PAPER ID: 11A13R

ESTIMATION OF PROVINCIAL MULTIDIMENSIONAL POVERTY INDEX (MPI) OF PAKISTAN

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A R T I C L E I N F O

A B S T R A C T

Poverty has multidimensional aspects. That is, it does not only capture the lack of consumption expenditure in terms of food poverty, but it also considers education, sanitation, housing, health, and other aspects as well. Thus, the assessment of poverty also considers the incorporation of all aspects during its assessment phase. Therefore, the new methodology of poverty assessment captures these deficiencies/deprivations that people face. The paper estimates the multidimensional poverty index (MPI), by considering five dimensions i.e. the quality of housing, health facility, education, basic needs, and living standards with 11 indicators. The theme of this paper is to consider all dimensions right at the time of poverty assessment, not to consider after the poverty assessment (as effects of poverty). This will clearly explain the multidimensional aspects of poverty assessment. This study will adopt a methodology used by Alkire and Foster (2007). This study used PSLM (Pakistan Social and Living Standard Measurement Survey, Round VII, 2013-14), which is micro-level data at the provincial level covered eighteen thousand households collected by the Pakistan Bureau of Statistics. This study finds that the nation-wise headcount ratio is 87% and MPI is 35%. The provinces with the highest MPI are seen in Sindh and Balochistan by 40% and minimum MPI are noticed in the provinces Punjab by 31% followed by Kyber Pakhtunwa by 34%.

Disciplinary: Economic Sciences, Poverty and Wellbeing Studies, Socio-Economic Study, South Asia Study.

1. INTRODUCTION

More than 1129 million humans worldwide suffer from acute income poverty with a certain disparity. Poverty has become a major challenge in history for the developing world, due to its

widespread impact on the developmental process (UNDP, 2013). Income for the poverty measurement is a conventional measurement. Their justification of using the income as determine to poverty is based on the philosophy that income offers money by which one can fulfill the basic needs (Christiaensen et al. 2002). Absolute poverty means a situation that indicates an acute deficiency of basic needs like housing, provision of sanitation, water, food, health, information, safe drinking, and education therefore Poverty not only depends upon income but also on basic needs as well as access to services. (von Maltzahn et al. 2008).

According to most economists, poverty is a multidimensional phenomenon, yet in practice for poverty assessment, the majority of the researchers use a unidimensional index to analyze an individual's wellbeing by per capita income or usually expenditures (Duclos et al. 2006). But poverty has a variety of signs, like shortage of income and lack of productive resources which should be sufficient for ill health, livelihoods, hunger, malnutrition, and lack to access of educational facilities and mortality from illnesses, insufficient shelters, social discrimination, and insecure environment (seminal work of Sen, 1976). One researcher has characterized it by the lack of contribution of decision-making in social, civil, and artistic life which have presented the capabilities concept like good education and health (Laderchi 1997).

Poverty is a link between income and wellbeing that includes such as school enrolment, mortality, and malnutrition. For a complete picture of poverty, only income does not give all the essential information. Thus, for the image of absolute poverty additional dimensions should also be added (Dercon 2005). Similarly, the World Bank (1990; 2000) reports on poverty, focus on 3D of poverty in combination with income poverty i.e. education, health, voicelessness, and vulnerability.

To estimate the Multidimensional Poverty Index (MPI) by taking the following dimensions,

1. Quality of housing
    a. To see Occupancy Status (Own Occupied (Not Self hired)
    b. Dwelling Type (if the household have no independent house / Compound / Apartment / Flat)
    c. To see the room density (three or more than three persons per room)
    d. To see the sanitation facilities (if they have no sanitation facility)

2. To see health facility
    a. If any child has died in a family in the age of 0-5

3. To examine the education dimension
    a. Years of schooling (If no family member has completed 05 schooling years)
    b. School attendance (If any child of school-going age 4 to 8 is out of school)

4. To observe the basic needs
    a. Nutrition
    b. Drinking water (availability of drinking water)

5. To find the living standard of the masses
    a. Cooking fuel,
    b. Electricity,
    c. Assets (Freezer / Refrigerator / Air cooler / Air conditioner / Geyser / Washing machine / Dish antenna / Pc)

2. LITERATURE REVIEW

This chapter highlights the earlier studies and discussion and their summaries which are as under:

Although the literature on this topic is not sufficient, yet the following are the earlier studies that were carried out in this field. This paper explains the self-evident basis of multidimensional poverty indices avoiding the income poverty approach which measures poverty by predetermined poverty income line and took the basic need approach into account. The researcher also depicts the fact that area restrictions may have a crucial role in the design of "multidimensional poverty" indices (Tsui, 2002). Abraham et al. (2008) has suggested that an individual's poverty can be seen in her/his deficiency that consists of not "only income but also many other dimensions such as sanitation, health, and nutrition" not only in his income. Hereafter, a complete poverty measure should be taken into account by taking multiple dimensions of an individual. Poverty vulnerability confines the probability of an individual falling into poverty. Unlike poverty, that indicates the status of an individual, whereas nature vulnerability is predictive.

Sabina et al. (2014) implemented the first "direct method to measure the poverty" for more than 100 countries in developing context. After offering the MPI, she analyzed robustness and its scope, by considering the data constraints and issues of methodological which were involved in estimating and constructing. A variety of robustness tests shows that MPI is a dependable framework that can harmonize global poverty income estimation. Ramya et al. (2014) explored that multidimensional poverty measurement on the individual level shows the important weaknesses in the discussion of poverty. The researcher found that the majority of poor individuals belong to non-poor families. In the household level, poverty analysis these poor people would be misclassified as non-poor. The particular female is completely ignored in such a conventional approach. Currently, gender analysis is with female heads as the representative for all the females while disregarding those women who are living in such a family which are headed by males. He further said that several studies including his study found that "female household heads are not worse than" those whose household head is male; therefore, it is concluded that in poverty gender differences do not exist. Still, the study reveals that when poverty is measured on an individual basis, the mainstream of the women is found poor. He further added that about 25% of the households are suffering from multidimensional poverty.

On assigning the value of multidimensional poverty to individual members of the household, approximately 22% of all people of households are recognized as multidimensional poor with the ratio (21%) of men and (22%) women. Similarly, results indicate that there is a slightly higher poverty rate in male-headed families with the ratio (25%) more than (23%) female-headed ones. The analysis at the individual level, however, shows a different picture of poverty of gender differences i.e. among the women poverty rate 64% is more than double than the poverty rate 30% among men which indicates that the majority of the women are (71%). Thomas et al. (2009) compared and distinctions of poverty of lay individuals, who are suffered by policies. He took "Livelihood insecurity" as the key determinant of poverty for identification of poor households where families were classified into four different groups based on very poor livelihood (Hungry

households), Poor (agricultural laborers /Other casual laborers / Fish workers / Construction workers), non-poor (Government service, Gulf migrants (semi-skilled or unskilled), farmers /Traditionally well off families, skilled migrants. While the methodology indicates basic needs (clothing, food, sanitation, and housing), assets (consumer goods, debt, and land), capabilities (school attendance and literacy) and livelihood (means of livelihood, labor status, and migration) and the Kerala method took basic needs (water, food, sanitation, and housing) and capabilities (education), stress on socio and cultural factors. Whereas local method highlights only one aspect of poverty which is livelihood insecurity and also gave relative standing to diverse livelihood.

Conchita et al. (2011) used three approaches giving identical result, that 80% of the families are poor. They also find a U-shaped relationship amid the size of the family size and poverty as well as between the age of the individual and poverty. Also, marital status and work have the largest marginal effect over poverty, this impact is seen truly in all the five.

Franc et al. (2013) evaluated not only the nature of the multidimensional poverty of children but also to classify the children group which is most vulnerable in Darfur. It showed the child deprivation which may attract the interventions on a humanitarian basis to improve child welfare by improving nutrition, access to clean water and shelter, sanitation, health, and education. For humanitarian agencies and policymakers, this paper shows four important issues that declare an emergency. First, in Darfur, poverty is noticeably high; almost all children, boys, and girls, are disabled and nondisabled, Secondly, poor-children do not consist of the undeviating group. More, he has found disabled children, especially disabled girls, which shows the poverty at the highest level. This gap of "multidimensional poverty" between nondisabled and disabled, children with disabilities are significantly worse than non-disabled children. Thirdly, disable children are significantly worse off.

Mahmood and Hussain (2020) report the multidimensional Poverty Index (MPI) for urban and rural regions of Pakistan and find that rural region contributes a 76% share of MPI.

This work analyzes the estimation of the multidimensional poverty index at the provincial level of Pakistan, therefore it is important to explore its different aspects.

3. METHODOLOGY AND DATA

For the estimation of MPI researcher has used the methodology of Alkire and Faster (2007). The estimation section is broken into two parts one is the identification of poor and non-poor by using a dual-cutoff point approach. The first cutoff is used to identify the non-deprived and deprived while under the second cutoff, non-poor and poor is separated, and the second section consists of aggregation which is used to find information regarding the MPI at the provincial level.

3.1 DATA SOURCE

For research PSLM data (Pakistan Social and Living Standards Measurement Survey), Round VII (2013-2014) is used which consists of 17989 families. It is micro-level (a unit record) data collected by the Pakistan Bureau of Statistics (PBS), Statistics Division, Islamabad.

4. ANALYSIS AND DISCUSSION

This chapter describes the basic features of the analysis of the study, which provides simple summaries about the sample and the measurements. Result of first cut off of poverty which splits the deprived and not deprived families separately. If a family receives a "0" score then the family will be declared as not deprived otherwise if the family obtains 1 then it will be considered as deprived. In Pakistan, there are four provinces which are Khyber Pakhtunkhwa, Punjab, Sindh, and Baluchistan. After the discussion of three-dimensional frequencies, the multidimensional poverty index has been estimated according to provinces and country wise.

4.1 FIRST CUT OFF OF POVERTY DIMENSION WISE

In this section, five dimensions along with eleven identifications are taken into account, where deprived and non-deprived (not deprived) are identified.

4.1.1 QUALITY OF HOUSING DIMENSION

Under this dimension four indicators are selected which are occupancy status, dwelling type, room density, and sanitation are included.

Table 1 Quality of Housing. (authors' calculation)

Provinces	Occupancy Status		Dwelling Type		Room density		Sanitation	
	Non-Deprived	Deprived	Non-Deprived	Deprived	Non-Deprived	Deprived	Non-Deprived	Deprived
Khyber Pakhtunkhwa	2884	638	3002	520	2582	940	126	3396
% within indicator	81.9	18.1	85.2	14.8	73.3	26.7	3.6	96.4
Punjab	6355	1242	6388	1209	5482	2115	2267	5330
% within indicator	83.7	16.3	84.1	15.9	72.2	27.8	29.8	70.2
Sindh	4639	572	3866	1345	3083	2128	1128	4083
% within indicator	89.0	11.0	74.2	25.8	59.2	40.8	21.6	78.4
Baluchistan	1383	276	1451	208	1174	485	141	1518
% within indicator	83.4	16.6	87.5	12.5	70.8	29.2	8.5	91.5

According to Table 1 in occupancy status, 89% of Sindh families are "non deprived" followed by Punjab and Baluchistan where they have equal percentage i.e. 83. In the dwelling type maximum percentage is seen in "non-deprivation" in the families of Baluchistan by 87.5% traced by Kp 85% while the least percentage i.e. 74% in "non-deprivation" is depicted in Sindh province. The case of room density exposes the same situation as the dwelling type here "non-deprivation" are also in majority here majority families with fractional fluctuation in ascending order belongs to provinces Kp, Punjab, and Baluchistan by 73%, 72%, and 71% respectively. On the other hand in the indicator sanitation, the condition is shocking, here majority houses of entire provinces are not connected with the sanitation system. Maximum "deprivation" is shown in Kp chased by Baluchistan with 96% and 92% and the minimum percentage is depicted in Punjab province where this percentage is 70.

4.1.2 CHILD MORTALITY

Under this dimension, only one indicator is included i.e. child mortality. Our total sample size is 17989 while here in child mortality our sample is 14100 and 3889 number of families have either no children or their children' age is more than our required age.

Table 2: Child Mortality (author's calculation)

Provinces	Non-Deprived	Deprived
Khyber Pakhtunkhwa	2332	531
% within indicator	81.5	18.5
Punjab	4301	1449
% within indicator	74.8	25.2
Sindh	2942	1108
% within indicator	72.6	27.4
Balochistan	1191	246
% within indicator	82.9	17.1

Table 2 depicts that overall "non-deprivation" is larger than "deprivation". The situation of Baluchistan exposes that this percentage of "non-deprivation" is 82.9% which is maximum across the provinces chased by Kp with almost the same percentage i.e. 81.5. While this percentage in Sindh is 73 concerning "non-deprivation" is minimum among the provinces.

4.1.3 EDUCATION DIMENSION

This education dimension consists of drop out and school attendance. Table 3 indicates that in drop out the greater part of families of Sindh and Punjab are in "deprivation" having the same percentage by 53% while in the same indicator 56% of families of Kp province pursued by Baluchistan with 53% are in "non-deprived". On the other hand, in school attendance according to Table maximum families of entire provinces are in "deprivation" here maximum percentage i.e. 95 which is observed in Baluchistan and 88% in Kp and 85% in Sindh.

Table 3: Education dimension.

Provinces	Drop Out Ratio		School attendance	
	Non-Deprived	Deprived	Non-Deprived	Deprived
Khyber Pakhtunkhwa	1459	1133	427	3095
% within indicator	56	44	12.0	88.0
Punjab	2908	3351	1977	5620
% within indicator	47.0	53.0	26.0	74.0
Sindh	1647	1888	789	4422
% within indicator	47.0	53.0	15.0	85.0
Balochistan	561	489	89	1570
% within indicator	53.0	47.0	5.0	95.0

Similarly condition of the Punjab province although is worse yet a little bit better than the rest of provinces here the "deprivation is depicted by 74%.

4.1.4 BASIC NEED DIMENSION

This includes nutrition and access to clean drinking water. According to Table 4 in the nutrition indicator majority families of provinces, Kp and Punjab are fine as compared rest of the provinces about 61% of Kp families and 59% of Punjab provinces are in not deprivation, while 58% of Baluchistan and 52% of Sindh's families are suffering from malnutrition i.e., not deprivation.

Table 4 Basic Need Dimension

Provinces	Nutrition		Access to clean drinking water	
	Non-Deprived	Deprived	Non-Deprived	Deprived
Khyber Pakhtunkhwa	2130	1392	2571	951
% within indicator	60.5	39.5	73.0	27.0
Punjab	4489	3108	7451	146
% within indicator	59.1	40.9	98.1	1.9
Sindh	2478	2733	4683	528
% within indicator	47.6	52.4	89.9	10.1
Balochistan	684	975	1098	561
% within indicator	41.2	58.8	66.2	33.8

The indicator access to clean drinking water indicates that the majority families of entire provinces have the access to drinking water while among the provinces, 98% of Punjab's families are receiving clean drinking water track by Sindh where this percentage is about 89 while Kp and Baluchistan having 73% and 66% respectively.

Living Standard dimension; this dimension includes Gas availability, electricity facility, and assets. Table 5 illustrates a very awful situation that the majority of the families of the entire provinces have no access to the gas facility, "deprivation" about 74% is ceiling percentage which is observed in Baluchistan and then approximately 70% and 68% by KP and Sindh respectively.

Table 5: Living Standard Dimension

Provinces	Gas Availability		Electricity Availability		Assets	
	Non-deprived	Deprived	Non-deprived	Deprived	Non-deprived	Deprived
Khyber Pakhtunkhwa	1071	2451	3070	452	558	2964
% age	30.4	69.6	87.2	12.8	15.8	84.2
Punjab	2770	4827	6612	985	1013	6584
% age	36.5	63.5	87.0	13	13.3	86.7
Sindh	1660	3551	2539	2672	273	4938
% age	31.9	68.1	48.7	51.3	5.2	94.8
Balochistan	439	1220	1172	487	160	1499
% age	26.5	73.5	70.6	29.4	9.6	90.4

The situation of the electricity availability is good where the majority of families in entire provinces have access to the electricity facility except Sindh province where 51% of the houses have no access to electricity facility. In not deprivation, Kp and Punjab provinces have an equal percentage, while 71% of Baluchistan's houses have an electricity facility. The situation of assets is very horrific as the majority of families do not qualify the condition of assets, here maxim "deprivation" is seen in the provinces Sindh i.e. 95% and then in the Baluchistan which is 90%. Similarly, 87% of "deprivation" is in the Punjab and 84% "deprivation" in Kp is depicted.

4.2 WEIGHTED DEPRIVATION IN GROUPING INTENSITIES (2ND CUT OFF)

Weighted deprivation in grouping describes the second cut off ranging from 00 to greater than or equal to 0.51, while "non-poor" having the score less than 0.20 and the poor have the score greater than or equal to 0.20 while the rest of the column shows the severity of Poverty.

The analysis of Table 6 specifies that that within the province in Kp majority families lie in the

slab of greater or equal to 0.51 which is severed poverty intensity, oppositely minimum families are associated with near to poor or "non-poor" by about 9%. Similarly, 18% of families are living between two extremes i.e. 0.36-0.4. In the case of Punjab, the situation is different majority chunk (18%) belongs to "non-poor" and families which belong to the succeeding percentage i.e.16% are living in poverty (>= 0.51). Likewise, 8% of families are near the acute poverty living in 0.46-0.50.

Table 6: Weighted deprivation intensity (author's calculation).

Provinces	Non-Poor	.20-.26	.26-0.3	0.31-0.35	0.36-0.4	0.41-0.45	0.46-0.50	>=.51
Khyber Pakhtunkhwa	332	299	412	359	625	450	363	682
%age within province	9.4	8.5	11.7	10.2	17.7	12.8	10.3	19.4
Punjab	1357	738	1119	900	962	693	584	1244
%age within province	17.9	9.7	14.7	11.8	12.7	9.1	7.7	16.4
Sindh	580	290	409	488	615	579	587	1663
%age within province	11.1	5.6	7.8	9.4	11.8	11.1	11.3	31.9
Baluchistan	81	94	150	161	261	244	204	464
%age within province	4.9	5.7	9.0	9.7	15.7	14.7	12.3	28.0

Analysis of Sindh province (within the province) indicates that under the "non-poor" intensity only 11% families lie, while 32% families are breathing in the severe poverty block which is greater than or equal to 0.51. The lowest portion of the sample size of families of Sindh is existing near the "non-poor". The case of Baluchistan depicts that 28% of the households are living in the brutal poverty slab, the smallest number of families are breathing in "non-poverty". Between the two extremes i.e. 0.36-0.4, about 16% of the families of Baluchistan are surviving.

4.2.1 AVERAGE DEPRIVATION (POVERTY INTENSITY), HEADCOUNT (POVERTY INCIDENCE), AND MPI ACCORDING TO PROVINCIAL AND COUNTRY-WISE

Average deprivation (A) is planned by summing up to the total proportion of deprived families of all dimensions and "divided it by the total number of poor" families. The Headcount ratio (H) is calculated by dividing the poor people number by the total number of people i.e. the Total number of poor/total number of population, and multidimensional poverty index or depth of poverty or adjusted headcount "MPI" is calculated by multiplying the average poverty (A) to headcount ratio (H) whereas MPI should be between 0 and 1 if the family's MPI is 0, which indicates that the family is not poor whereas 1 shows perfect poverty.

Table 7 Provincial wise MPI (authors' calculation).

Provinces	A	q (total number of poor)	H= q/n	MPI
Khyber Pakhtunkhwa	0.39	3049	0.87	0.34
Punjab	0.38	6302	0.83	0.31
Sindh	0.44	4728	0.91	0.40
Baluchistan	0.43	1550	0.93	0.40

The outcome of Table 7 portrays "A" (average poverty), "q" (total number of poverty), "H" (headcount), and MPI at the provincial level. Analysis of "A" depicts that maximum average poverty is seen in the families of Sindh followed by the Baluchistan where it is 0.44 and 0.43 while this poverty in the families of Punjab is 0.38 which is the lowest. The investigation of the "q"

indicates that the majority of poor families are living in Punjab province then in Sindh and minimum poor families are perceived in Baluchistan. Similarly, the situation of "H" illustrates the highest score is seen in Baluchistan and then Sindh.

On the other hand, the analysis of MPI indicates that families of Sindh and Baluchistan provinces have equal and are highest multidimensionally poor. While lowest multidimensional poverty is seen in the provinces of Punjab and then Kp with 0.31 and 0.34.

Multidimensional Poverty Index (MPI) or depth of poverty or adjusted headcount at the country level. The "adjusted headcount ratio combines information on the number of multidimensionally poor" families and the extent of deprivation ratio; it is calculated by multiplying the headcount ratio (H) with average poverty (A) or poverty intensity (at the country level). Thus, MPI = A x H = 0.41 x 0.87 = 0.35. The result shows that in Pakistan 35% of people are multidimensionally poor.

5. CONCLUSION

MPI multidimensional poverty index is an important and interesting effort to find the poverty extent in-depth and coverage with the extensively used poverty indicators. MPI is broadly accepted by the researcher as the substance of multiple deprived magnitudes. Now a day's "non-income indicators and multidimensionality of poverty" index have got much attention with the expansion of knowledge. Explicitly, the effective components of poverty i.e. education, living standards, nutrition, housing, basic needs, etc. etc. are now measured in terms of deprivations along with "establishing cut-off points according to Millennium Development Goals" (MDGs).

The research analyzed the issues of deprived dimensions across provinces of Pakistan with the identification of poor and non-poor. An estimation of deprived dimensions for incidence, depth & severity poverty has been made. According to the results of the multidimensional poverty index, the nation-wise headcount ratio (H) is 87% (0.87) and MPI is 35%. Whereas among the provinces highest MPI is seen in Sindh and Balochistan by 40% and minimum MPI is noticed in the provinces Punjab by 31% followed by Kyber Pakhtunwa by 34%.

6. AVAILABILITY OF DATA AND MATERIAL
Data can be made available by contacting the corresponding authors

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