



GROWTH IN INDIA'S STATES IN THE FIRST DECADE OF THE 21ST CENTURY: FOUR FACTS

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Introduction and Literature Review

Posting a growth of income per capita of 6.1% per annum during the first decade of this millennium (2001-09, hereafter the 90's. India seems to have put even more distance from its "Hindu" growth past - a reference to the anaemic growth seen from Independence in 1947 to the late 1970S. The growth rate of income per capita almost tripled from 1.5% during 1951-81 to 4.2% during 1981-2009.,² Within the latter period, growth accelerated from 2.8% in the 1980s to 4.2% in the 1990S and then surged to 6.1% in the 90's. India now has three decades of respectable growth performance behind it, a point that is often obscured by the near-universal tendency to equate India's growth turnaround with the policy turnaround that occurred in 1991.

Despite this performance and despite starting ahead of China in the late 1970s in terms of per capita GDP (measured in purchasing power parity terms), India's per capita GDP was still only half that of China in 2009. China's GDP per capita grew almost twice as fast as India's (8.2% versus 4%) between 1979 and 2009.

India's growth performance, especially across the states within the country, since the take-off in the late 1970s/early 1980s has been the subject of considerable research interest, including by Ahluwalia (2000), Besley and Burgess (2004), DeLong (2004), Williamson and Zaghera (2002), Rodrik and Subramanian (2005), Kochhar et al (2006), Aghion et al (2008), Amin and Mattoo (2008), Panagariya (2008), Ghani (2010), Kumar (2010), Aiyar and Mody (2011). Different authors emphasise different aspects of growth performance.

DeLong (2004) and Rodrik and Subramanian (2005) emphasise the fact that growth took off a decade before policy reforms were seriously initiated in 1991; Amin and Mattoo (2008) stress the role of human capital and institutions in explaining services sector performance. Besley and Burgess (2004) argue that differential labour market regulation was a driver of interstate growth performance. Aghion et al (2008) find that the effects of delicensing were unequal across states - industries in states with employer friendly labour regulations grew faster than those in states with pro-worker labour regulations. Kumar (2010) and Aiyar and Mody (2011) highlight the role of demographic change in explaining the differential performance of states while Kochhar et al (2006) draw attention to the initial conditions and diversification achieved in manufacturing in explaining interstate differentials. Ghani (2010) focuses on the dynamism of the service sector. Lahiri and Yi (2009) compare the economic performance of two states - Maharashtra and West Bengal- and provide evidence that suggests a worsening of business climate in West Bengal between 1960 and 1993.

But all these papers cover the period until 2000. This paper, to the best of our knowledge, represents the first attempt to compare growth performance across states during the most recent decade, the first of this millennium. We present below some key stylised facts about interstate growth performance and establish their robustness with supporting evidence. In particular we establish four facts which are then discussed in detail in Section 2.

- a) Growth in the main states, except three, increased in 2001-09 compared to 1993-2001.
- b) Despite the strong performance of the hitherto laggard states, we do not find any convergence across states. On the contrary, we find that divergence in the growth performance across states continues.
- c) States with the highest growth in the pre-crisis years, 2001-07, suffered the largest deceleration during the crisis years (2008 and 2009).
- d) For the period 2001-09 we do not find any positive effect of the so-called demographic dividend, namely, that the growth in the share of the working-age group in total population boosts growth of per capita income.

Growth in the 2000s: Stylised Facts

Using data on the 21 largest Indian states, we summarise growth patterns across the states during the period 1993-2009. During the period under study, three new states were carved out of three existing states in 2000. These are Jharkhand (out of Bihar), Chhattisgarh (out of Madhya Pradesh) and Uttarakhand (out of Uttar Pradesh). State-level domestic product data for the new states prior to 2000 is available only till 1993. The choice of the time period under study in this paper is therefore dictated by the availability of data. In those instances when we take the analysis further back than 1993, we use data for the old (and larger) states.

Stylised Fact 1: Growth Increased in Most States

Chart 1 plots the income per capita growth rate for the 21 largest states for two time periods - between 1993 and 2001 (on the horizontal axis, this period will hereafter also be referred to as the



Table 1: Net State Domestic Product Per Capita Growth Rates in State (%)

State	1993-2001	2001-09	1993-2009	2001-07	2007-09
				Pre-crisis	Crisis Years
Main states					
Andhra Pradesh	4.33	6.43	5.38	7.11	4.38
Assam	0.40	3.53	1.97	2.90	5.42
Bihar	1.41	5.86	3.64	5.01	8.43
Chhattisgarh	0.89	5.87	3.38	5.89	5.80
Delhi	3.47	7.35	5.41	7.29	7.53
Gujarat	3.36	8.19	5.77	8.65	6.81
Haryana	3.50	6.98	5.24	6.84	7.43
Himachal Pradesh	5.24	5.15	5.20	5.82	3.14
Jammu and Kashmir	1.55	3.50	2.52	3.29	4.12
Jharkhand	0.83	4.73	2.78	5.15	3.46
Karnataka	4.09	5.57	4.83	6.69	2.20
Kerala	4.05	7.54	5.80	7.57	7.48
Madhya Pradesh	2.13	3.37	2.75	2.61	5.63
Maharashtra	2.38	8.13	5.26	8.71	6.39
Orissa	2.05	6.58	4.32	6.98	5.39
Punjab	2.09	4.92	3.50	4.67	5.67
Rajasthan	4.34	3.75	4.04	3.80	3.60
Tamil Nadu	3.99	6.75	5.37	7.03	5.92
Uttar Pradesh	1.31	3.88	2.59	3.64	4.58
Uttarakhand	2.23	9.18	5.71	9.94	6.93
West Bengal	5.04	5.00	5.02	4.78	5.67
Average growth of main states	2.79	5.82	4.31	5.92	5.52
Other states					
A& N Islands	1.10	8.15	4.62	8.59	6.83
Arunachal Pradesh	2.46	5.34	3.90	3.79	10.00
Chandigarh	5.67	8.49	7.08	9.13	6.57
Goa	4.40	7.28	5.84	6.61	9.29
Meghalaya	4.22	3.01	3.61	2.97	3.13
Pondicherry	10.56	3.13	6.85	2.99	3.58
Sikkim	2.88	6.19	4.53	6.05	6.60
Tripura	6.81	5.85	6.33	5.47	6.98
Average growth of all states	3.34	5.85	4.59	5.86	5.83
Source: CSO and authors' calculations.					

"nineties") and during 2001 and 2009 (on the vertical axis), The chart shows that all the states, with the exception of Himachal Pradesh, Rajasthan, and West Bengal, lie above the 45 degree line, i e, their growth in the 2000s was substantially greater than in the 1990s. Indeed, average growth across the 21 states doubled from 2.8% in the 1990s to 5.8% in the 2000s. Table 1 shows the growth rate in the 21 states for the period 1993 to 2009 and the sub-periods. The largest improvements were posted by Uttarakhand (7.0 percentage points), Maharashtra (5.8 percentage points) and Chhattisgarh (5 percentage points) with Gujarat, Orissa and Bihar not far behind. The figure provides a clue both to the long-standing success of the Left Front in West Bengal and it's unseating in the 2011 elections: West Bengal was one of the strongest performers in the 1990s but was one of the few states whose growth remained unaffected in the 2000s while others surged.

Stylised Fact 2: Divergence across States Continues

A remarkable feature of the growth performance during the 2000s was the strong performance of the hitherto laggard states. Bihar, Chhattisgarh, Orissa and Uttarakhand recorded some of the highest improvements between 2001 and 2009.



Table 2: Unconditional Convergence Regressions for Main States (1993-2009)

	Dependent Variable Is Growth Rate of Income Per Capita during					
	2001-09	1993-2009	1993-2001	2001-09	1993-2009	1993-2001
	New States			Old States		
	(1)	(2)	(3)	(4)	(5)	(6)
Log of initial income per capita	1.69** (0.75)	1.47*** (0.47)	1.13** (0.47)	2.02*** (0.68)	1.60*** (0.46)	1.07 (0.71)
Constant	-10.94 (7.51)	-9.92** (4.60)	-8.13* (4.60)	-14.43* (6.88)	-11.18** (4.43)	-7.41 (6.99)
Observations	21	21	21	18	18	18
R-squared	0.18	0.20	0.09	0.29	0.23	0.08
States	Main	Main	Main	Main	Main	Main

Robust standard errors in parentheses.

*, **, *** denotes statistical significance at 10%, 5%, and 1% respectively.

Source: Authors' calculations.

Table 3: Convergence and Divergence (1971-2009)

	OLS			Difference GMM		SystemGMM	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Log of initial GDP per capita	2.910*** (0.634)	-0.669 (0.683)	-4.102* (2.161)	-8.613 (9.475)	-4.602 (6.243)	-0.773 (0.522)	-0.797 (0.591)
Log of initial GDP per capita* dummy for the 1980s		1.342 (1.182)	1.166 (1.092)	1.191 (0.880)	1.518 (1.086)	20400** (0.967)	2.099* (1.039)
Log of initial GDP per capita* Dummy for the 1990s		1.878* (1.055)	1.678 (1.313)	1.737 (1.047)	1.729 (1.037)	2.348** (0.870)	2.215** (0.995)
Log of initial GDP per capita* dummy for the 2000s		2.691** (1.028)	2.830** (1.097)	3.101* (1.506)	2.751*** (0.877)	1.931*** (0.598)	20491** (0.888)
State FE	No	No	Yes	Yes	Yes	Yes	Yes
Time FE	No	Yes	Yes	Yes	Yes	Yes	Yes
Observations	72	72	72	54	54	72	72
Number of groups				18	18	18	18
No of instruments				9	8	14	11
Lag length				All	Two	All	One
Collapsed instruments				No	No	No	No
Arellano-Bond test for AR(2) in first differences (p value)				0.76		0.17	0.11
Hansen test of joint validity of instruments (p value)				0.16	0.09	0.30	0040
Difference-in-Hansen tests							\
All-system GMM instruments (p value)						0.32	
Those based on lagged growth only (p value)						0.80	0.94
Total effect for the 2000s: Log of Initial GDP per capita+ (Log of Initial GDP per capita* Dummy for the 2000s)=0 (p value)		0.01	0046	0.51	0.75	0.02	0.02

Robust standard errors reported in parentheses.

*, **, *** denotes statistical significance at 10%, 5%, and 1%, respectively. Only the main states are used. New states are combined with the respective state they were created from for the period 2001-09, ie. the old definition of states is used.



Estimates shown in columns 1-3 are based on 21 states which include the newly formed states in 2000 as well. Since the new states were formed only in 2000, a relevant question is: how do the above results change if the definition of the old states were used for the Post-2000 period? In other words, the new states are considered together with their respective parent state." This leaves us with only 18 main states. We find that the initial income per capita is positive and statistically significant for 2001-09 (column 4) and 1993-2009 (column 5) but is positive and insignificant for the period 1993-2001. Appendix Table 1 shows the results for all the states. We find that broadly our results continue to hold.

Kochhar et al (2006) find that divergence accelerated in the 1990s. In this paper, we present evidence that the pattern of divergence continued to intensify in the 2000s. We have already shown that, using cross-sectional unconditional convergence regressions, the pattern of states growing far apart continued in the 2000s. Next we examine whether this pattern of divergence is a new phenomenon or holds over a longer period of time as well. To do so we construct a 10-year panel from 1971-2009 (the last time period is 2001-09) for 18 states (old states used because there is no data for new states prior to 1993). We then estimate unconditional convergence regressions using OLS and conditional convergence regressions using both OLS and GMM. Results from this estimation are shown in Table 3 (p 50).

In column 1, the average annual growth rate of income per capita has been regressed on the log of initial income per capita at the beginning of each period without any state or time fixed effects and find that the coefficient on the log of initial income per capita is positive and statistically significant showing unconditional divergence on average for the whole period of 1971-2009. In columns 2 and 3, we examine if there is any difference in the strength of divergence in each successive decade. To do so, the log of initial income per capita is interacted with the respective decadal dummy. In column 2 we have only time fixed effects and in column 3 we have both time and state fixed effects. The coefficient on the log of initial income per capita is negative - statistically insignificant in column 2 and significant in column 3. Coefficients on the interaction of the log of initial income per capita with the period dummies (columns 2 and 3) show that the interaction term has a higher coefficient in each successive period implying that the pattern of divergence has accelerated in each successive decade, showing that richer states continue to grow faster.

In columns 4 to 7, estimates are obtained using difference GMM and system GMM approaches." The significance of the coefficient on the log of income per capita varies with the estimation method used (Table 3 and Appendix Table 3, p 56). Once again what we are most interested in is the coefficient on the interaction of the log of income per capita for each successive period and how it evolves over time. Except column 6, the coefficient on the interaction of the log of initial income per capita with the decadal dummies is the highest for the most recent period (2001-09) showing that divergence gained further momentum in the 2000s.

Another way of looking at the divergence across states is to plot the distribution of per capita income over time. Chart 4A (p 51) shows the distribution at different times during 1971-2009. Chart 4B shows the distribution without Delhi. The plot confirms that per capita incomes have increased in all states, including the laggard ones. See for example, Bihar (BH) whose per capita income is trending up but is still at the bottom of the distribution. On the other hand states like Delhi (DL), Haryana (HY) and Maharashtra (MH) continue to be at the top of the income distribution. This conforms to the divergent nature of growth during 2000s. Punjab (PJ) which was among the top states in 1991 was overtaken by other states during 1991-2009.

Stylised Fact 3: Faster Growing and More Globalised States Took a Bigger Hit during the Crisis

Since the major policy turnaround in 1991, Indian economy has become increasingly integrated with the global markets through the trade and the finance channels. India's trade-to-GDP ratio, a measure of trade openness, increased from 20% in 1993 to 45% in 2007 (*World Development Indicators*). The ratio of foreign assets and liabilities to GDP, a measure of financial integration with the global economy, increased from 43% in 1993-94 to 85% in 2007-08 (Lane and Milesi-Ferretti 2007). The crisis of 2008-10 highlighted the vulnerability that is the flip side of the dynamism that globalisation has engendered: growth declined in, and capital fled from, India, as in most other countries, albeit to a lesser extent. But the question remained as to which states were more dependent on foreign markets and hence more susceptible to a downturn as conditions abroad faltered.

Average growth across the main states slowed down from 5.92% (Table 1) during the pre-crisis years (2001-07) to 5.52% during the crisis years (2008 and 2009). Average across all the states shows that growth during the pre-crisis and the crisis years were essentially the same. But the question remains if there was any differential in the growth performance across states during the crisis years and which states took a bigger hit.



Table 4: Demographic Dividend and Growth: By Decade

	Dependent Variable Is the Growth Rate of Income Per Capita during							
	2001-09		2001-09		1991-2001		1981-91	
	New States				Old States			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Log of initial share of working-age population	0.53 (13.33)	10.59 (6.93)	5.83 (10.19)	13.70** (4.94)	15.78*** (5.13)	13.77** (5.18)	-0.22 (5.73)	4.67 (4.75)
Growth in the share of the working-age population	-2.13 (1.81)	-1.22 (1.50)	-0.92 (1.44)	-0.18 (1.21)	2.85** (1.27)	2.38* (1.14)	0.40 (1.05)	0.29 (1.07)
Log of initial income	1.36 (1.50)		1.07 (1.31)		-0.81 (0.69)		1.19 (0.73)	
Constant	-5.54 (19.95)	12.61*** (2.84)	-0.80 (16.98)	13.44** (2.05)	18.99** (7.83)	10.16*** (3.00)	-8.85 (9.79)	5.30* (2.87)
Observations	21	21	17	17	17	17	17	17
R-squared	0.26	0.22	0.41	0.38	0.50	0.47	0.18	0.06
States	Main	Main	Main	Main	Main	Main	Main	Main

Robust standard errors in parentheses.

*, **, *** denotes statistical significance at 10%, 5%, and 1% respectively. For 1991-2001 and 1981-91, main states do not include Jammu and Kashmir.

Source: Authors' calculations

business services in total state output - as proxies for the openness of each state.? We then plot this share against the change in growth during the crisis. These plots are shown in Charts 7A (P 52) (where manufacturing share in output is the proxy for openness of a state) and 7B (P 52) (where the share of manufacturing and business services combined is the proxy for openness). They show a clear negative correlation. Karnataka, Maharashtra, Tamil Nadu and Gujarat are among the most open states and they also experienced the greatest growth declines. In contrast, Bihar; Janunu and Kashmir and Assam, which produce relatively few tradable goods were the most resilient during the crisis.

Of course, there are likely to be a multiplicity of factors at work which precludes drawing ay clear causal conclusions, but the simple correlations seem to be consistent with globalisation conferring dynamism and stoking growth but at the same time inducing vulnerability.

Stylised Fact 4: Demographic Dividend seems to be Disappearing

Bloom and Williamson (1998) argue that different age groups have different economic behaviour and that any discussion of the impact of population growth on economic growth should take into account the changing age structure. According to one estimate, demographic dividend accounted for one-third of the growth in East Asia during 1965-90 (Bloom et al 2000). Using provincial level data for 1989-2004, Wei and Hao (2010) show that changes in the demographic structure have helped fuel China's economic growth since 1989.

Demographics affect growth because different age groups exhibit different economic behaviour. A higher share of the working age population has a positive effect on growth through various channels - a higher labour supply on account of an increase in the population as well as behavioural changes such as increased female labour participation, higher savings as working- age groups tend to save more than the young and the old, and greater investment in education and health as number of children being raised decline and the lifetime over which the investment can be recouped becomes longer. Thus, a favourable change in the age structure, i e, an increase in the share of the working-age population, as captured by the growth in the share of the working-age population, has the potential to positively influence growth.

Table 5: Demographic Dividend and Growth: Panel Regressions with Decadal Interactions

OLS	Difference GMM			System GMM	
	(1)	(2)	(3)	(4)	(5)
Log of initial GDP per capita	-5.164*** (1.652)	-9.925 (9.594)	-7.941 (19.001)	-0.110 (1.480)	-0.005 (6.329)
Log of initial share of Working-age population	34.429** (13.015)	54.033 (31.912)	40.959** (6.021)	22.611 (16.551)	8.713 (0.828)
Growth in the share of	3.992	6.312	4.694	2.191	0.985



Working-age population	(2.647)	(4.333)	(2.720)	(1.908)	(1.263)
Growth in the share of working- Age pop* 1980s dummy	-2.801 (2.171)	-3.006 (3.571)	-3.346 (2.832)	-2.541 (2.513)	-1.233 (1.571)
Growth in the share of working- Age pop* 1990s dummy	-0.970 (2.967)	-1.939 (3.854)	-1.109 (3.393)	0.166 (4.280)	2.649 (3.021)
Growth in the share of working- Age pop* 2000s dummy	-5.676* (2.720)	-9.754 (7.427)	-7.547* (3.786)	-0.590 (1.276)	-1.800* (0.880)
State FE	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	Yes
Observations	67	50	50	67	67
Number of groups		17	17	17	17
No of instruments		20	17	29	21
Lag length		All	Two	All	One
Collapsed instruments		No	No	No	No
Arellano-Bond test for AR (2)					
In first differences (p value)		0.79		0.08	0.03
Hansen test of overriding Restrictions (p value)		0.28	0.21	0.98	0.96
Difference in Hansen tests All-System GMM Instruments (p value)				1.00	1.00
Those based on lagged Growth only (p value)				1.00	1.00
Total effect for 2000s: Growth In the share of working age pop + (Growth in the share of working age pop* Dummy for 2000s) = 0 (p value)	0.12	0.44	0.24	0.44	0.55

Robust standard errors reported in parentheses.

*,**,*** denotes statistical significance at 10%, 5% and 1% respectively. Only the main states are used. New states are combined with the respective state they were created from for the period 2001-09, i.e, the old definition of states is used.

Source: Authors' calculations.

Hope in India's future growth is founded on the demographic dividend: a rapidly expanding young population will save more and inject entrepreneurial vigour that will lift the country to a faster growth trajectory. The demographic dividend is routinely touted by analysts and forecasters as one basis for optimism for India's economic future. And corroborative evidence was provided in two recent papers by Kumar (2010) and Aiyar and Mody (2011). But the pattern of growth in the 2000S appears to muddy the waters.

The share of the working-age (defined as ages 15 to 59) population in the total population in India has been increasing since the late 1970S. This share is projected to increase from 58.6% in 2000 to 63.9% in 2035 before it starts trending down! India is, thus, undergoing changes in the age composition of the population that can help contribute to its growth. Kumar (2010) and Aiyar and Mody (2011), using state-level data for India till 2001, show that there is a positive and a statistically significant impact of growth in the share of the working-age in total population on growth. Aiyar and Modi (2011) estimate that the demographic dividend could add up to 2 percentage points to per capita GDP growth during the next two decades.

To test this, growth convergence regression augmented with the standard demographic variables (the initial share of the working-age population in total population and the growth in the share of the working-age population)." Growth in the share of the working-age population is not positively correlated with income growth after controlling for initial income per capita for the period 2001-09 (columns 1 and 3, Table 4,. The coefficient on the growth of the share of the workingage population is negative and statistically insignificant after 2001.

Table 6: Average Annual Growth Rate (%) of the Share of the Working-Age Population

State	1991-2001	2001-11
Andhra Pradesh	0.54	0.89
Assam	0.44	1.14



Bihar	-0.08	1.37
Delhi	0.31	1.03
Gujarat	0.42	0.69
Haryana	0.64	1.24
Himachal Pradesh	0.64	0.81
Karnataka	0.62	0.80
Kerala	0.33	0.24
Madhya Pradesh	0.12	0.99
Maharashtra	0.32	0.86
Orissa	0.29	0.97
Punjab	0.39	0.92
Rajasthan	0.07	1.22
Tamil Nadu	0.40	0.31
Uttar Pradesh	-0.08	1.09
West Bengal	0.43	1.06

Data for share of the working-age population for 1991 and 2001 is from respective censuses. For 2011 projections of age-specific distributions based on the 2001 Census are used. The age-specific distribution from the latest 2011 Census was not available at the time of the writing of this paper.

Source: Census of India and authors' calculations.

This could be due to the fact that there are significant differences before and after 2001 in the states which see a favourable demographic structure (Table 6). Post-2001, based on the population projections from the 2001 Census, Kumar (2010) shows that the growth in the working-age population is likely to have been concentrated in four states, the so-called BIMARU states. Close to 49% of the increase in India's working-age population during 2001-11 was likely to have been contributed by these four states. Growth in the share of the working-age population in the four states was amongst the highest. Now, while the BIMARU states, especially Bihar, did perform better in the 2000s than in the 1990s, they still lagged behind the other states. That might explain why we find here that the growth in the share of the working-age population is not positively correlated with economic growth in the 2000s. At least so far, these states have not been able to utilise fully the young population to their advantage. But this might change in the future.

In any event, it seems premature to tout the benefits of the demographic dividend.

Conclusions

India's growth has been distinctive in many ways, what one of us has dubbed the "Precocious India" phenomenon (Subramanian 2007). It has relied on services rather than on manufacturing as an engine of growth; growth has been skill-intensive rather than intensive in the use of India's abundant factor; India despite being poor is exporting skills and technology in the form of FDI and that too to countries much richer than itself.

The analysis of growth in the 2000s throws up one more quirk, relating to Kerala. The conventional wisdom is of a state that is Scandinavian in its social achievements but sclerotic in its growth performance because of investment-chilling labour laws and strong trade unions, and reflected in a labour force that has voted with its feet by emigrating to west Asia. Well, the data suggest that the conventional wisdom is dead wrong. Kerala posted amongst the highest rates of growth in the 1990s (4% per capita), continued its stellar performance in the go-go 2000s (7.5%), and exhibited great resilience during the crisis, experiencing virtually no decline in growth.

India, evidently, is capacious enough to allow both, reforming Gujarat and, reform-resistant Kerala to flourish. Or, to put it more honestly, the Indian growth miracle, including the experience of the 2000s, continues to confound.

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