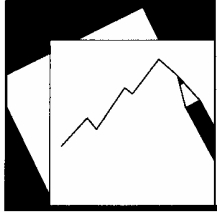


# Working Paper

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## Mind the Gap—Is Economic Growth in India Leaving Some States Behind?

*Catriona Purfield*

**IMF Working Paper**

Asia and Pacific Department

**Mind the Gap—Is Economic Growth in India Leaving Some States Behind?**

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Authorized for distribution by Jerald Schiff

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**Abstract**

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This paper examines how growth has varied across India's states. It finds that (i) the income gap between rich and poor states has widened; (ii) rich and faster-growing states have been more effective in reducing poverty; (iii) poor and slower-growing states have had little success in generating private sector jobs; (iv) labor and capital flows do little to close income gaps; and (v) the volatility in economic growth is greatest in poor states. Differences in states' policies affect the cross-state pattern of growth. Greater private sector investment, smaller governments, and better institutions are found to have a positive impact on growth.

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## I. INTRODUCTION

Despite India's recent strong growth performance, there is a growing concern that the benefits of growth have been concentrated in India's richer states, leaving the poorer states lagging further and further behind. As India's poorest states are also its most populous, the concern is that unless these states begin to share in the benefits of growth, an increasing proportion of the population will be left in poverty and that rising inequality will lead to social, political, and economic difficulties. Moreover, as many perceive that globalization and economic liberalization have contributed to this state of affairs, economic divergence could erode support for economic reform and for further opening of the Indian economy. These concerns gain even greater traction when one considers projections that about 60 percent of the forecast 620 million increase in the Indian population between now and 2051 will occur in three of its poorest states, Bihar, Madhya Pradesh and Uttar Pradesh (Visaria and Visaria, 2003).

There is a rich literature using regional data to test whether growth in regions within India has converged or diverged over time. However, as is often the case with such studies, the results are conflicting. For example, Cashin and Sahay (1996) and Aiyar (2001) find evidence of convergence after controlling for differences in initial economic conditions, but Rao, Shand, and Kalirajan (1999), Bajpai and Sachs (1996), and Sinha and Sinha (2000) find divergence. Aiyar (2001) finds that education and investment helped to reduce cross-state income divergence, while Cashin and Sahay (1996) found fiscal transfers were a significant equalizing force. Various studies have made opposing claims about the impact of globalization and economic reform post-1991 on income convergence, although few have conducted rigorous statistical tests of this hypothesis. Bhattacharya and Sakhivel (2004) and Kumar (2004) assert that the reforms of the 1990s exacerbated the gap between richer and poorer states, while Ahluwalia (2002) asserts that these reforms helped reduce the gap. In light of the wide range of evidence, this paper seeks to shed light on the debate by asking two related questions. First, what evidence is there to support the view that poorer states have fallen further behind richer states, particularly since the 1990s? Second, why have certain states performed better than others? If state-level economic policies have an impact on growth, better policies could help laggard states grow faster. Section II presents stylized facts about growth across Indian states. Section III assesses empirically the question of convergence and the impact of state policy on growth. Section IV concludes.

## II. STYLIZED FACTS ABOUT GROWTH IN INDIA

The disparity in economic conditions across Indian states is large and growing (Table 1). Over the past three decades, the ranking of states by income as poor, medium, and rich has changed remarkably little and, although poverty has declined, it has become more spatially concentrated. We highlight five key facts about the pattern of development across states.

Table 1. India Then and Now: Summary Income, Growth, and Poverty Indicators, 1970–2004

Real Per Capita Net State Domestic Product (NSDP) 2000–04 (Rupees)	Real Per Capita Income	Income Rank in:		Real Per Capita Income of Richest to Poor (Ratio)		Real Per Capita Income Growth (Percent)	Population Growth Rate (Percent)	Headcount of Total Poverty (Percent)		Overall Literacy Rate (Percent)	
	(Rupees)	1970–74	1990–94	1970–74	2000–04	1970–2004	1970–2004	2000	1977–78	2001	1973
<b>Poor states</b>											
14 Bihar	3,553	14	14	1.0	1.0	1.9	1.4	46.9	61.6	47.5	23.4
13 Uttar Pradesh	5,702	13	12	1.8	1.5	1.4	2.1	33.0	49.1	57.4	26.9
12 Orissa	6,487	11	13	2.1	1.6	1.4	1.7	46.3	70.1	63.6	32.4
11 Madhya Pradesh	8,284	12	11	1.8	2.1	2.6	1.3	36.8	61.8	64.1	28.2
10 Rajasthan	8,571	9	9	2.3	2.2	1.5	2.7	20.4	37.4	61.0	23.9
<b>Middle-income states</b>											
9 Andhra Pradesh	11,333	10	8	2.2	2.9	3.1	1.8	18.8	39.3	61.1	29.8
8 West Bengal	11,771	8	10	2.4	2.9	2.9	1.9	32.1	60.5	69.2	40.6
7 Kerala	12,109	4	7	2.9	3.1	2.5	1.3	14.5	52.2	90.9	71.9
6 Karnataka	13,141	7	6	2.4	3.4	3.2	1.9	25.6	48.8	67.0	38.5
<b>Rich states</b>											
5 Tamil Nadu	12,976	6	5	2.8	3.5	2.8	1.4	21.5	54.8	73.5	47.1
4 Gujarat	16,779	5	4	2.8	3.9	3.2	2.1	15.6	41.2	66.4	43.7
3 Haryana	15,721	2	2	3.2	4.0	2.8	2.5	11.8	29.6	68.6	34.0
2 Maharashtra	16,050	3	3	3.1	4.1	2.9	2.4	28.7	55.9	77.3	47.6
1 Punjab	15,800	1	1	3.6	4.2	2.6	1.9	6.0	19.3	70.0	40.4
<b>14 Major states</b>											
Weighted average	10,410	...	...	2.5	2.6	2.3	1.9	...	...	...	...
National average	13,048	...	...	2.9	3.3	2.6	2.1	28.6	51.3	65.38	...
Standard deviation	5,415	...	...	0.67	1.05	0.67	0.44	11.51	11.57	10.36	13.27
Coefficient of variation	1	...	...	0.27	0.40	0.28	0.23	0.40	0.23	0.16	...

Sources: EPW States database; and IMF staff calculations.

**Fact 1: The gap between in income levels across states is widening.**

The gap in per capita income levels between the richer and poorer states has widened over the past three decades.<sup>2</sup> Rich states have also grown over three times faster than poorer states (Figure 1) so that by March 2004, the ratio of per capita income in the richest state (Punjab) to that in the poorest state (Bihar) had risen to 4.5 from 3.4 in 1970. There is also a strong correlation between the pace of growth and initial income levels. Dividing the sample into those states that grew at rates either above or below the national growth rate, we find that all the poor states plus Kerala grew more slowly than the national average during 1970–2004 (Table 2). The fast-growing states, which include mainly the middle-income states (Andhra Pradesh, West Bengal, and Karnataka) and the two rich states, Gujarat and Maharashtra, grew over twice as fast as the slow-growing states.

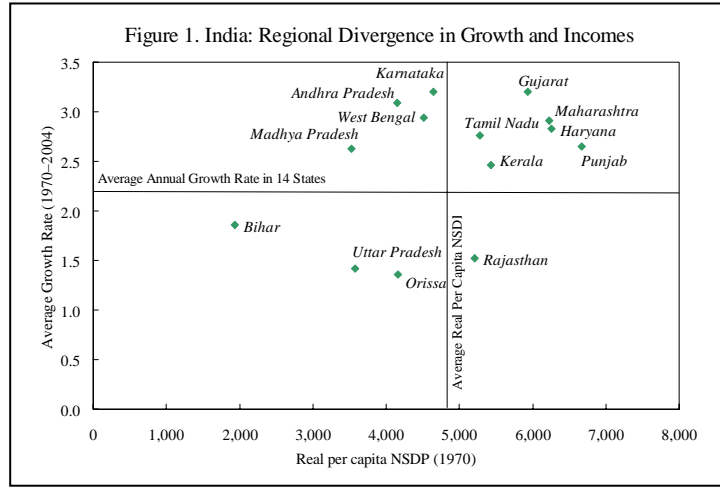


Table 2. India: Absolute Divergence in Growth Rates

States Classified by Real Per Capita Income in 1970	Average Annual Growth in Real Per Capita Income				
	1970–2004	1970–79	1980–89	1990–99	2000–04
Poor states	0.46	-3.4	1.9	2.9	1.8
Middle-income States	2.74	0.8	2.2	5.6	5.0
Rich states	2.68	3.0	4.3	3.3	4.5
1970–2004					
Fastest-growing states	3.07	1.9	3.8	5.5	7.7
Slowest-growing states	1.43	0.6	2.6	2.6	1.8
National average	2.61	0.2	3.4	3.5	4.4

Sources: IMF staff calculations; EPW States database.

**Fact 2: Richer and faster-growing states are generally better at reducing poverty.**

A state’s record in reducing poverty reflects differences both in the level of growth and in the effectiveness of this growth in reducing poverty. On average, richer states have been about 50 percent more effective in reducing poverty than poorer states for each percentage point of growth.<sup>3</sup>

<sup>2</sup> Using net state domestic product (NSDP); gross state domestic product (GSDP) was not available for all states for this time period.

<sup>3</sup> For each state, we run the following regression:

$$LNPOVERTY_{st} = \alpha + \beta_s LNGDP_{st} + \varepsilon_{st}$$

(continued...)

While national-level growth in India has reduced poverty less than proportionately—the country-wide average poverty-growth elasticity is about 0.73 percent—Table 3 illustrates the huge variation across states in poverty-growth elasticities. To evaluate the relative importance of growth rates and poverty-growth elasticities, the decline in the poverty headcount ratio can be expressed as:

$$p_{st} = \bar{\varepsilon} \bar{g} + \bar{g} \left( \varepsilon_s - \bar{\varepsilon} \right) + \varepsilon_s \left( g_s - \bar{g} \right)$$

where  $p_{st}$  is the reduction in the poverty rate between 1977 and 2001 in a given state,  $s$ ,  $\bar{\varepsilon}$  is the average India poverty-growth elasticity,  $\bar{g}$  is the average India growth rate,  $\varepsilon_s$  and  $g_s$  are the state-specific average poverty-growth elasticity and growth rates. The first term measures the average reduction in poverty, the second differences across states in the effectiveness of growth in reducing poverty, and the third differences in growth rates across states. Terms two and three can be used to classify states according to the relative importance of the pace of a state's growth and the effectiveness of this growth in reducing poverty.

Table 3. India: Cross-State Variation in Poverty-Growth Elasticities, 1977–2001 1/

	Poverty-Growth Elasticity (B) 1977–2001	Standard Errors	Contribution to Reduction in Poverty Rate of:	
			State Poverty-Growth Elasticity Relative to India Average	State Growth Rate Relative to India Average
Poor states	-0.68	...		
Bihar	-0.43	0.05 ***	-0.41	-0.18
Orissa	-1.06	0.11 ***	0.45	-0.87
Uttar Pradesh	-0.68	0.08 ***	-0.07	-0.36
Madhya Pradesh	-0.39	0.05 ***	-0.46	-0.02
Rajasthan	-0.82	0.05 ***	0.12	-0.31
Middle-income states	-0.98	...		
West Bengal	-0.96	0.08 ***	0.31	-0.07
Andhra Pradesh	-0.80	0.06 ***	0.09	0.23
Kerala	-1.54	0.09 ***	1.09	-0.04
Karnataka	-0.63	0.04 ***	-0.15	0.15
Rich states	-1.02	...		
Tamil Nadu	-1.02	0.04 ***	0.39	0.16
Haryana	-0.73	0.15 ***	0.00	-0.03
Gujarat	-1.01	0.07 ***	0.38	0.05
Punjab	-1.68	0.13 ***	1.30	-0.32
Maharashtra	-0.62	0.05 ***	-0.15	0.01
National average	-0.73	0.03 ***		
Coefficient of variation	-0.51	...		

Source: IMF staff calculations.

1/ Headcount poverty ratio regressed on real per capita net state domestic product. White-corrected heteroskedasticity errors. All variables are in logs. \*\*\* implies significance at the 1 percent level, \*\* at the 5 percent level, and \* at the 10 percent level.

where  $LNPOVERTY_{st}$  is the Deaton-corrected state poverty head count ratio from the National Sample Survey,  $t$  is time (within sample years are extrapolated), and  $LNGDP$  is real per capita net state domestic product.  $\beta$  is the elasticity.



States in the upper left-hand corner of Table 4 have the best of both worlds: growth in these states was faster than the Indian average and was effective in reducing poverty. In contrast, states in the lower right-hand corner experienced below-average growth and its effectiveness in reducing poverty was less than average. However, Table 4 underscores that some fast-growing states were not as effective as slower-growing states in reducing poverty. The policies explored in Section III as drivers of growth may also help explain why some states are more effective than others in reducing poverty.

	High-Growth States 1/	Low-Growth States 1/
High poverty elasticity	Andhra Pradesh Gujarat Tamil Nadu	Kerala Orissa Punjab Rajasthan West Bengal
Low poverty elasticity	Karnataka Maharashtra	Bihar Haryana Madhya Pradesh Uttar Pradesh

Source: IMF staff estimates.

1/ Using gross state domestic product. Most recent poverty data available is from 2001.

**Fact 3: Poor and slower-growing states generated fewer private sector jobs.**

While employment has risen across all states in the past three decades, the pace of job creation in middle- and high-income states far outstripped that of poorer states. India's poorest and most populous states, where about 40 percent of the population live, account for only one-quarter of organized sector employment in India.<sup>4</sup> While employment growth has in all states been driven by the public sector, the latter played a more crucial role in the poorer states where the private sector progressively shed jobs (Table 5).

<sup>4</sup> The organized or official sector comprises enterprises registered under the 1951 Industries Act and covers all enterprises that employed 100 workers or more and do not use electricity, or firms that employ 50 or more workers and use electric power. Organized employment accounts for about 10 percent of the labor force.

Table 5. India: Structure of Employment in the Organized Sector 1/

	1970/71			2001/02			Annual Percentage Change			Employment Share 1970/71		Employment Share 2001/02	
	Public	Private	Total	Public	Private	Total	Public	Private	Total	Public	Private	Public	Private
	(In millions)						(In percent to total employment)						
Poor states 2/	3.7	1.4	5.1	5.7	1.2	6.9	1.4	-0.4	1.0	74.9	25.1	83.3	16.7
14 Bihar	0.8	0.4	1.2	1.4	0.3	1.6	1.9	-1.8	0.9	63.1	36.9	84.3	15.7
13 Uttar Pradesh	1.4	0.5	1.9	1.7	0.5	2.2	0.7	-0.5	0.4	72.0	28.0	79.0	21.0
12 Orissa	0.3	0.1	0.4	0.7	0.1	0.8	2.5	0.4	2.2	81.0	19.0	89.2	10.8
11 Madhya Pradesh	0.8	0.2	1.0	1.0	0.2	1.1	0.8	-0.8	0.5	77.2	22.8	84.8	15.2
10 Rajasthan	0.5	0.1	0.6	1.0	0.2	1.2	2.3	2.7	2.4	81.3	18.7	79.3	20.7
Middle-income states 2/	2.7	2.2	4.9	4.7	2.7	7.4	7.7	5.0	6.4	57.2	42.8	62.5	37.5
9 Andhra Pradesh	0.7	0.3	1.0	1.5	0.6	2.1	2.3	2.3	2.3	70.8	29.2	71.3	28.7
8 West Bengal	1.1	1.2	2.3	1.5	0.7	2.3	1.1	-1.6	0.0	46.9	53.1	67.0	33.0
7 Kerala	0.3	0.4	0.7	0.6	0.6	1.2	2.3	1.2	1.8	44.2	55.8	52.8	47.2
6 Karnataka 3/	0.6	0.3	0.9	1.1	0.8	1.9	1.9	3.1	2.4	66.8	33.2	58.7	41.3
Rich states 2/	3.4	2.5	5.9	5.7	3.6	9.2	9.8	8.5	9.2	60.0	40.0	62.0	38.0
5 Tamil Nadu	0.9	0.7	1.5	1.6	0.9	2.5	1.9	1.1	1.6	57.7	42.3	64.1	35.9
4 Gujarat	0.5	0.5	1.0	0.8	0.7	1.6	1.6	1.5	1.5	52.3	47.7	53.6	46.4
3 Haryana	0.2	0.1	0.3	0.4	0.3	0.7	2.8	2.9	2.8	62.3	37.7	61.6	38.4
2 Maharashtra	1.5	1.2	2.6	2.2	1.4	3.6	1.3	0.6	1.0	56.1	43.9	61.4	38.6
1 Punjab	0.3	0.1	0.4	0.6	0.3	0.8	2.1	2.5	2.2	71.9	28.1	69.5	30.5
National average	10.7	6.7	17.5	18.8	8.4	27.2	1.8	0.7	1.4	61.1	38.4	69.0	31.0
Share of poorest states	34.6	20.7	29.1	30.3	14.4	25.4	...	...	...	...	...	...	...
Share of middle-income states	25.2	32.7	28.0	25.1	31.8	27.2	...	...	...	...	...	...	...
Share of rich states	31.5	37.2	33.5	30.3	42.1	34.0	...	...	...	...	...	...	...

Source: Ministry of Labor, India.

1/ These states accounted for 90 percent of organized sector employment in 1970/71, and 86.5 percent in 2001/02.

2/ Simple average over each income group.

3/ 1972/73.

States differ greatly in their ability to translate growth into jobs. Although puzzling for a labor-rich country, it is a well-documented fact that growth in India has not been very job-intensive—the national growth-employment elasticity for the organized sector is only 0.5. However, poorer states have fared even worse than this. This may reflect the fact that job creation in the private sector has been concentrated in the richer and middle-income states while it declined in the poorer states. Notwithstanding this, Tables 6 and 7 show that high-growth states are generally more successful in translating growth into jobs, which may also help explain why states such as Andhra Pradesh, Gujarat, and Tamil Nadu have made large inroads into poverty. However, it is also the case that some fast-growing states (Madhya Pradesh, Maharashtra, and West Bengal) have been less successful in generating job-intensive growth.

Table 6. India: Cross-State Variation in Employment-Growth Elasticities, 1970/71–2001/02 1/

	Employment Growth			Standard Errors		
	Total	Public	Private	Total	Public	Private
Poor states 2/	0.65	0.77	0.13	...	...	...
Bihar 3/	0.32	0.52	-0.46	0.06 ***	0.10 ***	0.08 ***
Orissa	1.41	1.62	0.18	0.20 ***	0.23 ***	0.13
Uttar Pradesh 3/	0.41	0.59	-0.16	0.08 ***	0.10 ***	0.06 ***
Madhya Pradesh 3/	0.28	0.31	0.10	0.09 ***	0.10 ***	0.05 *
Rajasthan	0.83	0.80	0.97	0.12 ***	0.11 ***	0.12 ***
Middle-income states 2/	0.44	0.51	0.37			
West Bengal	-0.10	0.22	-0.55	0.02 ***	0.07 ***	0.06 ***
Andhra Pradesh	0.68	0.69	0.65	0.05 ***	0.07 ***	0.04 ***
Kerala	0.45	0.59	0.31	0.09 ***	0.13 ***	0.06 ***
Karnataka	0.73	0.55	1.05	0.04 ***	0.06 ***	0.05 ***
Rich states 2/	0.58	0.61	0.55			
Tamil Nadu	0.49	0.55	0.39	0.05 ***	0.08 ***	0.03 ***
Haryana	0.78	0.84	0.69	0.07 ***	0.08 ***	0.07 ***
Gujarat	0.48	0.50	0.45	0.05 ***	0.07 ***	0.04 ***
Punjab	0.81	0.75	0.98	0.04 ***	0.05 ***	0.03 ***
Maharashtra	0.33	0.40	0.23	0.04 ***	0.05 ***	0.02 ***
National average	0.50	0.59	0.31	0.052 ***	0.075 ***	0.018 ***
Coefficient of variation	0.70	0.73	1.50	...	...	...

Source: IMF staff calculations.

1/ Using employment in the organized sector. \*\*\* implies significance at the 1 percent level, \*\* at the 5 percent level, and \* at the 10 percent level.

2/ Simple average across states in each income group.

3/ Regressions included a dummy variable to capture year when new state was formed.

Table 7. India: Ranking of States by the Sources of Employment Generation, 1970/71–2001/02

	High-Growth States	Low-Growth States
	Total Employment	
High employment elasticity	Andhra Pradesh Haryana Karnataka Punjab	Orissa Rajasthan
Low employment elasticity	West Bengal Gujarat Madhya Pradesh Maharashtra Tamil Nadu	Bihar Kerala Uttar Pradesh
	Private Employment	
High employment elasticity	Andhra Pradesh Gujarat Haryana Karnataka Punjab Tamil Nadu	Rajasthan
Low employment elasticity	Madhya Pradesh Maharashtra West Bengal	Bihar Kerala Orissa Uttar Pradesh

Source: IMF staff estimates.

#### Fact 4: Capital and labor flows do little to address imbalances in economic activity and income across states.

Economic activity is highly concentrated, and India's most populous states contribute less to output than their share in the population. The five poorest states, with 40 percent of the population, produce only one-quarter of the total. The richest five states, home to only about one-quarter of India's population, produce over 40 percent of its output. There are also large geographical disparities in the sectoral distribution of economic activity. While about half of total agricultural value added in India is produced in the northern and central states, the coastal states of Maharashtra, Gujarat, and Tamil Nadu produce 40 percent of industrial and service sector output. The concentration of economic activity observed in India is very similar to that observed by Easterly and Levine (2002) in the United States. The correlation between the poverty and geographic location is also high. India's poorest states are mainly located in the central and northern regions where the headcount poverty ratio generally exceeds 30 percent. Middle- and high-income states are generally located in the coastal areas.<sup>5</sup>

<sup>5</sup> The correlation between the headcount poverty rate and a dummy variable that is set equal to one if the state is located in the central and northern regions is 0.83. If the dummy variable is set to capture coastal states the correlation turns negative (-0.35).

Capital also goes primarily to the richer states, exacerbating the plight of poor states. Using the stock of credit from scheduled commercial banks to proxy capital stock, we find that the five richest states receive a disproportionate share of capital, about 55 percent of total stock. The five poorest states received only 15 percent.<sup>6</sup> Half of total foreign direct investment (FDI) approvals in India go to five, largely prosperous states.

Even though labor migrates to the richer states, the overall level of labor mobility in India across state borders is very low and does little to assist the convergence process (Table 8).

Only 6 percent of migration in rural areas and 20 percent of migration in urban areas occurred across state borders.<sup>7</sup> Net outward migration is highest from the northern and central states of Bihar, Uttar Pradesh, and Punjab. Delhi and the coastal states of Maharashtra and Gujarat are the prime migration destinations and India's wealthiest states attracted about half of the total number of migrants during 1999–2000. However, limited cross-state migration is consistent with Cashin and Sahay (1996), who find that state-to-state

Table 8. India: Interstate Migration, 1961–2000

	Net Annual Migration Rate			
	1971	1981	1991	2000
	(In percent) 1/			
Poor states				
Bihar	-0.00112	-0.00105	-0.00030	-0.01862
Orissa	0.00036	0.00028	0.00060	0.00233
Uttar Pradesh	-0.00114	-0.00175	0.00250	-0.00458
Madhya Pradesh	0.00094	0.00028	0.00360	0.00651
Rajasthan	-0.00095	-0.00047	0.00350	-0.00351
Average for poor states	-0.00038	-0.00054	0.00198	-0.00358
Middle-income states				
West Bengal	0.00086	0.00057	0.00090	0.00623
Andhra Pradesh	-0.00035	-0.00029	0.00430	0.00035
Kerala	-0.00177	-0.00128	-0.00320	-0.00104
Karnataka	0.00035	0.00013	0.00090	-0.00434
Average for middle-income states	-0.00023	-0.00022	0.00073	0.00030
Rich states				
Tamil Nadu	0.00103	-0.00060	-0.00010	-0.00308
Haryana	0.00087	0.00069	-0.00040	0.03662
Gujarat	0.00034	0.00053	-0.00110	0.00857
Punjab	-0.00207	-0.00018	-0.00320	0.00827
Maharashtra	0.00181	0.00226	0.00570	0.02032
Delhi	0.02166	0.02293	...	...
Average for rich states	0.00394	0.00427	0.00018	0.01414

Sources: Migration in India, 1999–2000; NSSO (2001); Cashin and Sahay (1996).

1/ Average annual net migration as a share of state population at the start of each decade.

<sup>6</sup> Using the location where credit was disbursed may overstate the degree of spatial concentration if borrowers utilize the funds in a different state. In addition, the credit series of scheduled commercial banks does not capture lending via the cooperative movement which is spatially concentrated, although small in terms of its overall magnitude.

<sup>7</sup> Urban-to-urban and rural-to-urban each account for one-fifth of interstate migration.

migration in India was not very responsive to cross-state income differentials. The low level of cross-state migration may reflect language barriers and poverty, as poorer individuals may find it difficult to finance a move to a different state in the absence of family ties.<sup>8</sup>

**Stylized Fact 5: Growth has been the most volatile in the poorest states.**

Growth has been the most volatile in the poorer states, and increasingly so since the early 1980s which stands in marked contrast to the experiences of rich and middle-income states.<sup>9</sup> However, Table 9 shows that the fastest-growing states (the three middle-income and two high-income states) experienced greater volatility in growth rates than slower-growing states, suggesting that despite experiencing temporary busts, on average these states ended up with higher per capita incomes.

States Classified by Real Per Capita Income in 1970	Coefficient of Variation in Real Per Capita Income Growth				
	1970–2004	1970–1979	1980–1989	1990–1999	2000–2001
Poor states	4.11	9.14	2.42	2.01	2.78
Middle-income states	2.92	7.58	1.80	1.23	0.74
Rich states	2.74	5.74	2.48	1.08	0.99
1970–2004					
Fastest-growing states	3.38	7.46	2.75	1.50	1.23
Slowest-growing states	1.89	4.91	1.02	0.84	0.96
National average	1.38	3.55	0.58	0.60	0.55

Sources: IMF staff calculations; EPW states database.

<sup>8</sup> The data reported in this paper do not capture substantial seasonal migration that occurs across some state borders. In states such as Punjab and Haryana the bulk of the agricultural workforce comprises migrant labor and the factor incomes earned in these states are not reflected in the NSDP data of migrants' resident state.

<sup>9</sup> Growth rates are averaged over five-year periods to help smooth cyclical fluctuations. The volatility in income growth between 1970 and 2004 was over three times the variation in cross-state incomes. The cross-sectional standard deviation averaged about 0.5 percentage points in the past three decades, but standard deviation over time averaged 1.6 percentage points.

In sum, the stylized facts suggest that the income gap between richer and poorer states has widened. States differ greatly in their ability to attract investment and translate growth into more jobs and less poverty. In many ways, these findings contrast with those of the theoretical neoclassical convergence literature which predicts that states that are initially poor should grow faster than richer ones, and that capital and labor will migrate to ensure convergence.<sup>10</sup> However, the concentration of economic activity across states may reflect other factors highlighted in the economic geography literature such as locational advantages in terms of access to markets and supply sources (Redding and Venables, 2004), transport and congestion costs (Krugman, 1991), scale economies and spillovers of knowledge and information (Fujita, Krugman, and Venables, 1999) that can lead to the agglomeration of economic activity. Moreover, the analysis also suggests that while high growth is generally associated with poverty reduction and job creation, growth alone is not enough to ensure good outcomes on these two fronts. Differences in economic policies across states affect the pace of growth.

### III. DO POLICIES MATTER?

There have been various attempts to assess econometrically whether differences in economic policies across states account for the differences in the pattern of state-level growth. Generally, states that sought to liberalize factor markets and promote good institutions are found to have fared better than others. Besley and Burgess (2000, 2004) look at the impact of specific economic reforms on manufacturing and agricultural growth. They find that states that amended labor laws in favor of workers experienced lower growth in output, employment, investment, and productivity in the formal manufacturing sector and increases in urban poverty. In agriculture, states that amended land laws to encourage redistribution of land to laborers and the amalgamation of farms into viable units experienced higher investment, productivity, and output growth. Banerjee and Iyer (2005) use district-level data and find that areas in which proprietary land rights were historically given to landlords had significantly lower agricultural investments and productivity post-independence than areas in which these rights were given to cultivators. Burgess and Pande (2004) found that the Indian rural bank branch expansion program of 1977–90 significantly lowered rural poverty and increased nonagricultural output.<sup>11</sup> Kochhar and others (2006) found that states with weaker institutions and poorer infrastructure experienced lower GDP and industrial growth, particularly in electricity- and infrastructure-intensive sectors. Surveys of over 2000 business establishments across 20 states conducted by Indicus Analytics (2004) are also suggestive of

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<sup>10</sup> In a steady-state framework, per capita growth rates vary inversely with the distance a state is from its own steady-state level of growth. A poorer state with a relatively low capital-to-labor ratio should enjoy higher rates of return on capital and therefore higher growth rates, as it converges to its steady state, assuming a constant returns-to-scale technology.

<sup>11</sup> Under this program, a commercial bank was granted permission by the Reserve Bank of India (RBI) to open a branch in a location with one or more bank branches only if it opened four in locations with no bank branches.

a positive relationship between a state's economic policy environment and its growth performance (Figure 2).

To test this link more formally, we identify various time-series indicators of economic policy at the state level on the basis of the literature and the availability of data. The purpose is not to identify an exhaustive list of the determinants of growth nor to rank the importance of each factor, but

rather to assess whether policies are linked with growth and whether they can account for the cross-state pattern of economic performance. In general, the real per capita growth rate of a state is related to two kinds of variables. The first type proxies initial economic conditions, such as the structure of a state's economy. In line with the convergence literature (Barro and Sala-i-Martin, 1999) the second group of so-called policy variables reflect actions by the government or individuals and capture their direct effect on a state's growth rate via their impact on the state's steady-state or long-run level of per capita income. The extent of time-series data varies, but generally cover the 1973–2003 period with the exception of infrastructure where data are only available from the 1980s onward. The variables used in the analysis are described below and key correlations are illustrated in Figure 3.

### *Initial conditions*

- **Initial income:** If there is convergence, states with higher levels of income will tend to grow at a slower rate. The initial level of per capita income is measured using real net state domestic product (NSDP) and the coefficient on this variable is used to derive the rate of convergence.
- **Economic structure:** States whose economic structure is more biased toward agriculture are expected to grow more slowly reflecting the low productivity of the largely subsistence sector. The economic structure of a state is measured using the lagged ratio of agriculture and industry in a state's NSDP.

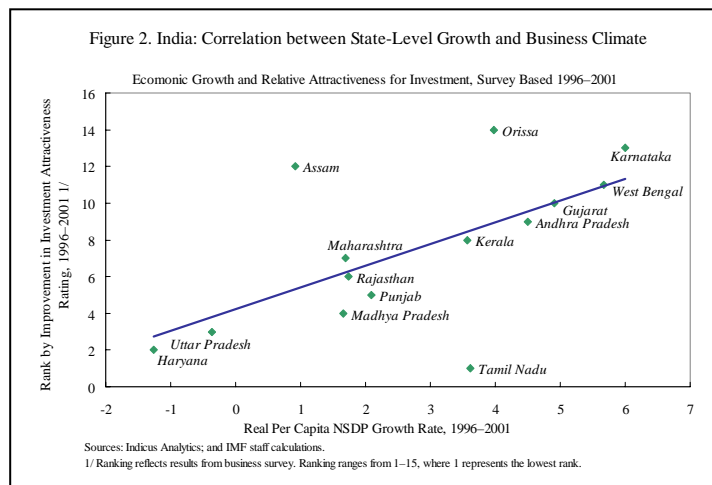
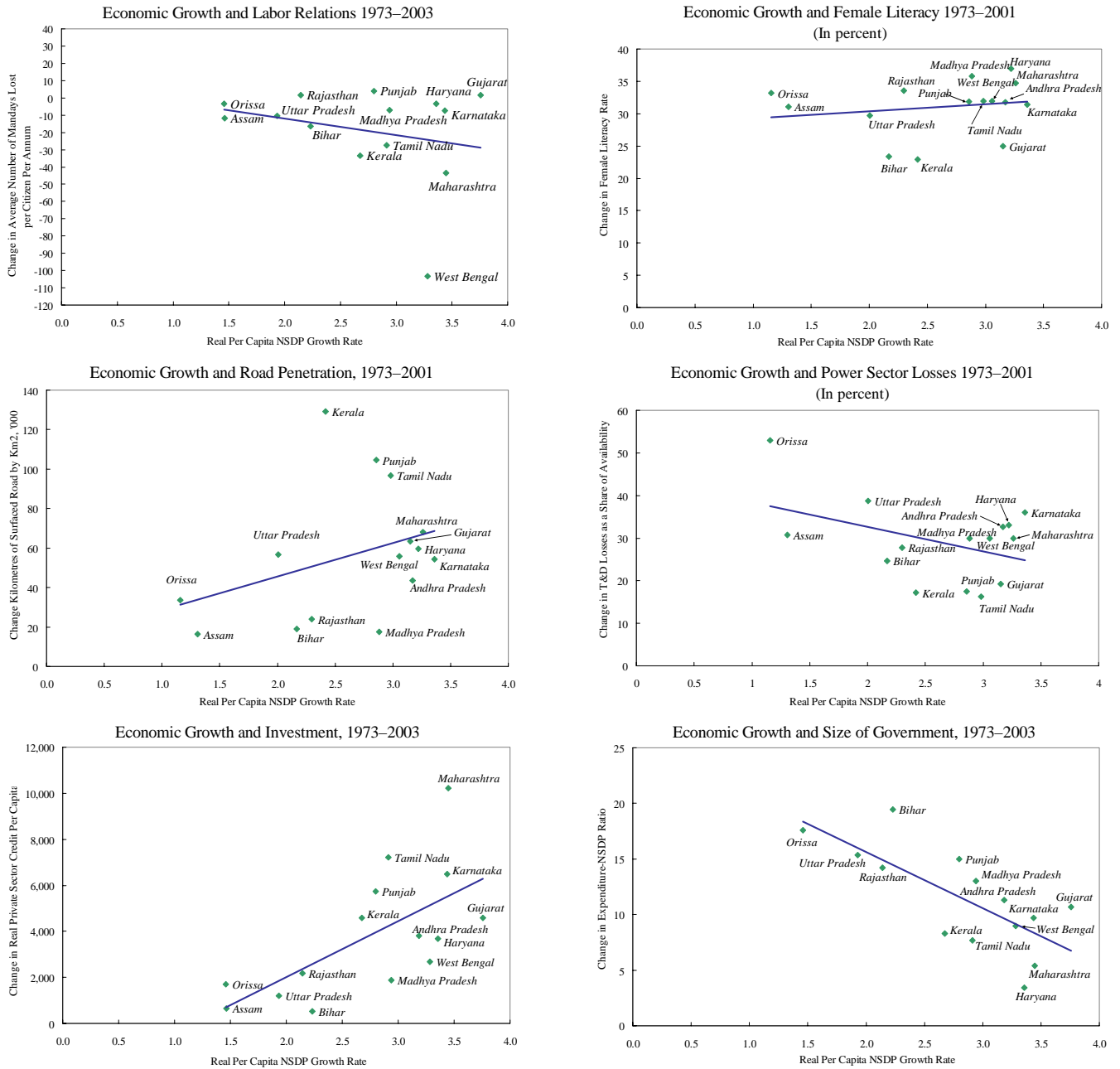


Figure 3. India: State-Level Economic Growth and Changing Business Climate Indicators



Sources: Besley and Burgess (2000, 2004); Reserve Bank of India; Ministry of Power; Department of Road Transport and Highways; NSSS; and IMF staff calculations.



### *Policy variables*

- **Private investment/financial intermediation:** Absent national account data on capital stocks and investment by state, the real stock of private sector credit per capita is used as a proxy for capital investment. This variable also reflects the depth of financial intermediation. Levine, Loayza and Beck (2000) find robust evidence that financial development can foster faster long-run growth by ameliorating information and transaction costs. Thus states with greater levels of investment and/or more developed financial systems should experience a more rapid pace of growth.
- **Level and quality of human capital:** Following Barro and Sala-i-Martin (1999), the stock of human capital is proxied using female literacy rates.<sup>12</sup> Using female rather than overall literacy can also serve as a crude proxy for the quality of education in a state, with states that place greater emphasis on female literacy being viewed as more progressive. Moreover, there are also numerous channels through which female education can impact the rate of economic growth. Empirical studies show that the education of mothers improves the education, nutrition, and health of their children. Education of women can improve the education prospects and standards of the next generation. Thus this variable serves both as a control for differences in initial levels of human capital stock across states—convergence suggests that states with initially high levels of education would tend experience lower growth rates—and the impact of education on growth.
- **Size of government:** Cross-country studies of the determinants of economic growth generally find that countries with smaller governments have better growth performance (e.g., Easterly and Levine, 2002). Here the size of government is measured using the ratio of total state government expenditure to net state domestic product.
- **Industrial relations climate:** States facing fewer labor disputes are likely to attract greater investment and this can spur growth. The analysis uses the lagged number of worker-days lost to strikes and lockouts scaled by total organized sector employment to capture such effects.
- **Reform of labor regulations:** State-level legislation that offers greater protection for workers and curtails the flexibility of employers to hire, fire, and organize their work practices may reduce productivity and deter investment. Besley and Burgess (2004) construct a measure that summarizes how the industrial relations regulation in Indian states changed between 1947 and 1992, and this measure is extended here to include amendments implemented post-1992 reported in Malik (2003). State-level amendments to the 1947 Industrial Dispute Act are coded so that pro-worker amendments receive a score of one, pro-employer amendments score negative one,

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<sup>12</sup> Using overall literacy rates in lieu of female literacy rates did not alter the results.

and changes that are neutral score zero. The scores are then accumulated over time to give a continuous quantitative picture of how the labor relations environment evolved. The method classifies Andhra Pradesh, Karnataka, Kerala, Madhya Pradesh, Rajasthan, and Tamil Nadu as pro-employer states. Gujarat, Maharashtra, Orissa, and West Bengal are pro-worker states. India's six other large states did not implement any amendments to the Industrial Disputes Act over the period.

- **Infrastructure:** States with more extensive transport networks should be better able to facilitate economic activity and attract investors. The penetration of transport networks is measured as the number of kilometers of roads scaled by the area of the state. Likewise, states with better power networks, as measured by transmission and distributional (T&D) losses of state electricity boards should be more attractive investment locations. This variable has also been interpreted as a proxy of state reform credentials by Kochhar and others (2006), with improvements in this ratio reflecting the willingness of state governments to control losses of power from their networks due from theft and unwillingness to charge users.

In contrast to other studies, the use of time-series data on these variables will allow the analysis to assess whether changes in policies, as well differences in the policy environment across states, impacted cross-state growth rates. This may account for differences in the findings with other studies such as Ahluwalia (2002) and Kochhar and others (2006) who rely on time-invariant or static measures of state institutions sampled at fixed points in time.

The econometric analysis utilizes a generalized method of moments (GMM) dynamic panel estimate to assess the relationship between policy and economic growth. The panel consists of data for India's 15 largest states for 1973/74–2002/03 averaged over six non-overlapping five-year periods. The GMM estimator has the advantage that it allows past realizations of the dependent variable to affect its current level using lagged levels of the dependent and predetermined variables.<sup>13</sup> Time dummies are included to account for time-specific effects. Robust standard errors are reported.

The results of the analysis are summarized in Table 10. Specifications I and II examine the question of absolute convergence, namely whether poor states grow faster toward their steady state than richer states, absent policy controls. Specification II interacts initial income with a post-1991 dummy variable to assess if convergence or divergence accelerated post-1991. Specifications III-V examines the relationship between growth and state-level policies. Specification III includes all those variables for which data are available from 1973/74-2002/03, specification IV adds indicators of infrastructure which are available over a shorter time span, while specification V assess whether state-level policies mattered more for individual economic performance post-1991 by interacting the policy variables with the post-1991 dummy.

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<sup>13</sup> Ordinary least square (OLS) estimates are inconsistent in the presence of a lagged dependent variable and fixed effects.

Table 10. India: Determinants of State Real Per Capita Income

	Dependent Variable: Five-Year Average Real Per Capita NSDP, 1973/74–2002/03 1/				
	Absolute Convergence		State Policies and Economic Structure		
	Full Sample		Full Sample		Post-1990s
	I	II	III	IV	V
Constant	0.07 ** (0.029)	0.03 (-0.0424)	0.08 *** (.0131)	0.06 *** (0.0213)	1.18 * (0.6965)
Initial conditions					
In initial real per capita income	0.59 *** (0.218)	0.58 *** (0.208)	0.42 *** (0.160)	0.38 *** (0.082)	0.08 (0.088)
In initial real per capita income*post 1990s	...	0.02 ** (0.009)	...	...	...
In agriculture share of NSDP lagged	...	...	-0.18 (0.069)	-0.27 *** (0.069)	-0.39 * 0.216
In industry share of NSDP lagged	...	...	-0.12 * (-0.070)	-0.20 ** (0.082)	-0.36 *** (0.102)
Policy variables					
In investment	...	...	0.12 ** (0.053)	0.09 (0.072)	0.12 ** (0.062)
In female literacy rate	...	...	-0.09 (0.061)	0.03 (0.059)	-0.09 (0.104)
In size of government	...	...	-0.32 *** (0.072)	-0.25 *** (0.062)	-0.16 (0.140)
In days lost to dispute per worker, lagged	...	...	-0.02 * (0.012)	-0.03 *** (0.012)	0.06 *** (0.021)
Index of Labor Regulation, lagged	...	...	0.01 *** (0.002)	0.01 *** (0.003)	-0.01 *** (0.005)
Post-1990s Dummy	...	...	...	...	...
Controls for state infrastructure					
Roads per Km <sup>2</sup>	...	...	...	0.00 (0.058)	...
Transmission and distribution (TD) losses % of availability	...	...	...	-0.17 *** (0.064)	...
Convergence coefficient	0.01 ***	0.01 ***	0.02 ***	0.01 ***	0.16 *
Half-Life	49.0	112.5	44.8	61.6	4.4
Time controls	Yes	Yes	Yes	Yes	Yes
Serial correlation test (p value)	0.58	0.47	0.57	0.75	0.2847
Observations	60	60	60	60	60

Source: IMF staff estimates.

1/ Robust standard errors are reported in brackets. All variables, with the exception of variable for labor regulation are in logs. \*\*\* implies significance at the 1 percent level, \*\* at the 5 percent level, and \* at the 10 percent level.

- **Absolute convergence occurs very slowly.** The coefficient on lagged income in specifications I and II is significant and suggests that initially poor states grow faster than initially rich ones—so-called absolute convergence—absent controls for differences in policies and economic structure. However, the rate of convergence is about 1½ percent per annum which implies that it takes almost 50 years to close half the gap (also known as the half-life) between any state’s initial level of per capita income and its steady-state level of income. The coefficient on the interaction term for the post-1991 period suggests incomes continued to converge post-1991 but at a slower pace than observed over the full sample.
- **The differences observed in state incomes reflect wide gaps in their steady-state or long-run level of income.** Specifications III–V find evidence of conditional convergence. In other words, poor states grow faster than rich states once controls that proxy for differences in the policies and economic structure are held constant. But the convergence coefficient in Specification III changes only marginally relative to specifications for absolute convergence, and the pace of convergence is broadly in line with the findings from other international studies (Box 1).<sup>14</sup> This suggests that differences in individual states’ steady-state or long-run income potentials have been the main drivers of the disparities in growth performance observed in India since 1970. However, in Specification V, the speed of conditional convergence increases sharply and the half-life is reduced to about 4½ years. This suggests that differences in policies implemented by states in the 1990s have become important determinants of a state’s growth, reflecting perhaps the impact of greater openness to world trade as well as a move toward greater decentralization.

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<sup>14</sup> While the rate of convergence is close to that found by Cashin and Sahay (1996) for India in the 1960–1980s, it is far lower than that reported by Aiyar (2001) who found convergence occurred at a rate of about 20 percent per annum. The high convergence coefficient in the latter study is most likely the outcome of the fixed effects estimator where inclusion of lagged dependent variables can result in upward bias (see Shioji, 1997, who demonstrates that fixed effects estimates can be biased upward by between 7 percent and 15 percent, and Islam, 1995).

### **Box 1. International Evidence on Regional Convergence**

*The speed of conditional convergence in incomes across Indian states mirrors that found by studies of regions in other industrial and emerging market economies. The speed of convergence across regions in developing countries or in panel data sets generally appears to be faster than that commonly found in studies of regions of industrialized countries or across countries. For example, Barro and Sala-i-Martin (1991) and Sala-i-Martin (1996) find the speed of convergence across the regions of the United States, Europe, and Japan to be close to about 2 percent. Islam (1995) that finds speeds of convergence across 97 countries range from 4 percent to 10 percent depending on the method of estimation used. Canova and Marcet (1995) find that the speed of convergence across regions of Western Europe is as high as 20 percent. Caselli, Esquivel, and Lefort (1996) find a speed of convergence of about 13 percent per annum across 97 different countries. The remainder of this box examines some of the evidence on convergence from China, Korea, Latin America, and Spain.*

**China:** Jian, Sachs, and Warner (1996) find convergence in incomes across China's provinces post-1978. There was only weak evidence of convergence during the central planning period (1952–65), and during the Cultural Revolution (1965–1978) incomes across provinces diverged strongly. Convergence post-1978 was associated with rural reform, and was strong in coastal areas where trade and investment flows were liberalized. However their study only extended to 1993 and toward the end of their sample there was some tendency towards divergence. Using a GMM estimator, Weeks and Yao (2003) find China's provinces converged at a rate of only 0.4 percent per annum in the 1953–77 period but in the post-reform 1978–97 period convergence accelerated to 2.2 percent per annum.

**Korea:** Koo, Kim, and Kim (1998) finds that per capita income across Korea's 10 states converged between 1967 and 1992 at an annual rate of between 4 and 6 percent. However, in two five-year subperiods during 1972–82, income diverged because regions responded differently to the 1970s oil price shocks. However, industrial promotion policy promoted convergence during 1977–82. Migration was found to have little impact on regional convergence.

**Latin America:** In *Brazil*, Ferreira (1999) finds evidence of conditional convergence between 1939 and 1995. By 1995 the income of a number of poor states was very close to their steady-state values, suggesting that, looking forward, large income disparities would remain across states. In *Columbia*, Cárdenas and Pontón (1995) find a rate of convergence across Columbia's 22 departments between 1950 and 1990 of 4 percent per annum without controls for initial conditions, and 5¼ percent per annum if regional controls were included in the analysis. Labor migration did not play a large role in promoting convergence, except in the 1960s. Elias and Fuentes (1998) find evidence that rates of conditional convergence across regions were higher within *Chile* than in *Argentina* between 1960 and 1985. After controlling for differences in initial conditions, they find the rate of convergence in income per unit of labor of 2 percent.

**Spain:** de la Fuente (2002) finds evidence that the speed of convergence across Spanish regions varied over time and was not necessarily fastest during periods of high national growth. Income per capita converged at an average annual rate of about 2½ percent between 1965 and 1975, slowed to about 1 percent during the crises of 1975–85, and fell to 0.4 percent between 1985 and 1995, at a time when Spain was growing faster than most industrialized countries. The slowdown in the rate of convergence reflects lower employment generation and a fall in internal migration. Leonida and Montolio (2004) find that the convergence in incomes stalled in the 1980s but recommenced in the 1990s.

- **State-level policies have long-run growth effects.** Greater investment—as measured by the stock of real private credit per capita—leads to economic growth.<sup>15</sup> The quality of a state’s infrastructure also appears to be an important determinant of growth. On the other hand, the size of government adversely affects state-level growth. While Specification II does not find any significant relationship between growth and road penetration, rising transmission and distribution losses in the electricity sector adversely impacts a state’s growth performance. Specification V, which interacts the key policy variables with a post-1991 dummy, yields broadly similar results, although the increase in the magnitude of the coefficient on many of the policy variables suggests the policy environment of individual states became more important post-1991.
- **The impact of initial economic conditions can linger for long periods.** Specifications III-V find that states with a greater initial dependence on agriculture and or industry grew more slowly.
- **It is difficult to disentangle a clear impact of labor market policies on growth.** Specifications III and IV suggest the number of days lost to labor disputes in the preceding period had an adverse impact on growth. However, the result that states which enacted pro-worker legislation experienced a better growth performance is puzzling. This may be a product of the fact that legislative changes may be a poor proxy for actual labor market flexibility because some fast-growing states have chosen to loosely enforce or even exempt firms from such provisions. In fact, the results on labor market conditions are driven by one outlier, West Bengal, a state that has been far more active than others in enacting pro-worker amendments to the Industrial Disputes Act but which has exempted many key sectors from such provisions. Once West Bengal is excluded, the coefficients on the two labor market variables become insignificant in all specifications.
- **Female literacy is not found to have a significant exogenous impact on states’ growth performance.** In fact, the coefficient suggests a negative relationship with growth, a result that is shared with many other such studies in this field (see for example, Barro and Sala-i-Martin, 1999, and Kalaitzidakis and others, 2001).<sup>16</sup> Barro and Sala-i-Martin argue that female education is picking up standard conditional convergence effects whereby states with lower initial human capital grow faster given their greater distance to their steady state. Szulga (2005) on the other hand argues that

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<sup>15</sup> Since the GMM panel estimator controls for endogeneity, the findings suggest that the exogenous component of the relevant policy variable, take for example here, investment, exerts a positive impact on economic growth.

<sup>16</sup> Using overall literacy rates in place of female literacy rates did not alter the result. The findings are likely to have been influenced by the inclusion of Kerala which has a relatively high female literacy rate but performs less well in terms of economic growth rates.

the estimate of the impact of female education on growth is biased because many educated females do not enter the labor force. Even when aggregate literacy levels are used in place of female education, human capital is again found to have a negative, albeit insignificant, effect on growth a finding that is also confirmed by Islam (1995) in cross-country growth regressions.

In sum, the findings suggest that states can affect their relative growth performance by adopting better economic policies. A state can improve its long-run economic position by bringing about improvements in its investment, fiscal, and infrastructure policies. The results on the impact of state economic structure also suggest there could be a need in some poor-performing states to either diversify economic activity away from agriculture and industry or to adopt policies that make these sectors more productive.

#### **IV. CONCLUSION**

This paper examines how growth and economic performance have varied across India's largest states over the past 30 years. It documents five stylized facts about their performance: (i) the gap in real per capita incomes between rich and poor states has widened over time; (ii) rich and faster-growing states have generally been more effective in reducing poverty; (iii) poor and slower-growing states have had very little success in generating private sector jobs; (iv) labor and capital flows appear to do little to close the gap in incomes between poor and rich states; and (v) poor states experience the greatest volatility in economic growth.

The paper also examines the link between state-level policies and economic growth. The econometric analysis presents evidence that state-level policies are a key factor influencing the pattern of economic growth across Indian states. Greater private sector investment, smaller governments, and better state-level institutions (as proxied by T&D losses) are found to be positively associated with growth performance, but the impact of labor market policies is more difficult to discern. The historical structure of economic activity in a state also appears to matter for a state's subsequent growth performance. All this suggests that states can impact their relative growth performance and accelerate convergence through their policy choices.

### **Data Sources**

State-level income data is derived from the new Economic and Political Weekly States database and Central Statistics Office. The sample of 15 states account for 95 percent of India's population and about 80 percent of its domestic product. Using these data we construct an annual series on real net state per capita incomes and the share of agriculture, industry, and services by splicing the three base-year series on real net state domestic product to arrive at a series based in 1993/04 prices. In the absence of state-level aggregate investment or capital stock data, we utilize the stock of credit extended by scheduled commercial banks reported in the RBI Basic Statistical Tables from the banking system starting in 1973, translated into real terms using state-level NSDP deflators. Literacy rates are derived from various rounds of the National Sample Survey with intervening survey years constructed by linear extrapolation. Data on labor market regulation was provided by Tim Besley and are available at <http://sticerd.lse.ac.uk/eopp/research/indian.asp> and were updated using the Handbook of Industrial Law (Malik, 2002). Employment and labor disputes data was provided by the Ministry of Labor, as reported in the annual editions of the Indian Labor Yearbook. Electricity sector technical and distribution losses as a percent of availability were derived from the Annual Reports of State Electricity Boards available via the Ministry of Power and Planning Commission (see <http://planningcommission.nic.in/reports/genrep/reportsf.htm>). Data on state government spending were derived from the World Bank's States Fiscal Database and <http://sticerd.lse.ac.uk/eopp/research/indian.asp>, and the primary source for this data is the Reserve Bank of India's annual report on state finances.



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