Measuring Multidimensional Poverty and Inequality in Pakistan

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1. INTRODUCTION

The key development objective of Pakistan, since its existence, has been to reduce poverty, inequality and to improve the condition of its people. While this goal seems very important in itself yet is also necessary for the eradication of other social, political and economic problems. The objective to eradicate poverty has remained same but methodology to analysing this has changed. It can be said that failure of most of the poverty strategies is due to lack of clear choice of poverty definition. A sound development policy including poverty alleviation hinges upon accurate and well-defined measurements of multidimensional socio-economic characteristics which reflect the ground realities confronting the poor and down trodden rather than using some abstract/income based criteria for poverty measurement. Conventionally welfare has generally been measured using income or expenditures criteria. Similarly, in Pakistan poverty has been measured mostly in uni-dimension, income or expenditures variables. However, recent literature on poverty has pointed out some drawbacks in measuring uni-dimensional poverty in terms of money. It is argued that uni-dimensional poverty measures are insufficient to understand the wellbeing of individuals. Poverty is a multidimensional concept rather than a uni-dimensional. Uni-dimensional poverty is unable to capture a true picture of poverty because poverty is more than income deprivation.

Multidimensional wellbeing is not a new concept. Sen (1976) is among the pioneers to conceptualise the wellbeing in an alternate and direct way using the concept of capability and functioning. Income is rather an indirect approach to evaluate individual welfare since it is required to purchase basic needs for example food, shelter, clothing, etc., assuming a well-functioning market. Consequently, it is true to say that to acquire certain goods and services income is needed. So, poverty is not the state of deprivation of certain level of income, that is, one dollar per day or two dollars per day but poverty is a state of multiple deprivations that poor faces. This multiplicity of dimensions leads to a broad definition of poverty. Income data is not correctly available and also there are difficulties in adjusting data for prices and inflation. Multidimensional poverty does not fluctuate due to inflation. So, this is a relatively stable measure. Indicators reflect a relatively long term accumulation of welfare.

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Many studies in 1990s have put a great emphasis on the relationship between economic growth, inequality and poverty. Inequality is also a multidimensional phenomenon. Only income or consumption inequality does not give true snapshot of inequality. It has considered that the combination of economic growth and inequality reduction policies are the key determinants of poverty reduction. Eradication of poverty is one of the most important objectives of all countries but the question arise, how to tackle this ambiguous problem? Although measuring MPI is a difficult task but due to the importance of MPI some developed and developing like Mexico, Colombia, Philippines, China, Brazil, Bhutan, Malaysia, Indonesia, Chile etc. have adopted multi-dimensional poverty estimation. Many researchers have investigated MPI for different countries like Metha and Shah (2003) in India, Justino (2005) in Brazil, Batana (2008) in Sub-Saharan countries, and Alkire and Santos (2010) in America. Computation of Multidimensional inequality is an exigent exercise as many variables contribute in it. Multidimensional inequality has been investigated in different countries like Justino (2005) examined multidimensional poverty in Brazil, Decancq, *et al.* (2009) in several countries, Aristei (2011) in Italy, Decancq and Lugo (2012) in Russia and Rohde and Guest (2013) in US.

In Pakistan, for alleviation of poverty, different social programs like Benazir Income Support Program (BISP) and Wasila-e-Rozgar scheme etc., have been introduced. Implementation of Poverty Reduction Strategy Papers (PRSP) approach and pledge to achieve Millennium Development Goals (MDGs) by Government of Pakistan reveal the importance of and need of poverty reduction. All poverty reduction strategies and social safety nets require the accurate analysis of poverty estimates to reach the primal objective of these programs. For achieving eight Millennium Development Goals, it is necessary to gauge the multidimensionality of poverty and inequality.

Main objective of this study is to measure multidimensional poverty and multidimensional inequality in Pakistan. Rest of the study is organised as Section 2 illustrates data and methodology. Results, conclusion and policy recommendations are discussed in Section 3.

2. DATA AND METHODOLOGY

This study employs Household Integrated Economic Survey (HIES) (2005-06 and 2010-11) for analysis of Multidimensional Poverty and Inequality in Pakistan. The study follows Alkire and Foster (2007) methodology for measuring Multidimensional poverty and Gini index for Inequality. It is easy to compute and interpret, intuitive and fulfils many desirable axioms. This is also called Adjusted Headcount Ratio (M_0). M_0 is applicable when any one of dimensions is ordinal, numerical values have no meaning, for example, qualitative in nature. Alkire and Foster Methodology (AFM) does not assume that data is continuous. Brief and simple steps involved in computation of MPI in mathematical as well as non-mathematical form are given below:

Step one is choice of unit of analysis. Unit of analysis may be household, individual, community, district or country. Choice of unit of analysis depends on research question. Second step is choice of dimensions. Dimension may be selected due to public consensus, empirical evidence or convenience due to data availability. Choosing indicator for each dimension is third step. For more accuracy and parsimony, it is necessary to use few reasonable indicators. Fourth step is to apply poverty lines for each indicator and convert achievement matrix into deprivational matrix. Replace individual's achievement with 0 or

one. Intuitively Equation 1 shows that if achievement of nđ[th]household in dimension Đ is less than dimensional cut-off $z_đ$ then that household is declared as poor and vice versa.

$$g_{nđ}^0 = \begin{cases} 1 \; if \; Q_{nđ} \; < z_đ \\ 0 \; if \; Q_{nđ} \; > z_đ \end{cases} \qquad \ldots \qquad \ldots \qquad \ldots \qquad \ldots \qquad \ldots \qquad \ldots \qquad (1)$$

Next step is to count the number of deprivations for each individual and get one column vector. For simplicity, equal weights are assumed to apply. Then set second cut off for identification, k is applied. If the number of deprived dimension is smaller than k then the household is non-poor and vice versa according to identification function. Identification function ρ_k is defined in Equation 2.

$$\rho_k = (Q_{n,}, z) = 1 \, , \text{if} \; S_n \geq k \qquad \ldots \qquad \ldots \qquad \ldots \qquad \ldots \qquad \ldots \qquad (2)$$

Now a censor matrix is defined, having zeros and ones for non-poor and poor households respectively. As AF methodology is concerned, MPI is calculated by the product of two components. First component of MPI is Multidimensional Headcount Ratio and second is Average Intensity of Poverty. So calculate headcount ratio (H) by dividing the number of poor by total population. Mathematically $\mathbb{H} = \mathbb{h}(Q; z)$is defined in Equation 3.

$$\mathbb{H} = {}^{\mathbb{q}}/N \qquad \ldots \qquad \ldots \qquad \ldots \qquad \ldots \qquad \ldots \qquad \ldots \qquad \ldots \qquad (3)$$

where

N= Total population

$\mathbb{q} = q(Q; z) = \sum_{n=1}^{N} \rho_k(Q_{n,}, z)$ in set of $\mathbb{z}_k = \{n : \rho_k(Q_{n\bullet}, z) = 1\}$

Average intensity (A) is ratio of sum of deprivation of each individual to total number of poor. It gives the fraction of dimensions in which average household experienced multidimensional poverty. MPI is simple product of the average share of deprivation with raw headcount ratio, which is given in Equation 4.

$$\mathcal{M}^0 = A \times \mathbb{H} \qquad \ldots \qquad \ldots \qquad \ldots \qquad \ldots \qquad \ldots \qquad \ldots \qquad \ldots \qquad (4)$$

MPI measures can also be decomposed by dimensions as given in Equation 5.

$$\text{Dimensional Contribution} = {}^{\mu(\mathscr{g}_{.đ}^{\alpha}(k))}/{\mathcal{M}(Q; z)} \qquad \ldots \qquad \ldots \qquad (5)$$

2.1. Dimensions, Weights and Cut-offs

For accurate measurement, selection of appropriate dimensions is as important as accurate data. It is an important and most challenging task. But for this, there is no hard and fast rule. According to Sen, appropriate dimensions are those which have importance for individuals and society, and have importance regarding policy making. Based upon data availability regarding MDGs, this study has selected four dimensions, Education, Health, Expenditures and Living Standard, with ten indicators. Eight out of ten indicators are related to MDGs.

MPI can be measured at individual or household level through AF methodology, but if we select individual as a unit of analysis there might be a problem of data availability. In Micro survey expenditures, detail is present only on household level so it is most appropriate to analyse poverty on household level. In this study unit of analysis is household level. All four dimensions are equally weighted, equal to one forth or 25 percent. Moreover, all indicators in all the dimensions are also equally weighted.

2.1.1. *Education*

Education enables an individual, hence a nation to adopt new technology and technological changes. Income also depends on complete years of schooling. If a child is not attending school, it lessens the chances of increase in future income of a household. That's why education is the second goal of MDGs.[1] So it is essential to dissect education poor areas and take some measures. In line with MDG two, this study has used five years of education and school enrolment of schooling children as indicators of education. Current education level shows level of knowledge of a household because any one of educated member has positive externalities on other members of the household [Basu and Foster (1998)]. So the household is referred as deprived if no member has completed five years of education. The current enrolment status of all school going age members shows an increase in present and future abilities. The household is declared as poor if any school going age child is not enrolled in school.

2.1.2. *Health*

Health like education is also a key variable of development. A person with good health can earn enough income to meet the basic necessities of his household. That's why MDGs put greater emphases on health. Three out of eight MDGs are in one or other way related to health. This study, based on data availability, has included immunisation against measles and postnatal care as indicators of health which are directly linked to fourth and fifth goal of MDGs respectively. Household is declared as deprived in immunisation if no child is immunised against measles. In Postnatal care Household is referred as deprived if mother of a family never goes for postnatal check-up.

2.1.3. *Expenditures*

As multidimensional poverty emphasises on other dimensions of poverty, it does not mean to ignore monetary dimension. Monetary dimension is as important as others because income provides power to purchase other basic necessities. Many empirical studies excluded income/expenditures due to lack of data on income and expenditures. However, PSLM survey has data on all dimensions. There are three possible choices for material wellbeing income, asset ownership and expenditures. People do not report their true income level. They report low income level than actual may be due to fear of theft or income tax. Furthermore, income of agriculture and self-employed is difficult to estimate. Second indicator, asset ownership is supposed to be a good measure because it is free of these issues but the choice of a set of assets is highly crucial and questionable. Expenditure data is relatively credible than income data. So this study has used expenditure data as a proxy of monetary wellbeing.

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[1]To attain universal primary education by 2015.

2.1.4. *Living Standard*

A single variable is not able to measure living standard. Due to limitation of data this study has selected only five indicators for living standard; access to safe drinking water, electricity, gas, sanitation and crowding per room. These indicators directly or indirectly are included in MDGs.

Life is impossible in the absence of water. But contaminated and grimy water grounds many diseases like diarrhoea and hepatitis leading to many deaths in Pakistan. Safe drinking water is related to seventh MDG.A household is deprived in water dimension if the household has no access to drinking water or more than 30 minutes consume to reach the source of safe drinking water.

Access to improved sanitation is a vital need for dignity and health of people. Sanitation is directly related to hygienic problems. For safety of health access to improved sanitation is essential. It is also related to seventh. A household is declared as poor if the household does not have an improved toilet.

Electricity is an important indicator of living standard. Electronic devices can be used with electricity and these electronic products enhance productivity and leisure. A household is deprived in this dimension if it has no electricity connection.

Gas is also indirectly related to MDGs; Bio mass fuel causes environmental degradation. So indirectly gas provides environmental sustainability and is also linked with 7th MDG. A household is pronounced as poor if it has no gas connection.

Crowding symbolises the number of persons who share a room for sleeping. More persons sharing one room indicate the shortage of facilities hence a low living standard. Indirectly this indicator is related to MDG five. A household is deprived if more than three persons are sharing one room for sleeping.

2.2. Multidimensional Inequality

Fisher (1956) is one of the pioneers of Multidimensional Inequality, who have given the idea of Multidimensional matrix. Kolm (1977), Atkinson and Bourguignon (1982), Walzer (1983), Gajdos and Weymark (2005) and Decancq and Lugo (2011) have proposed Multidimensional Inequality indices. Decancq and Lugo (2012) aggregate in reverse direction, first aggregate across dimensions and then across individuals, this technique takes into account correlation between dimensions. So, this study has employed Decancq and Lugo Multidimensional methodology for measuring Multidimensional Gini coefficient.

For measuring Multidimensional inequality Gini coefficient distributional matrix can be compared with social welfare function. Distributional matrix is similar as achievement matrix in MPI. Social welfare function can be constructed by double aggregation. First aggregated across dimensions to get individual welfare function and then aggregated across individuals for social welfare function. Same or different weights can be assigned to each dimension. Weights reflect the relative importance of a dimension. Weights must be assigned in such a way that the sum of all weights must be equal to one, mathematically $\sum_{d=1}^{D} W_d = 1$.

Social wellbeing function can be written as:

$$W_{n \times d} = \sum_{n=1}^{N} \left[\left(\frac{r^n}{n} \right)^{\delta} - \left(\frac{r^n}{n} \right)^{\delta} \right] \left[\sum_{d=1}^{D} W_d (Q_d^n)^{\beta} \right]^{1/\beta} \qquad \ldots \qquad \ldots \qquad (6)$$

Where $\delta > 0, \quad W_d > 0, \sum_{d=1}^{D} W_d = 1$

$\mathcal{W}_d$ = weights assigned to each dimension

r^n = rank of individual n on the basis of S

δ = inequality inversion parameter

β = substitution parameter

$$S = \left[\sum_{d=1}^{Đ} \mathcal{W}_d (Q_d^n)^\beta\right]^{1/\beta} \quad \dots \quad \dots \quad \dots \quad \dots \quad \dots \quad \dots \quad (7)$$

So β mirrors the degree of substitutability among the dimensions of wellbeing. Specifically, β is related to the elasticity of the substitution σ between the dimensions, and equals 1-1/ σ. β=1, represents perfect substitutability between the dimensions of wellbeing and β = -∞, denotes dimensions are perfect complementry; at the extreme, individuals are judged by their worst outcomes.

Multidimensional Gini index can be defined as the fraction of an aggregated amount of dimensions of a distributional matrix by aggregated amount of dimensions if dimensions are equally distributed. It is analogous to Uni-dimensional Gini index which is also ratio of aggregated gap of income to the equally distributed income. So Multidimensional Gini is defined as below:

$$I(Q) = 1 - \frac{\sum_{n=1}^{N}\left[\left(\frac{r^n}{n}\right)^\delta - \left(\frac{r^n}{n}\right)^\delta\right]\left[\sum_{d=1}^{Đ} \mathcal{W}_d (Q_d^n)^\beta\right]^{1/\beta}}{\left[\sum_{d=1}^{Đ} \mathcal{W}_d (Q_d^n)^\beta\right]^{1/\beta}} \quad \dots \quad \dots \quad \dots \quad (8)$$

The value of Gini co-efficient lies between zero and one (0<Gini<1). Gini co-efficient equal to zero shows a perfectly equal distribution of income (every person has the same level of income) while equal to one shows a perfectly unequal distribution of income (some persons have more income and some have less income).

Choice of different dimensions for multidimensional inequality is a crucial task and can be chosen with various justifications. Following dimensions are used for Multidimensional Inequality: Monetary wellbeing (consumption expenditures), Educational achievement and Health. This study has utilised maximum years of education attained by any member of a household as a proxy of educational wellbeing.

There are many proxies for Health like BMI, stunning and wasting for children, but these are not monotonically increasing function of health. Alternate to this, health risk index, proposed by Seth (2010), is a better measure of health quality. This index captures the risk of health of a household. The higher the value of health index mirrors the better quality of health. Health risk index combines three sub-indicators. The first indicator, safe drinking water Iw=1 if a household has access to safe drinking water and Iw=0, otherwise. The second indicator is access to improved toilet, It=1 if a household has access to improved sanitation and It=0, otherwise. Last indicator, crowding Ic=Mn/Rn, where Mn is number of members and Rn is number of rooms. It is difficult to decide normatively which indicator has more importance for health risk index so equal weights have applied. Health risk index for N household is defined in Equation 9.

$$\text{H.R.I} = \frac{1}{3}I_w + \frac{1}{3}I_t + \frac{1}{3}I_c \quad \dots \quad \dots \quad \dots \quad \dots \quad \dots \quad \dots \quad (9)$$

This equation shows simple Health Risk Index with equal weights and ordinal data. As these dimensions have only value judgment and all researchers may not agree upon any weighting scheme, so equal weights is a better option.

3. RESULTS AND DISCUSSION

3.1. Results of Multidimensional Poverty

Income or expenditures are not the only determinant of poverty, many factors other than income/expenditures also contribute in poverty like poor health, lack of education, poor housing and low living standard. Poverty is something beyond income deprivation. This study has estimated MPI at National level.

This study applied Alkire and Foster (2007) methodology by using four dimensions; health, education, expenditures and living standard for measuring multidimensional poverty. Figure 1 shows the percentage of multidimensional deprived people by using ten indicators under the umbrella of four dimensions and by using equal weights. In 2005-06, 51 percent people were multidimensional deprived where as 49 percent people were multidimensional non-deprived.

**Fig. 1. Percentage of Multidimensional Deprived Population in 2005-06 and 2010-11**
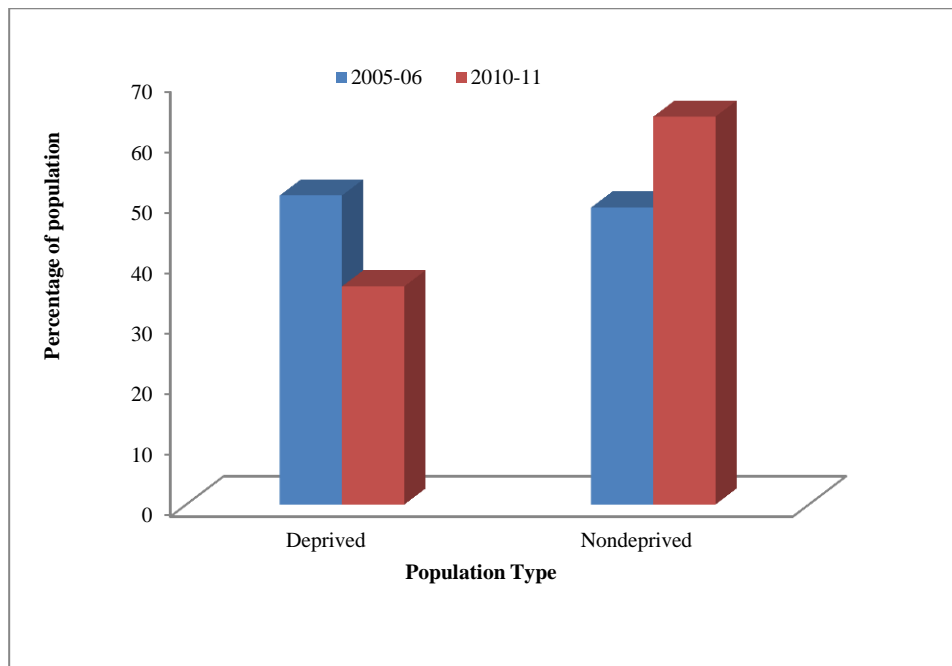
Source: Author's own calculations.

In 2010-11 multidimensional deprived population was 35.86 percent while the rest were non-deprived. Multidimensional poverty has declined by 15 percent during 2005-06 to 2010-11.

3.2. Dimensional Share to overall MPI

**Fig. 2. Dimensional Share to National Poverty 2005-06 and 2010-11**
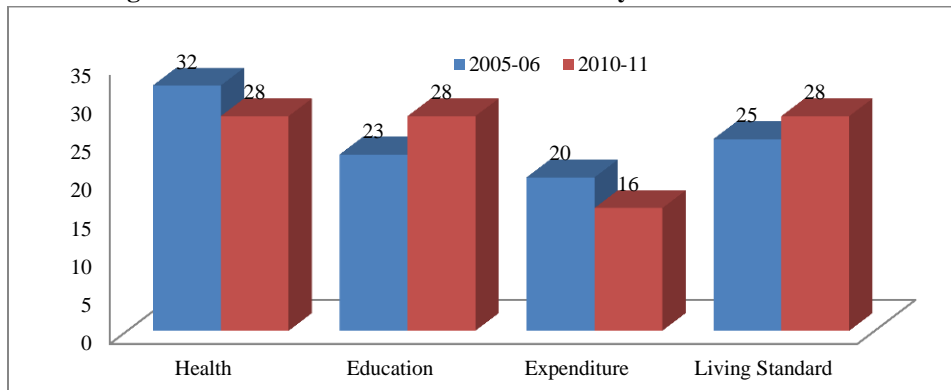
Source: Author's own calculations.

From Figure 2, it is clear that education contributes 23 percent in 2005-06 and 28 percent in 2010-11 to overall poverty, Health contributes 32 percent and 28 percent in 2005-06 and 2010-11 respectively while living Standard contribution is 25 percent and 28 percentage respectively. Expenditure share to overall poverty is 20 percent and 16 percent in 2005-06 and 2010-11. Contribution of education and living standard has increased over time. The reason for increase in share to poverty was due to over population, decline in quality of water and increase in education inequality. Thus these findings conclude that to curb multidimensional deprivation, resources must be allocated according to the percentage of the share of each dimension in overall poverty.

Dimensional contribution can be more zoomed by considering percentage deprivation in each indicator. Figure 3 gives a more detailed picture of multidimensional poverty through percentage of deprived population in each indicator.

Fig. 3. Percentage of Household Deprived in each Indicator during 2005-06 and 2010-11
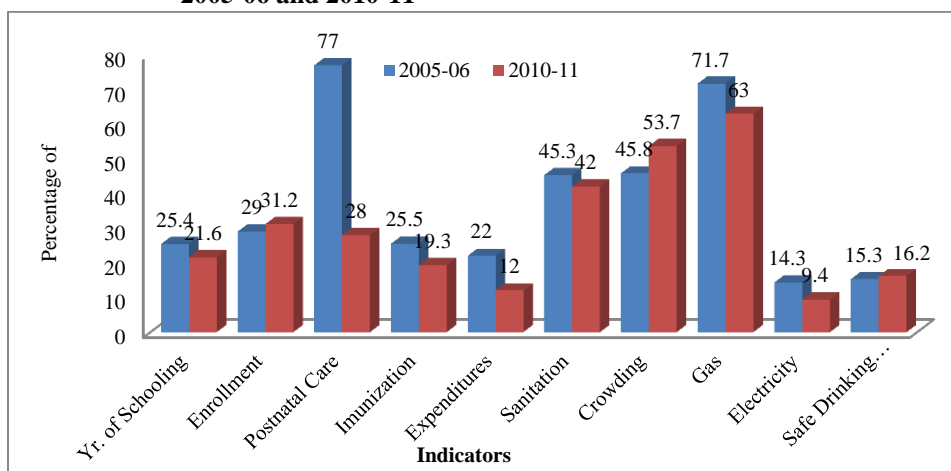
Source: Author's own calculations.

Above diagram illustrates that during 2005-06 and 2010-11, about 77 percent and 28 percent households are deprived in post natal care, 25.5 percent and 19.3 percent households in immunisation against measles, 71.7 percent and 63 percent households have not a gas connection respectively. It is also depicted that the households have small houses as compared to their family, i.e. 45.8 percent and 53.7 percent households share a room more than three persons in 2005-06 and 2010-11. Congestion may cause many diseases which spread through respiration. In 2005-06 and 2010-11, 45.3 percent and 42 percent of households had no access to an improved toilet. In Pakistan, in 2005-06 and 2010-11, 15.3 percent and 16.2 percent households had no access to safe drinking water or it may consume 30 minutes to reach at the source of drinking. 14.3 percent and 9.4 percent households have no electricity connection as a lightning source while 22 percent of the population was living below Poverty line (BPL) in 2005-06 and 2010-11.

Table 1

Adjusted Headcount Ratio at Different Cut Offs in 2005-06 and 2010-11

	2005-06			2010-11		
K	H	A	$M_o = H \times A$	H	A	$M_o = H \times A$
1	91.86	40.08	36.82	60.02	36.55	25.23
2	72.07	46.81	33.74	54.40	42.07	22.89
3	51.06	55.55	28.36	35.86	50.56	18.13
4	36.85	62.71	23.11	22.60	58.66	13.26
5	27.53	68.52	18.86	15.37	64.53	9.92
6	16.86	76.62	12.92	8.60	73.09	6.29
7	10.60	83.65	8.87	3.84	80.71	3.10
8	05.58	89.06	4.97	.16	88.16	1.41
9	1.64	96.64	1.58	.10	96.46	.10
10	0	0	0	0	0	0

Source: Author's own calculations.

According to Union approach adjusted headcount ratio is 36.83 percent and 25.23 percent whereas Intersection approach shows zero percent headcount ratio in 2005-06 and 2010-11. Regarding Dual Cut off approach, poverty cut off "K" must be lie between two approaches. At "K=2" headcount ratio is 33.74 percent and 22.89 percent. As "K" increases headcount ratio decreases such as at k equal to three, four, five, six, seven and eight headcount ratio is 28.36 percent, 23.11 percent, 18.86 percent, 12.92 percent, 8.87 percent, 4.97 percent and 1.58 percent respectively in 2005-06. In 2010-11 for k equal to three, four, five, six, seven and eight headcount ratio is 18.13 percent, 13.26 percent, 9.92 percent. 6.29 percent, 3.10 percent, 1.41 percent and 0.1 percent respectively. The estimates of headcount ratio illustrate that multidimensional poverty has declined at all cut offs during 2005-06 to 2010-11.

3.3. Results of Inequality in Pakistan

This study analysed inequality in wellbeing in Pakistan for 2005-06 and 2010-11. Data used in this section have been also drawn from PSLM conducted by Pakistan Bureau of Statistics. In addition to consumption expenditure, facts of health and

education have also been incorporated. Equivalent per adult expenditures, proposed by Planning Commission of Pakistan, are used. In analysis, maximum years of education of any of the family member and Health Risk Index are included.

For computation of Gini coefficient, this research used four fundamental decisions about: standardisation of each indicator, the degree of substitution (value of β), weights and inequality aversion parameter (value of δ). Each outcome was divided with its respective mean for standardisation, the value of β was restricted to zero because of ratio-scale invariance property. Cobb–Douglas function was used and Value of parameter infers value judgment about indicators and it is difficult to say which indicator is most important in human welfare so equal weights are employed in analysis.[2]

Standard Gini coefficient possessed the value of δ equal to 2. This study computed Gini Coefficient for two values of delta one value was equal to 2 and other was 5 which represent the higher weight for bottom distribution. Higher the value of delta, higher weights will be given to bottom distribution. Results are given below;

Table 2

Gini Coefficient in 2005-06 and 2010-11

Gini Coefficient	Delta=2		Delta=5	
	2005-06	2010-11	2005-06	2010-11
Expenditure	.32	.29	.5	.45
Health Risk Index	.19	.21	.34	.38
Max. Education	.34	.33	.69	.68
Multidimensional	.35	.34	.61	.61
Welfare Index	.64	.65	.38	.39

Source: Author's own calculations.

Table 2 illustrates consumption inequality in different wellbeing dimensions in Pakistan in 2005-06 and 2010-11. Value of Gini-coefficient ranges from 0 to 1 where zero means perfect equality and 1 means perfect inequality. Gini index shows the percentage of inequality prevailing in a country. The table portrayed that consumption expenditure inequality has declining trend from 0.32 to 0.29 for delta equal to two and more severe when value of δ=5 but inequality has decreased for both values of delta. Health risk inequality has increased from 0.19 to 0.21 for delta equal to 2 and also increased from 0.34 to 0.38 for delta equal to 5. Education inequality declined for delta equal to 2 and remained same when value of delta is 5. Multidimensional inequality showed slightly decline in dispersion when delta is 2 but showed no significant reduction in dispersion for delta equal to 5. Welfare index showed welfare has only 1 percent reduction for both values of delta and welfare has declined about 26 percent with the increase in value of delta from 2 to 5.

Upshot, results showed that multidimensional poverty also declined from 51 percent to 36 percent. The dimensional breakdown of MPI showed that Immunisation, postnatal care, Enrolment and Equivalent per adult expenditures comprise 66 percent of whole poverty in 2005-06, while in 2010-11 these four dimensions contribute 62 percent

[2]HDI also used equal weights.

in overall poverty. From 2005-06, Consumption inequality has declined about by 3 percent while Multidimensional inequality has declined only by 1 percent.

3.4. Policy Recommendations

The results of present study give some suggestions about polices for development. Policy for curbing poverty should be dimension specific. Education and health contribute 62 percent to overall poverty. Government should invest in health and education to provide more facilities, to accelerate pace of poverty reduction, to redistribute and improve health and educational facilities. Access to water has declined; the proper mechanism must be taken for provision of water supply schemes and improvement in the drainage system. The study opens some future research avenues like to explore main causes of multidimensional poverty and inequality. Additionally multidimensional poverty and inequality should also be dissected at provincial and rural-urban levels.

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Comments

- The paper has estimated the MPI and MGI.
- On page 1 author wrote, "Although measuring MPI is a difficult task but due to the importance of MPI developed and developing countries have adopted multi-dimensional poverty estimation". Though 2014 global MPI report measure more than 100 countries but it not official, except few countries, Mexico, Colombia, Philippines, China, Brazil, Bhutan, Malaysia, Indonesia, Chile
- Why study is measuring MPI and MGI, whether you have some policy target and you mould MPI indicators as according to conventional MPI methodology, you will suggest policy then. For example, in Colombia country's development plan has three pillars: employment, poverty reduction and security. The government plans to reduce multidimensional poverty by 13 percent– from 35 percent of the entire population in 2008 to 22 percent in 2014. They put more emphasis on education and labour indicators (long term employment, formal employment) to improve quality of education and to resolve the issues of decent work. In Mexico, MPI is the part of public policy in which government aim to pull the extreme poor out of poverty based on both MPI and uni-dimensional approach.
- The study has utilised Pakistan Social and Living Standard Measurement (PSLM) surveys (2005-06 and 2010-11). But you have reported the sample of HIES data (15453 and 16341) so you not using PLSM data. Though you can use if you not indicator from consumption and income side.
- The MPI and MGI results are highly sensitive to the choice of indicators. Author wrote 10 pages on theoretical modelling of MPI and MGI while there is no discussion of selection of dimensions, indicators, weights, cut-off which should be because all your results are based on it that how you estimated the MPI and MGI.
- In result section 4.1.1. The author has stated to use four dimensions; education, expenditure, living standard and health I have reservation on expenditure dimension because it is usually determined by the other 3 and our discussion with Alkaire in April, she suggest not to use expenditure.
- But again there is no discussion on indicators before explaining the results. Indicators should be representative, sustainable, and less collinear to each other
- The results are very alarming in Figures 1 and 2, it should that MPI is 51 percent in 2005 and only 12 percent in 2010. Two reservations. Firstly we Pakistan not perform well health, education, expenditure and living standard indicators. Second we have estimated MPI with Alkaire.

k-value	2004/05	2006/07	2008/09	2010/11
17	0.284	0.272	0.261	0.230
23	0.264	0.252	0.240	0.208
28	0.240	0.229	0.217	0.185
33	0.219	0.208	0.197	0.166
34	0.211	0.200	0.188	0.157
40	0.179	0.169	0.158	0.129
50	0.122	0.117	0.108	0.085
52	0.105	0.102	0.094	0.072
62	0.057	0.057	0.050	0.037
75	0.016	0.017	0.014	0.010

- In Figures 3 and 4, author has mentioned the change in MPI within the dimensions. I think there should also be explain the reasons.
- In Figure 5 author has mentioned the indicators. It should be very earlier because whole your exercise is based on this analysis. But still we don't know that what the definition of indicators is. Some indicators look not representative, covering whole population (gas, enrolment, or not sustainable.
- Finally your Table 1 and Table 2 is totally contradict to Figure 1 (51 percent) and Figure 2 (12 percent).
- You have too summarised the discussion on MGI. Your take 11 pages to discuss MPI results while there is only 1 page on MGI. Again there is methodological gap that how you calculated as you mention health risk index, welfare index etc. but I don't know how you estimate these variables.
- Finally there is no conclusion or policy recommendation.

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