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Multidimensional Deprivation in India: A Study of Fifteen States

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Abstract: **This paper aims to compare the performance of fifteen Indian states in terms of measures of direct deprivation (captured by the Multidimensional Deprivation Index) and income deprivation (captured by the Head Count Ratio). Multidimensional Deprivation Index as a measure of poverty represents a more holistic approach that takes into consideration factors such as Education and Health as well the Standard of Living. This is a better measure of the actual deprivation (the lack of capability to utilize available resources) compared to other measures of Income Poverty. The paper also tries to study the relationship between the Multidimensional Deprivation Index and per capita State Domestic Product. The study finds that high rate of growth of per capita State Domestic Product is an insufficient condition for alleviating multidimensional poverty.**

Keywords: **Multidimensional Deprivation Index, Poverty, Education, Health, Capability.**

I. INTRODUCTION

Poverty is a serious problem in most developing countries and has been a much-debated issue during the recent years. One of the principal objectives of post-independent India has been to eradicate poverty, improving the lives of the deprived and strengthening social, political and economic outcomes. While the objectives have remained constant, new approaches have evolved. Previously, emphasis was given to income poverty alone; while in recent times attention has been directed towards both 'direct deprivation' and 'income poverty'. The entire concept of direct deprivation, or that poverty is not just the mere lack of monetary resources but so much more, stems from the introduction of the 'capability' concept by Sen (1992).

India has sustained a strong economic growth rate at over five percent on average during every five-year plan period since the 1980s. Although growth in gross national income (GNI) has been much higher than most of her neighboring countries, growth has not been as inclusive as some of her neighbours – either in terms of reducing the proportion of income poor or in terms of improving many of the key social indicators. Although the share of people living below both the World Bank's $1.25/day poverty line and the national poverty line has fallen by nearly one percentage point per annum on average in the past two decades (Deaton and Drèze 2002, Ravallion 2008), but this reduction has been much slower than the reduction in income poverty in Bangladesh, Pakistan and Nepal, despite these countries' having much lower GNI growth rates than India (Drèze and Sen 2011). Hence, understanding progress only in terms of income growth is not sufficient.

Our study here follows a similar approach, to the one developed by Alkire and Foster (2011), where we formulate a Multi-Dimensional Deprivation Index based on 10 plausible indicators under the three categories of Standard of Living, Health and Education for fifteen states of India. The paper also tries to analyze the relationship between monetary poverty and multidimensional poverty across states of India. Thereafter we try to establish a relation or the lack thereof, between the direct deprivation observed in the states and the Gross Domestic Product of these states. The aim is to elucidate the classic Growth versus Development debate, and point out if material growth necessarily signifies a decline in direct deprivation as well. The main data sources for this paper are NFHS-4, the Planning Commission of India and the Reserve Bank of India.

The paper is organized as follows. Section II of this paper briefly acknowledges the contribution of various economists whose work in this regard has been the guidance for this paper. Section III provides the results and analyses of this study while Section IV concludes the paper.

II. LITERATURE REVIEW

The capability approach argues that financial means do not reflect the extent of freedom enjoyed by the people because personal and group-specific characteristics may result in remarkable interpersonal and intergroup variations in the conversion of income and other resources or primary goods into the freedom to achieve alternate lives. Individuals have neither the same needs for resources nor the same abilities to convert resources into real freedom (Nussbaum, 2011; Sen 1992).

According to Bourguignon and Chakravarty (2003), "well-being is intrinsically multi-dimensional from the view point of 'capabilities' and 'functionings', where functionings deal with what a person can ultimately do and capabilities indicate the freedom that a person enjoys in terms of functionings"(p. 275). They have insisted on the necessity of defining poverty as a multi-dimensional concept rather than relying only on income or consumption expenditures per capita. They argue that existing attempts along this direction consist of aggregating various attributes into a single index through some arbitrary function. All these are merely redefining the more general concept of poverty, which essentially remained a uni-dimensional concept. They suggest that the only way to truly take into account the multi-dimensionality of poverty is to specify a poverty line for each dimension of poverty and to consider that a person is poor if he/she falls below at least one of these various lines. They also explored ways to combine various poverty lines and associated one-dimensional gaps into multidimensional poverty measures to be evaluated on samples of individuals or households. Based on this idea, the HPI (Human Poverty Index), a comprehensive welfare index used by the UNDP (United Nations Development Program) was developed by Chakravarty & D'Ambrosio (2006) and Chakravarty & Majumdar (2005). The HPI, in keeping with the recent multidimensional deprivation measures, allows greater flexibility in interpretation as it lets the data set specify the percentage contribution of each of the welfare indicators to overall deprivation.

Alkire and Foster (2011) attempted in their study to offer a practical approach to identify the poor and measure aggregate poverty. This paper analyzed the strength, limitations, and misunderstandings of multidimensional poverty measurement in order to clarify the debate and catalyze further research. They established the general definitions of uni-dimensional and multidimensional methodologies for measuring poverty and provided an intuitive description of the measurement process, including a 'dual cut-off' identification step that views poverty as the state of being multiply deprived, and an aggregation step based on the traditional FGT measures.

Initially, in India also, poverty measures were uni-dimensional in nature and were based on income or expenditure alone. However even the poor themselves report their experiences to be multidimensional. Thus from 2002, the Indian Government started identifying rural households as 'below the poverty line' (BPL), based on a thirteen-item census questionnaire. This was however widely criticized for corruption, low data quality and coverage, as well as the flawed weighting and aggregation procedure. Feeling the need for a better measure Alkire and Alkire and Seth (2008), used NFHS data, arguably of better quality, and compiled a pseudo-BPL score, by selecting 10 plausible matching indicators (from the NFHS data) and using the method suggested by Alkire and Foster (2007).

III. MULTIDIMENSIONAL POVERTY IN THE INDIAN STATES

We begin our analysis by constructing a Multidimensional Deprivation Index (MDI) for fifteen states of India. The states have been selected on the basis of their relative size (by population) and importance. The state of Andhra Pradesh has been deliberately avoided as it has gone through a recent fragmentation and some measures might be skewed as such. In order to compute the Multidimensional Deprivation Index (MDI) for the states, the following ten indicators have been selected.

The dimensional indices have been calculated using the following formula:

$$\textit{Dimensional Index} = \frac{Actual\ Value - Min\ Value}{Max.Value - Min.Value}$$

The simple arithmetic mean of these Dimensional Indices yields the Multi-Dimensional Deprivation Index. Here it is to be noted that the positive indicators for development have been deliberately turned into indicators of deprivation by subtraction each percentage from 100%.

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Table 1: Indicators for Multidimensional Deprivation Index

Dimension	Indicators
Standard of Living	Houses without Electricity (%)
	Houses without Improved Water Source (%)
	Houses without Improved Sanitation (%)
	Houses without Clean Fuel (%)
	% of Women not Owning a House and/or Land
	% of Women not having a Bank and/or Savings Account
Education	% of Women who are Illiterate
	% of Women who have less than 10 years of Schooling
Health	Infant Mortality Rate
	% of Women with BMI < 18.5 kg/m

Source: 'NFHS-4, State Fact Sheet', Ministry of Health and Family Welfare, Government of India

Table 2 shows the dimensional deprivation indices for Standard of Living, Education and Health for the year 2015-16 and the corresponding ranks of the states on the basis of the constructed indices. As can be observed from Table 2, Bihar is the worst performer in terms of Standard of Living and Education, while Uttar Pradesh is the worst performer in terms of Health closely followed by Bihar. Kerala has the best performance in all three dimensions. Considerable inter-state variations can also be observed from the table. Here ranking has been done in a descending order, i.e., the worst performing state has been given rank 1. The mean of these indices of direct deprivation give the Multidimensional Deprivation Index (MDI) which is shown in Table 3. The table also shows a comparison of state rankings on the basis of MDI and per-capita SDP.

Table 2: State Performance on the basis of the Dimensional Deprivation Indices

States	Standard of Living	Rank (Descending)	Education	Rank (Descending)	Health	Rank (Descending)
Assam	0.6387	4	0.7358	8	0.7485	5
Bihar	0.6943	1	1.0000	1	0.8621	2
Chhattisgarh	0.6330	5	0.7897	4	0.8244	4
Delhi NCT	0.3846	11	0.3582	13	0.3411	12
Gujarat	0.5044	10	0.6556	9	0.6641	8
Karnataka	0.3827	12	0.5415	10	0.4467	11
Kerala	0.2697	15	0.0000	15	0.0000	15
M. Pradesh	0.6698	2	0.8945	3	0.8396	3
Maharashtra	0.5075	9	0.4879	11	0.4885	9
Odisha	0.5371	8	0.7763	6	0.6989	7
Punjab	0.2938	14	0.3439	14	0.2466	13
Rajasthan	0.6405	3	0.9053	2	0.7196	6
Tamil Nadu	0.3496	13	0.4071	12	0.2390	14
U. Pradesh	0.6172	6	0.7798	5	0.8768	1
W. Bengal	0.5945	7	0.7410	7	0.4612	10

Source: 'NFHS-4, State Fact Sheet', Ministry of Health and Family Welfare, Government of India

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Table 3: Rank (descending) of the States on the basis of MDI and Per Capita SDP (2015-16)

States	MDI	Rank	PCSDP at Factor Cost (Base: 2011-12) (Thousand Crores)	Rank
Bihar	0.78897	1	0.36648	1
Uttar Pradesh	0.70162	5	0.56046	2
Assam	0.68008	6	0.7251	3
Madhya Pradesh	0.74869	2	0.73036	4
Odisha	0.61727	7	0.78828	5
Rajasthan	0.7093	3	0.99749	6
West Bengal	0.59716	8	1.00802	7
Chhattisgarh	0.70261	4	1.02085	8
Punjab	0.29435	14	1.41132	9
Tamil Nadu	0.33897	13	1.61055	10
Karnataka	0.42727	11	1.65775	11
Kerala	0.16184	15	1.6702	12
Gujarat	0.56657	9	1.69621	13
Maharashtra	0.4998	10	1.78086	14
Delhi NCT	0.37062	12	3.26472	15

Source: Table 2 and RBI Handbook of Statistics

Next, we compare the relative position of the states on the basis of two alternative measures of poverty – the Head-Count Ratio and the Multidimensional Deprivation Index for the year 2011-12. The correlation coefficient of 0.748 between HCR and MDI implies that the two measures of poverty are strongly associated.

Table 4: State Rankings on the basis of HCR and MDI (2011-12)

States	HCR*	Rank	MDI	Rank
Assam	32.5	4	0.680079	6
Bihar	34.06	2	0.788965	1
Chhattisgarh	40.2	1	0.702609	4
Delhi NCT	--		0.370621	12
Gujarat	16.95	10	0.566566	9
Karnataka	21.18	7	0.427271	11
Kerala	8.08	14	0.161838	15
Madhya Pradesh	31.98	5	0.748692	2
Maharashtra	17.31	9	0.499798	10
Odisha	32.91	3	0.617265	7
Punjab	8.23	13	0.294347	14
Rajasthan	14.78	11	0.709301	3
Tamil Nadu	11.71	12	0.338974	13
Uttar Pradesh	29.5	6	0.701624	5
West Bengal	20.43	8	0.597158	8

*Source: *Planning Commission Report 2011-12 and as in Table 3*

In order to study the relationship between MDI and PCSDP, we regress MDI (y_i) on PCSDP (x_i). The regression equation can be written as $y_i = \alpha + \beta x_i + u_i$ for $i = 1,2,\ldots,15$. The regression results are shown in Table 5.

Table 5: Result of regression of MDI (y) on PCSDP (x)

	Coefficients	*Standard Error*	*t Stat*	*P Value*
Intercept	0.781458117	0.077348397	10.10309383	0.000
X- Variable	- 0.182323091	0.052946409	- 3.443540276	0.004

Source: Table 3

The observed value of the t-statistics, t_{obv} **(-3.44354)** $< t_{14,\ 0.05}$. As such the null hypothesis, H_0: (β=0) is rejected at 5% level of significance. Therefore, the relationship is statistically significant at 5% level. The value of R^2, a measure of the goodness of fit of the regression of MDI on per capita SDP, is found to be 0.477 which is quite low. As such it can be concluded that the rising per capita SDP is not a sufficient condition for lowering MDI.

IV. CONCLUSION

The study finds that considerable disparity exists across the states in terms of the different dimensions of poverty. It brings to light the gross inadequacy of the housing conditions of many states. It also shows the existence of gender inequality in India where only a select few women are privileged enough to own their house/land. Adequate drinking water facilities and education opportunities also need to be ensured by the government of the states. Only then can there be true development. However, it has to be remembered that robust economic growth by itself does not imply development of the masses. As can be observed from the above study, the states of Gujarat and Kerala although having practically the same per capita income are quite removed in their development performances. While Kerala leads with a MDI of 0.16, Gujarat is quite behind at 0.56. Thus, policies need to be directed towards the multiple dimensions of poverty in an integrated framework.

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