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Measurement of Multidimensional Poverty in the Metropolis: The Case of Shanghai

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Abstract: From the perspective of multidimensional poverty theory, this paper takes the low-income population in District J of Shanghai as the sample for analysis, and explores six dimensions of poverty, i.e., income, health, education, employment, social participation, and whether there are children in the family, and divides the population covered by subsistence allowances into three levels of poverty: high, moderate and low. We find that: (1) 71% of individuals suffer from poverty at moderate levels or above; (2) There is a clear trend of "cluster disadvantage" at high poverty levels among families with children; (3) Women, especially women without registered resident status in Shanghai, are particularly vulnerable to poverty. These "silent minorities" should be the targets of priority intervention for social assistance; (4) From a geographical perspective, areas with high poverty intensity tend to be "concentrated and connected" in space. (5) In terms of service strategies, according to the poverty intensity which can be divided into three levels of "high, moderate and low," this article proposes four types of assistance services: "general preventive, basic living needs ensured, supportive and development-oriented, and urgent protective," in order to maximize the use of limited welfare resources for the best benefits of the most group in need.

Keywords: Multidimensional Poverty, Alkire-Foster Method, Poverty Measurement, Targeted Social Welfare Service

1. Background

In recent years, with the proposal of China's national strategic goal of targeted poverty alleviation and eradication, multidimensional poverty research focusing on poor rural areas has blossomed. However, there have been relatively few studies on the urban poor, especially in metropolises such as Shanghai. What is the real condition of the poor in metropolises behind a thriving economy? How poor exactly are these people, and in which aspects? Who are the poorest of the poor?

From the perspective of multidimensional poverty theory, this paper presents an empirical analysis of the population covered by subsistence allowances in District J of Shanghai (5441 households and 7532 people) in three dimensions: (1) Poverty dimensions: this paper explores the "contribution rate" of each of the six dimensions (income, health, education, employment, social participation and whether there are children in the family) to overall multidimensional poverty. (2) Poverty intensity: the AF method is used to measure the intensity of poverty endured by different groups in the sample in the above six dimensions, and identify "the poorest of the poor", so as to inform welfare policies in prioritizing the most needy groups. (3) Proposal of welfare policies: suggested countermeasures for poverty alleviation in metropolises are proposed from both theoretical and practical perspectives, so as to concentrate limited welfare resources on the poor in the most cost-effective way, and provide genuine multidimensional solutions for welfare policies, towards realizing the final goal of supporting the sustainable development of the poor.

2. Origin of the Problem: The Poverty Line Is Not Enough to Reflect the Reality of Urban Poverty

Since Shanghai took the lead in establishing the minimum living security system for urban and rural residents in China in 1993, there has been an increase followed by a decrease in the number of residents covered by subsistence allowances. In 2003, the number of people covered reached a peak of 550,600

(446,000 in urban areas and 104,600 in rural areas), with a poverty rate of 4.1%. Since then, the number of urban and rural residents in Shanghai has shown a downward trend year by year. Since 2015, the number of people living on subsistence allowances has stabilized around 180,000, with a poverty rate of approximately 1.3%-1.4%. [1]

The persistently low poverty rate can be explained by the rapid economic and social development of Shanghai. From 2015 to 2019, Shanghai's per capita disposable income was among the top in China (Table 1). The proportion of food in Shanghai's per capita consumption expenditure has decreased year by year, stabilizing around 25% from 2017 till now (Table 2), with an annual growth rate of poverty line higher than that of the per capita disposable income.

Table 1. *Shanghai's per capita disposable income (RMB) and poverty line from 2015 to 2019.*

Year	2015	2016	2017	2018	2019
CPI (100 for the previous year)	102.4	103.2	101.7	101.6	102.5
Residents' average monthly disposable income 1 (actual value)	4156	4525	4916	5349	5787
Residents' average monthly disposable income 2 (Converted to 2019 values after considering CPI)	4544	4793	5120	5483	5787
Annual growth rate of per capita disposable income (considering CPI)		5%	7%	7%	6%
Poverty line 1 (actual value)	790	880	970	1060	1160
Poverty line 2 (Converted to 2019 values after considering CPI)	1006	1062	1096	1129	1170
Annual growth rate of poverty line (considering CPI)		8%	8%	9%	7%
Percentage of poverty-line income in per capita disposable income	19%	19%	20%	20%	20%

Notes The basic data is retrieved from the official website of Shanghai Statistics Bureau: http://tjj.sh.gov.cn

In terms of both Engel's coefficient and per capita disposable income, Shanghai qualifies among the "richest" cities. However, even in the richest cities, the poor is still troubled by "a low poverty line".

Table 2. *Shanghai's per capita consumption expenditure, food consumption and poverty line from 2015 to 2019.*

Year	2015	2016	2017	2018	2019
Price index of food (100 in the previous year)	102.9	103.7	101.2	102.3	105
Residents' total average monthly consumption	2899	3129	3316	3613	3800
Average monthly expenditure on food	773	797	834	894	912
Poverty line	790	880	970	1060	1160
Percentage of food expenditure in total consumption expenditure (Engel's coefficient)	26.7%	25.5%	25.1%	24.7%	24%
Percentage of food expenditure in poverty relief fund	97.8%	90.6%	85.6%	84.3%	78.6%

Notes The basic data is retrieved from the official website of Shanghai Statistics Bureau: http://tjj.sh.gov.cn

On the one hand, Shanghai's poverty line has been hovering around 20% of per capita disposable income (Table 1), far below the internationally accepted relative poverty line of regions with similar levels of economic development. [2] Hong Kong amended its law on the formulation of poverty line in 2013, setting the poverty line at 50% of the median household income and replacing the absolute poverty line with relative poverty line. [3] Taiwan amended its *Social Assistance Act* for the sixth time in 2010, setting the minimum living standard at 60% of the median disposable income. In comparison, the poverty line in Shanghai seems to be too low.

On the other hand, compared with the consumption of services, expenditure on food represents the rigid demand of residents in meeting basic needs. For poor families in Shanghai, 85% of their subsistence allowances is used to meet basic needs for food (Table 2), while the needs to maintain the physical and mental health of family members and improve the quality of life, such as cultural consumption, education and improvement of living environment, are generally neglected. These economically disadvantaged families still face great challenges in rising out of perpetuated or intergenerational poverty.

However, as a means to identify the poor, the "poverty line" is only the starting point, not the end point of social welfare. Poverty means not only inadequate income, but more importantly the deprivation of basic "capabilities". [4] From the lens of "capability poverty", simply raising the poverty line and granting more relief to impoverished families are not the permanent solution to poverty. Therefore, to truly understand the living conditions of the poor in Shanghai has become an essential precondition for exploring a development-oriented social assistance model.

3. How to Measure: The Measurement and Dimensions of Multidimensional Poverty

Scholars differ in their views on the essence of poverty, but are increasingly converging as they move from a single monetary perspective to a multidimensional perspective, and from descriptive conceptual discussion to developing standardized measurement methodologies. These developments in research further point to the core of poverty: the root causes of poverty (why poor), the dimensions of poverty (poor in which aspects) and the intensity of poverty (how poor exactly). At the practical level, poverty, as a kind of life experience, is characterized not only by income, but by other vulnerabilities as well, such as problems in health, family structure, family relations, and social participation.

3.1. Development of Poverty Theory: From Unidimensional to Multidimensional Approach

The application of a non-monetary multidimensional approach to measuring poverty can be traced back to the promotion of concepts such as social needs, social exclusion, capability poverty, social cohesion, and cluster disadvantage, among which Amartya Sen's "capability poverty" is the key representative of the transition from a uni-dimensional to multidimensional approach to poverty research.

As a departure from the traditional welfare economics (utilitarianism) and the measurement of poverty based on income, Amartya Sen put forward the conceptual framework of the "capability approach" from the perspective of social rights. He regards poverty as the deprivation of people's basic capabilities, and thus poverty reduction is to expand the real freedom that individuals have reason to cherish. Basic capabilities include equitable access to education, health, drinking water, housing, sanitation and market. Sen's theory represents a breakthrough from the traditional view of "income-poverty" and has a significant impact on academic and policy fields. The Human Development Index (HDI), Human Poverty Index (HPI) and Multidimensional Poverty Index (MPI) established by the United Nations Development Programme (UNDP) in 1997 are all based on Sen's "capability approach".

While Sen analyzed the close relationship between the interpersonal differences of "capability" at the individual level and the diversity of welfare environment from the perspective of multidimensional structure, a clear definition of the specific dimensions of poverty and the solutions to measuring multidimensional poverty remain unspecified. [5]

3.2. Multidimensional Poverty Measurement: The AF Method

Multidimensional poverty measurement involves two core concepts: the definition of poverty dimensions and the measurement of poverty intensity. The uni-dimensional poverty analysis is generally realized by using poverty line or cut-offs, that is, individuals with income below the poverty line are classified as poor. However, multidimensional measurement involves multiple variables, and a "dual cut-off approach" is needed to identify poverty. The first cut-off identifies whether a person is deprived with respect to a specific dimension, and the second specifies the number of dimensions a person must be deprived in in order to be considered poor.

In 2008, Alkire and Foster (2008) [6] at the Oxford Poverty and Human Development Initiative (OPHI) at University of Oxford proposed an approach to the identification, aggregation and decomposition of multidimensional poverty, namely, the Alkire-Foster counting methodology, which generally follows these steps:

(1) Determine dimensions and indicators. Define a set of dimensions and indicators that can reflect poverty, including education, health status, employment status, and child mortality. The number of dimensions is generally represented by d.
(2) Set the dimensional deprivation cut-offs. The deprivation cut-off Z (one dimension corresponds to one cut-off value) is used to determine whether an individual is deprived in a dimension. For example, if the number of years of education is less than 9 years, the individual will be considered deprived in the dimension of education.
(3) Assign weights. Weights are used to express the relative importance of different deprivation dimensions. Equal weights are assumed for all deprivation dimensions if they are regarded as equally important. If deprivation dimensions differ in importance, the weights will differ as well. Generally, the higher the weights, the greater the importance. The sum of the weights of all dimensions must be 1.
(4) Number and score of deprivations at the individual level. The deprivation counts c captures the breadth of a person's deprivation. If an individual is deprived in both education and employment, the number of deprivations experienced by an individual will be 2 (c=2). In case of equal weights of the dimensions, the score of individual deprivation will be: c/d.
(5) Set a poverty cut-off. Usually, the poverty cut-off K is used to determine whether a person is deprived to a degree that can be called multidimensional poverty, and K satisfies $0 \leqq K \leqq d$. For example, if the cut-off is set at K=2, the individual will be considered multidimensionally poor only if the deprivation counts $c \geqq 2$, and if c is less than 2, the individual cannot be considered multidimensionally poor.
(6) Calculate the poverty intensity of the poor (A). The overall multidimensional poverty intensity (also known as the depth of poverty) can be obtained by adding up the deprivation scores of the poor in all dimensions and dividing by the number of the poor.
(7) Calculate the headcount ratio (H), and obtain the percentage of the population that is multidimensionally poor.
(8) Calculate the multidimensional poverty measure (M_0). The multidimensional poverty measure (M_0=H*A) is calculated by multiplying the headcount ratio (H) by the poverty intensity (A).

The AF method is highly flexible in the selection of poverty dimensions and indicators, and can decompose poverty conditions according to different factors such as dimensions and regions. Since 2010, the United Nations Development Programme (UNDP) has proposed a Multidimensional Poverty Index (MPI) based on the AF method, and conducted an annual MPI assessment of 102 developing countries, calculating a composite index including ten indicators in three dimensions (health, education and living standards), so as to measure the overall reality of poverty [7]. Subsequently, the method was successively adopted by Germany [8], the United States [9], and the European Union. Alkire and Apablaza [10], based on EU-SILC statistics on income and living conditions, used six dimensions in the analysis of EU countries, i.e.,

equivalised disposable income, employment, material deprivation, education, health and living environment, and found that in the surveyed countries, the poverty index declined from 2006 to 2012, mainly due to the decline in the percentage of the multidimensionally poor, while the poverty intensity of the poor population remained unchanged.

3.3. The Selection of Multidimensional Poverty Dimensions

The key step of multidimensional poverty measurement is to determine the dimensions and indicators of poverty. Dimensions are conceptual groupings (e.g. health dimension), while indicators, as a basic component of dimensions, provide specific description of dimensions. Indicators are also variables that reflect data in a concentrated way (e.g. the health dimension can be decomposed into indicators including serious illness, disability and chronic disease). Indicators may fall under different categories, i.e., cumulative indicators (e.g. education level is relatively stable) versus mobile indicators (employment status changes with time), subjective indicators (such as the health status perceived by the individual) versus objective indicators (certificates of physical health status issued by authoritative institutions), and relative indicators (income standards reflecting relative poverty) versus absolute indicators (income standards reflecting absolute poverty).

The multidimensional approaches to poverty range from three key dimensions of global MPI (education, health and standard of living) to as many as 17 dimensions. [11] Despite differences in practical application, most countries have opted for certain key dimensions and indicators.

Among the existing dimensions, the most frequently used dimensions are health and education, followed by standard of living (statistical indicators include basic living standard, housing, and public services) and employment (statistical indicators include work, employment, social security, labor, and social insurance). In addition, different countries and regions have incorporated the dimensions of material deprivation, social participation, children, access to information, environment, geographical space (low-income geographical areas) into the MPI according their local realities.

Many scholars have debated over whether an authoritative "dimension list" is warranted. Nussbaum considered that Sen's perspective of capabilities was too vague, warranting the establishment of a list of basic capabilities. [12] Sen, while believing in the necessity to take key dimensions into account, was against the establishment of a series of fixed dimensions, arguing that dimensions should be determined based on public discussions and social environment. Alkire and Foster believed that the measurement of multidimensional poverty must accommodate such conditions as the regional culture, economic levels, and social welfare levels, and that many key factors in measurement should depend on users, such as the selection of dimensions, dimension cut-offs, dimensional weights and multidimensional poverty cut-off. [13]

Building on the comprehensive comparison of global universal dimensions, this paper selects six dimensions based on Shanghai's economic and social reality, i.e., income, health, education, employment, social participation and whether there are children in the family, to measure multidimensional poverty. This paper determines the specific cut-offs of deprivation. Table 3 provides the dimension descriptions, weights and deprivation cut-offs.

Table 3. *Dimensions, Indicators, Deprivation Cut-offs and Weights.*

Dimension	Indicators	Deprivation cut-offs	Weights
Income	Income below the poverty standard or not	Per capita income of the family below the poverty line (1160 yuan)	1/6
Health	Physical and mental health status	Suffering from serious illnesses, chronic illnesses or disabilities	1/6
Education	Education level	Junior high school or below	1/6
Employment	Employment status	Out of work or unemployed	1/6
Social participation	Obvious social exclusion in social participation	Former prisoner, drug addict, individual without registered resident status	1/6
Children	Whether there are children in the family	There are children aged 16 or under in the family	1/18
	Single-parent family	There are children aged 16 or under in the family and the caregiver (householder) is single	1/18
	Health status and number of children	There are children aged 16 or under in the family with health problems, or there are 2 or more children aged 16 or under in the family.	1/18

3.3.1. Income

Poverty is more than just a lack of money, but a lack of money is undoubtedly an integral part of poverty. To decide whether or not to measure the income dimension, it is important to consider the overlap and intersection between income and the standard of living and material shortage. Regarding the data in this paper, it is more appropriate to include the income dimension due to the unavailability of detailed information such as basic living standard and material deprivation. The standard line of Shanghai's subsistence allowances in 2019 is adopted as the deprivation cut-off in the income dimension, that is, a family income per capita of less than 1160 yuan. As the research object of this paper is people entitled to subsistence allowances, and thus all of them are regarded as deprived in this dimension.

3.3.2. Education

Lack of education will limit opportunities of social participation, employment and economic security. For instance, in the modern labor market, individuals without a high school diploma are usually at a severe disadvantage. This paper takes junior high school as the cut-off, and regards individuals with an education level of junior high school or below as deprived in this dimension.

3.3.3. Health

Poor health is a crucial factor for families plunging into

distress. Poor health conditions here include physical and mental disabilities, major diseases, and chronic diseases.

3.3.4. Employment

The benefits of employment go beyond income. Employment contains a sense of belonging and structure brought about by social connection, and a sense of goal for future life and self-worth. Obviously, a working family is better-off than a non-working one. Compared with temporary unemployment, long-term unemployment will have physical, psychological and social consequences. Therefore, in this paper, people out of work are regarded as deprived in employment.

3.3.5. Social Participation

Social participation is meant to capture an individual's entitlement to social communication opportunities, actions and social security. Compared with ordinary individuals, former prisoners and drug addicts are more likely to be excluded from social interaction and thus experience difficulties in social integration. Due to the restriction of Shanghai's household registration system, those who are not locally registered are not entitled to the same levels of social security as Shanghai citizens.

3.3.6. Children

The choice of dimensions needs to be adapted to specific groups and analysis units (individuals or families). Structural indicators such as employment and education levels are not suitable for children aged 16 or under. However, compared with ordinary families, the following situations will render the main caregiver in a family more vulnerable in terms of the required efforts, capabilities and expenditure: there is more than one child aged 16 or under in the family, the child is in poor health, or the family is a single-parent family. Although children cannot be included in the statistical analysis in the same way as adults, their information can be integrated into that of the main caregiver (householder) through assigned branch.

Among the above six dimensions, employment, education, health and social participation are directly related to people's functionings, while income is the most direct signal of whether basic needs (economic security) are met. The dimension of children displays the characteristics of "disadvantage cluster" when family is taken as the unit for analysis.

3.4. Correlation Coefficient Test of Different Poverty Dimensions

In addition to consistency and stability, dimensions shall also be mutually exclusive, that is, the smaller the correlation between dimensions, the better. However, it has been proved at both theoretical and practical levels that achieving zero correlation between different dimensions of poverty can be extremely difficult. [14-15] For instance, with respect to the potential interplay among education, health and employment, poor health status or low education levels often lead to difficulties in employment.

Table 4. *Pearson Correlation Test of different poverty dimensions.*

	Income	Education	Health	Employment	Social participation	Children
Income	.					
Education	.	1				
Health	.	0.0686*	1			
Employment	.	-0.0285*	0.0391*	1		
Social participation	.	0.1299*	-0.1427*	-0.0542*	1	
Children	.	-0.016	-0.0132	-0.1284*	-0.0595*	1

Notes * $p < 0.05$

In this paper, the Pearson correlation test is used to evaluate the correlation matrix between the dimensions (Table 4): Overall, the correlation between the five dimensions, i.e., education, health, employment, social participation and children, is relatively low, which are adaptable as dimensions in multidimensional poverty measurement (income is not included in the correlation coefficient test as the subjects are all deprived in the dimension).

4. How Poor Exactly: Multidimensional Poverty Measurement in District J of Shanghai

The subjects in this research are individuals aged 17 or over covered by subsistence allowances in District J of Shanghai, i.e., 7,352 people, 5,441 households (including 25 householders aged 17 or under). To identify the poverty dimensions of families, the subjects are grouped into different units according to their registration file number, as each family has a file number, and in principle only one householder. Regarding families composed only of children aged 17 or under (i.e. the householder is a child, and all other family members are aged 17 or under), in order to accurately identify the intensity of poverty of this kind, this group of children is also included in the analysis, with the same employment and education dimensions as adults over 17.

4.1. Basic Profile of Research Objects

Table 5. *Basic profile of people covered by subsistence allowances*

	Number of People	Percentage/%
Gender:		
Female	2,683	36.49
Male	4,669	63.51
Total	7,352	100

	Number of People	Percentage/%
Age:		
Aged 18 or under	200	2.72
19-29	626	8.51
30-39	889	12.09
40-49	1,459	19.84
50-59	2,447	33.28
Aged 60 or over	1,731	23.54
Total	7,352	100
Marital status (aged 25 or over):		
Widowed	303	4.56
Married	2,588	38.91
Unmarried	1,613	24.25
Divorced	2,147	32.28
Total	6,651	100

As can be seen in Table 5, men account for 64% of the population covered by subsistence allowances in District J, far exceeding women; individuals older in age take up a higher proportion, specifically, individuals aged 50 or above account for 57% of the total population covered by subsistence allowances. Among the marriageable population (aged 25 or over), married individuals account for only 39%, and the total percentage of widowed, unmarried and divorced individuals amounts to 61%, demonstrating obvious dual clustering of individual and family vulnerability.

4.2. Measurement of Multidimensional Poverty

4.2.1. Deprivations in Employment, Education and Health Are Prominent Apart from Income

After selecting the poverty dimensions, we can calculate the poverty rate in each dimension, namely, the number and percentage of people deprived in each, as well as the contribution rate of each dimension to the overall multidimensional poverty, that is, the percentage of deprivation counts in each dimension in the total deprivation counts of all poverty dimensions.

In addition to a general lack of income, deprivations in employment, education and health are notable. Among them, 93.6% are deprived in employment, contributing 30.6% to the overall poverty; 60.5% have insufficient education levels, and 20.9% face problems in physical and mental health (Table 6).

In addition to the high percentage of unemployed people, there is also a long-term dependence on subsistence allowances. Among the working-age group, 46% have been recipients of subsistence allowances for more than 10 years; 27.9% between 6 and 10 years (Figure 1). The longer they are absent from the labor market, the lower the possibility of re-employment. In contrast, from the perspective of development, people who have enjoyed allowances for less than 5 years are more likely to be re-employed, and should probably be the target group for re-employment support offered by the social assistance system.

Table 6. *Incidence and contribution rate of different poverty dimensions.*

Dimension	Indicator	Poverty dimension incidence (%)	Poverty dimension contribution rate (%)
Income	Income below the poverty line	100.0	32.7
Education	Education level of junior high school or below	60.5	19.8
Health	Physical and mental health status	20.9	6.8
Employment	Unemployment	93.6	30.6
Social participation	Inadequate social participation	11.1	3.6
	Whether there are children in the family	13.0	4.2
Children	Single-parent family	1.9	0.6
	Health status and number of children	5.1	1.7

4.2.2. More Than 71% of Individuals Suffer from Triple or More Vulnerabilities

The greater the deprivation counts, the higher the poverty level. This paper addresses 6 poverty dimensions, so the deprivation counts c is between 1 and 6. c=1 indicates that the individual is deprived in only one dimension. c=2 indicates that the individual is deprived in 2 dimensions, and so on. c=6 means that individuals are deprived in all six dimensions.

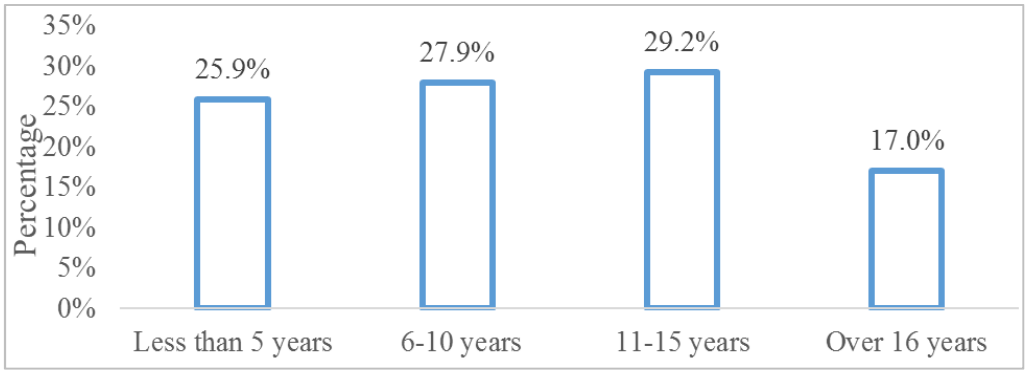


Figure 1. *Length of time receiving subsistence allowances (working-age population).*

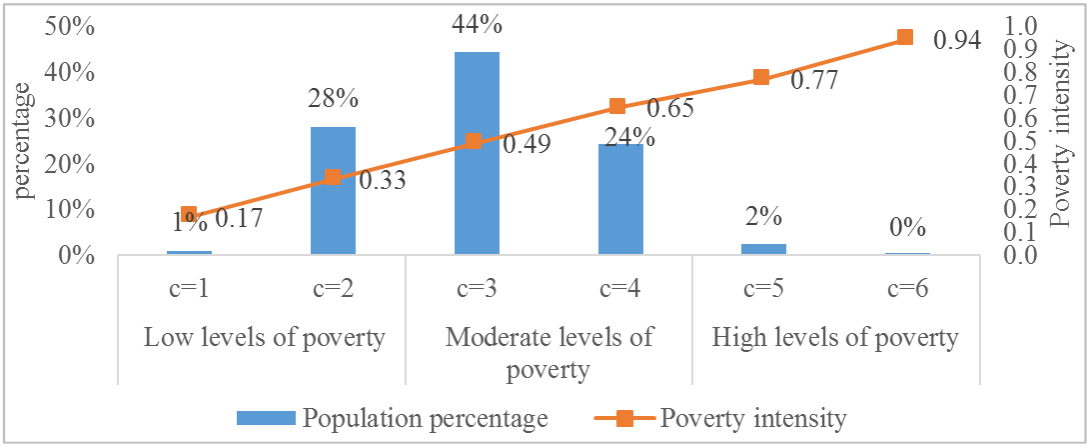


Figure 2. *Individual deprivation counts and poverty intensity.*

Approximately 28% of individuals are vulnerable in two dimensions; more than 71% are vulnerable in three or more (Figure 2). These data further prove that poverty is more than just simply lacking money, but involves multiple difficulties such as poor health, low education levels and under-employment.

By integrating the deprivation counts (c value) and poverty intensity (A value), the plight of the poor can be divided into low levels of poverty ($c \leqq 2$, $A \leqq 0.33$), moderate levels of poverty ($3 \leqq c \leqq 4$, $0.39 \leqq A \leqq 0.67$) and high levels of poverty ($c \geqq 5$, $A \geqq 0.72$), among which the number of people enduring low levels of poverty accounts for 29%; moderate levels of poverty, 68.7%; and high levels of the poverty, a mere 2.3%, but the poverty intensity is as high as 0.78 (Table 7).

Table 7. *Percentage of individuals with high, moderate and low levels of poverty.*

Levels of poverty	Average deprivation counts of individuals (c)	Average poverty intensity of individuals (A)	Percentage	Cumulative Percentage
Low-levels of poverty	c=1	0.167	0.94	0.94
	c=2	0.222	0.29	1.22
		0.278	0.37	1.59
		0.333	27.39	28.99
Moderate-levels of poverty	c=3	0.389	2.45	31.43
		0.444	2	33.43
		0.500	39.88	73.31
	c=4	0.556	2.9	76.21
		0.611	2.54	78.75
		0.667	18.58	97.33
High-levels of poverty	c=5	0.667	0.3	97.63
		0.722	0.94	98.57
		0.778	0.88	99.46
		0.833	0.37	99.82
	c=6	0.833	0.15	99.97
		0.9444445	0.03	100

When the intensity of poverty endured by individuals becomes the basis for formulating welfare policies, those who simultaneously endure moderate or high levels of poverty in three or more dimensions should be prioritized in social assistance services.

4.2.3. High Poverty Rate and Relatively High Overall Poverty Intensity

Table 8 shows the headcount ratio (H) and the change of multidimensional poverty intensity (A) of the poor in District J. When the cut-off K is set at K=1, it means that individuals are regarded as poor as long as they are deprived in at least one dimension. The income of the sample population in the present study is invariably below the standard of subsistence allowances, so when K=1, the poverty rate is 100%, the multidimensional poverty intensity (A) is 0.488, and the average poverty dimension experienced by the object is 2.99. When the cut-off is set at K=2 (i.e. individuals are deprived in at least 2 dimensions), the incidence of multidimensional poverty is 99%, the intensity of multidimensional poverty (A) is 0.491, and the average poverty dimension experienced by the poor population is 3.01. When K=3, the incidence of multidimensional poverty drops to 71%, the intensity of multidimensional poverty (A) rises to 0.554, and the average poverty dimension experienced by the poor is 3.4. When K=4, the incidence of multidimensional poverty drops sharply to 27%, and the intensity of multidimensional poverty (A) rises to 0.658.

Table 8. *Multidimensional Poverty Measurement with different K values.*

Multidimensional poverty cut-off (K)	Multidimensional poverty measure (M0=H×A)	Headcount ratio (H)	Intensity of Multidimensional Poverty (A)	Average deprivation counts (c)
K= 1	0.488	1.00	0.488	2.99
K= 2	0.486	0.99	0.491	3.01
K= 3	0.394	0.71	0.554	3.4
K= 4	0.176	0.27	0.658	4.08
K= 5	0.018	0.02	0.770	5.01
K= 6	0.000	0.00	0.944	6

In the follow-up analysis, this paper assumes K=2 as the multidimensional poverty cut-off of the population covered by subsistence allowances in District J, and the overall average poverty intensity of the population covered by subsistence allowances is 0.491.

4.3. Population Clustering of the Multidimensionally Poor

4.3.1. Families with Children Aged 16 or Under Show an Obvious Trend of Clustering at High Levels of Poverty

(1) The highest poverty intensity is observed in householders aged 16 or under.

A further breakdown of different age groups uncovers a much higher poverty intensity (0.6) of children aged 16 or under who are also householders than both the average of other age groups and the overall poverty intensity (Figure 3). Among all the people covered by subsistence allowances in District J, there are only 25 children aged 16 or under in registered households composed only of children (a total of 24 households, including 23 households with only one child and one household with 2 children).

The present project finds it difficult to learn about the actual situation of the custodians (parents or grandparents) of such children. But given their extremely high poverty intensity in comparison with other population groups, children in households with no adult householders deserve the urgent attention of the social assistance service system.

(2) At high levels of poverty, the percentage of families with children is as high as 88%.

Apart from the above-mentioned children who are also themselves the heads of household, this study assigns the poverty indicators of other children aged 16 or under to adult heads of household. Here, we take family as the unit for analysis, take the maximum value of deprivation counts (*c*) of family members as the number of deprivations endured by the family, and take the maximum value of poverty intensity (A) among family members as the poverty intensity of the family.

Among the low-income families in District J, 956 households have children aged 16 or under (accounting for 17.6% of the total number of low-income families). Among them, 55% of households with children are simultaneously deprived in 4 dimensions, and 16.2% experience 5 or more poverty deprivations. As shown in Figure 4, with the increase of the number of deprivations experienced by families, the percentage of families with children increases significantly compared with families without. Especially at high levels of poverty (177 households with *c*=5 and *c*=6), the percentage of families with children is as high as 88%, showing obvious "disadvantage cluster" of such families at high levels of poverty.

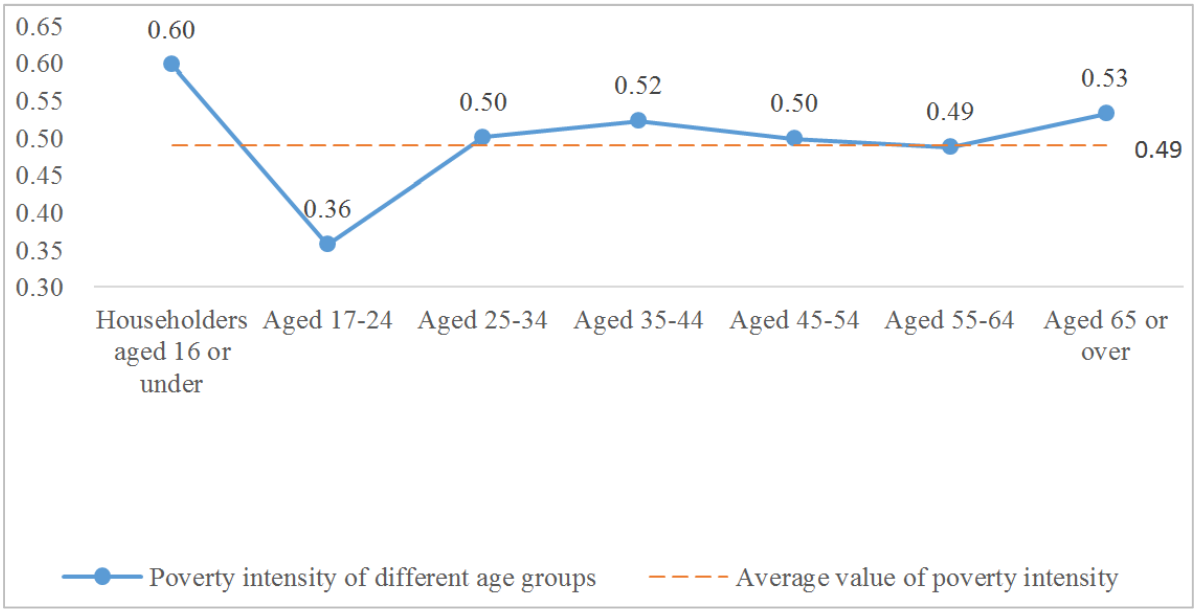


Figure 3. *Multidimensional Poverty Intensity Analysis of Different Age Groups (K=2).*

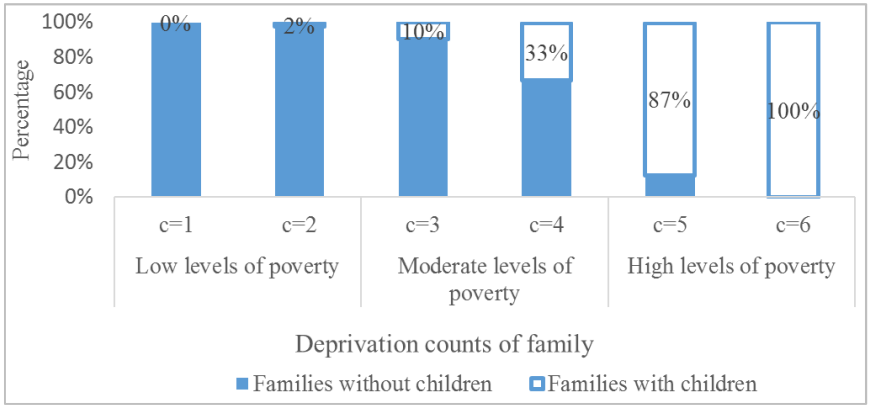


Figure 4. *Families with children and families without children at different levels of poverty.*

(3) Relatively high percentage of single parents, poor physical and mental health, and family members without registered resident status are the main causes of multidimensional poverty in families with children.

Of the 956 families with children, 39.4% are single-parent families, 45% have members without registered resident status (see below for poverty conditions caused by not being locally registered), and 24.5% have family members with health problems (Figure 5). In other words, these children, who are troubled by a meager family income and a lack of schooling and entertainment to meet their developmental needs, also face unfavorable factors such as incomplete family structure, unemployed family members, poor physical and mental health and not being locally registered. A combination of these factors leads to severe poverty of these children.

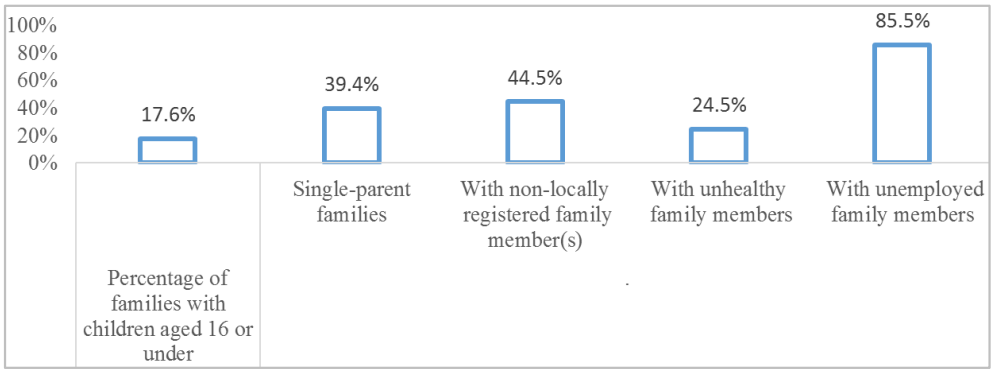
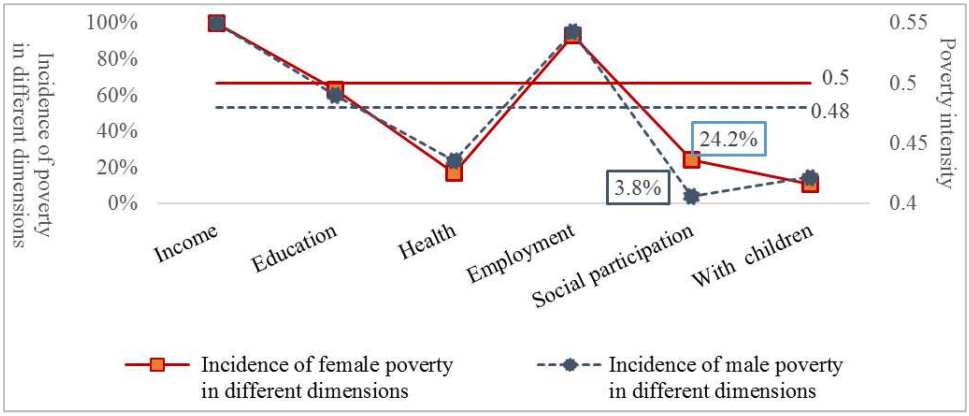


Figure 5. *Poverty conditions of families with children aged 16 or under.*

4.3.2. The Poverty Intensity of Women Is Significantly Higher Than That of Men, with Particularly Severe Conditions for Non-locally Registered Women

Overall, the average poverty intensity of women is significantly higher than that of men (Figure 6). A comparative analysis of the poverty rate in different dimensions may suggest reasons behind "female poverty".



Notes T Test of Poverty Intensity of Men and Women: Ha: diff! = 0, Pr (T > t) = 0.0000.

Figure 6. *Poverty incidence and intensity across different dimensions between males and females.*

With roughly equal poverty intensity in other dimensions, the poverty rate in social participation of women (24.2%) is considerably higher than that of men (3.8%) (Figure 6), which is an important cause of a higher poverty intensity for women. As mentioned earlier, we have incorporated such conditions as former prisoner, drug addict, and individual without registered resident status into the dimension of social participation, among which having no registered resident status is the most important factor, accounting for 91% (817 people are deprived in the dimension of social participation, of which 743 have no registered resident status in Shanghai). In addition, women account for 85% of the 743 non-locally registered residents.

At the policy level, subsistence allowances are granted on a family basis to eligible individuals whose householder is a locally registered resident in Shanghai. Migrant female residents typically obtain subsistence allowances by marrying locally registered male residents in Shanghai. However, in reality, the identity of migrant resident often render women a disadvantageous position in the family, in addition to restrictions in social participation, job market, social security, and medical insurance. In particular, due to the lack of medical insurance, in the event of a major illness, huge medical expenses will be an unbearable burden for women without registered resident status.

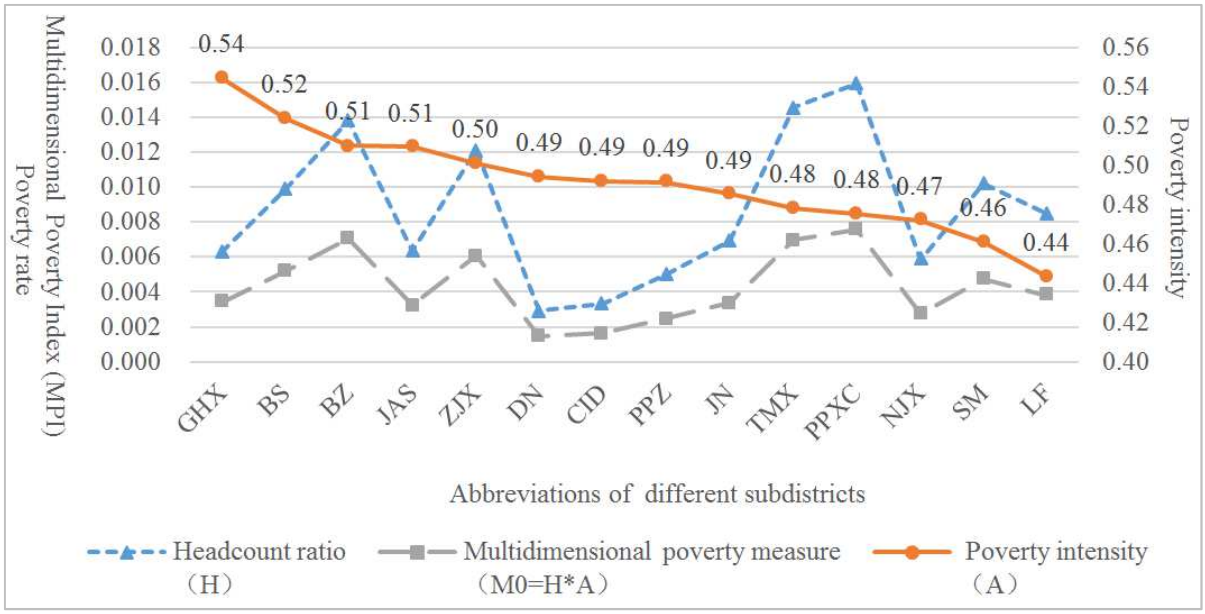
Moreover, with respect to families with non-locally registered female members in Shanghai, 29% experience physical and mental health difficulties for family members, and 59% have children To sum up, the restrictions brought about by not being locally registered, coupled with multiple conditions such as relatively high incidence of poor physical and mental health of family members and the need to take care of underage family members have led to prominent levels of poverty among female migrant residents in Shanghai.

4.4. Regional Clustering of the Multidimensionally Poor

In a cross-regional comparison of poverty, the poverty rate can reflect the scale of the poor in a region, while the poverty intensity serves as a most direct indicator of the distress of the poor. We take K=2 as the multidimensional poverty cut-off, that is, individuals can be regarded as multidimensionally poor only when they experience deprivations in at least one non-monetary dimension in addition to deprivation in income. The headcount ratio (H) in District J is calculated based on the total population of registered residence in different subdistricts.

Significant differences in the total registered population, the number of poor people and the multidimensional poverty intensity across different subdistricts result in large discrepancies in overall poverty measure (M_0) among different subdistricts. As Figure 7 shows, of the 14 subdistricts, only two (Subdistrict BS and Subdistrict ZJX) have relatively high levels of both poverty rate and poverty intensity. Other subdistricts with lower poverty rate have higher poverty intensity, while those with lower poverty intensity have higher poverty rate.

Analysis of poverty intensity in combination with the geographical location of subdistricts points to obvious features of "regional clustering": four of the top five subdistricts with the highest poverty intensity in Figure 7 (with Subdistrict JAS being the exception) are close to each other geographically and cluster in the regional center (Figure 8). With regard to the regional distribution of poverty intensity, the regions with higher poverty intensity tend to be "concentrated and connected" in space.



Notes Analysis of variance (K=2) of multidimensional poverty intensity (A) in 14 subdistricts in District J: F=21. 33, P=0. 000

Figure 7. *Multidimensional poverty conditions of different subdistricts in District J of Shanghai (K=2).*

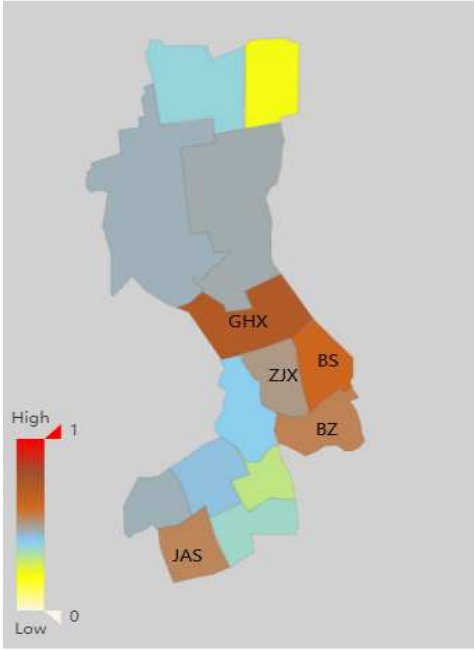


Figure 8. *Multidimensional poverty intensity of different subdistricts in District J of Shanghai (darker color indicates higher poverty intensity).*

Since the regional poverty rate is directly related to the level of economic development in a jurisdiction, economically advanced subdistricts tend to have relatively low poverty rate. However, low poverty rate often hides the real picture of high poverty intensity of the poor in a region. For example, Subdistrict DN and Subdistrict CJD have the lowest poverty rate, and rank among the top in District J in levels of economic development, but have medium-high levels of poverty intensity in the district. In other words, despite a relatively small number of poor in these two subdistricts, the intensity of poverty is relatively high. As a result, *compared with the "high poverty rate-low poverty intensity" subdistricts* (for example, Subdistrict PPXC and Subdistrict TMX, with the highest poverty rate in the district but relatively low poverty intensity), *"low poverty rate-high poverty intensity" subdistricts involve a higher degree of risk for the poor*, who have weaker ability to cope with risks. Such areas deserve high attention from relief policies and the investment of multiple relief resources. Of course, the most ideal subdistricts, like NJX and LF, are low in both poverty rate and poverty intensity.

5. How to Assist: Suggested Measures for Targeted Assistance for the Multidimensionally Poor

5.1. Policy Level: Establish a Multidimensional Poverty Assessment System to Target Priority Groups for Intervention and Services

In formulating welfare policies, the government should ensure efficient allocation of limited welfare resources, while upholding the principle of equitable access to resources, giving full consideration to population and regional differences. Therefore, at the policy level, it is a priority to establish a multidimensional poverty assessment system to accurately identify the objects for service.

First, a multidimensional poverty assessment system should be established to accurately analyze the poor in terms of "how poor exactly" and "poor in which aspects". As mentioned earlier, 99% of all the low-income people simultaneously suffer from double or more difficulties. In addition to a lack of money, about two thirds of the poor individuals and families are subject to three or more deprivations including long-term unemployment, low education level and physical and mental health diseases. If a single economic dimension is taken as the basis for consideration, the real plight of the "poor" may be underestimated or ignored.

Second, the decomposition of poverty intensity into different groups of people has helped to target the "poorest of the poor". The present study finds that families with children show a trend of "disadvantage cluster" at high levels of poverty. From the perspectives of both general welfare assistance and capability development, families with children experiencing severe deprivations should be prioritized in social services. "Female poverty", especially that of non-locally registered women is particularly pronounced. These vulnerable groups of the "silent minority" should also become the key targets of social assistance service.

Third, the multidimensional poverty measure fully captures the "regional differences of poverty". If only the poverty rate is taken as the basis for consideration, subdistricts with a large poor population will be partially regarded as the "poorest area". However, after introducing the poverty intensity, we will find that despite a small poor population in economically advance areas, the poverty intensity is relatively high, and the regions with higher poverty intensity tend to be "concentrated and connected" in distribution. Therefore, by creating a multidimensional poverty measure, we will be able to accommodate both the incidence and intensity of poverty, thus evaluating regional poverty differences in a more comprehensive and objective way. In allocating social welfare resources, the subdistricts high in both poverty rate and poverty intensity require special attention, while those characterized by lower poverty rate and higher poverty intensity cannot be ignored.

5.2. Practical Level: Create a Classified Assistance Service Model with Diversified Professional Services

In order to concentrate limited resources on vulnerable groups in the most cost-effective way, it is necessary to create a classified and tiered social assistance service system according to the division of "high, moderate and low levels" of poverty intensity (Figure 9).

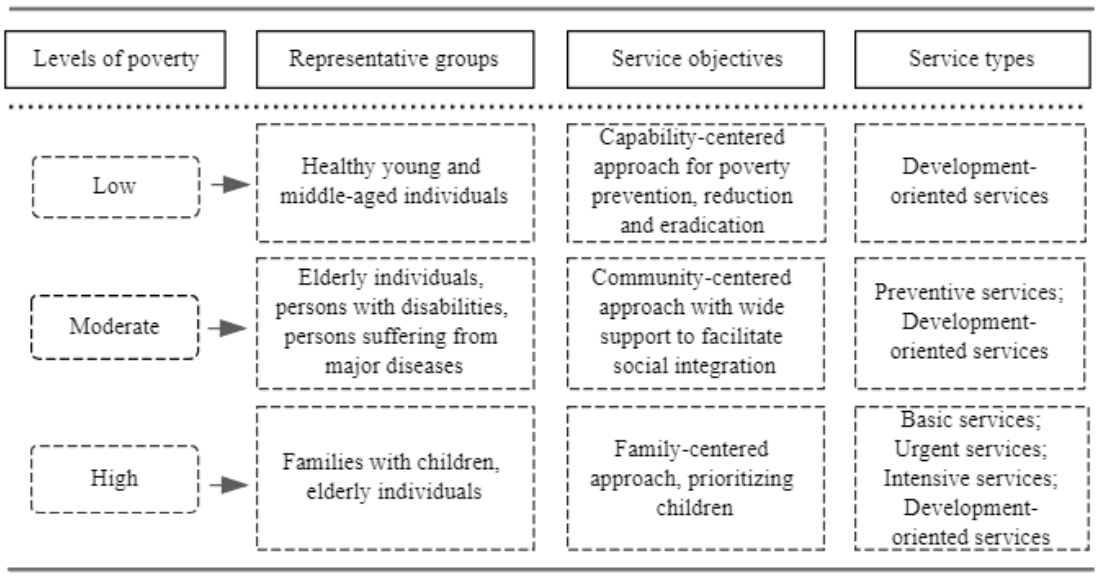


Figure 9. *Classified social assistance service model.*

Preventive services: General support is provided for families with low-level poverty, in an effort to prevent poverty escalation.

Basic services: For families with moderate or high levels of difficulty, limited potential for development and relatively stable structure (low risk of accidents in the near future), social assistance services should focus on ensuring basic living needs, supplemented by general daily services.

Development-oriented services: For families experiencing moderate levels of poverty, with potential for development and relatively strong resilience, social assistance should mostly be development-oriented professional services encompassing social integration, skill development, relation support, resource sharing, child education, and employment support, etc., to help families stimulate their resilience and find a way out of poverty.

Urgent services: For families experiencing high levels of poverty, with complicated situations, unstable family structure and high risk of accidents, intensive social assistance customized for individual needs should be offered to provide targeted support according to the urgent situations of such families, in a bid to help them maintain the status quo and prevent accidents.

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Conflicts of Interest/Competing Interests

The author declares that there is no conflict of interests regarding the publication of this article.

Availability of Data and Material

All data, models, or code generated are available from the author by request.

Code Availability

Software application is STATA.

References

[1] Alkire, S. (2002). Valuing Freedoms: Sen’s Capability Approach and Poverty Reduction. New York: Oxford University Press.

[2] Alkire S., & Apablaza, M. (2016). Multidimensional Poverty in Europe 2006–2012: Illustrating a Methodology. OPHI Working Paper 74, University of Oxford.

[3] Alkire, S., & Foster, J. (2008). Counting and Multidimensional Poverty Measurement, OPHI Working Papers.

[4] Alkire S., & Foster, J. (2011). Understandings and misunderstandings of multidimensional poverty measurement. Journal of Economic Inequality, 9, 289–314.

[5] Census and Statistics Department of the Hong Kong Special Administrative Region, (2018). https://www.statistics.gov.hk/pub/B9XX0005C2018AN18C0100.pdf.

[6] Chen, K., Leu, C., & Wang, T. (2016). Multidimensional Poverty Measurement and Analysis in Taiwan. Journal of Population Studies (53), 1-59.

[7] Ciula, R., & Skinner, C. (2015). Income and Beyond: Taking the Measure of Child Deprivation in the United States. Child Indicators Research, 8.

[8] Glassman, B. (2017). A Multidimensional Poverty Measure using the American Community Survey. Working Paper for the Southern Economic Association Annual Meeting, 17-19.

[9] Nussbaum, M. (2003). Capabilities as Fundamental Entitlements: Sen and Social Justice. Feminist Economics, 9 (2/3).

[10] Reeves R. V., Rodrigue E. & Kneebone E. (2016). Five Evils: Multidimensional Poverty and Race in America. Brookings: Metropolitan Policy Program.

[11] Sen, A. (2008). Development as Freedom. Beijing: China Renmin University Press.

[12] Sen, A. (2016). Inequality Reexamined. Beijing: China Renmin University Press.

[13] Shanghai Civil Affairs Bureau, (August 2019). Shanghai: Truth & Wisdom Press, Shanghai People's Publishing House, p. 22.

[14] Suppa N. (2015). Towards a Multidimensional Poverty Index for Germany. OPHI Working Paper 98.

[15] United Nations Development Programme and Oxford Poverty and Human Development Initiative, (2019). How to Build a National Multidimensional Poverty Index (MPI): Using the MPI to inform the SDGs. University of Oxford. https://creativecommons.org/licenses/by-nc/4.0/.

[16] World Bank, (2018). Report of the World Bank on poverty statistics. https://undocs.org/ch/E/CN.3/2018/23.