Research Article

Income Inequality Estimation of Rural Region of KP Province: A Gini Coefficient Approach

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Abstract | This research paper is designed to estimate the income inequality of rural region of Khyber Pakhtunkhwa (KP) Province, Pakistan. This study utilized cross sectional data of House Hold Integrated Economic Survey (HIES) collected by Pakistan Bureau of Statistics to obtain the income and expenditure level of sampled House Hold. The HIES data set of year 2011-12 for KP Province was comprised of the total of 1352 sampled House Hold. However, the sampled rural House Hold was 926. The statistical framework comprised of Lorenz curve and Gini Coefficient to gauge the income inequality in the study area. To assess the income inequality both income and expenditure approaches are employed to construct the Lorenz Curve and Gini Coefficient values. The major finding of this study divulge that the Gini Coefficient value through income approach of rural region of KP province is 0.35 which illustrates that there is 35% of income inequality in rural region of KP. While, the Gini Coefficient value through expenditure approach was observed as 0.30. These results confirm the expected statistical discrepancies between income and expenditure approach. The results were further elaborated through deciles under both income and expenditure approaches. The lower poorest category estimated through deciles contributes 2.78% to the overall rural region's income. However, the upper richest category shares 30.06% to the aforementioned income. The deciles measured through expenditure approach revealed that the lower poorest category and upper richest category contributes 3.13 and 25.59, respectively. The study concludes that the contribution of poorest category is pretty less in overall income and expenditure of KP Province. This study recommends that the Government of KP province may provide more employment opportunities to the poorest category of KP so that their contribution to overall income and expenditure can be escalated.

Introduction

Income is the reward that is earned by rendering services and producing goods through factors of production. However, income distribution is of major concern for not only developing economies but also for developed economies. The high income inequality in the society subsequently plunged the economy to high poverty and less economic development (Awan, 2007). The core objective for economic development is to enhance the living standards at individual level across the societies which encompass both richer class and those who are living beneath the line of poverty. Poverty and Income inequality go parallel, they are interrelated, but policy makers didn't make any extra efforts in the policy that how poverty reductions can

be achieved together with reducing income inequality.

Pakistan's economy is facing insignificant momentum for last many years owing to various factors. The stagnant economic growth of Pakistan is evident through the GDP rate which was reported as 2.9% (GoP, 2013-14). Income inequality is considered as one of the substantial factors for low economic growth. Agriculture sector is the bedrock of Pakistan's economy and the overwhelming majority of the people are employed in this sector. However, the prevailing inequality of income is drifting the richer class to become richer and plunging the poor class to be poorer over the period of time. Such scenario of the society is because of disparity and uneven distribution of the resources among the individuals of the society. This study has made an attempt to highlight the income inequality level in KP Province, Pakistan. The pattern of income disparity is a major apprehension to economists (Clarke et al., 2003). The specific objective of this research study includes: To measure income inequality of rural region of KP Province, To conduct Income inequality comparison through income and expenditure approach and To suggest policy implications to the concerned policy makers.

Literature Review

The major outcome of the various research endeavours is evident that the income inequality is significant tool to acquaint the overall scenario of the poverty in the society (Kemal, 2005; Rehman et al., 2008; Awan, 2007). It is precedent from previous research studies that Gini coefficient technique is one of the significant techniques to measure income inequality (Haq, 1964; Idrees and Eatazaz, 2010; Clarke et al., 2003; Anwar, 2009). In addition, the income and expenditure approach is also practice in vogue to estimate the Lorenz curve and Gini Coefficient. The literature reviewed is also evident for other modus-operandi utilized to estimate Income Inequality such as Theil's Index, Polarization, Coefficient of Variation (Milanovic, 2005; Idrees and Eatazaz, 2010; Awan, 2007). The literature review depicts that that income inequality in rural is fatal in KP province through income approach and expenditure approach. This is substantially evident from literature review (Kemal, 2005; Rehman et al., 2008; Awan, 2007; Idrees and Eatazaz, 2010; Clarke et al., 2003; Anwar, 2009) that high income inequality subsequently leads to high poverty in a society.

Materials and Methods

Study Universe

The Pakistan Bureau of Statistics selected rural region of 16 districts of Khyber Pakhtunkhwa Province, Pakistan. Therefore, the universe of this research study consists of selected rural areas of mentioned districts that include Swat, Upper Dir, Lower Dir, Chitral, Shangla, Malakand, Bonair, Kohat, Karak, Hangu, D.I. Khan, Peshawar, Charsada, Nowshera, Mardan and Swabi.

Sampling Size

This research endeavour has utilized data-set of the House Hold Integrated Economic Survey (HIES) (2011-12) conducted by the Pakistan Bureau of Statistics (PBS), Government of Pakistan, Islamabad. The total of 926 sampled House Hold of the rural region were interviewed during HIES which is deemed as a sample size for this study.
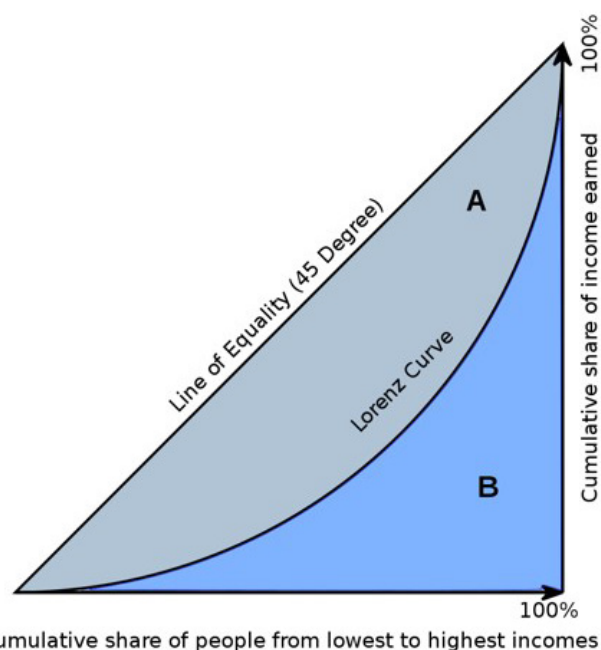

Figure 1: *The Lorenz Curve*

Analytical Framework

The Lorenz Curve (Figure 1) is an instrument that depicts income distributions as proposed by Lorenz (1905). It informs us which proportion of total income is in the hands of a given percentage of population. However, as an alternative of ending up with income shares, the Lorenz Curve relates the cumulative proportion of income to the cumulative proportion of house hold individuals. The Lorenz curve provides an effortless way to embody income equality in terms of graph. The frequent value for representing income inequality is the Gini coefficient. It is derived from the

Lorenz curve and is represented as a ratio, where the region between the line of equality and the Lorenz Curve is the numerator and the total region below the line of equality is the denominator. Therefore, perfect income equality is equal to zero, perfect income inequality is equal to one, and all other values are somewhere between zero and one.

Gini Coefficient or Gini Index or Gini Ratio

The Gini coefficient is a measure of statistical dispersion projected to depict the income distribution of a nation's population, and is the one of the commonly used techniques to estimate income inequality in developing countries.

$$G = \sum_{i=1}^{n-1} (P_i q_{i+1} - P_{i+1} q_i)$$

Where;

P_i is the cumulative population share and q_i is the cumulative consumption share corresponding to the ith House Hold when all House Hold are arranged in ascending order of income share. The value of Gini coefficient lies between 0 and 1.

Results and Discussion

Distribution of Income and Expenditure for Rural Region of KP

The descriptive statistics of income and expenditure can reveal the different level of income and expenditure. The analyzed data illustrates the income and expenditure trend of KP province in Table 1. The mean annual income and expenditure of rural region was observed as Rs. 234000 and Rs. 2040005, respectively. The range of annual income level lies between Rs. 4000 and Rs. 3125000. The similar descriptive statistics for expenditure is highlighted in Table 1.

Table 1: *Annual incomes and expenditure trend of rural region of KP*

	Min.	Max.	Mean	S.D.
Income (In Rs.)	4000	3125000	234000	208460
Expenditure (In Rs.)	3350	2147574	2040005	141521

Source: *Cross Sectional Data (2011-12), Pakistan Bureau of Statistics*

Lorenz Curve and Gini Coefficient Estimation through Income Approach

The Lorenz curve was constructed at Figure 2 to graphically illustrate income inequality of rural region of KP province through income approach. The apparent wideness of the Lorenz curve from line of equality portrays that income inequality prevails in the rural region of KP Province. The numeric representation of the income inequality is measured through Gini Coefficient. The calculated value of Gini Coefficient for rural region of KP province was 0.35 implies that 35 % income inequality prevails in rural region. This is evident from literature reviewed such as Anwar (2009), Idrees and Eatazaz (2010) that high Gini Coefficient may be considered as indication of Poverty. Therefore, the reported value of Gini Coefficient depicts that rural region of KP is confronting the issue of Poverty.
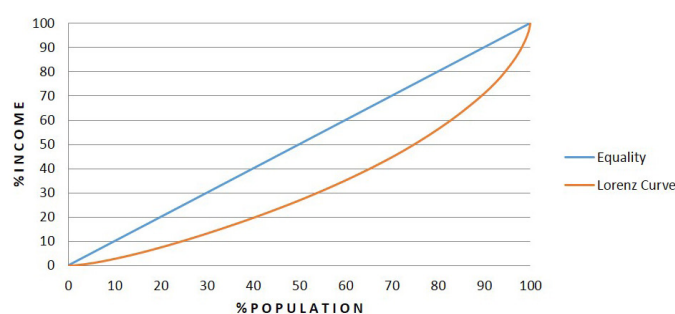

Figure 2: *Lorenz Curve of Rural Region of Khyber Pakhtunkhwa through income approach,* **Source:** *Cross Sectional Data (2011-12), Federal Bureau of Statistics, Pakistan; Gini Coefficient value of rural region of Khyber Pakhtunkhwa through Income approach: 0.35*
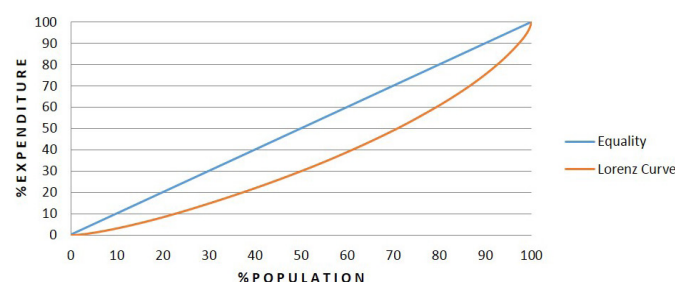

Figure 3: *Lorenz Curve of Rural Region of KP through expenditure approach,* **Source:** *Cross Sectional Data (2011-12), Pakistan Bureau of Statistics, Pakistan; Gini Coefficient value of rural region of Khyber Pakhtunkhwa through Expenditure approach: 0.30*

Lorenz Curve and Gini Coefficient Estimation of Rural Region of KP Province through Expenditure Approach

The interesting findings have been observed through expenditure approach for rural region (Figure 3) as Lorenz curve and Gini Coefficient value both demonstrates contradictory results of income inequality in rural region of KP as compared to income approach. It is precedent through literature that expenditure approach is more appropriate (Anwar, 2009) so one can conclude that the income inequality in rural region of KP Province was 30% as revealed by Gini Coefficient value through expenditure approach analysis.

Distribution of Income and Expenditure through Deciles of Rural Region

The deciles of rural region are given in Table 2 to demonstrate the income and expenditures trend of the sampled House Hold in 10 equal categories. These deciles are calculated to measure the contribution of rich and poor category to overall rural income. Table 2 shows that the lower poor category is contributing 2.78% through income approach while 3.13% though expenditure approach. Furthermore, the upper richest category through income approach and expenditure approach is contributing 30.06 and 25.59, respectively.

Table 2: *Deciles of rural region of KP developed by income and expenditure approach*

Deciles under Income Approach		
Population by deciles (%)	Income by deciles (%)	Cumulative income (%)
Lowest Poor Class 10	2.78	2.78
Next 10th Category	4.67	7.45
Next 10th Category	5.68	13.13
Next 10th Category	6.38	19.15
Next 10th Category	7.15	26.66
Next 10th Category	8.13	34.79
Next 10th Category	9.38	44.17
Next 10th Category	11.35	55.52
Next 10th Category	14.37	69.89
Upper Richest Class	30.06	100
Deciles under Expenditure Approach		
Population by deciles (%)	Expenditure by deciles (%)	Cumulative expenditure (%)
Lowest Poor Class 10	3.13	3.13
Next 10th Category	5.19	8.32
Next 10th Category	6.38	14.7
Next 10th Category	7.11	21.81
Next 10th Category	7.89	29.7
Next 10th Category	8.85	38.55
Next 10th Category	9.98	48.53
Next 10th Category	11.62	60.15
Next 10th Category	14.21	74.36
Upper Richest Class	25.59	100

Source: *Cross Sectional Data (2011-12), Pakistan Bureau of Statistics*

Conclusion

The major findings also highlighted that the Gini Coefficient value of rural region was computed as 0.35 which confirms that income inequality is 35% in rural region of KP. While Gini Coefficient for rural region through expenditure approach was 30%. The data set was further interpreted through deciles. This modus-operandi to convert the data set into deciles form is to demonstrate that how various income and expenditure categories are contributing to overall income and cumulative income. The similar deciles were constructed through expenditure.

Recommendations

Economic activities such as small enterprise should be introduced at house hold level by government rural region of KP to squeeze the income inequality. The deciles of the poorest category illustrates that the over whelming majority of this category are deprived of major resources as this category contributes 2.78% of total income of rural region of KP. Therefore, the poorest category of rural region may be the prime consideration of the concerned authorities while distributing the perk and privileges.

Authors' Contribution

Mr. Qureshi had undertaken the major data analysis and its interpretation of this research endeavour. The idea of this research study was drawn by Dr. Sadozai and the entire research endeavour was undertaken under his supervision.

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