

# Convergence among Indian States: a planning perspective

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## Abstract

*Convergence, or the lack of it, among Indian states is a well-discussed topic, notably by Ahluwalia (2000), Besley and Burgess (2004), Rodrik and Subramanian (2005), Aiyar and Mody (2011) and Kumar and Subramanian (2011). This paper seeks to contribute to the literature by exploring the role of the central planning process. Even though the significance of central assistance has declined since the 1990s, it is still critical at close to 30% of all investment. The paper establishes that growth in income levels is dependent strongly on the per-capita expenditure from central plans. It also concludes that allocated outlays are higher for the richer states. This explains why convergence among Indian states is not seen.*

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## 1. INTRODUCTION AND LITERATURE REVIEW

The Convergence Theorem postulated by Barro (1991) says that as economic growth in a country accelerates, the initial benefits will go mostly to the well-developed and richer regions. However, as the law of diminishing returns sets in, there will be a capital flight from the richer to the poorer regions; and hence, in the longer term, we should see convergence in the income levels of different regions.

Bhattacharya and Sakhivel (2004) present several numbers to highlight the point that divergence has increased in the post-reform period. For example, the variance in the growth rate of state GDPs increased from 0.14 in the 1980s to 0.29 in the 1990s. This is in keeping with Barro's theorem. However, the question still remains - at what point would we expect to see convergence? Studies about the decade of the 2000s have just begun.

Kumar and Subramanian (2011) present one of the first papers studying convergence among Indian states in the 2000s. They present four stylized facts – (1) Growth in all major states, except three, increased in 2001-09 compared to 1993-2001 (2) They find divergence in the growth performance across states (3) States with the highest growth in the pre-crisis years, 2001-07, suffered the largest deceleration during the crisis years (4) They do not find any positive effect of the demographic dividend. While the paper does not explicitly go into the causes behind the divergence, it makes an interesting point that states that performed best during the pre-crisis years were also states that were most open. Moreover, they point out that while divergence among Indian states has been seen since at least the 1970s, the pace of divergence has intensified in recent years. The purpose of this paper is to study the role of the Central Planning process; however there might be a causal link between openness and planning that is worth exploring for further researchers.

## 2. STYLISED FACTS

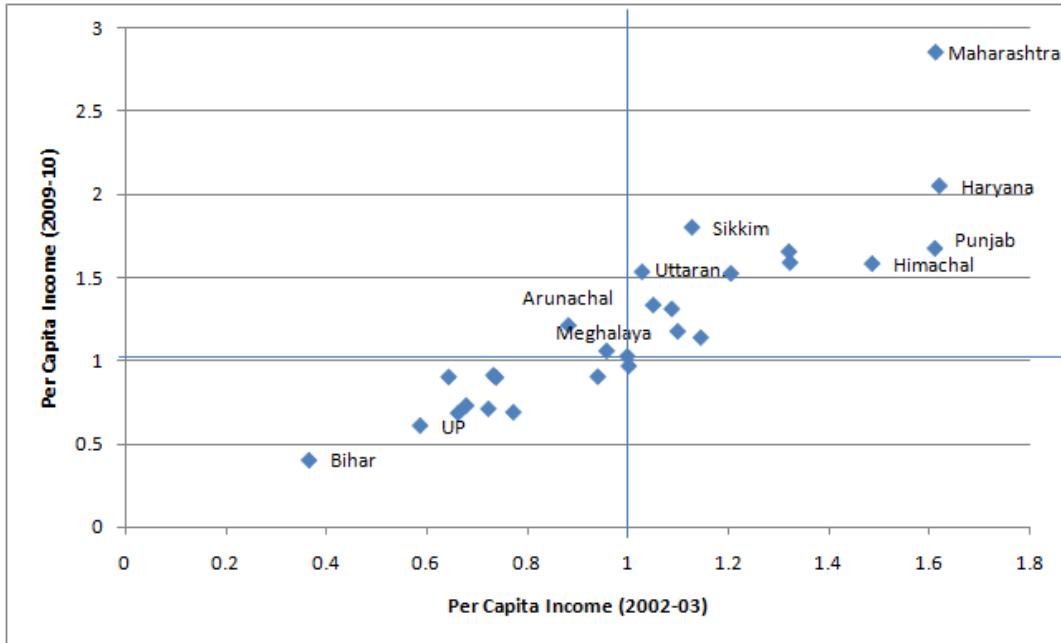
### a. No state, except two, has changed its income rank versus the median in the 2000s

To study the phenomenon of middle-income trap in countries, economists often employ a 2x2 scatter diagram to study the movement of countries between different income groups w.r.t a reference country, mostly the US. We conduct a similar exercise for Indian states but with certain modifications.

Firstly, we excluded Goa from this exercise because of its outlier status. Secondly, we use the median income level (the average of Tripura and Bengal) in the base period (2002-03) as the reference because in the Indian context, the largest state (Maharashtra) is also the fastest growing one and hence the score of all other states would have declined.

**Figure 1: Movement in Per Capita Income Levels**

(w.r.t. average of Tripura and Bengal income level)



The results are startling on many counts. Firstly, the second and fourth quadrants of the map are almost empty – which implies that no major reshuffle of income levels has taken place. Secondly, the only two states to have changed their relative position are from the country’s North East – Arunachal Pradesh and Meghalaya. Thirdly, if we were to draw a 45-degree line to differentiate between the performers and the laggards, Punjab would lie below the line. Fourthly, Bihar and UP continue to be laggards despite claims of high growth under new regimes in both states.

Surprisingly, Gujarat’s growth, at rank 10, is not as high as one would expect it to be. In the results of our regression, we will have more to talk about it.

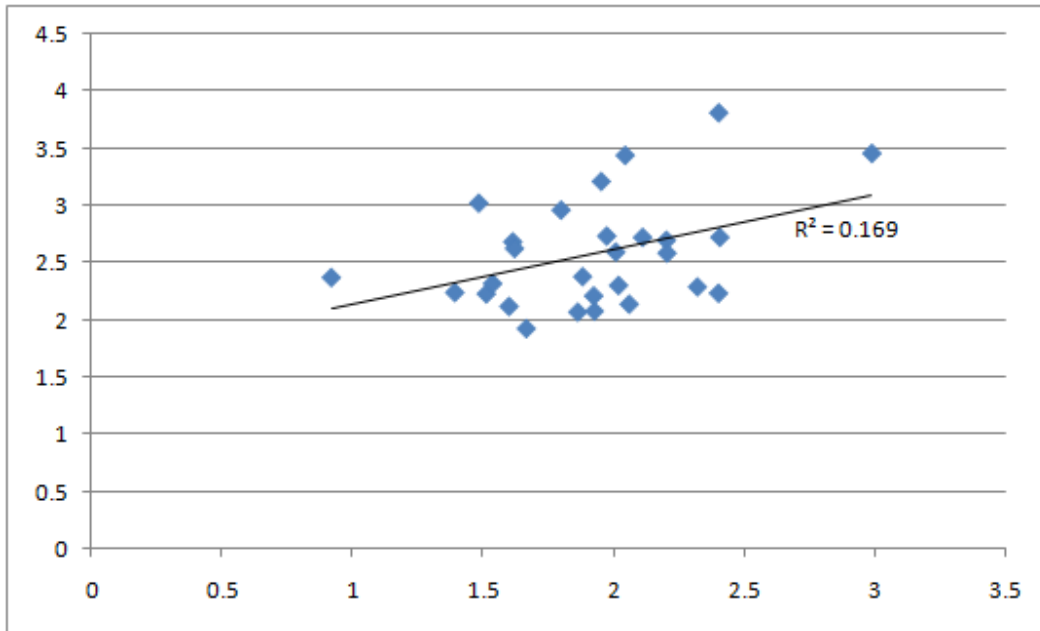
b. Unconditional convergence has not taken place in the 2000s

If unconditional convergence was to take place, then states with a low per capita income level in the base year (2002-03) would have shown a higher growth rate over the next 7 years that this paper covers. To test whether this has taken place, we plot the ratio of  $PCI_t/PCI_0$  against the log of the base per capita income level.

To our surprise, we find that the trend line is upward-sloping, i.e. states that had higher per-capita income level in the base year have also tended to grow faster. This confirms our hypothesis that in the last decade, growth rates of Indian states have not converged.

**Figure 2: Growth v/s Base Per-Capita Income Level**

(note: we have subtracted 8 from the x-axis for the sake of illustration)



From this cursory glance and from the literature on this subject, it is evident that convergence among Indian states is not taking place. We now explore the role of the planning process in this.

### 3. THE MODEL

The objective in this section is to study how actual expenditure from the central plans has affected per capita level of income. We also need to control for factors that might ensure better outcomes with the same level of plan expenditure, such as health, education and inequality.

As a proxy for health indicators, we use the infant mortality rate (IMR), which unlike birth rate or death rate, is unaffected by the age-wise distribution of the population. As a proxy for educational attainments, we use the literacy rate (LR). As a proxy for inequality, we use the average of the rural and urban Gini coefficients (GC). Values for all these indicators have been obtained from the Planning Commission website.

For the plan expenditure, there are two sets of numbers available on the Planning Commission website - the Approved Outlay (AO) and the Actual Expenditure (AE). We will use the actual expenditure in our model because of its more direct causal link with income outcomes. The per-capita AE (in '000) is thus used in the model.

Between any two time periods  $0$  and  $t$ , we can construct a model such as follows:

$$\frac{PCI_t}{PCI_0} = \alpha + \beta_1.AE + \beta_2.IMR + \beta_3.LR + \beta_4.GC + \varepsilon$$

Such a simplistic model should be enough of an indicator because our objective is not to study the effects of social indicators, but merely to control for them in an effort to study the outcome of the Actual Expenditure (AE) of central plans.

#### 4. RESULTS

The model is run for the 28 states of India (including Goa). The results for the regression are summarized in Table 1 below.

**Table 1: Decomposition of Per Capita Income Growth**

$R^2$ : 0.49 | Significance: 0.002

	<i>Coefficients</i>	<i>t Stat</i>	<i>P-value</i>
<b>Intercept</b>	0.64	0.76	0.45
<b>Plan Ex.</b>	0.02	3.61	0
<b>IMR</b>	0	-0.16	0.88
<b>LR</b>	0	-0.26	0.8
<b>GC</b>	6.73	3.82	0

Not surprisingly, the coefficient  $\beta_1$  has a p-value of 0.001, thus implying that the growth in per-capita level of income is strongly dependent on the per-capita plan expenditure. The two most important social-sector indicators, infant mortality rate and literacy rate, both have slightly negative coefficients, but both of them have extremely high p-values, and hence the counter-intuitive sign of the IMR can be ignored.

The surprising result is that the Gini coefficient has a strong effect on the growth in per capita income level. A higher Gini coefficient (which implies higher inequality) is correlated to higher growth in per capita income.

Returning to the case of Gujarat, the state ranks 14<sup>th</sup> on the Gini coefficient and 13<sup>th</sup> on the per-capita actual expenditure (AE) from central plans. This might explain the state's less-than-stellar growth story.

#### 5. WHAT DETERMINES APPROVED OUTLAY?

Given the strong causation between actual expenditure (AE) from central plans and the growth in per-capita income level, one would expect that the most obvious way of reducing regional inequality in India would be to allocate a higher planned outlay to poorer states.

However, a frequent accusation by opposition parties is that the Centre favors those states that have a Government from the same party. Hence, this might be one of the factors that determines the per-capita approved outlay (AO).

To test these hypotheses, we construct a model with approved outlay in year  $t$  as a function of per capita income in year  $t-1$  and a dummy for whether the state and central Governments are from the same party in year  $t-1$ . Hence, the model looks as follows:

$$AO_t = \alpha + \beta_1.PCI_{t-1} + \beta_2.D_1 + \varepsilon$$

$D_1 = 1$  if state and central Govts from same party/alliance; 0 otherwise

We run the regression for each year between 2002-03 and 2009-10. The values for the variables are obtained from the Planning Commission website. The results are as follows:

**Table 2: Determinants of Approved Outlay**

$R^2: 0.21$  | Significance: 0.0

	<b>Coefficients</b>	<b>t Stat</b>	<b>P-value</b>
<b>Intercept</b>	932.84	2.74	0.01
<b>PCI</b>	0.05	7.05	0
<b>D</b>	226.21	0.65	0.52

The results are quite surprising. States with higher income levels are also given a higher per-capita allocated outlay (AO). The party affiliation of the state government does not seem to matter, given the low p-value.

What could explain this lacuna in our planning process? One possible explanation could be that states with higher income levels are those that employ their resources more productively; hence, in an attempt to maximize growth *given* limited resources, the central planners would want to invest resources in the most productive way, i.e. in the richer state. This would imply that growth, rather than equity, is the explicit or implicit goal of our policy-makers.

## 6. CONCLUSIONS

We have established that states with higher income levels are also allocated more resources through the central plans. We also previously established that a higher per-capital actual expenditure also results in higher growth. Hence, given these two causal links, it is obvious that states with a higher per-capita income level would also have higher growth. Hence, convergence among Indian states will not be seen unless the methodology of allocation of central funds changes.

## 7. REFERENCES

- *B.B. Bhattacharya, S Sakthivel (2004) –Regional Growth and Disparity in India*
- *Utsav Kumar, Arvind Subramanian (2011) -India's Growth in the 2000s: Four Facts*

**APPENDIX : DATA SET**

State	PCI Growth	Plan Ex. P.C	IMR	LR	GC
Andhra Pradesh	2.74	18525.83	49.00	60.47	0.30
Arunachal Pradesh	2.96	67054.12	32.00	54.34	0.23
Assam	1.93	7111.45	61.00	63.25	0.24
Bihar	2.38	6157.27	52.00	47.00	0.25
Jharkhand	2.23	11566.29	44.00	53.56	0.26
Goa	3.46	60818.20	11.00	82.01	0.30
Gujarat	2.70	19083.34	48.00	69.14	0.27
Haryana	2.73	15249.15	51.00	67.91	0.31
Himachal Pradesh	2.30	24251.93	45.00	76.48	0.26
J&K	2.07	25350.76	45.00	55.52	0.22
Karnataka	2.60	21893.38	41.00	66.64	0.30
Kerala	2.59	11826.40	12.00	90.86	0.32
Madhya Pradesh	2.32	11091.71	67.00	63.74	0.29
Chattisgarh	2.69	17347.45	25.00	64.66	0.30
Maharashtra	3.81	15503.65	31.00	76.88	0.31
Manipur	2.13	29304.67	16.00	70.53	0.14
Meghalaya	2.38	25501.52	59.00	62.56	0.19
Mizoram	2.14	56343.36	36.00	88.80	0.19
Nagaland	2.31	30347.01	26.00	66.59	0.19
Orissa	3.02	8981.25	65.00	63.08	0.29
Punjab	2.24	12194.95	38.00	69.65	0.29
Rajasthan	2.63	13027.08	59.00	60.41	0.25
Sikkim	3.44	84465.12	35.00	68.81	0.23
Tamil Nadu	2.73	13502.40	28.00	73.45	0.30
Tripura	2.08	22132.16	31.00	73.19	0.25
Uttar Pradesh	2.25	8245.80	63.00	56.27	0.29
Uttaranchal	3.21	24097.17	41.00	71.62	0.26
West Bengal	2.22	6257.76	33.00	68.64	0.30

PCI Growth = (PCI in 2009-10) / (PCI in 2002-03)

Plan Ex. P.C = Average Actual Expenditure (AE) from Central Plan from 2002-03 to 2009-10

IMR = Infant Mortality Rate (2009)

LR = Literacy Rate (2001)

GC = Average of Urban and Rural Gini Coefficient (2004-05)