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Convergence of Per Capita Income in Indian States during 1980-2020

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Abstract

This study undertakes four decades of data for Indian states from the 1980s and traces the convergence of state-level per capita income, which has always been one of the most important economic phenomena for Indian states. A total span of four decades has been broken down into three sub-periods, viz., 1980-1992, 1993-2003, and 2003-2020 based on time and levels of income using panel unit root tests. The results show no discernible evidence of convergence across the states, especially after post-liberalization. The panel unit root tests suggest no evidence of convergence over the whole-time period of 1980-2020 when all the regions are taken together. The pre-liberalization period of 1980-1992 showed more evidence of convergence among the regions as compared to the post-liberalization period of 1992–2020 which does not exhibit any convergence. After dividing the post-liberalization period into sub periods of 1992-2003 and 2004-2020 some sign of convergence is found; however, the number of regions exhibiting any significant convergence is less in number than such regions in the pre-liberalization period (three states in 1992-2003 and five states in 2004-2020 vs six states in 1980-1992). However, taking into account control variables significant evidence for convergence of state-level per capita GDP was traced. This indicates that inequality across states could be reduced through active policy interventions through control variables for capital expenditure, development expenditure, and fiscal deficit.

Keywords: Economic growth; Per capita state domestic product; Growth convergence; Inequality

Introduction

Seventy-five years since independence, eradication of poverty and inequality have been the prime objective of every government. Yet, India remains the home of one-third of the world's poor. As India aims to join the global superpowers, shedding the tag of a developing country, there is a pressing need to evaluate how successful the country has been in this endeavour. India is a diverse country with significant regional variations in economic development. The per capita GDP of Indian regions has shown significant disparities over the years, with some regions consistently outperforming others. According to data from the World Bank, the per capita GDP of India in 2020 was $1,947. However, the per capita GDP of individual states and union territories varied widely. In 2020, Delhi had the highest per capita GDP of $7,172, while Bihar had the lowest per capita GDP of $528. Data from the Reserve Bank of India shows that there has been some convergence in per capita GDP across Indian states over the past few decades. Between 1980 and 2020, the gap between the highest and lowest per capita GDP states narrowed. In 1980, the ratio of the per capita GDP of the highest and lowest states was 9:1, while in 2020, it was 5.5:1. However, despite this convergence, significant disparities remain. In 2020, the per capita GDP of Delhi was more than 13 times higher than that of Bihar, the state with the lowest per capita GDP. Several factors contribute to the regional disparities in per capita GDP in India, including differences in natural resources, infrastructure, education levels, and economic policies. Efforts to reduce these disparities have included targeted government programs and policies to promote investment in underdeveloped regions and sectors, as well as efforts to improve education and infrastructure. Since independence, the performance of several regions has consistently been below the national average. Economic policies of the government since independence were aimed at pulling these regions and their people out of poverty. But the question of whether and how far these policies have been effective has remained a concern. The inter-region disparity in per

capita income has been an ever-present feature in the Indian economy. Although the regional disparity cannot be eliminated, policies should work toward narrowing down the inter-regional differentials in per capita state gross domestic product, leading to a reduction in the disparity. India is considered one of the fastest-growing economies in the world along with China, in recent times. Amid complex regional heterogeneity across 29 states and seven union territories of India, in terms of culture, language, social norms, and economic outlook, one common question is often asked-"are the regions all growing toward convergence in the backdrop of economic growth?"1 Several studies have evaluated the per capita income convergence of regions, but no clear consensus has been reached so far. More surprisingly the existing economic bilateralism in the subcontinent makes us extremely curious about the distribution dynamics of income across the Indian regions. Thus, there is a need to examine the idea of income convergence of the various income-divergent regions primarily for two reasons. First, more than seven decades of planned economic development have already taken place. This exercise may help us figure out how successful the strategic planning was in terms of a reduction in income inequality among states. Second, more than three decades since economic liberalization (1991) that aimed to move away from years of protectionism to make the economy more market-driven, it would be judicious to evaluate the impact of releasing the caged tiger on the per capita income levels of Indian States. The existence of huge shopping complexes, plants of multinational firms, the development of infrastructure, the achievement of BSE-SENSEX (S&P Bombay Stock Exchange Sensitive Index2) crossing the 40,000 mark (in May 2019), immense expansion of telecommunication networks, the presence of multi-national food chains, the rapid expansion of real estate sector, and many more such examples are at the core of the growth narrative. However, the seminal work of shows that shining India corresponds to only the top 10 percent of the population, rather than the middle class or the middle 40 percent [1]. The 1980–2020 growth story of the middle class (102%), when put in the context of average growth (187%), seems significantly low. Thus, a reality check in terms of per capita income, which proxies the standard of living, is very relevant. Despite the importance of income growth, what remains even more crucial is equitable growth across all income groups. This brings to the concept of convergence and divergence of incomes.

Objective

This study aims to find out the convergence pattern in the per capita state/region GDPs (SGDP) across the Indian states and union territories, and tries to answer the questions;

1. Is there any convergence among the states/ territories before and after the liberalization policy introduced in 1992?
2. Is there any convergence among the states/territories for the sub-period before and after the liberalization policy?

Approach

The study examines if the poorer Indian states are indeed converging toward the richer states and whether liberalization has had any beneficial effect on the said convergence. In the case of convergence, it may fairly be assumed that the economy has been partially successful in addressing the poverty issue. If there is no evidence of convergence, then it points toward a serious situation that calls for an immediate policy revaluation and deeper introspection. The study contributes to the existing literature primarily from three different aspects: i) the dataset covers more than four decades from 1980; ii) relevant variables are controlled as suggested by literature and then the panel unit root test is applied to find any evidence of convergence; and iii) finally, the entire data- set both in terms of the period and levels of income at their initial stage are delved deeper and divided to trace out any evidence of convergence. However, if initial results indicate that over various periods and sub-time periods, states have shown little or no convergence over time the study proceeds to find evidence of convergence by taking into account capital expenditure, fiscal deficit, and total development expenditure which strongly implies that there is an active role of state policies in eliminating the lack of convergence or divergence among Indian states.

Literature Review

The theory of convergence to steady state stems from the central assumption of the Solow growth model-diminishing returns to reproducible capital [2]. It states that "Two countries that are the same in all their parameters—savings rates, population growth rates, rates of technical progress, etc. must ultimately exhibit similar levels of per capita income." As per the Solow–Swan model in a closed economy, the capital-labor (K/L) ratio causes variations in per capita incomes across economies. Keeping the savings rate constant, a lower initial K/L ratio is associated with a faster proportionate increase in K/L. This occurs due to factor mobility—labor will migrate from poor to richer states while capital will migrate from rich to poor [3]. The two types of tests often used in convergence analysis are—β convergence, which measures the proportionate growth in per capita income on the initial level of per capita income, and σ convergence, which measures the cross-sectional dispersion of per capita incomes. β convergence can be further divided into conditional and absolute convergence. The former is perceptible only after other factors which may cause variation in steady states have been accounted for while the latter is a stronger kind of convergence, where initially poor states grow faster, notwithstanding the differences in initial conditions [4]. In most studies, researchers test for conditional convergence. While

conditional convergence is crucial for cross-country regressions, in the case of intra-country regression, suggest that the effective output per capita and technological progress do not differ much, and hence, can be tested for absolute convergence instead [5]. Using the same reasoning, we test for absolute convergence for the various states of India. Tested for convergence among states of the US and found that the value of responsiveness to the average growth rate (β), is directly proportionate to the speed of convergence to the steady state. This methodology has been adopted by several researchers in the context of India [6]. At the time of independence in 1947, India's GDP was `2.7 trillion which has grown almost exponentially to stand at `57 trillion in 2013–2014. Despite India's overall stellar growth, several critics have expressed concern over the growth of individual states in India. As per the poverty estimates (2004–2005 and 2011–2012) during this period, more than half of the total poor lived in six states, such as Bihar, Chhattisgarh, Jharkhand, Madhya Pradesh, Rajasthan, and Uttar Pradesh [7]. Some states have experienced growth better than others. As India celebrated its 75th year of independence in 2022, a key question remains how far it has progressed from 1947 to the third decade of the twenty-first century? Analysed interstate differentials between 1950 and 1960 and showed no noticeable reduction in income differentials [8]. Suggested that the degree of inequality had remained unchanged whereas showed a steady increase in interstate inequalities [9,10]. Before the 1980s, GDP growth had stagnated at a dismal 3 percent per annum for almost 20 years, which shot up to 5 percent in 1980–1989, that further increased to 6 percent in the 1990–1999 period [11]. The proportion of poor below the poverty line has significantly declined from 44.5 percent in 1983-1984 to 27.5 percent in 2004-2005. This brings us to one of the most important questions-have all the states been able to reap the benefits of liberalization uniformly? The study states that the probability of convergence is the highest when national or regional economies are linked by open trade and factor mobility. This makes the 1991 reforms act as a perfect ground for a natural experiment aimed to test the aforementioned hypothesis. Believe that growth was kick started post-economic liberalization of 1991 since it provided domestic firm's access to capital equipment embodied with new technology, and better intermediate inputs, and expanded their choice set to act. With free markets came creative destruction increasing overall productivity, especially in the service sector. The introduction of cell phones and the diffusion of the internet paved the way for this revolution which aided the fastest-growing sector in India—business services. However, it is perplexing how an economy that was majorly employed in the unorganized sector was able to gain from these reforms. Point out certain channels, such as direct absorption of technology (e.g., cell phones), cheaper products from the organized sector leading to an increase in real wages in the unorganized sector, and demand spill overs from increased incomes of the organized sector. This further suggests how liberalization has the potential to affect economies such as India. However, the question remains whether these sources are significant enough to enhance the per capita income, particularly in the poor regions of any country. The broader literature points out that in the presence of significant human capital and skills, the effect of liberalization is higher, probably three or fourfold more than that of a skill-adverse region. Our results do support such a claim to some extent. States which experienced higher growth post-liberalization are the ones that already had more human capital, better infrastructure, and labour laws. Specific studies, such as the one conducted by, use both σ and β tests of unconditional convergence. The sigma convergence test shows that throughout 1961–1971, there was a reduction in regional disparities due to significant improvement in the agrarian economy and technological inputs. However, throughout 1972–1982, with the slowdown of industrial growth in India, there was a divergence in the disparities. The beta convergence test shows a statistically significant convergence for the first period whereas for both the other periods, the beta value comes out statistically insignificant, which suggests divergence. The results from the study by showed the presence of a V-factor in Indian states' growth turnaround that is consistent with policy reforms [12]. In an extension of this study, found largely ambiguous evidence of convergence across Indian states [13]. However, they found that states with higher literacy, urbanization, and access to ports participated more in the growth process. More concrete pieces of evidence for conditional convergence came in recent years from Das, where the authors further extended the data till 2007–2008 and found conditional convergence at the district level once controlled for district characteristics [14]. It is now a fact that incomes have seen substantial improvement since the 2000s, growing at 4.4 percent; historically which had never been higher than 2.5 percent. Use tax data to study how incomes have grown since 1922, the year when the income tax was implemented. It turns out that current income inequality is much higher than in the pre-independence period—the top 0.1 percent income share remained between 5 and 7 percent before 1922 as opposed to greater than 8 percent in 2015. The top 1 percent income share is at its highest level (22%) ever since the creation of income tax. On the other hand, the bottom 50 percent grew at a rate much lower than average, accompanied by the middle 40 percent that grew at a marginally better albeit lower than average rate. This data indicates a divergence in income. Table 1 provides a snapshot of the level of income inequality across income groups at two different time points 30 years apart. The first column exhibits the share of incomes in 1982–1983 and the second shows the share in 2013–2014, highlighting the widening gap among the top, middle, and bottom percentiles. Show that although most Indian states have had an upward trend from 1961 to 1990, there has not been much evidence of convergence [15]. On the contrary, the stronger states

grew even stronger. In the background of the contemporary literature in this particular area of research answers to the research questions mentioned in Section 2 were searched. The following sections explain the data and discuss the model and estimation, analysis and results, and lastly conclusions and recommendations.

Data

1. This study covers a period of forty years in this article from 1980 to 2020. The entire period was divided into three sub-periods: 1980–1992, 1993–2003, and 2003–2020. The first sub-period from 1970 to 1992 is the pre-liberalization period. The next 28 years have been also split into two sub-periods. The sub-periods are created to check if there is any evidence of convergence pre/post-liberalization. Also, 2002 was a major setback for most of the countries both in terms of the socio-political and economic scenario. In 2002, mentioned that India was losing economic momentum, inflation had decreased from high levels, and private balance sheets experiencing the costs of an investment boom funded by the credit bubble [16]. Hence, this particular year formed a basis for investigation before and after that year.

2. India is currently divided into 29 states and seven union territories. However, the limitation of relevant comparable data restricts our sample to 26 states and union territories, which represent almost more than 90 percent of the country.

Methodology

The PCSGDP convergence pattern was examined in two stages: i) without taking into consideration any control variables, and ii) with consideration of control variables.

Approach was used to detect any discernible convergence across the states' per capita GDP. This approach defines "convergence as equality of long-term forecasts at a fixed time. States i and j converge if both states' long-term forecasts of (log) per capita output are equal at a fixed time t" [17].

$$\lim E\,(y_{i,t+k} - y_{j,t+k} \mid I_t) = 0$$

If the differential yi–yj contains a unit root, the conditions of convergence are violated. Two-panel unit root tests; namely and the other one the panel unit root test were conducted [18,19]. Levin, Lin, and Chu test consider the specification from the augmented Dickey-Fuller test

$$y_t = \rho y_{t-1} + x_t'\Omega + \epsilon_t$$

$$\sum \text{¥}y_t = \alpha y_{t-1} + x_t'\Omega + \epsilon_t$$

Where the difference operator is

$\alpha = \rho - 1$,

xt are exogenous regressors, ρ, and Ω are parameters and €t is white noise

Taking p lagged differences,

$$\text{¥}y_{it} = \alpha y_{i,t-1} + \sum \beta_{ij}\, \text{¥}y_{i,t-1} + x_{it}'\Omega + \epsilon_t \quad (1)$$

The LLC test uses two additional regressions, regressing ¥y'it and y'it-1 and lagged value of ¥yit and the exogenous regressors.

$$\text{¥}y'_{it} = \text{¥}y_{it} - \sum \beta_{ij}\, \text{¥}y_{i,t-1} + x_{it}'\Omega$$

$$\& \; y'_{i,t-1} = y_{i,t-1} - \sum \beta_{ij}\, \text{¥}y_{i,t-1} + x_{it}'\Omega \quad (2)$$

Both ¥y'it ¥y'it & y'it-1 are adjusted using the standard error from the regression, i.e.

$$\text{¥}y'_{it} = \text{¥}y'_{it} / s_i \quad (3)$$

$$Y'_{i,t-1} = y'_{i,t-1} / s_i \quad (4)$$

And $\text{¥}y'_{it} = \alpha\, y'_{i,t-1} + \eta_{it}$ is the pooled proxy equation from (3) and (4) (5)

The t-statistic for the estimated α, for LLC, under the null hypothesis, is

$$T^*\alpha = [T\alpha - (NT)\, SN\, \alpha^* 2se\, (\alpha^*)\, \mu_{mT^*}] / \alpha_{mT^*} \text{ is } N(0,1) \quad (6)$$

$\alpha_i = 0$ Where $T^* = T - (\sum p/N) - 1$, and p is the number of lags in each cross-section ADF regression. Acceptance of the null hypothesis in LLC would imply the presence of a unit root.

The IPS panel unit root test begins with a similar premise by specifying a separate ADF regression from each cross-section.

$$\text{¥}y_{it} = \alpha y_{i,t-1} + \sum \beta_{ij}\, \text{¥}y_{i,t-1} + x_{it}'\Omega + \epsilon_t$$

, where the null hypothesis is $H_0 : \alpha_i = 0$, for all I ; and the alternate hypothesis $H_1 = \{\alpha_i = 0$, for i; $\alpha_i < 0$ for i= N+1, N+2, ….}

Analysis & Discussion

Average Per Capital SGDP of the States

This study covers 26 Indian States. Table 2 provides the average per capita state GDP (PCSGDP) for all states for the whole period, that is, from 1980 to 2020. While the nationwide average PCSGDP has been about `4,501.1, Delhi, Goa, and Sikkim boast of average PCSGDP of `11001.6, `11,141.6, and `11,409.6 respectively. On the other hand, Bihar (`1,581.1), Assam (`1,969.2), Uttar Pradesh (`2069.8), Orissa (`2,232.0), Madhya Pradesh (`2,349.5), Jammu and Kashmir (`2,638.1), and Rajasthan (`2,672.7) have been the poorest performing states. Only Delhi, Goa, Gujarat, Haryana, Maharashtra, Pondicherry, Punjab, and Sikkim have a higher PCSGDP than the national average. The average performance over the four decades indicates the plight of the poorly performing BiMARU (Bihar, Madhya Pradesh, Rajasthan, and Uttar Pradesh) states with Jammu and Kashmir as an inclusion.

Growth Rate of PCSGDP

The growth of State Gross Domestic Product (SGDP) is calculated using the available values of SGDP provided in the Indian Public Finance Statistics (IPFS) published by the Government of India. The ranking of these 26 states in the terminal period of the study, viz., 1980-81 and 2019-20, changed in their respective rank during the span of four decades and the growth rates are mentioned in Table 3. The performance of Sikkim has been outstanding during this overall period 1980-81 to 2019-20 (Table 3). It went from one of the middle-performing states (rank 12) in 1980 to the best-

performing state in 2019–2020; it's PCSGDP increased more than 28 times during this phase. Tripura has shown the largest jump in ranking, from the 22nd ranked state in 1980–1981, it has gone to become 9th ranked state in 2019–2020, its PCSGDP increasing more than eight times. Jammu and Kashmir have been the poorest performing state in terms of drop in the ranking. The state has declined from the 8th best-performing state in 1980–1981 to the 21st position in 2019–2020, with its PCSGDP rising only 2.71 times.

Table 1: *Income Inequality in India.*

Percentile	1982-83	2013-14
Top 1 %	6.2	21.7
Top 0.1%	1.7	8.6
Middle 40%	46.0	29.6
Bottom50 %	23.6	14.9

Table 2: *Average Per Capita State GDP between 1980 and 2020 (values in Indian Rupees).*

State	PCSGDP	State	PCSGDP
1. Andhra Pradesh	3541.5	2. Maharashtra	6381.7
3. Arunachal Pradesh	3501.3	4. Manipur	2629.2
5. Assam	1969.2	6. Bihar	1581.1
7. Nagaland	3431.9	8. Meghalaya	2668.5
9. Delhi	11001.6	10. Orissa	2232.0
11. Goa	11141.6	12. Pondicherry	7115.8
13. Gujarat	5328.5	14. Punjab	5114.5
15. Haryana	5203.3	16. Rajasthan	2672.7
17. Himachal Pradesh	3608.7	18. Sikkim	11409.6
19. Jammu & Kashmir	2638.1	20. Tamil Nadu	4297.5
21. Karnataka	4102.2	22. Tripura	3822.2
23. Kerala	3295.5	24. Uttar Pradesh	2069.8
25. Madhya Pradesh	2349.5	26. West Bengal	3756.1
Average of the 26 States			4501.1
Source: Department of Economic Affairs, Indian Public Finance Statistics (GoI).			

Table 3: *Ranking of Indian States according to their PCSGDP Between 1980–1981 and 2019–2020 and Annual Growth Rate.*

State	Rank in 1980-81	Rank in 2019-20	Change in Rank during 1980-81 to 2019-20	Average annual Growth Rate during 1980-81 to 2019-20
Andhra Pradesh	17	16	1	5.64
Arunachal Pradesh	11	17	- 6	3.95
Assam	23	26	-3	2.46
Bihar	26	25	1	3.67
Delhi	1	3	-2	7.47
Goa	2	2	0	10.21
Gujarat	7	6	1	7.13
Haryana	6	7	-1	4.84
Himachal Pradesh	10	14	-4	4.65
Jammu & Kashmir	8	21	-13	2.73
Karnataka	13	10	3	6.24
Kerala	14	15	-1	5.25

Maharashtra	5	5	0	6.53
Manipur	16	20	-4	3.45
Meghalaya	18	18	0	4.18
Madhya Pradesh	20	22	-2	3.47
Nagaland	19	12	7	6.47
Orissa	21	23	-2	3.06
Pondicherry	3	4	-1	6.63
Punjab	4	11	-7	3.46
Rajasthan	25	19	6	4.53
Sikkam	12	1	11	28.20
Tamil Nadu	15	8	7	7.41
Tripura	22	9	13	8.15
Uttar Pradesh	24	24	0	2,74
West Bengal	9	13	- 4	4.49
Source: Department of Economic Affairs, Indian Public Finance Statistics (GoI.).				

Table 4: *Panel Unit Root Test (Levin, Lin, and Chu) Including Subperiods.*

State	**1980-2020 Whole Study period**	**1980-1992 Pre liberalization period**	**1992-2020 Post- liberalization period (PLP)**		
			1992-2003 PLP part-1	**2004-2020 PLP part-2**	**1992-2020 Total PLP**
Andhra Pradesh	-0.68	-1.30	-2.61	-2.03	-1.76
Arunachal Pradesh	-1.68	-1.76	-1.83	-1 84	-1.84
Assam	0.08	-1 68	0.55	- 2.59	- 1 58
Bihar	0.09	- 0.91	- 4.18*	- 2.14	1 75
Delhi	0.70	- 071	- 2.71	- 2.81	1.73
Goa	-0.70	-1.86	-2 54	-2.06	-1.81
Gujarat	0.05	-2.79	-2 85	-2 55	1 35
Haryana	-0.30	-3.28	0.42	-2.78	-1.62
Himachal Pradesh	-0.30	-1.97	-2.76	-1.65	-1 61
Jammu & Kashmir	-0.84	-2.57	-2.57	-3.75*	-1.80
Karnataka	-0.98	-1.87	-3.98*	-2.00	-2.01
Kerala	0.08	-1.97	-0.32	-4.76**	-1.45
Madhya Pradesh	2.42	-2.87	-2.34	-1.67	-0.55
Maharashtra	2.63	-2.07	-267	-4.56**	-1.23
Manipur	-0.65	-5.96**	-3.43	-1.65	-1.68
Meghalaya	0.23	1.87	-2.24	-1.35	-1.98
Nagaland	-0.03	-4.90**	-1.87	-2.14	-1.55
Orissa	-1.29	-4.98**	-3.56*	-0.65	-1.75
Pondicherry	-1.32	-2.62	-2.91	-3.13	-1.78
Punjab	-0.23	-4.68**	-2.03	-1.41	-1.57
Rajasthan	-0.62	-2.97	-3.57	-1.97	-1.55
Sikkim	2.49	-2.06	-1.76	-2.08	4.06
Tamil Nadu	0.24	-0.56	-1.76	-4.78**	-1.24
Tripura	1.49	-4.58**	-2.18	-0.34	0.76
Uttar Pradesh	-0.23	2.11	-2.78	-2.34	1.45
West Bengal	-0.25	-4.78**	2.73	-4.47**	-1.45

All 26 States	5.66	-6.10***	-3.91***	-11.28***	0.19

*Source: The computations are the author's own. Note: ***, **, and * represent significance at 1%, 5%, and 10% levels, respectively.*

Table 5: *Panel Unit test result.*

Time Phase	All States		High-Income States		Middle-income States		Low-Income States	
	LLC	IPS	LLC	IPS	LLC	IPS	LLC	IPS
Whole Period (1980-81 to 2019-20)	4.39 (1.00)	12.89 (0.99)	2.42 (0.98)	7.10 (1.00)	1.99 (0.98)	6.80 (1.00)	3.44 (0.99)	7.88 (1.00)
Pre-Liberisation Period (1980-81 to 1991-92)	-8.87* (0.00)	-2.56* (0.00)	-4.70* (0.00)	-1.43** ()0.05	-5.60* (0.00)	-1.00 (0.15)	-5.03* (0.00)	-2.03** (0.02)
Post-Liberalisation Period (1992-93 to 2019-20)	2.60 (1.00)	4.87 (1.00)	-1.18*** (0.06)	2.76 (0.99)	-1.94** (0.02)	2.58 (0.99)	-1.13* (0.10)	3.03 (0.99)
Post-Liberalisation Period (1992-93 to 2002-03)	7.56 (1.00)	0.90 (0.18)	-4.70* (0.00)	-0.66 (0.02)	-4.61* (0.00)	-0.62 (0.27)	-4.08 (0.00)	-0.27 (0.39)
Post-Liberalisation Period (2003-04 to 2019-20)	19.73 (1.00)	2.98 (0.98)	-8.79* (0.00)	-1.65 (0.05)	-14.98* (0.00)	-0.22 0.41()	-8.00 (0.00)	-0.47 (0.31)

*Source: The computations are the author's own. Note: ***, **, and * represent significance at 1%, 5%, and 10% levels, respectively.*

Table 6*: Capex, Fiscal Deficit & Devextot.*

	All States		High Income		Middle Income		Low Income	
	LLC	IPS	LLC	IPS	LLC	IPS	LLC	IPS
Fixed Effect	-8.64*** (0.000)	-4.70*** (0.000)	-3.18*** (0.000)	-1.83** (0.032)	-4.44*** (0.000)	-2.11** (0.017)	-7.66*** (0.000)	-4.12*** (0.000)
Random Effect	-8.65*** (0.000)	-4.70*** (0.000)	-3.18*** (0.000)	-1.84** (0.032)	-4.43*** (0.000)	-2.11** (0.017)	-7.05*** (0.000)	-4.11*** (0.000)

Source: The computations are the author's own.
*Note: *** and ** represent significance at 1% and 5% level, respectively.*

Table 7*: Capex, Education, Health, Welfare, and Fiscal Deficit.*

	All States		High Income		Middle Income		Low Income	
	LLC	IPS	LLC	IPS	LLC	IPS	LLC	IPS
Fixed Effect	-6.64*** (0.000)	-2.70*** (0.002)	-2.18*** (0.010)	-0.83** (0.132)	-4.44*** (0.000)	-1.81** (0.037)	-5.66*** (0.000)	-2.12** (0.007)
Random Effect	-6.65*** (0.000)	-2.70*** (0.002)	-2.18*** (0.010)	-0.84** (0.132)	-4.43*** (0.000)	-1.81** (0.037)	-5.05*** (0.000)	-2.11** (0.007)

Source: The computations are the author's own.
*Note: *** and ** represent significance at 1% and 5% level, respectively.*

The performance of the BiMARU states during this period has been less than satisfactory. While Bihar's PCSGDP rose 3.61 times in 2019–2020, it finished only one rank above its 1980–1981 rank of 25. Madhya Pradesh slipped two ranks from its 1980–1981 position of 20 and ended at the rank of 22 in 2019–2020, with its PCSGDP rising 3.49 times. Rajasthan performed relatively better and jumped six ranks from the 1980s 25th to 19th position in 2019–2020, with 4.51 times rise in PCSGDP. Uttar Pradesh showed no change in its ranking in 1980–1981 and 2019–2020 at the 24th position.

Stationarity Check

The study considers five periods to check for stationarity: i) the period 1980–2020 (the whole period); ii) the pre-liberalization period of 1980–1992; iii) the post-liberalization period of 1992–2020 – which was further divided into two sub-periods in between, iv) from 1992 to 2003 and v) from 2004 to 2020. Was applied to test for stationarity for each of the periods. Table 4 shows the results of the Levin–Lin–Chu panel unit root test for all the sub periods taken together. The result shows no evidence of convergence over the whole time period of 1980–2020 with all the states taken together (Table 4). When the post-liberalization period as a whole is taken, from 1992 to 2020, it again showed no evidence of convergence. Table 4 shows the regional-level convergence for the four-time periods. The full-time period exhibits no stationarity and hence no discernible evidence of convergence among the regions. Between 1980 and 1992, only six states, Manipur, Nagaland, Orissa, Punjab, Tripura, and West Bengal have shown stationarity and hence signs of convergence. During 1992–2020, again no region exhibited stationarity. Between 1992 and 2003 only three states (Bihar, Karnataka, and Orissa) exhibited stationarity while during 2004– 2020 five states (Jammu and Kashmir, Kerala, Maharashtra, Tamil Nadu, and West Bengal) showed significant stationarity. We further investigate the analysis as mentioned below in (Table 5).

a) The results of the panel unit root test on the dataset were analysed by dividing the states into high-income, middle-income, and low-income using the standards followed by World Bank. Results indicate that for all the regions, and for the entire period the null hypothesis that not be rejected as that series contains a unit root. In other words, there is no such evidence of the mean reversion in the entire pool of states and the time period of four decades. Both tests confirm the same fact. This leads us to conclude that there is no resilient feature of convergence happening among the regions in this period and takes us to investigate if the same is true for the different groups of regions as designed by various income levels. We fail to reject the null hypothesis of the presence of unit roots in all the groups and indicate to state that even among the groups there is clearly no sign of any convergence taking place.

b) The time period 1980 to 1992 (Pre-liberalization): The exercise for all regions as well as for the groups was conducted. Interestingly, we can reject the null hypothesis of the presence of unit roots across all regions. Except for one case (IPS—Middle Income Group), we find stationarity. And if we take stationarity as a proxy for convergence, then, in this case, we must admit that for the mentioned period we see some presence of convergence. This is true for all three groups indicating that not only overall convergence was taking place but also among the group the process was active. So, one can argue that in the last decade or so just before the liberalization there is some evidence of convergence.

c) The Post- liberalization period: There is no such evidence of convergence anymore in the data across all states. We fail to reject the null hypothesis—the existence of a unit root in the series. However, when we look into the groups, we have mixed results in terms of test results. LLC test rejects the null hypothesis while the IPS test fails to reject the null hypothesis. Surprisingly the pattern is the same for all three groups. Unless both tests give the result in favor of rejecting the null hypothesis, we did not conclude in favor of convergence. Thus, for the entire period of 1992-1993 to 2019-20, we do not find any confirmation of convergence, both across regions as well as for each group. In order to further explore convergence, we divide the post-liberalization era into two halves; primarily 1992-1993 to 2002-2003 and 2003-2004 to 2019-20. There is a lack of convergence for all regions for both subperiod. Results of the designated tests indicate the presence of unit root in the panel and thus fail to reject the null hypothesis in both cases. Only for high-income regions for the time period 2002-2003 to 2019-20, we can reject the null hypothesis of the presence of unit root for both tests. Using our benchmark, we reinstate that there is some evidence of convergence among the rich regions. For all the other cases, we find support only from the LLC test in terms of rejecting the null hypothesis. The IPS panel in all cases fails to reject the null hypothesis. Thus, our conclusion from these results indicates a lack of convergence among these regions over the mentioned period.

d) To summarize, we find that post-liberalization the high-income regions are in some alignment with convergence for the time period 2002-2003 and 2019-20. The middle-income and low-income regions do not reflect any significant evidence of mean reversion post-liberalization. Thus, the bigger picture of the table shows some convergence for all regions and among each group for the period before liberalization (1980–1992). However, the post-liberalization period is primarily dominated by a lack of convergence among all regions and groups. Fair evidence of some convergence is only available for high-income states for the subperiod 2002/2003–2013/2014.

4. Analysis with Control Variables: Control variables were included in the analysis as mentioned in the literature to have a better understanding of the nature of convergence or the lack of it [20,21]. The control variables included for consideration in this study are;

1. CAPEX—Capital Expenditure of States and Union Territories as a percent of state GDP
2. FISCAL DEFICIT—State Fiscal Deficit as a percent of state GDP
3. DEVEXTOT—Total Development Expenditure, comprising of expenditure on revenue and capital accounts and loans and advances for social and economic development as a percent of state GDP.

We can reject the null hypothesis of the presence of a unit root except for two occasions. Thus, in a nutshell, it can be said that after controlling for CAPEX, DEVEXTOT, and FISCAL DEFICIT

(Table 6) and Capex, Education, Health, Welfare, and Fiscal Deficit (Table 7) there exists discernible evidence for the existence of convergence. This result, when combined with the results from the model without control variables, gives us a clearer picture of the root cause. Results indicate that when relevant control variables are added, there is evidence of convergence among regions of India. This apparently looks like a contradicting result to the earlier tests for absolute convergence, but the underlying reason can be traced to the very source of this problem. It points toward the fact that the nature of inequality across regions is not structural in nature and can be reduced through efficient policy decisions. Increased and efficient spending toward education, health, and welfare along with capital expenditure and addressing the state-level fiscal deficit can successfully reduce the gap between regions. However, given the sheer magnitude of the problem in a country the size of India, achieving the said efficiency is difficult, especially in a democracy. In most cases, Hausman tests indicate a fixed effect. However, for our data, the results are the same in both cases. It is a general practice to report results for both types of estimation. Also, there is significant literature that criticizes the Hausman test. Thus, both results are reported. Tables 6 and 7 above summarize the estimation results for both fixed effect and random effect LLC tests after controlling for the exogenous variables.

Conclusion & Recommendation

Eradication of poverty and inequality has been the prime objective of each government ever since independence during the last seventy-five years. There is a pressing need to evaluate how successful the country has been in this endeavor. Yet, India remains the home of one-third of the World's poor. This study examined the performance of Indian regions in terms of their per capita GDP and whether there is any evidence of growth convergence over the years among regions from 1980 to 2020. Since independence, the performance of several regions has consistently been below the national average. The economic policies of the government were aimed at pulling these regions and their people out of poverty. But the question of whether and how far these policies have been effective has remained a concern. The inter-region disparity in per capita income has been an ever-present feature in the Indian economy. Although the regional disparity cannot be completely eliminated, policies should work toward narrowing down the inter-regional differentials in PCSGDP, leading to a reduction in the disparity. In the absence of relevant control variables, findings from panel unit root tests suggest no evidence of convergence over the whole-time period of 1980–2020 when all the regions are taken together. Interestingly, the pre-liberalization period of 1980–1992 showed more evidence of convergence among the regions as compared to the post-liberalization period of 1992–2020 which does not exhibit any convergence. After dividing the post-liberalization period into subperiods of 1992–2003 and 2004–2020 some sign of convergence is found; however, the number of regions exhibiting any significant convergence is less in number than such regions in the pre-liberalization period (three states in 1992–2003 and five states in 2004–2020 vs six states in 1980–1992). Furthermore, when control variables for capital expenditure, development expenditure, and fiscal deficit are taken into account, we find significant evidence for convergence of state-level per capita GDP. This finding corroborates the findings and points toward the fact that the nature of inequality across regions is not structural and can be reduced through state-specific policy reforms and effective policy executions, such as increased and efficient expenditure on capital and development while addressing the state-level fiscal deficit. Recent evidence corroborates the rising inequality in India. Provided empirical evidence that between 1980 and 2014 top 1 percent earners captured 22 percent of the total wealth and the top 0.1 percent received a 12 percent share of total growth compared to the 11 percent share accrued to the bottom 50 percent. The results are indeed, worrying. It does not provide evidence of the fact that there has been any convergence in the states' PCSGDP. In fact, after liberalization, the signature of convergence among regions is weaker than before liberalization. The clustering of some high-income regions raises a question of whether the benefits of liberalization have been reaped only by a handful of regions while the majority of the regions saw little or no change in their relative position. Also, when we trace convergence after controlling for variables, such as capital expenditure, fiscal deficit, and development expenditure—it opens the door for more active policy interventions both at the Centre and State levels. It is the need of the hour to have a closer and more critical look at the policies aimed at poverty eradication, and removal of regional disparity and treat these issues as a priority. With rapid urbanization and population increase, the economic disparity will only grow, and if left unchecked, may lead to catastrophic possibilities. A series of reforms undertaken by the current government in the recent past, however, if implemented right, can nudge the economy in the right direction. The long-term impact of those policies on growth and convergence dynamics remains an important phenomenon to examine in the near future.

References

1. Chancel L, Piketty T. Indian income inequality, 1922–2014: From British Raj to Billionaire Raj? 2017.
2. Solow R M. A contribution to the theory of economic growth. The Quart J Econ. 1956; 70: 65-94.
3. Bajpai N, Sachs JD. Trends in inter-state inequalities of income in India. Development Discussion Harvard University, the Harvard Institute of International Development (HIID), Boston.1996; 27.
4. Trivedi K. Regional convergence and catch-up in India between 1960 and 1992. Economics Group, Nuffield College, University of Oxford. 2002.

5. Barro RJ, Sala-i-Martin X. Convergence. J Polit Econ.1992; 100: 223-251.
6. Cashin P, Sahay R. Regional economic growth and convergence in India. Fin and Devel. 1996; 33: 49-52.
7. Chowdhury S. Regional disparity in India-A study of three decades using a comparable database. Paper prepared for the IARIW 33rd General Conference, Rotterdam, The Netherlands. 2014.
8. Nair KRG. A note on inter-state income differentials in India 1950-51 to 1960-61. J Devel Stu. 1971; 7: 441-447.
9. Chaudhary MD. The behavior of spatial income inequality in a developing economy: India 1950-76. Ninth Conference of the Indian Association of Research in National Income and Wealth. 1974.
10. Majumdar G, Kapoor JL. The behavior of inter-state income inequalities in India. Twelfth Conference of the Indian Association for Research on National Income and Wealth, Bangalore. 1980.
11. Kotwal A, Ramaswami B, Wadhwa W. Economic liberalization and Indian economic growth: What's the evidence? J Eco Liter. 2011; 49: 1152-1199.
12. Ghate C, Wright S. The V-factor: Distribution, timing, and correlates of the Great Indian Turnaround. J Devel Eco. 2011; 99: 58-67.
13. Ghate C, Wright S. Why were some Indian states so slow to participate in the Turnaround? Economic & Political Weekly. 2013; 18: 118-127.
14. Das S, Ghate C, Robinson PB. Remoteness, urbanization, and India's unbalanced growth. World Devel. 2015; 66: 572-587.
15. Marjit S, Mitra S. Convergence in regional growth rates: Indian Research Agenda. Economic & Political Weekly. 1996; 31: 2239-2242.
16. Rajadhyaksha N. Indian economy: That 2002 feeling. 2017.
17. Bernard AB, Durlauf SN. Interpreting tests of the convergence hypothesis. J Econ. 1996; 71: 161-173.
18. Levin A, Lin CF, Chu CSJ. Unit root tests in panel data: Asymptotic and finite-sample properties. J Econ. 2002; 108: 1-24.
19. Im KS, Pesaran MH, Shin Y. Testing for unit roots in heterogeneous panels. J Econ. 2003; 115: 53-74.
20. Bandhopadhyaya S. Convergence club empirics: Evidence from Indian States. Res on Econ Inequ. 2012; 20: 175-203.
21. Department of Economic Affairs. (n.d.). Indian public finance statistics.