

## CHARACTERISTICS OF INTER-REGIONAL INCOME DISPARITIES IN INDIA - 2001 TO 2011

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### **Abstract**

*There are concerns that regional inequality in India has increased after the economic reforms of 1991. These concerns are supported by various statistical analyses. We are examining trends in regional disparities in India over a period of 11 years (2001 to 2011). There are wide and increasing variations in economic performances of states over time. The analysis is based on all the state economies in India. Results of the analysis suggest convergent trend in regional incomes, conditional upon growth rates of inputs and rate of technological progress. The objective of the study is to make a comparison of growth across states based on key results that are gross domestic product of the states. The logical reason that assess is whether there has been inter-regional convergence in income growth and whether income differentials have narrowed over specified periods.*

**Key words:** *income, states, disparity, inequality.*

### **Introduction**

India displays a high degree of complex regional heterogeneity in the levels of social and economic development. With the adoption of planning and a strategy of state-led industrialization it was envisaged to have balanced growth in the country so as to minimize the inter-state disparities. A study on regional income disparities in India is perhaps very timely now. In the backdrop of over four decades of planned economic development the study may help us to find how successful was planning - as a development strategy - to reduce regional income disparities. Secondly, likewise China, India too has extensive geographical disparities in the sectoral distribution of economic activity, living standards, resource base and other determinants of income levels and income growth. In fact, India can draw lessons from the Chinese experience since the process of economic reforms has come a long way in the latter and has only recently begun in the former. Besides the gap in per capita income between the richest state in India (Punjab) and the poorest (Bihar) in the 1980s was 3 to 1

Although poverty and income inequality are usually mentioned in the same statement, they are very different concepts. While it is unanimously agreed that poverty is bad and it is less clear that income inequalities are undesirable. After all increases in inequality can arise from the worsening of the poor (a situation that is clearly bad) or the improvement of the rich (a situation that is clearly not bad). It can be argued that excessive income equality is not good for the economy as it tends to kill the incentives to invest in both physical and human capital. In this sense income inequalities are seen as the rate of return to investment. On the other hand it can also be argued that excessive

inequalities create social tensions and political instability. In this case inequalities are seen by the poor as the rate of return to social and economic disruption.

Regional disparities in the level of economic growth experienced in India is a major challenge for policy makers and planners as it produces serious threat to the socio-political harmony of the country. States have experienced different pace of economic growth with some states showing fast progress and others languishing behind although the national growth has been remarkable for the past two decades (Dholakia, 1985; Sachs et al., 2001). Important policy questions that emerge out are - will the national growth lead to further widening disparities with rich states getting richer and poor states languishing behind even more.

Regional equality has been a significant objective of the national plans. Regional backwardness is a main criterion while determining the funds devolution to state governments by the Finance Commission and the Planning Commission. If it is established that national growth will lead to convergence in regional incomes then growth in richer states will trickle down to poorer states in due course of time. In that case, emphasis should be on economic growth rather than regional backwardness while distributing resources to the state governments. However, if the alternate hypothesis of divergence in regional incomes has stronger ground then some growth may have to be sacrificed in order to achieve balanced regional growth. The present study re-examines the issue of convergence/divergence in regional incomes for the period of 2001-2011. Among the 28 states three were formed in the year 2000 namely, Uttaranchal, Jharkhand and Chhattisgarh carved out of the states of Uttar Pradesh, Bihar and Madhya Pradesh respectively, that is why the study period started from 2001.

India embarked upon the structural adjustment program in 1991-92 and adopted the policies of liberalization, privatization and globalization. The pre-reform saw some deregulation and decontrol in the economy. During this period industrial expansion was heavily state controlled with the objective of helping the lagging regions. National GDP growth rate for this period on an average was around 5.3 per cent and the per capita income growth rate was around 3.2 per cent. During the post-reform period the growth rate of Indian economy has risen to 5.9 per cent and per capita has grown at around 4.1 per cent because of a declining population growth rate (Dholakia, 2009). So this study looks at the regional growth disparities across the two sub periods from 2001 to 2011.

### **Data and Analysis**

It can be argued that there are significant differences between regional products and regional income. The former measures the efficiency in converting inputs into output, whereas the later is a more appropriate measure of economic well-being of the residents of a state. However, availability of reliable data only on state domestic product limits us to analyze this variable as a proxy for income. We have used state domestic product data provided by Central Statistical Organization (CSO) for the purpose of the analysis. At

present India is a federation of 29 states and six union territories. For the purpose of the analysis we consider only the states. We have included all the states in the analysis to show that these states differ significantly in terms of per capita income and growth.

### Trends in Regional Disparities

Table 1 presents the basic economic data of the all the states for the years 2001 and 2011.

**Table 1 Indian states: Population and per capita GSDP (at Current Prices) 2001- 2011**

No	State	Population 2001 (Millions)	Population 2011 (millions)	GSDP 2001 (Rs. Crores)	GSDP 2011 (Rs. Crores)
1	Jammu and Kashmir	10069917	12548926	16700	58073
2	Himachal Pradesh	6077248	6856509	15661	57452
3	Punjab	24289296	27704236	74677	226204
4	Uttarakhand	8479562	10116752	14501	83969
5	Haryana	21082989	25353081	58183	260621
6	Rajasthan	56473122	68621012	82435	338348
7	Uttar Pradesh	166052859	199581477	181512	600164
8	Bihar	82878796	103804637	57242	204289
9	Sikkim	540493	607688	1014	7412
10	Arunachal Pradesh	1091117	1382611	1787	9013
11	Nagaland	1988636	1980602	3399	11759
12	Manipur	2388634	2721756	3112	9137
13	Mizoram	891058	1091014	1737	6388
14	Tripura	3191168	3671032	5499	17868
15	Meghalaya	2306069	2964007	3961	14583
16	Assam	26638407	31169272	36814	112688
17	West Bengal	80221171	91347736	143725	460959
18	Jharkhand	26909428	32966238	32093	127281
19	Orissa	36706920	41947358	43351	197530
20	Chhattisgarh	20795956	25540196	25846	119420
21	Madhya Pradesh	60385118	72597565	79203	263396
22	Gujarat	50596992	60383628	111139	521519
23	Maharashtra	96752247	112372972	252283	1035086
24	Andhra Pradesh	75727541	84665533	144723	583762
25	Karnataka	52733958	61130704	108362	410703
26	Goa	1343998	1457723	6757	33605
27	Kerala	31838619	33387677	72659	263773
28	Tamil Nadu	62110839	72138958	146796	584896
	<b>Total</b>	<b>1027015247</b>	<b>1210193422</b>	<b>1925017</b>	<b>724860</b>

Source: [www.planningcommission.gov.in/data/datatable/Data0910/tab%2019.pdf](http://www.planningcommission.gov.in/data/datatable/Data0910/tab%2019.pdf)

<http://planningcommission.nic.in/data-GSDP>

Table 1 presents the basic economic data of the 28 states for the years 2001 and 2011. The table reveals the wide differences in state-level economic conditions in India.

According to the 2001 data, there are huge disparities among the Indian states. Maharashtra has the highest per capita GSDP, whereas Sikkim has the lowest, about one third of Maharashtra's figure. In 2011, Andhra Pradesh became the state with highest per capita GSDP and Arunachal Pradesh was the state with the lowest. This shows that the disparity in per capita GSDP has risen during the period.

**Table 2 State wise Growth for the Eleventh Five Year Plan Period  
(Annual Average in Percentage)**

States	Growth Rate
Andhra Pradesh	9.5
Bihar	7.6
Chhattisgarh	8.6
Goa	12.1
Gujarat	11.2
Haryana	11.0
Jharkhand	9.8
Karnataka	11.2
Kerala	9.5
Madhya Pradesh	6.7
Maharashtra	9.1
Odisha	8.8
Punjab	5.9
Rajasthan	7.4
Tamil Nadu	8.5
Uttar Pradesh	6.1
West Bengal	9.7
Arunachal Pradesh	6.4
Assam	6.5
Himachal Pradesh	9.5
Jammu and Kashmir	6.4
Manipur	5.9
Meghalaya	7.3
Mizoram	7.1
Nagaland	9.3
Sikkim	6.7
Tripura	6.9
Uttaranchal	6.9

**Source:** GOI Planning Commission, Eleventh Five Year Plan 2007-2012, Volume -1, Inclusive Growth

Table 2 reveals the wide differences in state-level economic conditions in India. It shows that 10 states performed in higher level. Among these Goa scores the highest. Rest of them shows a growth rate of more than 5 per cent. Least growth rate was shown by

Manipur by 9 per cent. Leading states in the growth rate are Andhra Pradesh, Goa, Gujarat, Haryana, Jharkhand, Karnataka, Kerala, Maharashtra, Utter Pradesh, Himachal Pradesh and Nagaland. Among the special category states Himachal Pradesh scores the top (i.e., 9.5) and Manipur the least (i.e., 5.9). It is evident from the discussion above that regional disparities in income growth are prevalent in India. The next section presents a detailed statistical account of these disparities during the period 2001 to 2011

### Testing for Convergence

The existence of convergence/divergence is typically measured in two ways. The first is to run a regression of the growth of income per head on the initial level of per capita income (measured in logs) to test whether initially poor regions grow faster than initially rich regions first without conditioning variables and then with. This is testing for  $\beta$  convergence - unconditional and conditional. The second measure is to compute the standard deviation (SD) or coefficient of variation (CV) of the log of per capita income over time to see whether the dispersion rises or falls. This is the test for  $\sigma$  convergence. Unconditional  $\beta$  convergence is a necessary condition for  $\sigma$  convergence but not a sufficient condition because of random shocks. Neither is conditional  $\beta$  convergence a sufficient condition for  $\sigma$  convergence because the steady-state levels of regional per capita income may diverge through time through the dispersion of conditioning variables widening. In this paper we test for unconditional and conditional  $\beta$  convergence and sigma convergence across 28 States of India and 4 Union Territories over the period 1999/00 to 2010/11, using as conditioning variables: regional differences in population growth; male literacy rates (as a proxy for levels of education); the growth of outstanding credit to the private sector as a proxy for investment; the structure of regions measured by the share of agricultural output in State GDP and State expenditure as a proportion of State GDP.

There have been several previous studies of the convergence or otherwise of per capita incomes (measured by GSDP) across the regions of India, but most are now dated and none take as many regions as the study here. The studies differ in the number of regions taken; the time period covered, and the method of estimation but a broad consensus emerges. First there is no evidence of unconditional  $\beta$  convergence. The only study that reaches a different conclusion for the time period 1961-91 is Cashin and Sahay (1996) but on close inspection their statistics do not support the conclusion (Dasgupta et. al., 2000, and Ghosh, 2010 also mention this). There is unanimity that there has been an increase in  $\sigma$  divergence measured by the standard deviation or coefficient of variation of regional per capita incomes. Where there is disagreement over conditional  $\beta$  convergence and what the significant steady state (conditioning) variables are. Nagaraj et. al. (1998) use a dynamic panel with fixed effects and find differences in infrastructure, the structure of production and price shocks as significant variables in explaining differences in the growth of regional per capita income (GSDP). Differences in levels of education appear insignificant.

Trivedi (2002) also uses panel data with and without fixed effects using infant mortality, physical infrastructure and education as control variables. Without fixed effects infant mortality is significantly negative; infrastructure is significantly positive and education is insignificant. In the fixed effects model education becomes significant but infant mortality is only significant at the 90 per cent confidence level. Adabar (2004) uses a dynamic fixed effects panel using per capita investment, population growth and human capital as control variables. The author constructs his own measure of regional investment based on 'outstanding credit extended by all Scheduled Commercial Banks (SCBs) [plus] assistance given by all financial institutions [plus] government capital expenditure'. He also constructs his own index of human capital based on the literacy rate; age specific school enrolment rates; life expectancy and infant mortality. These three independent variables account for 93 per cent of regional growth rate differences. Nayyar (2008) also uses a dynamic panel using the literacy rate and public and private investment as control variables. He finds both important but with private investment tending to flow to the richer regions (as predicted by the theory of cumulative causation) and public investment also tending to favour richer regions because richer States raise more tax revenue. Ghosh (2010) takes a panel with fixed effects and shows inter-State variations in steady-state levels of GSDP per capita are due to variations in human capital, the structure of production and infrastructure, similar to the findings of Nagaraj et. al.(1998) and Trivedi (2002). The only study that does not find evidence of conditional convergence is Sachs et. al.(2002) because 82 per cent of cross-variation in regional growth is explained by the rate of urbanization.

There is a sizeable amount of literature relating to convergence across regions and countries. Williamson (1965) suggests that regional inequalities widen in the early development stages, while mature growth produces regional convergence. This is to say that the pattern of regional inequalities is in the form of an inverted 'U'. Also that regional inequality is much more extensive within the agricultural than within the industrial sector and that labor participation rates in part contribute to regional income per capita differentials. Economic convergence like economic growth has yet to have a universally acceptable model. In the Solow-Swan closed economy growth model, per capita incomes differ in various economies due to the capital-labor (K/L) ratio. With a given savings rate, a lower initial K/L is associated with a faster proportionate increase in K/L on the way to reaching the equilibrium point (Barro and Sala-i-Martin, 1995). Consequently there is a tendency for the poor countries to grow at faster rates than their rich counterparts. However if there is factor mobility between the rich and the poor countries capital will tend to flow from the rich to the poor, while labor will tend to migrate in the other direction. In this process there will be a tendency to equalize per capita income levels. Factor mobility is therefore the key to hasten the process of convergence. Factor mobility may include flows of technology - through licensing, foreign direct investment, joint ventures - as well as flow of labor and capital. Also there is the other possibility that if for example, capital flows from the richer to the poorer states, the labor migration in the

reverse direction may reduce since more jobs would be created in the poorer states than in the richer states. If capital is earning the same rate of return in both the rich and poor states then capital flow from the rich to the poor may not take place.

However since the incremental capital output ratio (ICOR) is higher in the richer states, this would imply a lower labor cost per unit of investment in the richer states than in the poorer states. In the process the richer states would be specializing in capital-intensive commodities while the poorer states in labor-intensive commodities. Besides the relative factor prices would tend to equalize among the states as such a growth pattern would check labor migration. Interestingly enough in the backdrop of such a growth process the poorer states are likely to gain significantly from the liberalization process currently underway in India. Richer states on the other hand, may have to bear most of the burden of adjustment. Romer (1986) suggests that convergence of income levels may not take place if technology exhibits increasing returns to scale. Countries or regions that begin with high level of K/L may tend to have the same income differentials over time with countries or regions with lower levels of K/L. Capital in these models is not merely physical capital but also human capital and the endogenous accumulation of technology.

Among OECD economies, Dowrick and Nguyen (1989) have found income levels to be converging and similarly for the European Community. Ben-David (1993) has found convergence of income levels. Besides, Jianetal (1995) emphatically argue that convergence of real per capita GDP among the Chinese provinces was distinctly seen in the period 1978-90. Of course, during the three Cultural Revolution periods, that is, 1965-78 there is a clear trend of divergence in income levels among the Chinese provinces. However it is significant to note that the period of convergence began with the launching of economic reforms in China. Sachs and Warner (1995) suggest that convergence is found in the subset of countries linked together by open trade policies. Segregating the different countries into open and closed economies they argue that while the open group demonstrates marked tendencies towards convergence the closed group does not. Empirical research on the subject of income convergence conclusively demonstrates that the probability of convergence is highest when national or regional economies are linked by open trade and factor mobility. In other words free movement of capital, labor and technology is vital for convergence to occur - it may be both inter-regional and international.

A number of studies have been done covering different time periods to examine whether per capita income levels have been converging or diverging. Nair (1971) analyzed the inter-state differences between 1950 and 1960 and found that there was no noticeable reduction in the income differentials. In other words the first decade of Indian planning does not seem to have witnessed any tendency towards convergence of income levels. Analyzing the nature of change in inter-state income differentials, Nair concludes that neither the changes in the degree of industrialization nor the labor productivity helped reduce income disparities. Similarly, Chaudhury (1974) in a paper studying state income

inequalities between 1950 and 1970 concluded that the degree of state income inequality had remained unchanged. Majumdar and Kapoor (1980) suggest that over the period 1962-76, there has been a steady increase in the interstate inequalities of income in India. Gupta (1973) studying the role of the public sector in reducing the regional income disparity in the Five Year Plans suggests that the public sector investment activities over the period 1950-1966 have contributed to reducing the spatial income disparity in the country. The public sector net investment constituted nearly 70 percent of the total net investment over the Fourth plan period. Hence, the public sector influence in reducing regional income disparities is obvious.

**Table 3: Convergence Studies for Indian States**

Study	Period	No. of states	Main Results
Cashin and Sahay (1996)	1961-91	20	Slow absolute and conditional convergence. Weak impact of internal migration.
Nagaraj, Varoudakis and Veganzones (1998)	1970-94	17	Absolute divergence, conditional convergence, share of agriculture, infrastructure, political and institutional factors matter
Rao, Shand and Kalirajan (RSK, 1999)	1965-95	14	Absolute, conditional divergence, faster in 90s. Private investment matters.
Aiyar (2001)	1971-96	19	Conditional convergence, infrastructure private investment and non measured institutional factors matter.
Ahluwalia (2002)	1981-99	14	Gini coefficient of per capita SDP (weighted by population) increased from late 1980s, through 1990s. Convergence not allowed for, but private investment matters for growth.
Singh and Srinivasan (2002)	1991-99	14	No clear evidence of conditional convergence or divergence. Financial /investment variables (credit, credit-deposit ratios, FDI) matter for growth.
Sachs, Bajpai and Ramiah (2002)	1980-98	14	Absolute divergence for all states (and for rich group but not poor group) for 1990-98: qualitative discussion of possible conditioning factors (social and geographical variables)

Table 3 summarizes a small subset of the numerous studies that have been undertaken. Rao, Shand and Kalirajan (1999) examined the State Domestic Products for 14 major states (excluding Goa and all the special category states) were diverging (using standard growth regression for conditional convergence), even when one controlled for differences



in initial conditions for the period of 1965-95. They emphasized the role of private investment flows in expanding this pattern of regional inequality. Ahluwalia (2002) similarly found private investment flows to be a significant factor in explaining cross-sectional variation in state's growth rates. While he did not examine divergence through regression analysis, his calculations of population weighted Gini coefficients for the 14 major states showed a substantial increase from 0.17 in 1991-92 to 0.233 in 1998-99.

Singh and Srinivasan (2002), looking at the period 1990-91 to 1998-99 found that the evidence does not permit one to reach very definite conclusions on convergence or divergence across the (14 major) states. As in other studies, they found that private investment (measured by per capita bank credit) matters for growth. They also found that credit -deposit ratios and FDI approvals per capita have positive impacts on growth. Finally, they observe that credit deposit ratios (a proxy for the internal movement of capital) have both become more varied across states, and more closely correlated with SDP per capita. These findings are suggestive of capital (foreign and domestic) increasingly moving to where it can be more effectively used, namely is higher income state. Increasing inequality across regions certainly a concern if it sharpens political tensions, especially in a diverge policy such as India's. On the other hand, the evidence for increasing inequality of per capita SDP across states may have limited consequences. In this paper we examine the tendency towards convergence of income levels among the states of India over a much longer time period.

We begin with two ways of examining the presence or absence of unconditional convergence. The first measure is the so-called a-convergence. We measure the standard deviation across regions of the logarithm of real State Domestic Product (SDP) per capita. We say that there is a-convergence if the standard deviation tends to decline over time. As a preliminary first step in analyzing whether there has been convergence or not in the first decade of the twenty-first century, we look at the average growth rate of the richest and poorest regions and calculated the ratio as shown in Table 4. It can be seen right from the start that the ratio exceeds unity even taking the ratio of the top half of the regions to the bottom half. The ratio of growth of the richest four to the poorest four is 1.61 and 1.21 for the top half of the distribution compared to the bottom half.

**Table 4: Ratio of Growth of the Richest to Poorest Regions 1999-00 to 2010 to 2011**

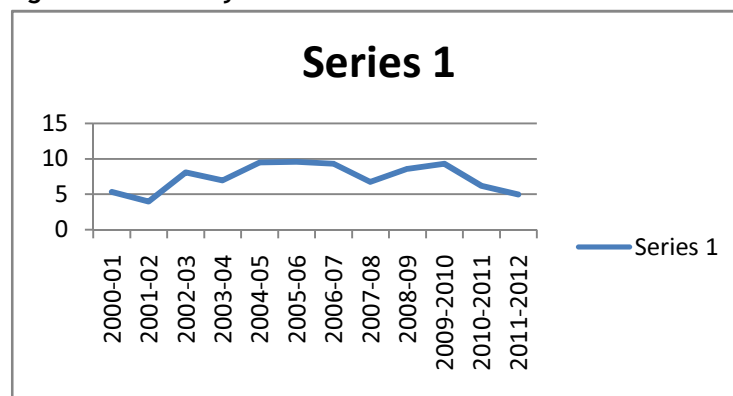
Indicators	Ratio
Top 4 richest to bottom 4	1.61
Top 6 richest to bottom 6	1.53
Top 8 richest to bottom 8	1.31
Top 10 richest to bottom 10	1.37
Top 12 richest to bottom 12	1.30
Top 14 richest to bottom 14	1.27
Top 16 (half) richest to bottom 16 (half)	1.21

This is prima facie evidence, although not conclusive that there has been unconditional divergence not convergence as other studies have found for previous decades. Whether this result is driven by the fast growth of the four richest regions mentioned above remains to be tested as does the question of whether unconditional divergence may coincide with conditional convergence. We now look at these questions using parametric tests

### The $\sigma$ Measure

This measure captures the trend in dispersion in the regional incomes overtime. We have used standard deviation as a measure of dispersion. We have plotted the cross sectional  $\sigma$  values, i.e. the standard deviation of per capita real GSDP (log values) over the years (Figure 1).

**Figure 1: Economy at a Glance: India 1999-2000 to 2011-12**



**Source:** by the author

It is evident from the plot that over all, the disparity has risen, and India has experienced divergence in regional incomes. A closer examination of the plot reveals that there are different distinct phases exhibited by standard deviation. In the first phase, from 2001-03, standard deviation has risen sharply revealing that growth in Indian economy has been highly unequal. During the second phase, from 2005-07 the overall increase in standard deviation is moves in almost same level but there are high spikes in the figures showing years with large disparities in growth. The third and the most recent phase exhibits steadily rising disparity.

### Conclusion

The Chinese experience has very clearly demonstrated that the convergence of income levels is strongly associated with an outward-oriented growth strategy. Rural reform along with reform of the trade and investment regimes in China has been critical to the process of convergence. A program of economic policy reform started in 1991 underway in India and if it were to go through completely we expect India to repeat what China has achieved if not surpass them. With the process of unleashing competition among the states

in India it may be reasonable to expect some states to surge ahead rapidly. This has also been true for China where the coastal provinces have had growth rates which are much higher than the provinces in the interior. Karnataka, Kerala, Tamil Nadu, and West Bengal may gain more from reforms in the initial stages rather than Uttar Pradesh, Madhya Pradesh and Bihar. Well to do states such as Punjab, Haryana, Delhi, Maharashtra and Gujarat are in any case going to be beneficiaries of economic liberalization in India. We have examined the trends in regional disparities in India over a period of 11 years. On the face of it data of Indian states shows divergence in regional state products. There are wide variations in economic performances of states and the differences have increased over time. However, a closer statistical analysis reveals that state domestic product has converged for the special category states during the period. Non-special category states have shown divergence in domestic products. A positive correlation of these effects with state domestic products accentuates the need of a detailed analysis of factors influencing them. From the conditioning variables we have used here, a necessary condition for regional convergence to take place would be less dependence on agriculture in the poorest states; a lower rate of population growth in poorer regions and a higher rate of investment in the slow growing regions. No doubt other factors are also important including more active regional policy by the central government but without a significant change in policy the process of cumulative causation as first outlined by Gunnar Myrdal is likely to continue to widen income disparities across the regions of India.

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