to regional divergence, rather than convergence. We outline some directions for future research in the concluding section.

## 2. Earlier Findings and Open Questions

Indian policymakers are in good company when expecting wonders from FDI. The so-called Monterrey Consensus, achieved at the UN Conference on Financing for Development in 2002, famously declared: “Foreign direct investment contributes toward financing sustained economic growth over the long term. It is especially important for its potential to transfer knowledge and technology, create jobs, boost overall productivity, enhance competitiveness and entrepreneurship, and ultimately eradicate poverty through economic growth and

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<sup>1</sup> According to government estimates, India received US\$ 19 billion in FDI inflows in 2006.

development” (UN 2002: 5). However, the empirical evidence supporting this view across developing host countries of FDI is weak at best (e.g., Nunnenkamp 2004).

It also applies to India that previous empirical findings point to a considerable gap between political rhetoric and economic reality. Various studies failed to find a robust and positive link between inward FDI and economic growth, including Agrawal (2005) and Pradhan (2002).<sup>2</sup> The evidence is particularly weak as concerns causation running from FDI to economic growth in India.<sup>3</sup> According to Chakraborty and Nunnenkamp (2008), the growth effects of FDI in India varied widely across sectors. Most notably, FDI in the services sector, which attracted the bulk of FDI in recent years, had only transitory output effects when subjecting industry-specific FDI and output data to Granger causality tests within a panel cointegration framework.

It is for several reasons that FDI may have fallen short of high expectations in the past. Most obviously, FDI flows to India may still be too low to make a big difference (Bhat et al. 2004). The recent boom notwithstanding, FDI inflows in 2003-2005 amounted to just 3.3 percent of gross fixed capital formation in India, compared to about 11 percent for all developing economies (UNCTAD 2006: Annex Table B.3).

In addition, economy-wide growth effects may have been compromised by the type of FDI India has attracted. Growth effects largely depend on whether firm-specific assets that foreign investors are supposed to have spill over to local firms (Lipsev 2002; Görg and Greenaway 2004). Spillovers tend to be more pronounced if (backward and forward) linkages between foreign and local companies are strong. An intensive use of local inputs by foreign-owned firms is expected to trigger technological and knowledge spillovers. Likewise, linkage-intensive FDI activities allow local producers to draw on a larger variety of inputs and, thereby, increase their productivity (Rodriguez-Clare 1996). The movement of workers from foreign to domestic firms may benefit the local economy through human-capital externalities.

The Indian economy is most likely to benefit from FDI-induced spillovers if FDI inflows correspond to India’s comparative advantages in relatively labor intensive activities, given its huge endowment of relatively low-skilled labor. In principle, trade liberalization that constituted a major element of the reform program of 1991 should have encouraged a better alignment of FDI inflows with India’s comparative advantage.<sup>4</sup> Some observers have doubted,

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<sup>2</sup> By contrast, Sahoo and Mathiyazhagan (2003) conclude that FDI inflows have played a vital role in the Indian economy.

<sup>3</sup> Studies accounting for the possibility that the relationship between FDI and growth may be bi-directional include: Dua and Rashid (1998); Chakraborty and Basu (2002); Bhat et al. (2004); Kumar and Pradhan (2005); and Herzer et al. (2006).

<sup>4</sup> Gupta (2005) argues that India’s earlier import substitution strategy impaired the economic benefits to be derived from FDI.

however, that economic reforms went far enough to remove the distinct anti-export bias of India's trade policy and, thus, induced types of FDI that may have more favorable growth effects (Balasubramanyam and Mahambare 2003; Fischer 2002).<sup>5</sup> The Asian Development Bank expressed concerns about "the apparently limited linkages between MNEs and local firms" in India (ADB 2004: 228).<sup>6</sup> Bhat et al. (2004) suspect economic spillovers to have remained weak due to a lack of local skills.

Similar to trade liberalization, more favorable FDI effects could have resulted from the liberalization of ownership restrictions in India since the early 1990s.<sup>7</sup> Previous restrictions imposed on foreign majority holdings, in combination with weak protection of intellectual property rights, seem to have worked against FDI-related technology transfers.<sup>8</sup> Stronger FDI effects may have been induced in the post-reform period by increasingly approving foreign majority holdings (or even fully foreign-owned subsidiaries) and, thereby, strengthening the incentives for technology transfers.<sup>9</sup> On the other hand, the chances of local joint-venture partners to benefit from spillovers and absorb the superior technology of foreign companies may be less if FDI increasingly takes place in the form of foreign majority holdings.

The growth effects of FDI in India may also be constrained by the concentration of FDI in relatively advanced locations (Aggarwal 2005). To the extent that greater openness to FDI in the post-reform era has led to further agglomeration, FDI may have fuelled regional divergence, rather than promoting convergence. The Schumpeterian growth model presented by Aghion et al. (2006) provides an explanation why more FDI may promote growth in relatively advanced regions, while leaving growth almost unaffected in poorer regions.

Aghion et al. (2006) assume that the decision of local companies to innovate is based on expected future returns. More trade or FDI is shown to lead to positive growth effects in regions and sectors that are initially close to the technological frontier. By contrast, the growth rate is left unchanged or even reduced in backward regions and sectors. This is because local companies which are relatively close to the technological frontier are principally able to compete with foreign investors. Such companies have an incentive to innovate and invest in R&D when foreign competitors enter the market.<sup>10</sup> Under these

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<sup>5</sup> Agarwal (2001) suspects FDI in India to be still domestic market seeking.

<sup>6</sup> For instance, foreign companies in the software industry are said to operate as "export enclaves" (Kumar 2003: 27).

<sup>7</sup> Singh (2005) provides a detailed account of the process of liberalizing FDI restrictions.

<sup>8</sup> Athreye and Kapur (2001) note that, according to surveys conducted in the early 1990s, almost half of foreign direct investors did not transfer up-to-date technologies to India.

<sup>9</sup> Kumar and Aggarwal (2005) find that foreign companies were more inclined to undertake R&D in India in response to the economic liberalization program.

<sup>10</sup> According to Kathuria (2002), FDI-related spillovers were restricted to Indian firms that invested in R&D, enabling them to make use of foreign technology.

circumstances, FDI leads to more local investment in R&D, higher efficiency by increased competition and ultimately a better growth performance. The opposite applies to local companies and regions that are far off the technological frontier. Even if they invested in R&D, these companies would have no chance to compete with multinational companies. Therefore, investment in R&D by companies seriously lagging behind tends to decline when foreign investors enter the market. The net effect of FDI on growth remains ambiguous under such circumstances, taking into account that foreign investors increase efficiency by using up-to-date technology.

The scarcity of recent studies subjecting the aforementioned propositions to empirical tests is largely due to the lack of sufficiently disaggregated FDI data. At least some data constraints can be overcome by drawing on a detailed account of FDI approvals in India during the period 1991-2005 (Section 3). By using most recent FDI data, we also take into account that earlier findings may no longer apply, considering that India's reform program of 1991 has changed considerably the rules and conditions under which FDI operates in the country. For example, the Asian Development Bank expects a fundamental shift in the behavior of foreign investors and in the benefits host countries may derive from FDI when the policy environment changes as it did in India (ADB 2004: 244). We will turn to this issue in Sections 4 and 5.

### **3. What the Data Can(not) Tell**

The analysis in this paper draws on an extensive database on FDI approvals in India during the period 1991-2005.<sup>11</sup> This unpublished database offers detailed information on the number and amount of approved FDI projects, the share of foreign equity, the state and district where FDI projects take place, and the country of origin.<sup>12</sup> Moreover, it presents information on planned activities which allows us to classify FDI projects according to broad sectors (primary, secondary and tertiary). Finally, the database also covers technology licensing arrangements (so-called technical cases) that do not involve FDI inflows.

Approved FDI may deviate considerably from realized FDI. Table 1 indicates that only about one third of approved FDI amounts were realized in the 1990s. Nevertheless, this gap does not seriously constrain the subsequent analysis. The increase in realized FDI was largely in line with the increase in approved FDI in the 1990s. Consequently, the analysis of the effects of booming FDI in the 1990s on subsequent economic development in Section 5 is

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<sup>11</sup> We do not use the data for 1991 and 1992 in the subsequent sections. Specific information on FDI projects, notably the state in which projects are located, is largely lacking for these years.

unlikely to be distorted by using approval data. Only recently, the development of realized and approved FDI diverged. Approved FDI dropped substantially after its peak in the late 1990s. This may be due to changes in the approval procedure. As noted by Singh (2005), the list of FDI projects placed under the automatic approval route has been progressively expanded since the 1990s. Consequently, the database on approved FDI may *understate* actual FDI inflows in recent years. This is even though automatic route approvals are included in the database used here until October 2004, according to information received from India's Ministry of Commerce and Industry. It should be noted, however, that the data on realized FDI suffer from inconsistency, too. Most importantly, it is only since 2000 that the Reserve Bank of India offers a revised series of FDI inflows that includes reinvested earnings and debt transactions between related entities (to be counted as FDI according to international standards).

**Table 1- Approved and Realized FDI Flows to India, 1991-2005<sup>a</sup>**

	Approved		Realized (US\$ million)	
	US\$ million	Number of cases	Ministry of Commerce	RBI
1991-1993	1519	561	404	343
1994-1996	7224	1311	2095	2093
1997-1999	9006	1520	3068	2725
2000-2002	3655	1880	3421	5065
2003-2005	1624	1145	3247	5908

<sup>a</sup> Annual average.

Source: unpublished database on FDI approvals; Ministry of Commerce and Industry (2007); Reserve Bank of India (RBI) (2006).

Moreover, differences in the level of FDI approvals and realized FDI are unlikely to significantly affect our results since the subsequent analysis is largely based on FDI shares, e.g., the share of a particular region in approved FDI in all India. Accordingly, results would only be distorted if approved and realized FDI differed to a considerably larger extent in one region than in another region.<sup>13</sup> Finally, we focus on the *number* of approved FDI projects, rather than the *amounts* of approved FDI. The former measure is unaffected by the gap between approved and realized amounts for particular FDI projects.

<sup>12</sup> The data were kindly made available by the Department of Industrial Promotion and Policy (DIPP) of the Ministry of Commerce and Industry.

<sup>13</sup> Note also that the analysis of FDI shares is unaffected by missing data for FDI projects automatically approved most recently, unless missing cases are distributed unevenly across states, districts or sectors.



We make use of these data in two respects: First, the distribution of FDI within India is supposed to offer insights as to whether FDI has become increasingly concentrated in relatively advanced regions. Second, we turn to the effects FDI may have on regional development in India. Thereby, we offer tentative insights on whether the high expectations attached to FDI are reasonable, even though intricate questions about causality are left to future research.<sup>14</sup>

#### 4. Where Did FDI Go in Post-reform India?

##### (i) *Regional Concentration of FDI*

FDI flows to India are heavily concentrated in a few states.<sup>15</sup> Measured by the amount of approved FDI in 2001-2005, almost 26 percent of overall FDI was located in Maharashtra, followed by Delhi (13.6 percent), Karnataka (11.3), Gujarat (8.3) and Tamil Nadu (6.3).<sup>16</sup> The concentration of FDI in these top-5 states was still more pronounced with respect to the number of FDI projects (74 percent versus 65 percent).

However, these simple concentration measures offer limited insights at best. FDI has to be “normalized” in order to reflect the states’ attractiveness to FDI. In the following, we relate FDI to the population of states to control for their size.<sup>17</sup> FDI per capita for each state is then related to FDI per capita for all India to reflect a state’s relative attractiveness. Moreover, the interesting question in the context of the present paper is whether the concentration in a few states has become stronger in the course of economic reforms. Therefore, we calculate the above measure for three time intervals, i.e., 1993-1996, 1997-2000, and 2001-2005, to determine possible trends.

We focus on the *number* of approved FDI projects (“FDI cases” for short) in the remainder of this section. Unlike the distribution of the amount of FDI, the distribution of FDI cases is not affected by single, exceptionally large FDI approvals.<sup>18</sup> Nevertheless, the amount

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<sup>14</sup> Equally disaggregated data on various control variables would be required to address the causality issue systematically; such data are presently not available.

<sup>15</sup> Whenever the data situation allows us to do so, we consider all Indian states, including Union Territories as well as Jharkhand, Uttaranchal and Chhattisgarh (which were part of Bihar, Uttar Pradesh and Madhya Pradesh, respectively, up to 2000). However, in several instances we had to refer to the older state boundaries for consistency reasons. For similar findings on the concentration of FDI in India, see Aggarwal (2005), Basu (2005), and Purfield (2006).

<sup>16</sup> These shares in FDI in all India are understated somewhat as the state is not indicated for about 15 percent of approved FDI in 2001-2005. For the whole period of observation (1993-2005), the state in which FDI is located remains unknown for 27.6 percent of approved amounts and 17.4 percent of approved cases.

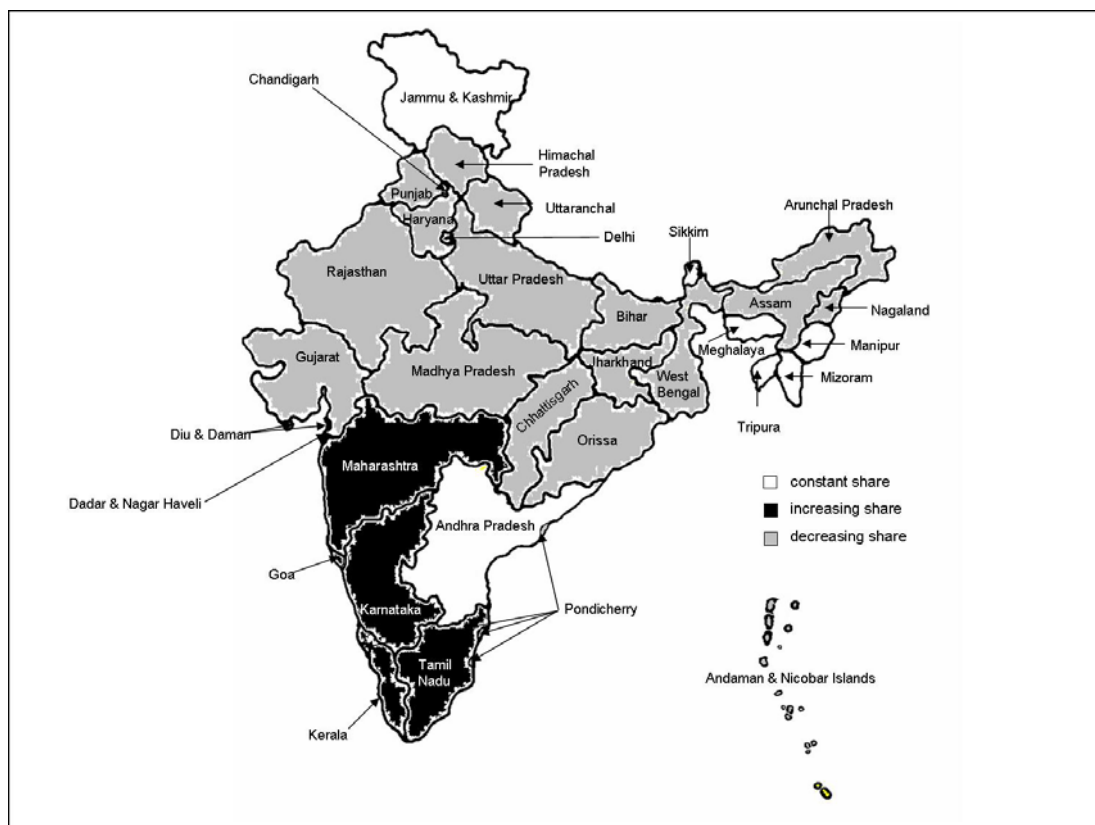
<sup>17</sup> Population figures refer to census years closest to the beginning of the period under consideration, e.g., 1991 for the period 1993-1996 and 2001 for the period 2001-2005. However, we refer to estimated population data below whenever census years and the initial year of the period under consideration deviate by more than two years.

<sup>18</sup> For instance, Delhi attracted one project of US\$ 1.3 billion in 1995. This project boosted Delhi’s share in FDI amounts approved in all India in the period 1993- 1996 by more than five percentage points to 19.1 percent.



the picture is ambiguous. Although they are clearly above the average at all times (with the exceptions already noted), some Union Territories managed to increase their relative share over time, whereas others failed to do so. Among the remaining Indian states, it was mainly the attractive states which further increased their FDI inflows in the aftermath of reforms. Out of the group of five states with per capita FDI well above the national average, only Haryana suffered a declining attractiveness over time, with the ratio falling from 3.3 in the first sub-period to 1.3 in the most recent sub-period. By contrast, out of the group of states with ratios well below the national average, only Kerala improved its position steadily, though just slightly from 0.43 to 0.57. All other states in this group failed to improve their relative attractiveness, and in most states even the absolute number of FDI projects declined over time.

**Figure 2: Trends in FDI Concentration**



Taken together, India is a highly divided country with respect to the distribution of FDI across states. FDI is concentrated in two regions, namely in the area around Delhi and in the southern part of India, especially along the west coast. The region around Delhi seems to have lost some of its importance, whereas the south-western part of India further increased its share in total FDI. The increasing concentration of FDI may imply that many large states and,

therefore, a large part of the Indian population were left unaffected by booming FDI in the post-reform period. Before returning to this question in Section 5, we will re-assess the concentration issue at the level of districts within selected states, and discuss major factors that may be underlying the uneven distribution of FDI.

The distribution of FDI within major states is portrayed in Table 2. We focus on large states at a considerably different stage of economic development, proxied by initial per-capita income in 1993.<sup>21</sup> The concentration on the single most important district as well as the top-3 districts is based on the number of FDI projects located in these districts.<sup>22</sup> In four out of the eleven states listed in Table 2, the most important district accounted for more than 60 percent of all FDI projects the respective state attracted in 1993-2005. Most notably, almost 90 percent of FDI projects in Karnataka went to Bangalore - followed by Kolkata in West Bengal, Chennai in Tamil Nadu, and Mumbai in Maharashtra.

At first sight, the concentration on the top district appears to be much weaker in less developed states such as Madhya Pradesh, Rajasthan, Uttar Pradesh and Bihar. However, the concentration is fairly similar in richer and poorer states once the share of top districts in FDI cases is related to the population living in these districts. For instance, the concentration on the top district in Uttar Pradesh was only slightly less than that in Maharashtra when FDI shares are related to population shares. In Rajasthan this relative measure reveals a somewhat higher concentration of FDI on the top district than in Karnataka. The relative concentration on the top district turns out to be particularly high in Kerala (23.3), Madhya Pradesh (22.9) and Bihar (21.8), even though the share of FDI projects *per se* was lowest in Madhya Pradesh, and the average per-capita income was lowest by far in Bihar.

The high concentration of FDI on a few economic centers within the states under consideration is corroborated when looking at the top-3 districts. With few exceptions, the top-3 districts attracted more than two thirds of the states' total number of FDI projects in 1993-2005. In Karnataka, the three districts (urban and rural Bangalore plus Mysore) accounted for almost all FDI projects. And again, Madhya Pradesh is not really an exception: Rather, the concentration on the top-3 districts was particularly pronounced in this state when taking into account that more than half of all FDI projects went to districts with a combined population of less than three percent of the state's total population.

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<sup>21</sup> Except Kerala, all states listed in Table 2 have a population of more than 40 million.

<sup>22</sup> We do not consider FDI amounts here as exceptionally large projects may distort the picture at the district level even more seriously than at the state level (see above). Moreover, the share of undisclosed FDI amounts is sometimes considerably higher than the share of disclosed FDI cases.

**Table 2 – Selected States: Concentration of FDI (number of projects) at the District Level<sup>a</sup>, 1993-2005 (percent)**

States <sup>b</sup>	Top district <sup>c</sup>	Top-3 districts <sup>c</sup>
Maharashtra (12200)	60.1 (3.4)	85.9 (19.3)
Gujarat (9800)	32.4 (11.5)	65.7 (21.4)
Tamil Nadu (9000)	63.8 (7.0)	86.7 (18.4)
Kerala (8000)	44.3 (1.9)	78.0 (5.4)
Karnataka (7800)	89.3 (12.4)	97.6 (20.9)
Andhra Pradesh (7400)	57.0 (4.9)	76.2 (13.0)
West Bengal (6800)	70.2 (5.7)	82.1 (26.3)
Madhya Pradesh (6600)	22.9 (1.0)	50.9 (2.8)
Rajasthan (6200)	31.6 (3.2)	68.4 (6.3)
Uttar Pradesh (5100)	30.7 (2.0)	68.5 (4.5)
Bihar (3000)	52.4 (2.4)	83.3 (10.9)

<sup>a</sup> Total number of projects in the particular state excludes projects for which the location at the district level is not disclosed. The share of undisclosed projects ranges from 2.8 percent (Karnataka) to 14.3 percent (Bihar). – <sup>b</sup> States ranked according to per-capita income in 1993 (as given in parentheses). – <sup>c</sup> In parentheses: percent of the state's population in 2001

Source: unpublished database on approvals; Central Statistical Organisation (var. iss.).

(ii) *FDI Determinants: Bivariate Correlations*

In this section, we present some bivariate correlations to provide first clues on major factors underlying the distribution of FDI approvals across Indian states in 1993-2005. This also offers indirect evidence with respect to the chances of less advanced states to improve their attractiveness to FDI and, thereby, foster economic growth. As noted by the World Bank (2004), differences in business conditions are far more pronounced within India than the much discussed differences between all India and competing China. At the same time, the World Bank's Investment Climate Assessment in 2004 suggests that those states attracting the bulk of FDI are characterized by better business conditions.

The correlations are run for our preferred measure of FDI, i.e., FDI per capita in a particular state relative to the national average.<sup>23</sup> Results presented in Table 3 are restricted to the number of FDI cases.<sup>24</sup> We consider two sub-periods, 1993-1998 and 1999-2005, in order to assess whether the correlations have changed over time. As concerns the possible driving forces underlying the distribution of FDI, we account for various factors that have been used in the cross-country literature on FDI determinants (see, e.g., Chakrabarti 2001). Notably, we include indicators on the economic development of Indian states, their size, the quality of

<sup>23</sup> Dadra & Nagar Haveli, Daman & Diu and Lakshadweep are missing due to lack of data.

<sup>24</sup> Additional correlations were performed for the amount of FDI. We do not report them here as the results were hardly affected when replacing the number of FDI cases by FDI amounts. Notable exceptions are: "literacy" and "students, higher" in 1993-1998 as well as "students, primary" in 1999-2005 for all of which the correlation with FDI amounts turned insignificant.

infrastructure, and the level of education.<sup>25</sup> Whenever possible, the data on the indicators used refer to the initial year of the period under consideration, in order to minimize any reverse causation that might exist.<sup>26</sup>

The correlation results can be summarized as follows. First of all, the correlations of FDI with the initial per-capita income of Indian states are significantly positive at the one percent level. The size of the coefficient suggests that the preference of foreign direct investors for the richer states strengthened in the second sub-period of 1999-2005. This may have rendered it increasingly difficult for poorer states to induce catching-up processes by drawing on FDI. This may apply especially to large and poor states, even though the correlation of per-capita FDI with the size of states (measured by population) remains insignificant. FDI is positively correlated with population density (population divided by surface area of states in square km) at the one percent level in 1993-1998 and, still more so, in 1999-2005. This finding, in combination with the aforementioned FDI attractiveness of various Union Territories, corroborates Sachs et al. (2002: 10), according to whom FDI located mainly in urbanized states.

**Table 3 – FDI at the State Level: Correlation with Possible Determinants<sup>a</sup>**

Indicators	1993-1998	1999-2005
Per-capita income (US\$)	0.67***	0.86***
Population (million)	-0.23	-0.21
Population density (number per square km)	0.53***	0.74***
Roads (km per square km)	0.33	0.76***
Electricity (kW per capita)	0.25	0.08
Bank deposits (per capita)	0.64***	0.87***
Telephone density (number per capita)	n.a.	0.76***
Literacy rate (percent)	0.48***	0.27
Students, primary (percent of population)	-0.32	-0.33*
Students, middle(percent of population)	0.17	0.19
Students, higher (percent of population)	0.41**	0.80***
Net value added in manufacturing (per capita)	0.73***	0.59***

<sup>a</sup> See text for exact definition of variables; \*, \*\*, \*\*\* denote significance at the 10, 5, and 1 percent level, respectively.

Source: unpublished database on FDI approvals; Observer Research Foundation (var. iss.); Central Statistical Organisation (var. iss.).

<sup>25</sup> The focus is on structural characteristics of Indian states that may impede their attractiveness to FDI in the long run. This is not to ignore that policymakers at the state level may have instruments at their disposal that could have an impact on the distribution of FDI. Possible candidates include the tax treatment of FDI as well as state-specific labor market regulations. As concerns the latter, Aggarwal (2005) finds that stricter labor market rigidities at the state level discouraged FDI in 1991-2001, especially in the case of export-oriented FDI. According to Sachs et al. (2002), more reform-oriented states attracted higher FDI inflows.

<sup>26</sup> For some indicators, data are lacking for 1993 and 1999. In these cases, we chose the closest year available.

Second, we correlate FDI with several indicators on the development of infrastructure in Indian states. The role of infrastructure as a determinant of FDI in India is disputed. According to the World Bank's recent investment climate assessment, deficient infrastructure ranks second, behind regulations and corruption, as an important bottleneck to investment even in relatively advanced states such as Maharashtra and Gujarat (World Bank 2004: 28). By contrast, Chakravorty (2003) finds that infrastructure had little influence in determining the location or quantity of new industrial investment. Likewise, the infrastructure index used by Singh and Srinivasan (2004) is only weakly correlated with FDI per capita approved in 1991-2001.

The correlations shown in Table 3 suggest that this ambiguity is due to two reasons: Results depend on (i) the specific indicator chosen and (ii) the time period considered. As concerns financial infrastructure, differences in bank deposits per head of the population are strongly correlated with FDI across Indian states throughout the period of observation. This supports the survey result of the World Bank (2004: 21), according to which respondents often rated access to finance to be a major obstacle to business operations. Telecommunication turns out to be similarly important. However, the indicator used, the number of telephones per head of the states' population, is only available for the second sub-period.

In some contrast, transport infrastructure as measured by the length of roads, relative to the states' surface area, is only weakly correlated with FDI in the first sub-period, while the correlation has become fairly strong in recent years. Most surprisingly perhaps, the supply of electricity (kW per capita) does not appear to be a relevant determinant of FDI in either of the two sub-periods.<sup>27</sup> This may be partly because of the shortcomings of the indicator used here.<sup>28</sup> Yet the correlation between electricity and FDI turns significantly positive (to 0.67 in 1993-1998 and 0.68 in 1999-2005) once two outlier states are excluded from the calculation.<sup>29</sup>

Third, the correlations of FDI with education-related variables reveal interesting changes over time. On the one hand, the positive correlation with the rate of literacy in 1993-1998 turns insignificant in 1999-2005. On the other hand, student enrolment at higher levels of education (in percent of the states' population) has become more important recently. This pattern indicates that FDI in India increasingly depends on the availability of skilled local

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<sup>27</sup> This is in sharp contrast to survey results of the World Bank (2004: iv) which suggest that the availability and the cost of electricity are among the most important determinants of where companies locate.

<sup>28</sup> Kochhar et al. (2006) use transmission and distribution losses of state level electricity boards, in order to account for generated power that is not paid for.

<sup>29</sup> Punjab proved fairly unattractive to FDI, while it ranked first among Indian states in terms of electricity supply per capita. By contrast, highly attractive Delhi reported below average electricity supply per capita.

labor. It fits into this picture that one in eight businesses in India consider skill shortages to be a major obstacle to business expansion (World Bank 2004: 22). States whose endowment of qualified students is particularly poor are thus likely to face mounting difficulties in attracting FDI.

Finally, we correlate FDI with two indicators on the industrial structure of Indian states. It turns out that states with a more developed manufacturing base, proxied by net value added per capita in the manufacturing sector, had better chances to attract FDI. The finding that this correlation weakened somewhat over time is probably because FDI shifted increasingly towards the services sector (see below). Furthermore, we considered the state-wise distribution of investment by purely export-oriented companies, relative to the states' population. This indicator is only available in aggregate form for the period 1991-2001 (Observer Research Foundation 2004: 87). Therefore, we correlated this indicator with our FDI measure for the whole period of observation, instead of the two sub-periods shown in Table 3. The correlation coefficient is positive (0.39), though significant at the 10 percent level only. This supports the view of Agarwal (2001) that FDI in India was largely local market seeking, even though states with a higher concentration of export-oriented companies attracted somewhat more FDI. It remains to be seen whether this relationship will become stronger in the future with India's more pronounced export orientation.

### *(iii) FDI Determinants: Regression Results*

The relatively small number of observations notwithstanding, OLS regressions may offer additional insights on the relative importance of major FDI determinants. The dependent variable is defined as the natural logarithm of the number of FDI cases in a particular state. We treat zero observations for FDI cases in two ways: In the preferred specification, we set the log of FDI equal to minus one when a state had no FDI case in the period under consideration.<sup>30</sup> The advantage of this approach is that we do not lose any observations for the FDI variable. Alternatively, we dropped zero observations for FDI in order to assess whether the results depend on the above choice.

Possible FDI determinants considered in all estimations include the per-capita income and the population of states, population density, bank deposits (all as defined above), as well as a dummy variable set equal to one for Union Territories. Population is included as an

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<sup>30</sup> While this is a somewhat arbitrary choice, the resulting difference in the logged dependent variable between FDI cases=1 and FDI cases=0 (-1) is similar to the corresponding difference between FDI cases=2 and FDI cases=1 (-0.69).



explanatory variable to control for the size of states.<sup>31</sup> As concerns education-related variables, we enter either the literacy rate or student enrolment in higher than primary education. Likewise, we consider either roads or electricity as an additional indicator of the quality of infrastructure in Indian states. All variables are logged.<sup>32</sup>

Even though variables related to education and infrastructure enter alternatively in the regressions, we still encounter multicollinearity problems. The per-capita income of states is highly correlated with both literacy rates (0.69) and bank deposits (0.81); the same applies to the correlation between population density and roads (0.85). In principle, multicollinearity could be mitigated by first regressing specific determinants on per-capita income and then using the residuals in the FDI equation. We refrained from doing so for several reasons. In the case of population density and roads, it would be somewhat arbitrary to decide on the variable for which to take residuals. Moreover, in several instances (see below for details), both variables turned out to be significant even though they are correlated.

The regressions are performed by pooling the observations for the two sub-periods of 1993-1998 and 1999-2005. We include a time dummy, with  $D=1$  for the second sub-period, in order to account for the structural break in our dependent variable resulting from liberalized approval procedures (see Section 3 above).<sup>33</sup> Depending on missing values for explanatory variables, we end up with 43 - 52 observations.

The results summarized in Table 4 corroborate major findings of the bivariate correlations. Most importantly, more advanced Indian states clearly attract more FDI. In all estimations, the coefficient of per-capita income (LN\_PCI) is significant at the one percent level. At the same time, the effect of per-capita income on the number of FDI cases is quantitatively important, with a one percent increase in per-capita income being associated with an increase in the number of FDI cases of about three percent. The same applies to population (LN\_POPULATION) : All coefficients are highly significant and positive as expected, consistently showing an elasticity of about 1.4 – 1.5.

The coefficient of the dummy variable for Union Territories (UNION\_TERR) remains statistically insignificant once other FDI determinants are controlled for. In contrast to the bivariate correlations, more densely populated states no longer attract more FDI. In some regressions, the coefficient of LN\_POP\_DENSITY is even significantly negative, though only

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<sup>31</sup> Note that the dependent variable is not normalized in the regressions.

<sup>32</sup> The remaining indicators listed in Table 3 are not included in the regressions as this would further reduce the number of observations.

<sup>33</sup> It would be interesting to interact the time dummy with possible FDI determinants to assess whether they have become more or less important over time. However, the limited number of observations renders this exercise rather futile.

weakly so. This may suggest that foreign investor prefer less congested regions once the stage of economic development and the quality of infrastructure are controlled for. The time dummy accounting for the break in the time series on FDI approvals is consistently negative and highly significant. This is not surprising given the above noted liberalization of approval procedures.

**Table 4 — FDI Determinants at the State Level: Regression Results<sup>a</sup>**

	(1)	(2) <sup>b</sup>	(3)	(4)	(5)
LN_PCI	3.09*** (0.68)	2.87*** (0.70)	2.75*** (0.71)	3.09*** (0.57)	3.14*** (0.66)
LN_POPULATION	1.40*** (0.13)	1.36*** (0.14)	1.54*** (0.13)	1.42*** (0.12)	1.46*** (0.14)
LN_POP_DENSITY	-0.57* (0.32)	-0.64* (0.34)	-0.57* (0.33)	0.24 (0.21)	0.09 (0.26)
LN_LITERACY	-2.21** (0.94)	-1.86* (1.00)	— (—)	— (—)	-0.14 (1.13)
LN_STUDENTS	— (—)	— (—)	0.02 (0.62)	0.53 (0.49)	— (—)
LN_ROADS	0.67** (0.31)	0.73** (0.32)	0.58* (0.31)	— (—)	— (—)
LN_ELECTRICITY	— (—)	— (—)	— (—)	0.38* (0.22)	0.28 (0.24)
LN_BANK	0.57 (0.35)	0.59 (0.36)	0.42 (0.38)	-0.43 (0.39)	-0.19 (0.42)
UNION_TERR	0.84 (0.80)	0.69 (0.83)	1.22 (0.81)	0.79 (1.11)	0.25 (1.38)
TIME_DUMMY	-2.11*** (0.39)	-2.04*** (0.42)	-2.10*** (0.48)	-2.08*** (0.43)	-2.36*** (0.38)
CONSTANT	-39.65*** (5.82)	-38.29*** (6.13)	-47.09*** (5.66)	-49.85*** (4.72)	-48.63*** (5.27)
Adjusted R-squared	0.88	0.86	0.87	0.91	0.91
SE of regression	0.93	0.92	0.99	0.80	0.80
F-statistic	48.54	35.16	43.89	60.98	56.22
Number of observations	51	47	52	46	43

<sup>a</sup> Standard errors in parentheses; \*\*\*, \*\*, \* significant at 1, 5 and 10 percent level, respectively.—<sup>b</sup>In contrast to all other columns: zero observations for FDI cases dropped; see text for details.

*Source:* unpublished database on FDI approvals; Observer Research Foundation (var. iss.); Central Statistical Organisation (var. iss.).

The treatment of zero observations for FDI cases does not affect our results. The significance as well as the size of coefficients is hardly affected when comparing columns (1)

and (2) in Table 4. Hence, it is only for our preferred model with zero observations, included in the way described above, that we report different specifications with respect to variables related to infrastructure and education.

The evidence for the indicators related to infrastructure and education turns out to be weaker than in the bivariate correlations. As was to be expected, the fact that more advanced states attract a larger number of FDI cases is mainly captured by per-capita income as an encompassing measure of the states' economic development. Yet, in some respects infrastructure matters even when per-capita income is controlled for. In line with the bivariate correlations, FDI is more strongly correlated with transport infrastructure, as measured by the length of roads (LN\_ROADS), than with the supply of electricity (LN\_ELECTRICITY). The coefficient of roads is significant in all three estimations including this variable (at the 10 percent level or better) with an elasticity of 0.6 – 0.7. Electricity enters significantly (at the 10 percent level) in column (4), while it remains insignificant in column (5). It should be noted, however, that the weaker evidence for electricity may be largely due to the reduced number of available observations when including this indicator on the quality of infrastructure.

As concerns financial infrastructure, the regression results are in striking contrast to the bivariate correlations. This may be partly due to multicollinearity. However, it also appears that the size and composition of the sample of Indian states matter considerably in this regard. In columns (1) and (2), the positive coefficient of bank deposits (LN\_BANK) just fails to pass the 10 percent level of significance. By contrast, the coefficient turns completely insignificant (and sometimes even negative) in columns (3) – (5). Closer data inspection reveals that this is probably due to specific outliers. For instance, the fact that bank deposits are not significant in column (3) of Table 4 can be attributed at least partly to the exclusion of Goa (for lack of data on student enrolment in the first sub-period): As noted in Section 4 (i), Goa attracted a large number of FDI projects, relative to its size. At the same time, Goa ranked among the top three states with regard to bank deposits per head of the population.

Most strikingly, we do not find that better education attracts FDI in Indian states. Rather, higher literacy rates (LN\_LITERACY) are associated with less FDI according to columns (1) and (2). This implausible result seems to be driven by some exceptional cases of extremely small states and Union Territories. The Andaman & Nicobar Islands as well as Mizoram (with populations of less than one million) report literacy rates well above 80 percent, while the number of FDI cases was either zero or one. These outliers are not included in column (5), as data on electricity are lacking. As a result, literacy turns insignificant, which is reasonable if FDI in India increasingly draws on more skilled labor.

Finally, student enrolment (LN\_STUDENTS) remains insignificant. In contrast to the bivariate correlations, we cannot differentiate between medium and higher levels of education in the regression analysis. This is because we pool two sub-periods for which the data on student enrolment beyond the primary level are not comparable due to changes in the classification. Consequently, we use aggregated enrolment data for all levels higher than primary education. This may at least partly explain why this variable does not affect FDI in Indian states. The results for student enrolment in Table 4 may be driven mainly by enrolment in the middle range of education, which would be consistent with the earlier correlation results.

All in all, the regression analysis supports the view that more advanced Indian states had considerably better chances to attract FDI. This is even though the assessment of FDI determinants at the state level suffers from the small number of observations, rendering the regression results rather sensitive to some outliers.

## **5. FDI and Economic Performance of Indian States**

### *(i) Overall FDI, Growth and Poverty Alleviation*

As noted in Section 2, previous studies typically failed to find a positive link between inward FDI and economic growth. However, earlier findings may no longer apply if the changed policy environment has resulted in a fundamental shift in the behavior of foreign investors and, thus, in the benefits India may derive from FDI. Based on FDI approvals (in per-capita terms) in 14 major states in 1991-2001, Singh and Srinivasan (2004: 33) indeed find a significantly positive impact of FDI on per-capita income growth at the state level.

Similar to Singh and Srinivasan (2004), we do not attempt to estimate a well specified growth equation in this section. Rather, we proceed in several steps: For a start, we perform bivariate correlations between different FDI measures on the one hand, and growth and poverty-related performance variables on the other hand. Subsequently, we account for initial income and the FDI intensity at the state level to assess whether FDI may have helped poorer states to catch up with richer states. This approach has obvious limitations: It suffers from an omitted variable bias, and it tells little about causation. However, data constraints and the limited number of observations for Indian states render a multivariate analysis all but impossible. The problem of reverse causation running from growth to FDI is mitigated by employing FDI measures for the period 1993-1998 while performance variables extend to the more recent past.

Table 5 reports the correlation results for three FDI-related measures: In addition to our preferred measure of the number of FDI projects, we use the amount of approved FDI as well as the number of so-called technical cases (i.e., technology licensing arrangements). Strictly speaking, technical cases do not represent a measure of FDI as they do not involve equity capital imports. Yet, the correlation of technical cases with growth may offer additional insights. This correlation may even turn out to be stronger than that of FDI projects with growth if licensing is as effective as FDI in making use of foreign technology, but less likely as FDI to crowd out local investment. All measures are in per-capita terms of the states' population, relative to the Indian average.

With few exceptions, the correlations turn out to be significant at the five percent level or better. Both the number of FDI cases and the number of technical cases are not only associated with higher per-capita income growth over the whole period of observation (1994-2005), but also with reduced poverty. Most strikingly perhaps, FDI and technical cases are correlated with poverty alleviation in rural areas, too. This appears to be in contrast to the view that the rural population was hardly affected by FDI in India (Singh 2005: 5). Given that FDI tends to locate primarily in more developed urban areas (Section 4), the effects on rural poverty may be rather indirect, e.g., by inducing poor workers to migrate to urban centers.

The data situation does not allow testing the robustness of the poverty-related results by considering only the recent past, in order to mitigate problems of reverse causation.<sup>34</sup> However, such a test can be performed with respect to performance in terms of growth. As shown in Table 5, the results weaken considerably once we correlate the FDI-related measures with subsequent growth in 1999-2005. Yet, this does not necessarily imply that the results for the whole period of 1994-2005 are grossly biased upwards due to reverse causation running from better performance to FDI. Closer inspection rather suggests that the results are sensitive to the treatment of outliers:

- On the one hand, the strong correlation with growth in 1994-2005 is largely driven by Delhi and Pondicherry, which attracted exceptionally high per capita FDI and, at the same time, experienced exceptionally high growth. Once these two Union Territories are excluded from the calculations, the correlation coefficients decline substantially (not shown in Table 5). This applies especially to the number of FDI projects and FDI amounts, for which the correlations remain significant at the ten percent level only.

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<sup>34</sup> This is even though Dev and Ravi (2007) present data on changes in poverty-related indicators for the two sub-periods 1993-2000 and 1999-2005, respectively. However, these data are available for 19 states only.

- On the other hand, the weak correlations with growth in 1999-2005 turn out to be stronger once tiny Nagaland and Tripura are excluded. The correlation results are biased downwards by these two outliers who proved to be unattractive to FDI, while reporting highly volatile growth rates (following a serious contraction of per-capita income in 1998 and 1999, the data point to a strong recovery in 2000).

In summary, the correlations indicate that FDI may well have supported economic growth and poverty alleviation at the level of Indian states. It remains open to question, however, whether favorable effects were confined to a few states which were fairly advanced already.

**Table 5 – FDI, Economic Growth and Poverty Alleviation<sup>a</sup>: Correlation Results across Indian States<sup>b</sup>**

FDI measure	Per-capita income growth		Change in poverty, 1994-2001		
	1994-2005	1999-2005	total	urban	rural
Number of FDI cases	0.70 <sup>***</sup>	0.31 <sup>*</sup>	-0.46 <sup>**</sup>	-0.56 <sup>***</sup>	-0.53 <sup>***</sup>
FDI amounts	0.66 <sup>***</sup>	0.39 <sup>**</sup>	-0.16	-0.25	-0.40 <sup>**</sup>
Number of technical cases	0.62 <sup>***</sup>	0.24	-0.46 <sup>**</sup>	-0.52 <sup>***</sup>	-0.44 <sup>**</sup>

<sup>a</sup> Percentage change of the share of people below the poverty line; all FDI measures are in per-capita terms, relative to the Indian average. \*, \*\*, \*\*\* denote significance at the 10, 5 and 1 percent level, respectively. <sup>b</sup> Lakshadweep, Daman & Diu, Mizoram as well as Dadra & Nagar Haveli are missing due to lack of data.

Source: unpublished database on FDI approvals; Reserve Bank of India (2006).

### *(ii) Specific Categories of FDI and Growth*

Before returning to this issue, we explore the possibility that the growth effects of FDI may differ depending on (i) where FDI is coming from, (ii) in which sector it is taking place, and (iii) the extent to which local Indian partners participate in FDI projects (joint ventures). In order to assess whether the structure of FDI matters, we replicate the above FDI-growth correlations for specific categories of FDI. As before, FDI is defined in per-capita terms for the period 1993-1998. The analysis is restricted to our preferred FDI measure, i.e., the number of FDI projects. Growth rates are for the period 1999-2005, excluding Nagaland and Tripura for the reasons stated before.<sup>35</sup>

<sup>35</sup> The differences between major sources of FDI as well as the sectors in which FDI takes place are hardly affected by the treatment of these two outliers, while all correlations tend to be weaker if Nagaland and Tripura are included.

To begin with, we use the information on the source of FDI projects that is included in the database on FDI approvals. The proposition that FDI effects may differ between source countries goes back to Kojima's (1978) claim that Japanese FDI in developing countries is distinct in that it fosters trade and economic development.<sup>36</sup> More recently, Harzing and Sorge (2003) argued that the source country of FDI matters as the strategies of multinational companies tend to be shaped by market conditions, business systems and the institutional background prevailing at home. Therefore, we calculate the correlation with growth for selected groups of foreign direct investors that contributed significantly to overall FDI projects in all India. The most important source countries are: the United Kingdom (16.3 percent of all FDI projects in 1993-2005), the United States (10.8), Germany (9.8), and Japan (6.2). In addition, we consider FDI projects undertaken by non-resident Indians (NRI), which the database identifies as a separate FDI category; NRI accounted for six percent of all FDI projects in 1993-2005.<sup>37</sup>

As concerns the four major home countries of foreign investors, there is at best weak evidence supporting the view that FDI from particular sources is superior to FDI from other sources. The correlations with growth are somewhat stronger for FDI from Japan and the United Kingdom than for FDI from Germany and the United States (Table 6). However, the correlation remains significant at the five percent level even for the two latter sources. This result is hardly surprisingly once it is taken into account that the location choices of foreign investors based in these four countries closely resemble each other.<sup>38</sup> If a superior type of FDI exists at all, it tends to come from non-resident Indians. FDI by non-resident Indians is less closely aligned with other sources of FDI in terms of location choices.<sup>39</sup> One may also suspect FDI by non-resident Indians to promote growth through stronger linkages with the local economy.

The results for FDI in specific sectors support the widely held belief that resource-seeking in the primary sector is unlikely to be associated with significant growth effects (e.g., Chakraborty and Nunnenkamp 2008). Most obviously, this is because FDI in India's primary sector plays a marginal role in quantitative terms. In 1993-1998, FDI projects in the primary

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<sup>36</sup> The analysis across the host countries of Japanese and US FDI by Kumar (2000) lends some support to this view; Japanese companies are shown to move a larger part of the value chain to the host countries. In the Indian context, Banga (2003) shows that the export effects of FDI differed between the home countries of foreign investors. In contrast to the Kojima hypothesis, however, it turned out that FDI from the United States had a positive impact on the export intensity of non-traditional export industries, whereas Japanese FDI had not.

<sup>37</sup> Taken together, the four source countries under consideration plus NRI accounted for about half of all FDI projects in 1993-2005. Their joint contribution to total approved FDI amounts was slightly less (44 percent).

<sup>38</sup> The pair-wise correlation between FDI from the four countries across Indian states in 1993-1998 ranges from 0.79 (Japan – United States) to 0.98 (Germany – United Kingdom).

sector accounted for just 4 percent of all FDI projects.<sup>40</sup> In addition, growth-promoting spillovers of FDI to local companies and workers tend to be relatively weak in the primary sector (UNCTAD 2001: 138).

**Table 6 – Structural Characteristics of FDI and Economic Growth<sup>a</sup>: Correlation Results across Indian States**

FDI characteristics	Sub-category	Per-capita income growth, 1999-2005
Source of FDI	Germany	0.43 <sup>**</sup>
	Japan	0.51 <sup>***</sup>
	United Kingdom	0.50 <sup>***</sup>
	United States	0.42 <sup>**</sup>
	Non-resident Indians	0.55 <sup>***</sup>
Sector	Primary	0.01
	Secondary	0.39 <sup>**</sup>
	Tertiary	0.48 <sup>***</sup>
Foreign equity share	Foreign minority	0.41 <sup>**</sup>
	Foreign majority	0.52 <sup>***</sup>
	Wholly foreign owned	0.44 <sup>**</sup>

<sup>a</sup> \*, \*\*, \*\*\* denote significance at the 10, 5 and 1 percent level, respectively.

Source: unpublished database on FDI approvals; Reserve Bank of India (2006).

More interestingly, the correlation with growth is at least as strong for FDI in the tertiary sector as it is for FDI in the secondary sector.<sup>41</sup> FDI in Indian manufacturing was dominated by relatively (physical and human) capital intensive items such as transport equipment and chemicals, whereas labor intensive items such as textiles and leather goods rank far down the list of approved FDI provided by the Ministry of Commerce and Industry (2007). This pattern suggests that FDI hardly drew on India's comparative advantage in labor intensive manufacturing industries, which may have prevented stronger growth-promoting spillovers in this sector (see Section 2). By contrast, Chakraborty and Nunnenkamp (2008) found FDI in Indian manufacturing to be superior to FDI in services in terms of growth effects. However, the panel cointegration approach of these authors does not cover the state

<sup>39</sup> For instance, the correlation between FDI from NRI and that from Germany amounts to just 0.56; the highest correlation is that with Japanese FDI (0.69).

<sup>40</sup> This share further declined in the more recent past.

<sup>41</sup> During the period of observation, FDI in India shifted significantly from the secondary sector to the tertiary sector. The share of FDI projects in the tertiary sector in all FDI projects soared from about 16 percent in 1993 to 38 percent in 1998, and further to almost 60 percent in most recent years. Correspondingly, the share of FDI in the secondary sector dwindled from 77 percent in 1993 to 60 and 41 percent in 1998 and 2005, respectively.



level, which is the focus of the present paper. Across Indian states, the location choices of foreign investors were fairly similar for FDI in the secondary and tertiary sector.<sup>42</sup>

Finally, the correlation between FDI and growth is only weakly affected when FDI projects are differentiated according to the degree of foreign equity participation. All three sub-categories of FDI are significantly correlated with growth. It is thus difficult to decide whether the liberalization of foreign equity restrictions helped positive growth effects by improving the incentives to transfer up-to-date technologies, or whether spillovers to local joint venture partners were impaired in this way (see Section 2). Possibly, these two opposing effects canceled out each other. It fits into this reasoning that the correlation with growth is somewhat stronger for FDI projects with majority foreign equity shares: While the incentives for technology transfers tend to be stronger for this sub-category in comparison to projects with foreign minority shares, majority-owned projects may have offered better chances of spillovers than wholly foreign owned projects. However, the weaker correlation shown for wholly foreign owned projects may also result from the still minor importance of this sub-category of FDI projects during the period of observation.<sup>43</sup>

### *(iii) FDI, Initial Income and Growth*

We now return to the question whether positive growth effects of FDI may have helped poorer Indian states to catch up economically with richer states. Several studies suggest that income discrepancies have widened in the post-reform period. For example, Sachs et al. (2002) find a tendency towards divergence across Indian states.<sup>44</sup> Kochhar et al. (2006), Purfield (2006) as well as Veeramani and Goldar (2006) all refer to growing concerns that economic progress is leaving some states behind. Economic reforms have changed the nature of central government control of the economy in a way that increases the potential for greater disparities across states (Singh and Srinivasan 2004: 30). Likewise, Kochhar et al. (2006: 36) argue that state-level capabilities as well as state-level policies and institutions matter more since the 1990s; with the center no longer enforcing inter-state equity, divergences in growth rates between states increased.

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<sup>42</sup> The correlation between FDI in the secondary sector and FDI in the tertiary sector is 0.64. By contrast, FDI in the primary sector is only weakly correlated with FDI in other sectors (0.33 and 0.29 with FDI in the secondary and tertiary sector, respectively).

<sup>43</sup> The share of wholly foreign owned projects in all projects (excluding projects for which the foreign equity share is unknown) increased considerably from 8 percent in 1993 to 35 percent in 1998. Nevertheless, projects with foreign minority shares were clearly dominant during the period 1993-1998; on average, they accounted for more than half of all FDI projects, compared to 29 and 19 percent for majority-owned and wholly foreign owned projects, respectively.

<sup>44</sup> Chakravorty (2003) uses district data on industrial location and finds inter-regional divergence, but intra-regional convergence.

According to Purfield (2006), labor and capital flows have done little to close income gaps. Nevertheless, it remains open to debate whether FDI has contributed to divergence across Indian states, rather than helping convergence. In Section 4, we provided some indirect evidence pointing in the former direction by showing that FDI located primarily in richer states. In the following, we address this issue in a more direct way. First, we classify all Indian states (including Union Territories) into two groups of relatively rich and poor states, taking the median of average per-capita income in the initial year 1993 as the dividing line.<sup>45</sup> Both groups are then further divided into two sub-groups of relatively high and low FDI intensity. The criterion applied is the number of FDI projects per head of the state's population (relative to the national average) in 1993-1998. Hence, we end up with four sub-groups of eight states each.<sup>46</sup> Second, we calculate the average annual growth rate of per-capita income in constant prices for each of the four sub-groups during the period 1994-2005 (Table 7).<sup>47</sup>

Catching up of relatively poor Indian states would obviously require that their average growth rate should have exceeded the average growth rate of the relatively rich states. This is not the case: While the difference in average growth rates between poor and rich states is marginal in the low FDI category, the substantially higher average growth rate of rich states in the high FDI category points to divergence rather than convergence.

More interestingly in the present context, it is only for relatively rich states that a higher FDI intensity is associated with a significantly higher growth rate. By contrast, the difference in growth rates remains marginal between relatively poor states with a low FDI intensity and poor states with a high FDI intensity. In other words, FDI does not appear to be a decisive factor for the growth prospects of less advanced Indian states. Table 7 thus supports the reasoning in Section 4 that FDI is more likely to increase regional income discrepancies between Indian states. It is left to future research whether this conclusion holds once (i) a finer regional disaggregation (at the level of districts) is applied, and (ii) a multivariate analysis is performed by controlling for other determinants of growth.

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<sup>45</sup> Lakshadweep, Daman & Diu as well as Dadra & Nagar Haveli are not included because of missing data.

<sup>46</sup> Table 7 lists only seven states in the sub-group with low FDI and high income. In addition, Mizoram belongs to this sub-group, but the data situation does not allow meaningful calculation of the annual average growth rate in this case. Nevertheless, the results reported in the table are hardly affected if Mizoram is included.

<sup>47</sup> Due to incomplete data, growth rates for most recent years could not be calculated for several states. Therefore, we checked the robustness of the results reported in Table 7 by limiting the period for which annual average growth rates are calculated to 1994-2002. While growth rates turned out to be somewhat lower for all sub-groups, the differences in growth rates between sub-groups were hardly affected. Considering that we focus on differences here, the results for the shorter period are not presented.

**Table 7 – Average Annual Growth in Per-capita Income (percent), 1994-2005: Groups of Indian States according to Initial Income and FDI Intensity**

	<b>High FDI, 1993-98</b>	<b>Low FDI, 1993-98</b>
<b>Low income 1993</b>	<p><b>3.87</b> Karnataka, Andhra Pradesh, West Bengal, Uttarranchal, Uttar Pradesh, Rajasthan, Madhya Pradesh, Orissa</p>	<p><b>3.61</b> Bihar, Assam, Manipur, Jammu &amp; Kaschmir, Tripura, Maghalaya, Chhattisgarh, Jharkhand</p>
<b>High income 1993</b>	<p><b>5.79</b> Delhi, Goa, Haryana, Maharashtra, Pondicherry, Tamil Nadu, Chandigarh, Andaman &amp; Nicobar</p>	<p><b>3.89</b> Himachal Pradesh, Kerala, Sikkim, Arunchal Pradesh, Nagaland, Gujarat, Punjab</p>

Source: unpublished database on FDI approvals; Reserve Bank of India (2006).

## 6. Summary and Conclusions

It is clearly beyond the scope of this paper to provide a definite answer to the question whether booming FDI in post-reform India has helped reduce regional income disparities within the country. While we make use of an extremely rich and detailed database on FDI approvals since the early 1990s, the data situation is rather poor with respect to other factors that may have an impact on economic growth and poverty alleviation at the regional level in India. Consequently, we follow Kochhar et al. (2006: 7) and attempt “to tease out broad patterns, and in a variety of ways”, mainly by means of descriptive statistics and bivariate correlations.

Data and methodological limitations notwithstanding, the available evidence indicates that FDI is likely to widen regional income disparity in India. The concentration of FDI in a few Indian states tends to work against favorable FDI effects spreading across the Indian economy. The regional dissemination of FDI-induced growth is further impaired by the increasing concentration of FDI at the state level since the early 1990s. FDI is heavily concentrated even within Indian states: Typically, the three most attractive districts account for more than two thirds of all FDI projects located in the state as a whole.

The analysis of possible determinants of FDI reveals that it has become increasingly difficult for less developed states to induce economic catching-up processes by drawing on FDI. Foreign investors strongly prefer locations in India that are relatively advanced in terms of per-capita income and infrastructure. In addition, states whose endowment of skilled workers is particularly poor may face mounting difficulties to attract foreign investors.

In some contrast to earlier studies, we find FDI to be positively correlated with per-capita income growth across Indian states, and negatively correlated with the share of people with incomes below the poverty line. This finding holds for different specifications of the FDI variable as well as for different sub-categories of FDI. This may indicate that the link between FDI and growth has become stronger in the aftermath of economic reforms so that earlier, much more skeptical assessments may no longer apply.

Nevertheless, FDI is unlikely to work wonders for India's regional development. It is only for relatively rich states that a higher FDI intensity is associated with a significantly higher growth rate in the post-reform era. By contrast, FDI does not appear to be a decisive factor for the growth prospects of less advanced states.

All in all, it appears to be unreasonable to expect that booming FDI in India will lead to regional convergence. Our empirical findings fit well into the theoretical reasoning of Aghion et al. (2006). The Schumpeterian growth model presented by Aghion et al. suggests that local conditions are essential for the effects of FDI in host countries like India. In particular, FDI tends to leave growth unaffected in poor regions where local companies operate far off the technological frontier. Under such conditions, FDI-induced spillovers are impaired by lacking incentives of local companies to innovate, as well as their weak capacity to absorb superior foreign technology. Similarly, Blomström and Kokko (1998) as well as Blomström et al. (2001) conclude from reviews of the literature that spillovers depend on the absorptive capacity of local firms, with small gaps encouraging spillovers and large gaps inhibiting them. Findlay (1978: 2) argued in the late 1970s already that economic backwardness encourages technology transfers provided that the technology gap "must not be too wide."

At the same time, the tentative findings presented above suggest several directions for future empirical research on the effects of FDI on economic growth and poverty alleviation in India. First of all, the data on the regional distribution of FDI needs to be complemented with similarly disaggregated data on control variables that might be relevant in the context of economic growth and regional development. Second, the state-level analysis in the present paper may be refined by a more detailed regional disaggregation. The above noted

concentration of FDI within individual states provides first hints that regional development may diverge even at the level of districts. Yet, it remains open to question whether the dissemination of FDI effects is more pronounced at the district level than at the level of Indian states, the population of many of which by far exceeds the population of various countries. Finally, it would be desirable to account for additional aspects of the heterogeneity of FDI in India. For instance, it is widely believed that greenfield FDI generates stronger investment and growth effects than mergers and acquisitions (M&As), which, at least in the first round, amount to little more than a change in ownership and do not add to overall investment. Pursuing all these research directions meets with considerable data constraints, however.

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