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Research Article

SPATIO-TEMPORAL ANALYSIS OF ECONOMIC INEQUALITY IN INDIA

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ABSTRACT

India has introduced New Economic Policy (also known as Liberalization, Privatization and Globalization (LPG)) in 1991 to face the economic crisis. Now India is one of the developing countries and its economic growth rate is more than 6% per annum especially after New Economic Policy. It is second fastest growing country followed by China. It has huge demand for domestic as well as international product caused by the second largest populous country. New Economic Policy, foreign investment, modern technology, human resource are mounting India's economic status in the World. Studies and experiences show that liberalization promotes the competitiveness and strength of the economy. But it has also rises the following questions.

1. Is it the inclusive development?
2. Do the fruits of development are testing by whole economy or only few are enjoying the benefits of development?
3. Does the development spreads everywhere or it creates discrimination within the economy?
4. Does each part of the economy have contributing to the development?

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INTRODUCTION

India has introduced New Economic Policy (also known as Liberalization, Privatization and Globalization (LPG)) in 1991 to face the economic crisis. Now India is one of the developing countries and its economic growth rate is more than 6% per annum especially after New Economic Policy. It is second fastest growing country followed by China. It has huge demand for domestic as well as international product caused by the second largest populous country. New Economic Policy, foreign investment, modern technology, human resource are mounting India's economic status in the World. Studies and experiences show that liberalization promotes the competitiveness and strength of the economy. But it has also rises the following questions.

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3. Does the development spreads everywhere or it creates discrimination within the economy?
4. Does each part of the economy have contributing to the development?

Equal development means not the same economic status of all; it means development as per the capability/potential. The paper

attempts to evaluate the contribution of the states in the economic development of the country in terms of PCNSDP (Per Capita National State Domestic Product). In the phase of development somewhat inequality can be take place in an economy. But gradually it has to diminish, especially after adopting the particular policy. (Ade, 2014)

Presently there are 29 states in India. But the economic development of the states is not as per their potential. All states are not contributing in the development of the economy as their potential. (Shelar, 2016) Policy makers addressed this issue immediately after the independence. But the policies put into practice are not in the order to solve the issue, because after such long period of policy implementation, the disparity is exist in the same proportion (somewhat increased). These are indications of recommendation to assessment and alter the policy. However a policy should be evaluated after certain period to answer the question and to know dos and don'ts. The paper is an attempt to do the same.

Objectives

1. To understand the spatial-temporal economic disparity in India.
2. To understand the trends of the inequality.
3. To use GIS technology to understand and address the economic issues.

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METHODOLOGY

The paper is based on secondary source. Per Capita income is one of indicator of economic development. (World Development Indicators, 2016) It is not away from the criticism, but it is the most reliable and countable indicator among others. PCI has to take in consideration while measuring economic status of a country using other parameters. Per Capita Net State Domestic Product at factor cost on current price (now onward PCNSDP) has taken as indicator of economic status of a state (region).

Spatial & Statistical Techniques

Quantum Geographic Information System (QGIS) is open source software has been used to understand the spatial pattern of inequality among the states.

The relative measures of Range (Co-efficient of Range) and Variation (Co-efficient of Variation(C.V.)) has been computed to measure temporal change in inequality.

$$\sigma = \sqrt{\frac{\sum(x - \bar{x})^2}{n}}$$

$$CV = \frac{\sigma}{\bar{X}} \times 100$$

Regional Economic Inequality is measured by using point- by- point method. It is based on the point- by- point method by calculating for PCNSDP for each state separately. The formula used to find Point value of given indicator:

$$B_{ij} = \frac{X_{ij}}{X_{imax}}$$

But in case of minimum by formula,

$$B_{ij} = \frac{X_{imin}}{X_{ij}}$$

Where

B_{ij} – point value of i-indicator for j- th region,

X_{ij} – value of i- indicator for j-th region,

X_{imax} – maximum value of i-th indicator,

X_{imin} – minimum value of i-th indicator.

Analysis & Result

PCNSDP at current price

PCNSDP has taken at current price because there is ten year gap between the study period i.e. 2001-02 and 2010-11 and the base year for both years are different. To understand the whole effect on the economy PCNSDP has been taken at current price as an indicator.

The states are divided in three categories i.e. low, medium and high PCI group to understand the disparity among the states. The classes of per capita income are as follow.

Table 1 Threshold of the income for classification

Income Group	Class	
	2001-02	2010-11
Low	< 17109	< 44828
Medium	17109 to 28224	44828 to 77567
High	> 28224	> 77567

Low Income Group States: There can be two reasons behind the low PCI. One is low NSDP or high population. There are

16 states came under this group in 2001-02, the numbers have increased to 18 in 2010-11. Bihar has least PCNSDP and Uttar Pradesh is second lowest state in both years.

Medium Income Group States: 11 States was come in medium PCNSDP group in 2001-02. The number has decreased to 8 in 2010-11. Punjab, Karnataka, West Bengal and Mizoram have placed in low income group from medium income group. Uttarakhand and Sikkim gained their position in medium income group from low income group.

High Income Group States: Goa and Delhi had place in the high PCNSDP. High PCNSDP states are increased to 3 in 2010-11 from 2 in 2001-02. Andhra Pradesh has secured their position in high income group in 2010-11. Goa remains its first position in both years. Goa is small state in terms of geographical area and total population. Literacy rate of Goa has relatively high. Tourism and mining of bauxite are the main source of the income of the Goa.

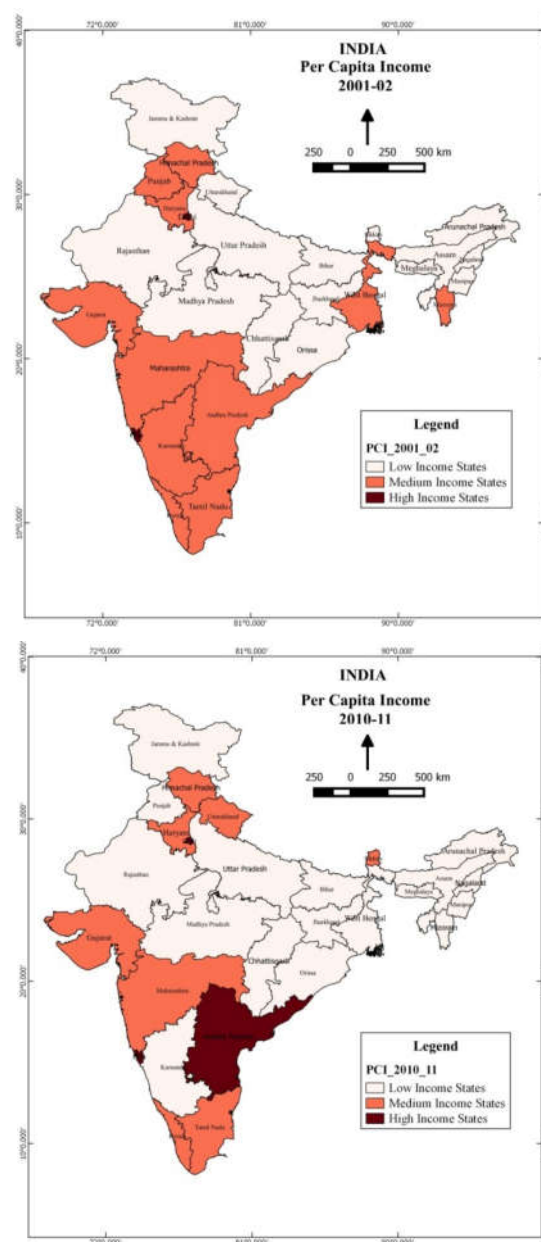


Figure 1 State-wise Per Capita NSDP of India 2001-02& 2010-11

The development was concentrated in south and southwest India (Figure 1). Out of all medium PCNSDP states 64% states was concentrated in the south and southwest India.

But the number states are largely decline to low PCNSDP form medium PCNSDP. 73% states of total medium and high PCNSDP states are from south and southwest area. This area is relatively more irrigated and also the amounts of rainfall of the states are comparatively sufficient. The states from middle and north India are more populous and southeast states are poor in terms of natural resources.

The inequality among the states has increased in the decade. The CV of PCNSDP among the states is increased from 0.38 in 2001-02 to 0.51 in 2010-11.

Rank of the states

Table 2 shows all India ranking of the states in term of PCNSDP in 2001-02 and 2010-11. Punjab, Himachal Pradesh and Karnataka have major loss in their all India ranking. The states ranking has dropped from 2nd, 4th and 9th to 11th, 10th and 13th respectively in the decade. Bihar has remained unchanged last rank.

Table 2 Per Capita NSDP Rank of the States of India

States	Rank (2001-2002)	Rank (2010-11)
Goa	1	1
Punjab	2	11
Haryana	3	5
Himachal Pradesh	4	10
Maharashtra	5	4
Kerala	6	8
Tamil Nadu	7	7
Gujarat	8	6
Karnataka	9	13
Mizoram	10	14
West Bengal	11	18
Andhra Pradesh	12	2
Tripura	13	15
Arunachal Pradesh	14	16
Nagaland	15	12
Sikkim	16	3
Meghalaya	17	17
Uttarakhand	18	9
Rajasthan	19	20
Jammu & Kashmir	20	19
Manipur	21	26
Assam	22	25
Chhattisgarh	23	21
Madhya Pradesh	24	24
Orissa	25	23
Jharkhand	26	22
Uttar Pradesh	27	27
Bihar	28	28

States Below and above the average per capita income

States are again divided into two categories below and above the PCNSDP to understand the contribution in the development of Indian economy.

Table 2 reveals the position of states between above and below PCNSDP. Most of the states are hanging below average PCNSDP. Few states has crossed the line to both direction and most of the states remain unchanged their position. Uttarakhand (North), Sikkim& Nagaland (Northeast region) have secured their position in the states of above average PCNSDP in 2010-11. However, West Bengal and Tripura

(Southeast region) have lost their position among the states of above average PCNSDP.

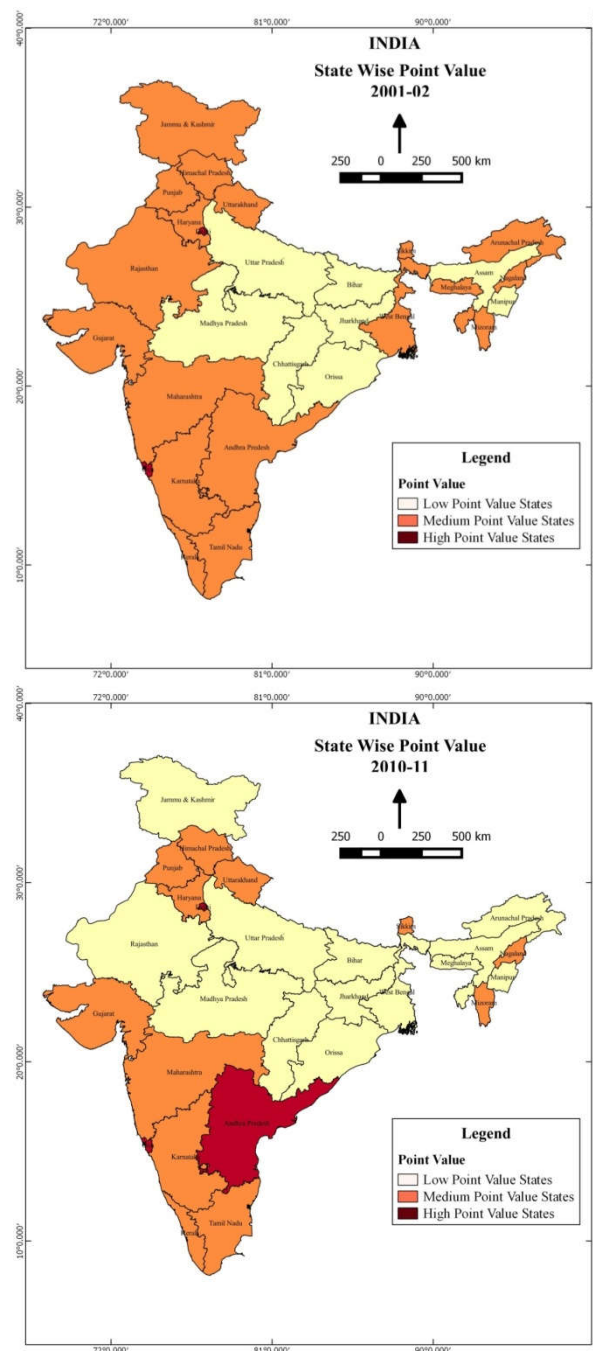


Figure 2 Point Value of Per Capita NSDP of States of India 2001-02

Point Value of States

Point-to-point value is one of the measures of inequality. Figure 2 are showing the point value of the states for 2001-02 and 2010-11 respectively. Most of the North and Northwest states shows fall in their point value in 2010-11.

Less point value (maximum) shows more inequality and vice-versa. The point values of all states are decrease in 2010-11 than 2001-02 (Figure 3). That is the clear incidence of increase the inequality.

Findings

- Andhra Pradesh, West Bengal, Tripura have lost their position among 'above the average' in 2010-11.

- Uttarakhand, Sikkim, Nagaland have secure the position among 'above the average' in 2010-11
- Some insignificant change in the rank and position of the states in terms of Per Capita Income.
- Rich states are being richer and poor states are remains undeveloped.
- The methods used in the paper to analysis disparity shows same trends of increase in the disparity among the states of India.

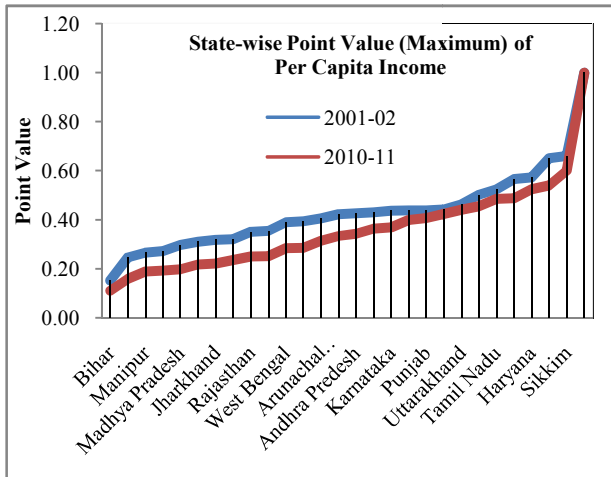


Figure 3 Point Value of Per Capita NSDP of States of India 2001-02 & 2010-11

- Change in the rank and position of the states in terms of Per Capita Income is insignificant.
- Rich states are being richer and poor states are remains undeveloped.

Suggestions

- States from low income group must introduce new policies to attract domestic as well as foreign entrepreneurs.
- Agriculture sector is the backbone of Indian economy, it has to promote by the modern means of irrigation and also secondary business.
- These states have to follow the population policy of the nation strictly. Also introduce other incentives to promote family planning.
- States have to set up the liberal way to get ease finance and other facility to start a business in shortest time.
- Infrastructure is the backbone of a development of an economy. Low income states should invest in infrastructure to attract investor.
- Education, trainings, health facilities are key solutions of various social and economic problems. States must invest in these sectors.

Major Findings

Year	2001-02	2010-11	Change	% Change
Minimum PCNSDP	5994	12090	6096	102
Maximum PCNSDP	39339	110306	70967	180
Average (Mean) PCNSDP	16939	41200	22840	135
Co efficient of Range	0.74	0.80	0.06	+8
Co efficient of Variance	37.83%	51.50%	13.67% Points	+36.13
States Below Average	Bihar, Uttar Pradesh, Jharkhand, Orissa, Madhya Pradesh, Chhattisgarh, Assam, Manipur, Jammu & Kashmir, Rajasthan, Uttarakhand, Meghalaya, Sikkim, Nagaland, Arunachal Pradesh (15)	Bihar, Uttar Pradesh, Manipur, Assam, Madhya Pradesh, Orissa, Jharkhand, Chhattisgarh, Rajasthan, Jammu & Kashmir, West Bengal, Meghalaya, Arunachal Pradesh, Tripura, Mizoram, Karnataka (16)	Add: West Bengal, Tripura Rank Decrease: Manipur, Assam, Rajasthan	
States Above Average	Tripura, Andhra Pradesh, West Bengal, Mizoram, Karnataka, Gujarat, Tamil Nadu, Kerala, Maharashtra, Himachal Pradesh, Haryana, Punjab, Goa (13)	Nagaland, Punjab, Himachal Pradesh, Uttarakhand, Kerala, Tamil Nadu, Gujarat, Haryana, Maharashtra, Sikkim, Andhra Pradesh, Goa (12)	Add: Uttarakhand, Sikkim, Nagaland Rank Decrease: Punjab, Tamil Nadu	
Spatial Output	Southwest states of India have shown high per capita income due to sufficient rainfall and low population.	Karnataka & west Bengal have to redefine their economic policy.	No major change	

CONCLUSIONS

- South and Southwest area of India is comparatively high PCNSDP.
- East and Southeast area of India is comparatively low PCNSDP.
- Widening regional disparity without any reduction during the decade of 2001-02 to 2010-11. During this period the CV has increased by 13.67% points.
- There is significant increase in the inequality among the states of India in term of PCNSDP from 2001-02 to 2010-11.
- Andhra Pradesh, West Bengal, Tripura have lost their position among 'above the average' in 2010-11.
- Uttarakhand, Sikkim, Nagaland have secure the position among 'above the average' in 2010-11.

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