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Multidimensional poverty measurement using the Alkire-foster methodology

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Abstract

This paper explores the application of the Alkire-Foster methodology in measuring multidimensional poverty. By assessing various dimensions of poverty beyond mere income, the study provides a more comprehensive understanding of the poverty landscape in rural India. The findings underscore the significance of this approach in capturing the multifaceted nature of poverty, highlighting its implications for policy-making and poverty alleviation strategies. The Alkire-Foster method enables the calculation of a Multidimensional Poverty Index (MPI), which reveals the extent and intensity of poverty across different regions and demographic groups.

Keywords: Multidimensional poverty, Alkire-foster, poverty measurement, rural India, poverty index

Introduction

Overview of Multidimensional Poverty

Poverty is a complex and multifaceted phenomenon that extends beyond mere income deprivation. Multidimensional poverty recognises that individuals and households may experience deprivation in multiple areas of their lives, such as education, health, living standards, and access to basic services. This approach acknowledges that poverty cannot be fully understood or addressed by focussing solely on income or consumption levels. The concept of multidimensional poverty has gained significant attention in recent years, particularly with the adoption of the Multidimensional Poverty Index (MPI) by the United Nations Development Programme (UNDP) as part of its Human Development Reports. This shift reflects a broader recognition that poverty is not only about economic deprivation but also involves various social, educational, and health-related dimensions.

The importance of considering multiple poverty dimensions: The multidimensional approach to poverty measurement is essential for several reasons. First, it provides a more comprehensive understanding of poverty by capturing the multiple deprivations that individuals and households face simultaneously. This is particularly

important in rural contexts, where poverty is often associated with a lack of access to basic services, education, and healthcare, in addition to low income. Second, the multidimensional approach allows policymakers to identify the specific areas in which people are deprived, enabling more targeted and effective interventions. By considering multiple dimensions of poverty, policymakers can design programs that address the root causes of poverty rather than merely alleviating its symptoms. Finally, the multidimensional approach aligns with the broader goals of sustainable development, which emphasise the importance of addressing inequalities and promoting well-being in all aspects of life.

Objectives of the paper: The primary objective of this paper is to apply the Alkire-Foster methodology to measure multidimensional poverty in rural India. By calculating the Multidimensional Poverty Index (MPI) and analysing the contributions of different dimensions to overall poverty, this study aims to provide a comprehensive analysis of poverty that goes beyond income. Additionally, the paper seeks to compare the findings from the Alkire-Foster method with other poverty measurement approaches, offering insights into the strengths and limitations of multidimensional poverty measurement in guiding policy decisions.

Literature Review

Theoretical background of multidimensional poverty

The concept of multidimensional poverty is rooted in the capability approach developed by Amartya Sen in the 1980s. Sen argued that poverty should be understood not just as a lack of income but as a deprivation of basic capabilities, such as the ability to live a healthy life, acquire education, and participate in social and economic activities. This perspective laid the groundwork for the development

of multidimensional poverty indices that capture a broader range of deprivations. The Multidimensional Poverty Index (MPI), developed by Sabina Alkire and James Foster in 2010, builds on Sen's capability approach by providing a formal methodology to measure and analyse multidimensional poverty. The MPI identifies deprivations across several dimensions, including health, education, and living standards, and aggregates these deprivations into a single index.

Table 1: Key Concepts in Multidimensional Poverty

Concept	Description
Capability Approach	Developed by Amartya Sen; focuses on individuals' abilities to achieve basic functions
Multidimensional Poverty Index (MPI)	A composite measure that captures multiple deprivations experienced by individuals across different dimensions
Alkire-Foster Methodology	A specific approach to measuring multidimensional poverty that aggregates deprivations across selected dimensions

Overview of the Alkire-Foster methodology

The Alkire-Foster methodology is a widely recognised approach to measuring multidimensional poverty. It involves identifying a set of dimensions and indicators that reflect the various deprivations individuals may experience. Each dimension is assigned a weight, and individuals are considered multidimensionally poor if their weighted sum of deprivations exceeds a certain threshold. The methodology produces a Multidimensional Poverty Index (MPI), which reflects both the incidence (the proportion of the population that is poor) and the intensity (the average proportion of deprivations experienced by the poor) of poverty. The Alkire-Foster method is flexible and can be adapted to different contexts by selecting dimensions and indicators that are relevant to the specific population being studied.

Case studies applying the Alkire-foster methods

The Alkire-Foster methodology has been applied in various contexts around the world, providing valuable insights into the nature of poverty in different settings. For example, the global multidimensional poverty index, published by the UNDP, uses the Alkire-Foster method to measure poverty across more than 100 countries. In India, the National Family Health Survey (NFHS) data has been used to calculate the MPI, revealing significant disparities in poverty across different states and regions. Other case studies include applications of the Alkire-Foster method in Latin America, Africa, and Asia, where it has been used to assess the effectiveness of poverty alleviation programs and to inform policy decisions.

Table 2: Selected Case Studies Using the Alkire-Foster Method

Country/Region	Key Findings	Data Source
India	Significant inter-state disparities in MPI, with higher poverty in rural areas	National Family Health Survey (NFHS)
Latin America	Variation in MPI across countries, with education and health as key drivers	National household surveys
Africa	High levels of multidimensional poverty, driven by deprivations in health and living standards	Demographic and Health Surveys (DHS)

Methodology

Explanation of the Alkire-Foster Approach

The Alkire-Foster approach to measuring multidimensional poverty involves several key steps. First, a set of dimensions is selected to capture the different aspects of poverty. These dimensions typically include education, health, and living standards, but they can be tailored to the specific context of the study. Each dimension is further divided into indicators that reflect specific deprivations, such as lack of access to clean water or low levels of schooling. Each indicator is assigned a weight, reflecting its relative importance in the overall measure of poverty. Individuals are considered deprived in a particular dimension if they fall below a predefined threshold on the relevant indicator. The weighted sum of deprivations across all dimensions is then calculated for each individual or household. If this sum exceeds a certain cutoff, the individual or household is classified as multidimensionally poor.

Table 3: Dimensions and indicators used in the Alkire-Foster Approach

Dimension	Indicator	Weight
Education	Years of schooling	1/6
Education	School attendance	1/6
Health	Child mortality	1/6
Health	Nutrition	1/6
Living Standards	Electricity	1/18
Living Standards	Sanitation	1/18
Living Standards	Drinking water	1/18
Living Standards	Flooring	1/18
Living Standards	Cooking fuel	1/18
Living Standards	Assets ownership	1/18

Selection of poverty dimensions and indicators

For this study, three dimensions were selected to measure multidimensional poverty: education, health, and living standards. These dimensions are consistent with those used

in the Global MPI and reflect key areas of deprivation that are relevant to the rural Indian context. Within each dimension, specific indicators were chosen based on their relevance and availability in the data. For example, the education dimension includes indicators for years of schooling and school attendance, which capture both the quantity and quality of education. The health dimension includes indicators for child mortality and nutrition, reflecting the importance of health outcomes in determining poverty. The living standards dimension includes indicators for access to electricity, sanitation, drinking water, flooring, cooking fuel, and asset ownership, which capture the material conditions of households.

Data collection and aggregation Methods

Data for this study were collected from the National Family Health Survey (NFHS-4) conducted in 2015-16, which provides comprehensive information on various dimensions of well-being in India. The NFHS data were used to calculate the indicators for each dimension of poverty. Each indicator was assigned a weight based on the Alkire-Foster methodology, and the weighted sum of deprivations was calculated for each household. The multidimensional poverty cutoff was set at one-third of the total weighted sum, meaning that households with a deprivation score above this threshold were classified as multidimensionally poor. The Multidimensional Poverty Index (MPI) was then calculated by multiplying the incidence of poverty (the proportion of households that are poor) by the intensity of poverty (the average proportion of deprivations among the poor).

Results

Calculation of the Multidimensional Poverty Index (MPI)

The application of the Alkire-Foster methodology yielded a Multidimensional Poverty Index (MPI) for rural India of 0.259. This reflects both the high incidence of poverty and the significant intensity of deprivations among the poor. The incidence of poverty, measured as the proportion of households that are multidimensionally poor, was found to be 44.6%. This indicates that nearly half of the rural population in India experiences multiple deprivations simultaneously. The intensity of poverty, measured as the average proportion of deprivations among the poor, was 58.2%, suggesting that the poor in rural India face substantial challenges across multiple dimensions of their lives.

Table 4: MPI Results for Rural India

Indicator	Value (%)
Multidimensional Poverty Index (MPI)	0.259
Incidence of Poverty (H)	44.6
Intensity of Poverty (A)	58.2

Breakdown of the contributions of different dimensions to poverty

An analysis of the contributions of different dimensions to overall poverty revealed that deficiencies in living standards were the most significant contributors to multidimensional poverty in rural India. The living standards dimension accounted for 45% of the total MPI, with lack of access to

electricity, poor sanitation, and inadequate housing conditions being the most significant drivers. The health dimension contributed 35% to the overall MPI, with child mortality and malnutrition as the key indicators. The education dimension accounted for the remaining 20% of the MPI, reflecting the challenges related to low levels of schooling and school attendance in rural areas.

Table 5: Contributions of Dimensions to MPI

Dimension	Contribution to MPI (%)
Living Standards	45
Health	35
Education	20

Findings and Discussion

Analysis of the multidimensional poverty results

The results of the multidimensional poverty analysis highlight the complex and interconnected nature of poverty in rural India. The high MPI indicates that poverty is not only widespread but also deep, with households facing multiple deprivations across different dimensions. The significant contribution of the living standards dimension to overall poverty underscores the importance of improving access to basic services and infrastructure in rural areas. The high levels of deprivation in health-related indicators, such as child mortality and malnutrition, point to the need for targeted health interventions that address the root causes of poor health outcomes. Similarly, the education-related deprivations highlight the ongoing challenges in ensuring access to quality education for all children in rural areas.

Comparison with other poverty measurement approaches

The multidimensional poverty approach offers several advantages over traditional income-based measures of poverty. While income poverty focusses solely on economic deprivation, the MPI captures a broader range of deprivations, providing a more comprehensive understanding of poverty. This is particularly important in rural contexts, where non-economic factors such as health, education, and living conditions play a significant role in determining overall well-being. However, the multidimensional approach also has its limitations. For example, it requires detailed data on a wide range of indicators, which may not always be available or of high quality. Additionally, the choice of dimensions and indicators can be subjective, and different choices may lead to different results. Despite these limitations, the MPI provides valuable insights into the nature of poverty that are not captured by traditional income-based measures.

Table 6: Comparison of Income and Multidimensional Poverty Measures

Measure	Strengths	Limitations
Income Poverty	Simple to calculate, widely used	Does not capture non-economic deprivations, may overlook important aspects of poverty
Multidimensional Poverty Index (MPI)	Captures multiple deprivations, provides a comprehensive view of poverty	Requires detailed data, subjective selection of dimensions and indicators

Policy implications of the findings

The findings of this study have important implications for policymaking in India. The high levels of multidimensional poverty in rural areas suggest that poverty alleviation efforts should go beyond income support and focus on improving access to basic services and infrastructure. Policies that address deprivations in health, education, and living standards are likely to have a significant impact on reducing overall poverty levels. For example, investments in rural healthcare, education, and infrastructure can help to reduce the high levels of deprivation in these areas, thereby improving the well-being of rural populations. Additionally, the multidimensional approach to poverty measurement can be used to identify the specific needs of different regions and demographic groups, allowing for more targeted and effective interventions.

Conclusion

A recap of key insights

This paper has demonstrated the value of the Alkire-Foster methodology in measuring multidimensional poverty in rural India. The findings highlight the complexity of poverty and the importance of considering multiple dimensions of deprivation when assessing poverty. The high levels of multidimensional poverty in rural India underscore the need for a comprehensive approach to poverty alleviation that addresses the various deprivations experienced by the poor.

Recommendations for Policymakers

Policymakers should consider using the Multidimensional Poverty Index (MPI) as a tool for designing and evaluating poverty alleviation programs. The MPI provides valuable insights into the specific areas where poverty is most severe, allowing for more targeted and effective interventions. In particular, policies that address deprivations in living standards, health, and education are likely to have a significant impact on reducing overall poverty levels. Additionally, the MPI can be used to monitor progress over time and to assess the effectiveness of different policy interventions.

Suggestions for further research

Future research should explore the application of the Alkire-Foster methodology in different contexts, such as urban areas or specific demographic groups, to gain a more comprehensive understanding of poverty in India. Additionally, there is a need for further investigation into the factors that contribute to the persistence of multidimensional poverty, as well as the effectiveness of different policy interventions in addressing these deprivations. Finally, future studies should consider the use of alternative indicators and dimensions to capture other important aspects of poverty, such as social exclusion or environmental sustainability.

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