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Role of Social Sector Spending, Net State Gross Domestic Product Per-capita, activity wise value addition of GDP and Multidimensional Poverty Escape – A State level data analysis of India

Dr Kanchan Datta[1]
[1]Associate Professor, Department of Economics,
University of North Bengal,
West Bengal. India

Prof. Falendra Kumar Sudan[2]
[2]Professor, Department of Economics,
University of Jammu,
Jammu and Kashmir. India

ABSTRACT

The first goal of sustainable development goal related to India is the reduction of poverty upto 13.95% in all its form in short which is popularly known as Multidimensional poverty among all the poor people (proportion of men, women and children of all ages living in poverty). This paper tries to explore the determinants of poverty reduction using the data NFHS-4 (2016) and NFHS-5 Sample size (2021). Since multidimensional poverty index has three dimensions. Health, education and standard of living, hence this paper uses role of social sector expenditure and net state domestic product per capita for poverty reduction. Moreover, this study also seeks to explore the role of activity wise value addition (agriculture industry and service sector) in various states and Union territories for poverty reduction. Since MPI is the product of Head count poverty and Intensity of Poverty, hence we have incorporated these two variables also for analysis. Diagnostic checking for the presence of heteroscedasticity and multicollinearity is also done. For the presence of heteroscedasticity, the estimation with robust standard error is also done. This study finds that social sector expenditure is not enough to reduce the multidimensional poor population on the other hand per capita income increase can reduce the poverty. Similarly increase in agriculture value addition significantly reduces the multidimensional poverty but the value addition to service and industrial activities are not capturing the multi dimensionally poor people. Hence policy makers should think how the benefits of social sector spending, value addition by industrial and service sector can reach the multidimensional poor so that they can be escaped from this curse of poverty in all its dimensions.

Key words: Sustainable development goals, multidimensional poverty, social sector spending, net state domestic product, activity wise value addition

1. INTRODUCTION

In the year 2000 (September) the United Nations General Assembly adopted the declaration which is known as UN Millennium Declaration emphasising a global partnership to reduce extreme poverty with a quantifiable target which was supported by United States and the world's leading development institutions and all the member states of United Nations. In this declaration eight objectives were settled with had to be fulfilled with in 2015. These objectives were known as MDGs or Millennium Development Goals. In short MDGs include

1. Eradicate extreme poverty and hunger
2. Achieve universal Primary education
3. Promote gender equality and empower women.
4. Reduce child mortality
5. Improve mental health
6. Combat HIV/AIDS, malaria and other diseases
7. Ensure environmental sustainability
8. Develop a global partnership for Development

Now regarding the achievement of MGDs there were two groups of thoughts. One group supports its successfulness for reducing poverty, improving literacy and fulfilling other goals but another group criticised MDGs achievements. According to this group MDGs only applied to countries of the global south, and that they had collectively played a minimal role in their design. Whatever its success or failure but it is true that MDGs were the first attempt to set global goals and targets which can be treated as a catalyst for countries to develop and strengthen their policies for the improvement of health and well-being of their populations. The momentum generated by MDGs led to the creation and adoption of the sustainable development goals in 2015 which expanded the goals to include indicators related to economic development, social welfare and environmental sustainability with targets to be accomplished by 2030, (Subramanian Etel, 2023).

Sustainable Development Goal indicators should be disaggregated, where relevant, by income, sex, age, race, ethnicity, migratory status, disability and geographic location, or other characteristics, in accordance with the Fundamental Principles of Official Statistics. The 17 Sustainable development Goals are shown below. Goal 1: End poverty in all its forms everywhere

- Goal 2: End hunger, achieve food security and improved nutrition and promote sustainable agriculture
- Goal 3: Ensure healthy lives and promote well-being for all at all ages
- Goal 4: Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all
- Goal 5: Achieve gender equality and empower all women and girls
- Goal 6: Ensure availability and sustainable management of water and sanitation for all
- Goal 7: Ensure access to affordable, reliable, sustainable and modern energy for all

- Goal 8: Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all
- Goal 9: Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation
- Goal 10: Reduce inequality within and among countries
- Goal 11: Make cities and human settlements inclusive, safe, resilient and sustainable
- Goal 12: Ensure sustainable consumption and production patterns
- Goal 13: Take urgent action to combat climate change and its impacts
- Goal 14: Conserve and sustainably use the oceans, seas and marine resources for sustainable development
- Goal 15: Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss
- Goal 16: Promote peaceful and inclusive societies for sustainable le development, provide
- Goal 17: Strengthen the means of implementation and revitalize the Global Partnership for Sustainable Development Finance

2. Objectives of this study:

This paper takes the 1st goal that is end of poverty in all its form everywhere and tries to assess the change of poverty in all its form measured by Multi-dimensional poverty of India during the time period 2015-16 to 2019-21. Since the Multi-dimensional poverty is the product of head count ratio and the intensity of poverty this study considers both the variables and calculate the change during these periods. Since head count ratio implies the proportion of multidimensional poor population hence the change between two periods indicates escape or addition to MPI, similarly the intensity of poverty implies average proportion of deprivations which is experienced by multi-dimensionally poor individuals, hence the difference of value in two periods implies escape or addition of intensity of poverty of MPI population. Multidimensional poverty index is the product of head count ratio and intensity of poverty as mentioned earlier, hence the difference of MPI between two periods 2015-16 and 2019-20 reflects the escape or addition to MPI poor population in India.
Since multidimensional poverty is an index prepared by using three dimensions health, education and standard of living, hence this study seeks to investigate the relation between social sector spending, GDP, GDP per-capita and MPI escape during the time periods 2015-16 to 2019-20 and also tries to enquire the relation between value added by three sector of the economy and the MPI escape population in India.

Variables, Data and Data Sources:
Variables used in this study:

State/ UT wise Changes over time (2015-16 to 2019-21)
1. Headcount Ratio poor population (in absolute number using 2011 census)
2. Intensity poverty measured by absolute number and
3. Change in Multidimensional poverty index (Number of people who escaped multi-dimensional poverty)
4. State wise Social Sector Expenditure (Billion Rs)
5. Gross State Value Added by economic Activity- Agriculture (Rs. Lakh)
6. Gross state value added by economic activity – Industry (Rs.Lakh)

7. Gross state value added by economic activity – Service
8. Gross State domestic product (At Constant Prices)
9. Per capita net state domestic product- state-wise (at 2011-12 prices)

3. Data Sources:

National Family Health Survey (NFHS-4 (2015-16) and NFHS-5 (2019-21) data for the time period 2015-16 and 2019-21 are used for the variables Head count, intensify of poverty and Multidimensional poverty index. Reserve bank of India published data set for the variables state wise social sector expenditure, GDP, GDP per-capita and the gross value added by economic activity. All the variables are taken for the two different time periods and calculate the change.

4. Hypothesis of the Study:

1. Reduction of multidimensional poverty depends on social sector spending and GDP
2. Reduction of multidimensional poverty depends on social sector spending and GDP per capita
3. Reduction of multidimensional poverty depends on Gross State Value Added by economic Activity (Agriculture)
4. Reduction of multidimensional poverty depends on Gross State Value Added by economic Activity (Industry)
5. Reduction of multidimensional poverty depends on Gross State Value Added by economic Activity (Services)
6. Reduction of Head count poverty depends on Gross State Value Added by economic Activity (Agriculture)
7. Reduction of Head count poverty depends on Gross State Value Added by economic Activity (Industry)
8. Reduction of Head count l poverty depends on Gross State Value Added by economic Activity (Services)
9. Reduction of intensity of poverty depends on Gross State Value Added by economic Activity (Agriculture)
10. Reduction of intensity of poverty depends on Gross State Value Added by economic Activity (Industry)
11. Reduction of intensity of poverty depends on Gross State Value Added by economic Activity (Services)

5. Methodology:

Multiple regression technique is applied in this study taking separate equation for social sector expenditure and GDP and/or GDP per-capita income as independent variables and the escape from MPI as dependent variable (its two components are also taken separately) and also value added by economic activity wise (all the three agriculture, Industry and services) are taken separately as independent variable with MPI escape as the dependent variable. Finally, the diagnostic checking also done to check the presence of heteroscedasticity, multicollinearity, etc in each cases separately.

states	escape from MPI	hc escape	intent escape	SSE	GDP	agriculture	Industry	service
Andhra Pradesh	30,19,718	4829.5751	1826.9496	21277	17117711	2008394	3409877	5065903
Arunachal Pradesh	1,61,358	144.9048	58.2664	2320	490425	-73823	58406	209762
Assam	46,87,541	4150.398	1082.8482	16833	4959824	30075	1951011	1398810
Bihar	2,25,11,679	18873.1487	3757.9739	19239	10179522.52	171127	1911111	6537513
Chhattisgarh	40,18,328	3456.2385	518.5635	11724	5929126	312650	2558677	1623416
Goa	45,564	42.6028	19.5506	1403	872068	-2941	465056	283954
Gujarat	47,84,122	4115.964	1039.568	18323	37081199	1261810	15606204	11708776
Haryana	14,29,341	1219.3831	268.7206	20045	15262895	683027	4975375	5596059
Himachal Pradesh	1,96,579	182.609	-53.547	4881	2489365	-18917	1241069	862479
Jammu & Kashmir	10,44,860	973.1816	258.3446	7990	1694177	13668	245768	1042205
Jharkhand	51,52,626	4384.1052	768.6204	10918	5687424	249421	2185853	2547217
Karnataka	34,87,223	3170.8305	946.9725	28401	31849913	1827795	4856784	19247634
Kerala	53,239	50.109	691.5042	5455	11531268	-158927	1655528	7023287
Madhya Pradesh	1,35,69,242	11576.7438	2578.2585	29610	15681810	3941799	3585300	4971523
Maharashta	87,37,064	7854.9426	2236.2426	50719	38969889	1666705	5967079	23626391
Manipur	2,81,803	253.0416	77.112	1562	370188	101843	-55305	248614
Meghalaya	1,56,738	140.9325	2.0769	1661	428497	-9590	12573	408872
Mizoram	54,665	49.1456	19.746	1602	294806	13000	-79539	309804
Nagaland	2,14,354	192.5567	72.8272	1680	381630	-12754	35980	242482
Odisha	62,62,852	5733.6484	805.9008	24783	10576324	679039	4116964	2879719
Punjab	2,50,586	227.4926	699.1236	5371	8324270	459629	1609356	4371528
Rajasthan	1,08,16,230	9288.254	3180.6272	24810	11622399	1442023	-1273293	7104972
Sikkim	8,236	7.4542	1.0998	1116	512254	45388	266746	168927
Tamil Nadu	19,58,454	1846.9632	916.2669	16334	27627304	46358	9388691	11539670
Tripura	1,43,237	128.9574	86.339	997	1127645	105869	138053	717556
Uttar Pradesh	3,42,72,484	29472.27	5534.7924	34092	23203376	1880086	6900619	12678802
Uttarakhand	9,17,299	806.88	238.0296	4073	3448073	62952	1188998	1669825
West Bengal	92,58,462	8579.944	2875.194	28592	17487939	663718	7663923	8794258
Delhi	2,11,163	169.5588	324.0084	9721	11169355	-120	1384137	8880875
Puducherry	13,804	10.7328	6.4896	356	741384	2165	512704	187127

Table 1: Data Matrix:

Estimable equations in this study:

$$MPIESCAP_i = \alpha + \beta_1\ SSEDIF_i + \beta_2\ GDPDIF_i + u_i \text{---------(1)}$$
$$MPIESCAP_i = \alpha + \beta_1\ SSEDIF_i + \beta_2\ GDPPCDIF_i + u_i \text{------(2)}$$
$$HCESCAP_i = \alpha + \beta_1\ SSEDIF_i + \beta_2\ GDPDIF_i + u_i \text{ ----------(3)}$$
$$HCESCAP_i = \alpha + \beta_1\ SSEDIF_i + \beta_2\ GDPPCDIF_i + u_i \text{--------(4)}$$

$$INTENPESP_i = \alpha + \beta_1\ SSEDIF_i + \beta_2\ GDPPCDIF_i + u_i \text{----(5)}$$
$$MPIESCAP_i = \alpha + \beta_1\ \text{AGRIVADD}_i\ + \beta_2\ \text{INDUSVAD}i + \beta_3\ \text{SERVADD}_i + u_i \text{----(6)}$$
$$HCEs_i = \alpha + \beta_1\ \text{AGRIVADD}_i\ + \beta_2\ \text{INDUSVAD}i + \beta_3\ \text{SERVADD}_i + u_i \text{-------(7)}$$
$$\text{INTENPESP}_i = \alpha + \beta_1\ \text{AGRIVADD}_i\ + \beta_2\ \text{INDUSVAD}i + \beta_3\ \text{SERVADD}_i + u_i \text{----(8)}$$

Where $MPIESCAP$ is MPI escaped population of various states and UTs in India , $SSEx_i\ is\ the\ change\ in\ Social\ sector\ Expenditure$ of the government in various states and UTs, GDPPC is the change in per capita net state domestic product at constant prices, $HCESCAP$ is the head count poverty escaped population in various states and UTs, INTENPESP is the intensity of Poverty escaped population, $Agrivadd_i$ is the gross state value added by agricultural activities at constant prices , similarly $Indusvaddi$ and $Servicevadd_i$ are gross state value added by industry and service activities respectively at constant prices.

6. Graphical Analysis:

From the above figure-1 it is clear that highest number of populations escaped from Multidimensional poverty is in Uttar Pradesh, followed by Bihar and Madhya Pradesh, Rajasthan. Figure -2 and figure-3 reflects the state wise reduction of Head count multi-dimensional poor population and the intensity of their deprivation during the time period 2015-16 to 2019-21. The pattern is same as MPI, here again Uttar Pradesh and Bihar takes the top position in reducing the multidimensional poor population followed by Madhya Pradesh, Rajasthan, Maharashtra. Regarding intensity of poverty other than Uttar Pradesh, Bihar Madhya Pradesh, West Bengal and Andhra Pradesh did well.

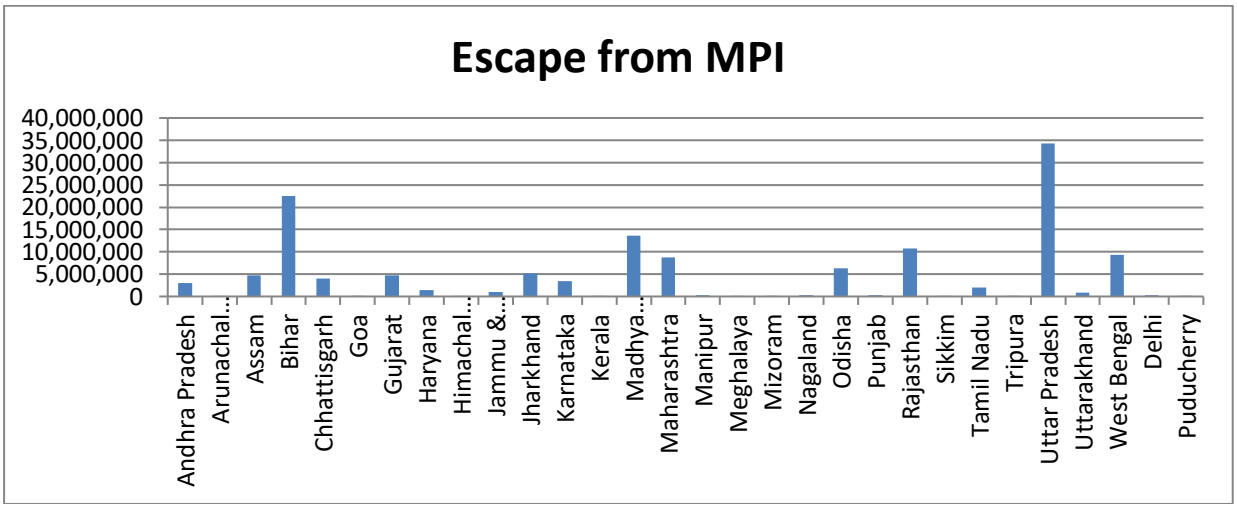

Figure-1 Reduction of population from Multidimensional poverty during the assessment period

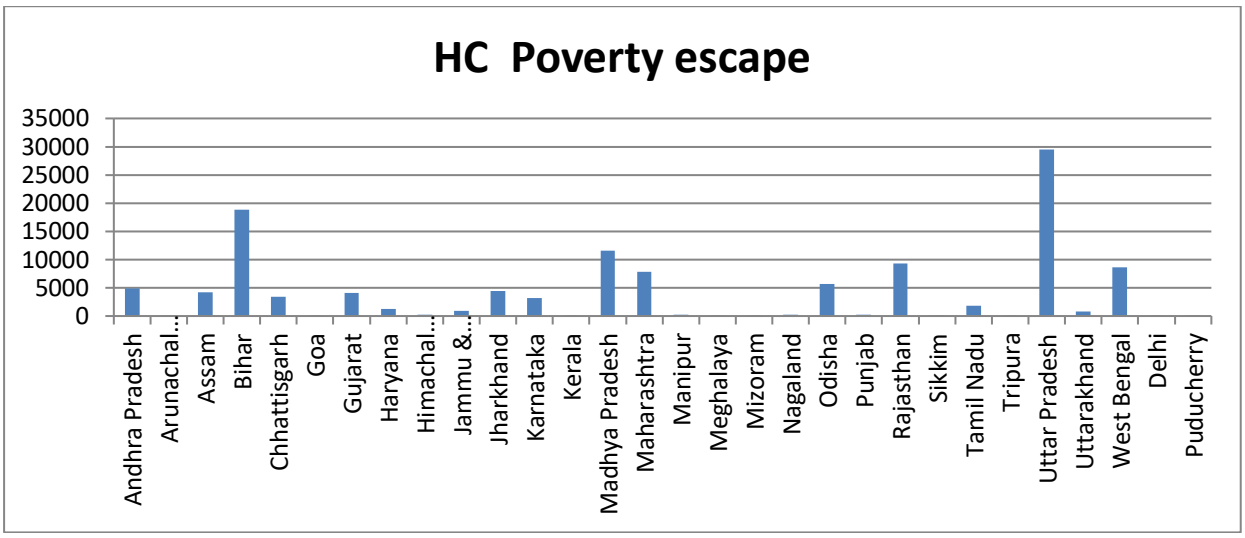

Figure-2 Reduction of population from Head count ratio measure of poverty during the assessment period

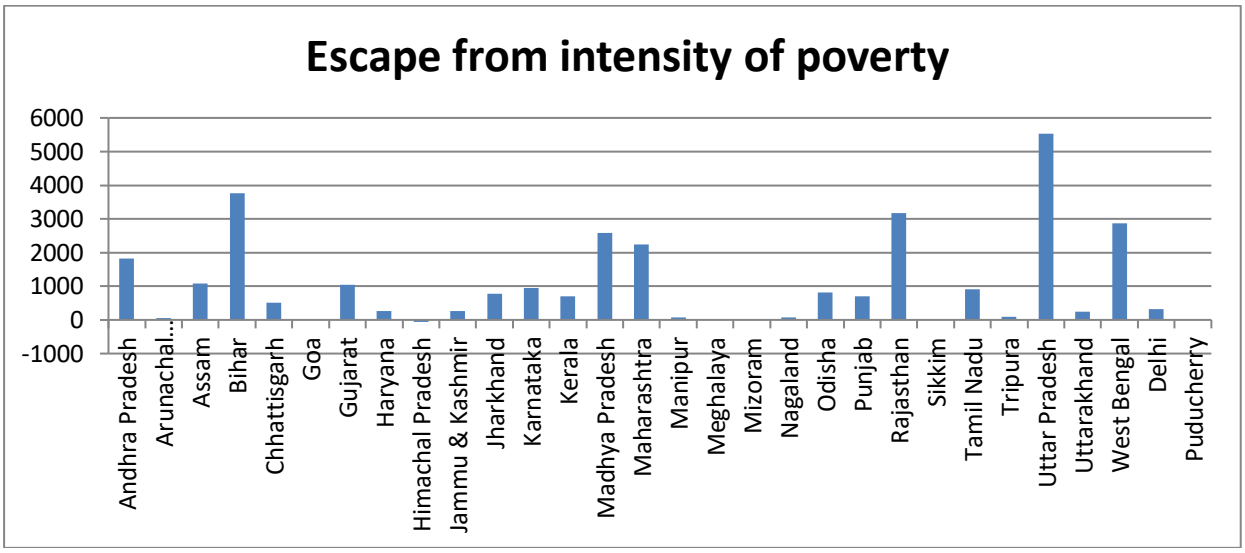

Figure-3 Reduction of population from intensity of poverty during the assessment period

Since the first two dimensions of measuring Multidimensional poverty is Health and Education, hence it is expected that government spending in health and education sector plays an important role for the reduction of poverty. Maharashtra takes the highest position in social sector spending followed by Uttar Pradesh, Madhya Pradesh, West Bengal, Karnataka and Odisha.

Figure-4 Change in social sector expenditure in various states and UTs of India during the assessment period

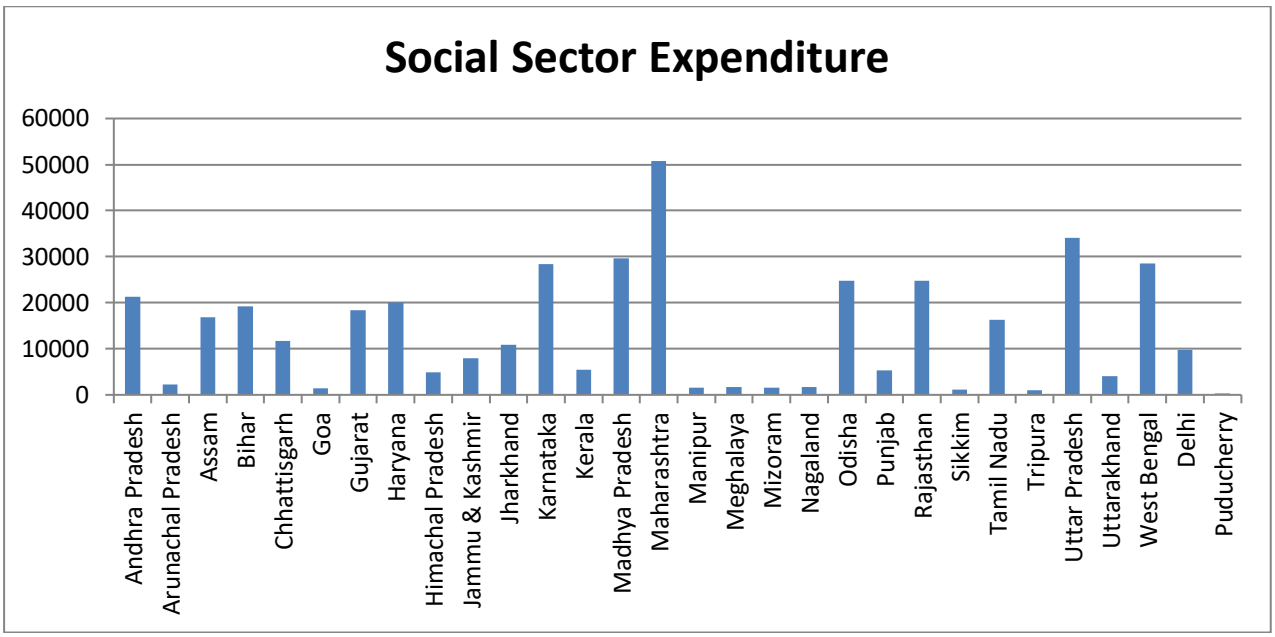

Figure -4 shows the state wise change in spending in social sector.

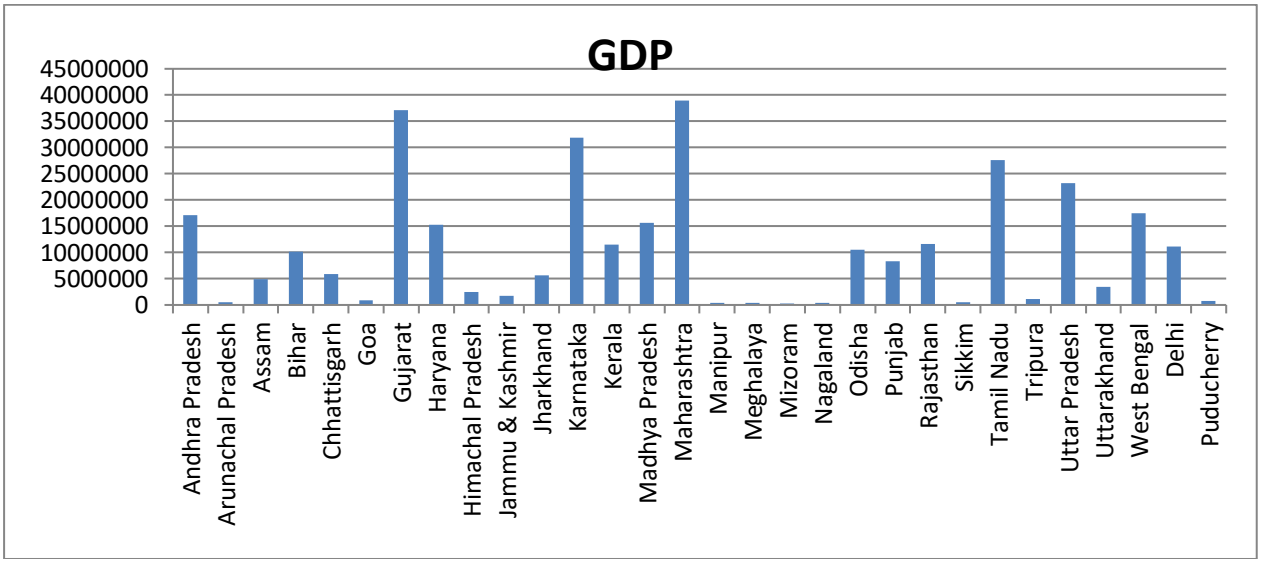

Figure-5 Change in GDP in various states and UTs of India during the assessment period

Figure -5 and 6 shows the change in state gross domestic product at constant price during the time period of the study. From figure-5 it is clear that Maharashtra takes the first place in changing the state GDP followed by Gujarat, Karnataka, Tamil Nadu and Andhra Pradesh. Bihar, Kerala, Odisha and West Bengal are more or less in the same level of change. North eastern states are far behind in this context.

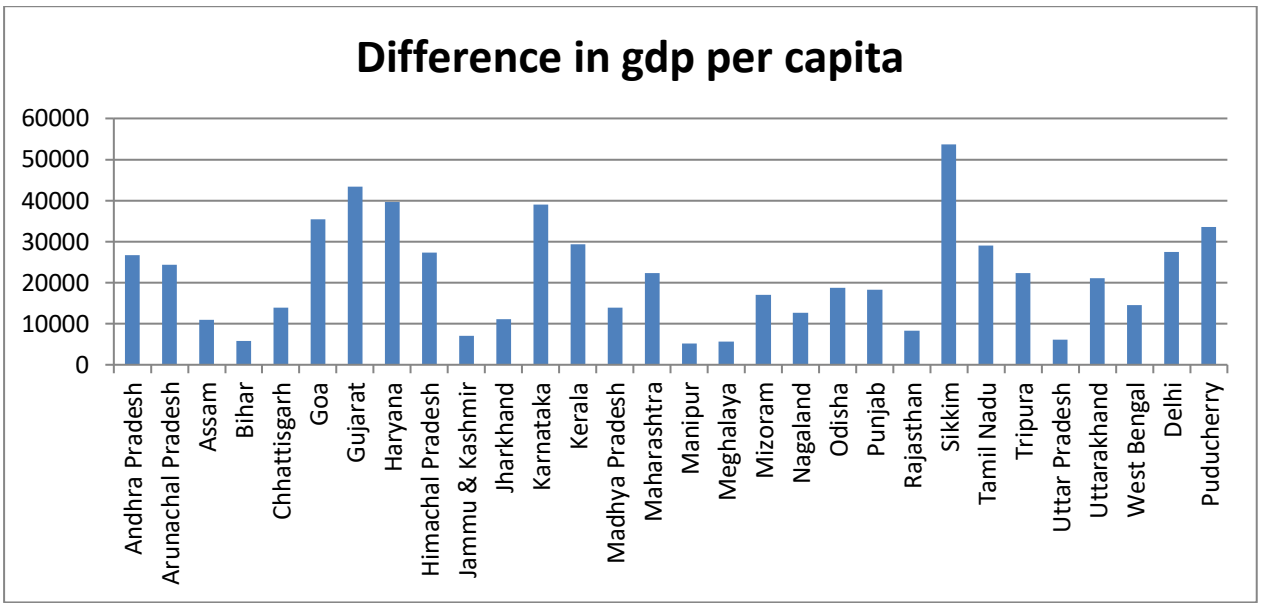

Figure-6 Change in GDP per-capita in various states and UTs of India during the assessment period

Figure-6 shows the change in per capita state domestic product at constant prices. One interesting thing is found here is that Sikkim takes the highest position in changing per capita income compared to other states in India, followed by Gujarat, Haryana, Goa, and Puducherry. Other states are not showing a huge change in this variable.

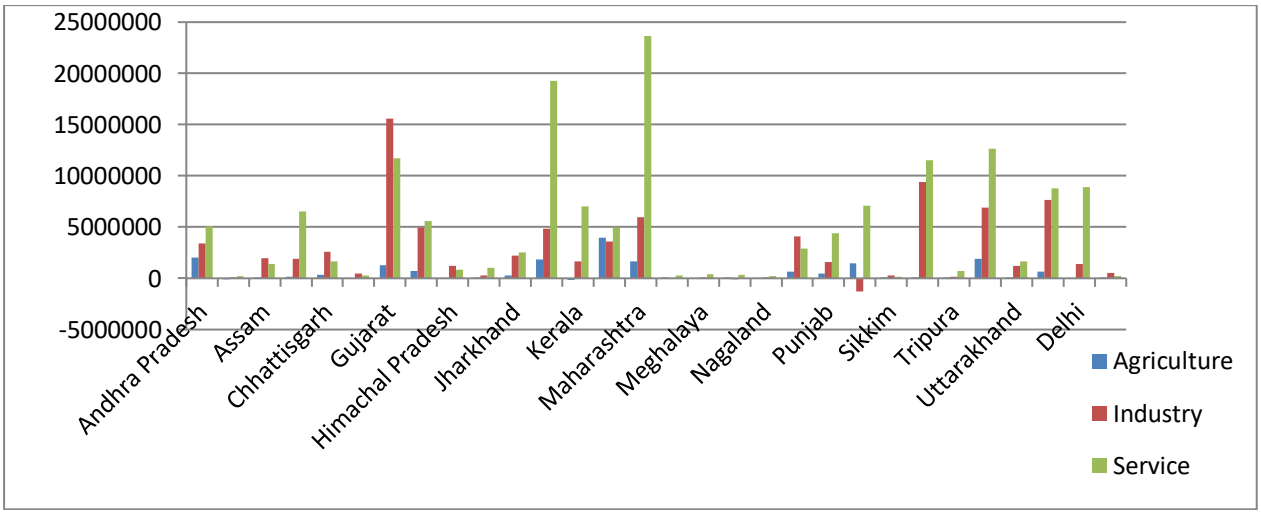

Figure-7 Change in activity wise (agriculture, Industry and Service) value addition in various states and UTs of India during the assessment period

Figure-7 shows the activity wise value addition in various states of India and Union territories from this figure it is clear that service sector takes the top place among these three sectors and Maharashtra takes the top place in service sector contribution of their state gross domestic product followed by industrial sector. The contribution of agriculture sector is not significantly visible through bar diagram.

Equation no.	Dependent Variable	Independent Variable	Estimated Value	P value	Breusch–Pagan/Cook–Weisberg test for Heteroskedasticity H0: Constant variance	VIF	Heteroscedasticity corrected p value
1.	MPIESCAPE	$SSEX$DIF	-571.73	0.001	chi2(1) = 76.82	2.94	0.00
		GDPDIF	.25	0.13	Prob > chi2 = 0.00	2.94	0.04
2	MPIESCAPE	$SSEX$DIF	-364.25	0.00	chi2(1) = 23.64	1.01	0.00
		GDPPCDIF	207.57	0.01	Prob > chi2 = 0.00	1.01	0.04
3	HCPESCAPE	$SSEX$DIF	-.49	0.00	chi2(1) = 29.42	2.94	0.00
		GDPDIF	0.0002	0.12	Prob > chi2 = 0.00	2.94	0.04
4	HCPESCAPE	$SSEX$DIF	-.32	0.00	chi2(1) = 24.75	1.01	0.00
		GDPPCDIF	.17	0.01	Prob > chi2 = 0.00	1.01	0.03
5	INTESPESCAPE	$SSEX$DIF	-.08	0.00	chi2(1) = 17.88	1.01	0.00
		GDPPCDIF	.033	0.01	Prob > chi2 = 0.00	1.01	0.03
6.	MPIESCAPE	AGRIVADD	3.38	0.04	chi2(1) = 11.14	1.94	0.02
		INDUSVAD	.09	0.84	Prob > chi2 =	1.69	0.80
		SERVADD	.22	0.45	0.0008	1.36	0.41
7.	HCPESCAPE	AGRIVADD	.003	0.03	chi2(1) = 11.25	1.94	0.01
		INDUSVAD	.0001	0.81	Prob > chi2 =	1.69	0.77
		SERVADD	.0002	0.46	0.0008	1.36	0.42
8.	INTENPESP	AGRIVADD	.001	0.01	chi2(1) = 10.72	1.94	0.01
		INDUSVAD	-4.38e-06	0.95	Prob > chi2 =	1.69	0.95
		SERVADD	.00006	0.15	0.0011	1.36	0.19

Table 2: Estimated results of the equations of this study:

7. Findings:

From the above results it is clear that, reduction of multidimensional poverty or the escape from multidimensional poverty is negatively associated with the change in social sector expenditure change. It implies more the change in social sector expenditure less the escape from multidimensional poverty. On the other hand, change in net state domestic product is positively associated with poverty escape, although the estimated parameter is not significant. Though Breusch–Pagan/Cook–Weisberg test for Heteroscedasticity test results show that there is heteroscedasticity exists in the model, hence heteroscedasticity corrected estimation shows the estimated parameter of GDPDIF is statistically significant. It implies with an increase in net state domestic product difference between the two time periods population escaped from poverty also increases. Similar results obtained if we replace the net state domestic product by per capita net state domestic product. Here again the relationship between is positive and significant. So increase in per capita income reduces multidimensional poverty (increase the difference in two periods). The estimation is also carried out by taking the other two measures that is head count poverty and intensity of poverty. The relationship is unchanged as earlier that is negative with the change in social sector expenditure and positively associated with GDP per capita income change. Multicollinearity is not seen in any estimated model. Now coming to testing of another hypothesis that relates poverty escape and change in activity wise (agriculture, Industry and

Service) value addition in various states and UTs of India during the assessment period that is the estimated results of equation 6, 7 and 8. In all the three cases it is clear that changes in agriculture value addition positively affecting poverty escapes that is more the change in agricultural value addition more the number of poverty reduction, but the value addition in service and industry is not significantly helping for multidimensional poverty reduction.

In the literature we found Irz et al. (2001) study which identifies three specific pathways whereby growth in agriculture can influence poverty reduction at the level of the national economy. First, agricultural growth can yield a sustained transfer of resources to other sectors, including through the supply of capital. This can occur through voluntary domestic savings, or through government taxes on the agricultural sector (direct or indirect). Second, increased agricultural exports can increase the supply of foreign capital or substitute for food imports. Third, where agricultural productivity grows at a faster rate than total output, it can release labour from agriculture into other sectors.

In a cross-country sample, Gallup et al. (1997) find a 1% increase in agricultural GDP leads to a 1.61% increase in the incomes of the poorest quintile. While empirical evidence confirms the presence of agricultural multiplier effects, their strength depends on the structure of the economy since non-tradeable goods will generate more local economic activity. For example, small economies with large tradable sectors, such as Lesotho, experience smaller multipliers from agricultural growth than larger economies with a greater share of non-tradeable goods and services, such as Cameroon, Nigeria and Tanzania.

8. Summary and Conclusion:

This study explores that the multidimensional poor people are not taking part in industrial or service sector value addition activities, hence change of these two sectors are not affecting to reduce poverty. Still now in India maximum poor, illiterate population are engaged in agriculture since in Industrial or service sector little bit efficiency, education or efficiency is required that is not captured by multi-dimensionally poor people in India. Moreover, it is expected that government spending in social sector should reduce poverty in all forms. But this study shows the fruits of social sector spending is not appropriated properly or job creation through social sector expenditure is not enough to control multi-dimensionally poor people in India. Either this expenditure is not coming up to their level in the mid-way it is appropriated by so called middlemen or this expenditure is not sufficient enough to raise the productivity or efficiency of the multidimensional poor people. Hence policy makers should think how the benefits of social sector spending, value addition by industrial and service sector can reach the multidimensional poor so that they can be escaped from this curse of poverty in all its dimensions. A study done by Herrera and Pang, 2004 related to measure the efficiency of public spending in health and education using data from 140 countries concludes that countries with higher expenditure levels and large wage bills (as percent of total budget) show lower efficiency scores). Similarly, in another study done by Afonso, Schuknecht and Tanzi (2003), on spending efficiency by exploring public sector performance in 23 OECD countries, concludes that countries with small public sectors realized the highest overall performance for their spending. Since India is a large open economy with huge expenditure on social sector in absolute term hence performance in social sector spending seems to be inefficient.

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