A Multidimensional Measurement Framework and Changing Trends of Urban Households on The Edge of Subsistence Allowance in China

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Abstract. As poverty reforms deepen, the issue of urban households on the edge of subsistence allowance in China has become increasingly pronounced. Based on the five reports from the China Family Panel Studies conducted in 2012, 2014, 2016, 2018, and 2020, this study employs the Alkire-Foster (AF) method to measure the multidimensional marginal status of urban households on the edge of subsistence allowance across four dimensions, including material well-being, education, health, and social security. Furthermore, it decomposes the multidimensional marginal index to further understand the factors influencing the multidimensional marginal status of urban households on the edge of subsistence allowance. The research findings indicate the following: the construction of a multidimensional measurement framework for urban households on the edge of subsistence allowance is rational; the incidence of multidimensional marginality is decreasing; and the education dimension has the greatest impact on the multidimensional marginal status.

Keywords: Urban Households on the Edge of Subsistence Allowance; AF Method; Multidimensional Marginal Status; Decomposition of the Multidimensional Marginal Index.

1. Introduction

Over the past nearly 30 years of development, the urban Minimum Subsistence Allowance system (hereinafter referred to as "urban subsistence allowance") has evolved from its initial humanitarian assistance approach to becoming a significant institutional arrangement within the realm of social policy. However, there has been a certain deviation between the actual operation of the urban subsistence allowance system and its initial functional orientation. This is mainly manifested in the high levels of omission and misallocation in the identification of beneficiaries, making it difficult to cover individuals on the margins of the urban low-income assistance threshold. The urban marginal groups are fixed within specific class structures, lacking opportunities for upward mobility, which could disrupt social equilibrium and lead to social unrest. The existence of urban households on the edge of subsistence allowance poses a challenge to the stability of China's urban social assistance system. Therefore, a multidimensional measurement of urban groups on the edge of subsistence allowance is both urgent and necessary.

Existing research on households on the edge of subsistence allowance mainly focuses on the plight of this group [1]and relevant assistance strategies [2][3]. However, there remains insufficient clarity regarding the concept of households on the edge of subsistence allowance and an incomplete understanding of their actual circumstances.

This paper aims to clarify the concept and characteristics of urban households on the edge of subsistence allowance and develop a multidimensional cognitive framework for understanding them. Drawing on the Alkire and Foster (2011) multidimensional poverty measurement method, this study utilizes data from five waves of the China Family Panel Studies conducted in 2012, 2014, 2016, 2018, and 2020 to measure and analyze the multidimensional marginal status of urban households on the edge of subsistence allowance. Additionally, it combines static and dynamic decomposition of marginality to explore the influencing factors of urban low-income marginal groups. The research in this paper holds significance in assessing the multidimensional measurement of urban households on the edge of subsistence allowance and the role of social security in their multidimensional

measurement evolution. It can provide policy references for alleviating the marginal status of urban low-income marginal groups in China.

2. Literature Review

The concept of "c" first appeared in a survey conducted by the Panjin General Union of Liaoning Province in 2004[4]. As absolute poverty has been alleviated in China, issues of relative poverty have gradually come into focus, leading to a growing body of research on urban households on the edge of subsistence allowance. These households emerged alongside the introduction of China's minimum subsistence allowance system and represent a unique group shaped by China's specific institutional and cultural context. Research on issues such as marginal poverty mainly reflects exploration into relative poverty in foreign studies.

2.1. Concept of urban households on the edge of subsistence allowance

Due to the predominant application and practice of the minimum subsistence allowance system in China, the concept of urban households on the edge of subsistence allowance is primarily utilized within China. Groups falling below the minimum subsistence allowance threshold are considered impoverished. Therefore, the marginal groups are essentially in a state of relative poverty. Consequently, the definition of concepts related to relative poverty also falls within the scope of research concerning this group.

The concept of "urban households on the edge of subsistence allowance" is greatly influenced by the overall economic environment and local conditions, making it a relatively dynamic concept. On one hand, the standards for marginality are comparative and subjective. Marginality is not just the lack of basic necessities but also the insufficient access to resources for individuals, families, and social organizations to achieve an average standard of living, thereby leading to exclusion from normal lifestyles and social activities[5]. On the other hand, the relative nature of marginality also varies over time and across different regions. In different areas, economic development stages, and policy contexts, the criteria for defining this group cannot be entirely uniform[6]. Internationally, there are various standards for defining relative poverty. For instance, the European Union uses a relative concept to define poverty, with the relative poverty line set at 60% of the median disposable income per capita. Similarly, some OECD (Organization for Economic Co-operation and Development) countries use the 50% median income standard as the relative poverty line for cross-national comparisons.

Furthermore, apart from the relative nature of quantitative standards, the dimensionality and characteristics of low-income marginal status also exhibit diversity. In addition to defining marginality and relative poverty from an income perspective[7], deprivation in non-material aspects such as mental well-being, power, and culture also represents a form of marginalization[8]. Consequently, research on relative deprivation status has transitioned from income-centric approaches to multidimensional standards involving welfare, capabilities, rights, and other perspectives.

Currently, the United Nations has begun to adopt multidimensional measurement methods to assess the status of poverty, encompassing dimensions such as education, health, and living standards. Therefore, it can be argued that urban groups on the edge of subsistence allowance exhibit forms consistent with relative poverty. Their manifestations are similarly complex and multidimensional, influenced by economic, political, cultural, and social factors. Consequently, the research framework and content regarding urban households on the edge of subsistence allowance should be diverse to account for these multifaceted dimensions.

From the perspective of China, the definition of marginal status under the minimum subsistence allowance policy is outlined in the Methods for Review and Confirmation of Minimum Subsistence Allowance issued by the Ministry of Civil Affairs on June 11, 2021. It states that "Marginal families under the minimum subsistence allowance generally refer to families that do not meet the conditions

for minimum subsistence allowance, with a per capita income lower than 1.5 times the local minimum subsistence allowance standard, and whose property status meets relevant regulations" [9].This standard is also used in this paper to measure urban groups on the edge of subsistence allowance.

2.2. Influencing Factors

Existing research has relatively few directly constructed measurement indicators for urban households on the edge of subsistence allowance, mainly considering measurement dimensions from the causes of low-income marginal households. The measurement of urban households on the edge of subsistence allowance should not only be considered from an economic perspective of income but also needs to take into account multiple factors such as individual, family, and societal aspects, transitioning from a single dimension to multiple dimensions. Currently, research mainly forms four different research perspectives on the measurement of urban households on the edge of subsistence allowance (see Table 1).

Table 1 Influencing factors of urban households on the edge of subsistence allowance

Research Perspectives	Influencing Factors
Economic factors	Wage income, monthly household expenditure, expenditure on durable goods, household savings
Political factors	Social assistance policies, social insurance systems
Cultural factors	Level of education, cultural differences across regions
Social factors	Number of children in the family, risk of illness, support from facilities and institutions, level of human capital

The first perspective is the economic perspective, which posits that the emergence of urban households on the edge of subsistence allowance is attributed to insufficient resilience to risks and inadequate support. Decreased wage income, higher monthly household expenditure, elevated expenditure on durable goods, and minimal household savings are crucial factors contributing to the relative poverty of urban households on the edge of subsistence allowance. This group struggles to withstand economic shocks, leading to an increased likelihood of becoming urban households on the edge of subsistence allowance. During this process, the financial literacy of household members plays a crucial role[9].

The second perspective is the political perspective, which highlights the unique situation of urban households on the edge of subsistence allowance. These households are near the poverty line but do not meet the assistance criteria, thus being excluded from policy assistance and becoming "quasi-poor households."[10] The improvement of social assistance policies and insurance systems is crucial in determining the existence of urban households on the edge of subsistence allowance. The binary division between urban low-income households and non-low-income households has led to imbalanced resource allocation. Urban low-income households receive most of the assistance, surpassing the living standards of urban low-income marginal households, thereby generating new inequalities. Consequently, there has been a reversal in the overall living standards of these two groups, resulting in a form of discrimination termed "reverse discrimination", where urban low-income households discriminate against urban low-income marginal households[11].

The third perspective is the cultural perspective. Insufficient education level is a significant individual factor contributing to the relative poverty of urban households on the edge of subsistence allowance. Inadequate education implies that although individuals possess certain labor skills, they are unable to perform higher-paying skilled jobs, leading to their classification as urban households on the edge of subsistence allowance[12]. Cultural differences across regions exacerbate regional development imbalances, further intensifying the variability in relative poverty among urban households on the edge of subsistence allowance[13].

The fourth perspective is the social perspective of urban households on the edge of subsistence allowance. Health risks increase medical expenses for this group, questioning the fairness of social

assistance[14]. From a household perspective, due to the dual urban-rural structure in China, urban families often have more children and greater caregiving burdens without the support of land, making them susceptible to relative poverty[15]. From a societal and institutional perspective, society and government can provide facilities and institutional support for the active social participation of urban low-income household families. Comprehensive social assistance policies and a sound community service infrastructure can reduce the occurrence of relative poverty among urban households on the edge of subsistence allowance[16]. Human capital level is a key factor influencing relative poverty, and insufficient human capital is an internal factor contributing to the relative poverty of urban groups on the edge of subsistence allowance[17].

Based on both domestic and international research findings, scholars have conducted extensive studies in the field of poverty, resulting in a shift from a single-dimensional income status to multidimensional identification criteria for defining urban households on the edge of subsistence allowance. Furthermore, research on the causes of marginal groups has expanded from economic, political, cultural, and social perspectives.

As research deepens and evolves, there are also some shortcomings. Firstly, current studies have not specifically discussed the characteristics of urban households on the edge of subsistence allowance themselves but have rather focused more on relative poverty or the aspect of the low-income assistance group itself. However, the low-income assistance group itself is highly vulnerable and prone to transitioning into marginal status. Secondly, poverty is dynamic, and standards for poverty vary at each stage. Currently, there is a lack of research on the identification and governance of relative poverty marginal conditions. Drawing on existing literature and research frameworks, this study aims to address these shortcomings by focusing on the characteristics of urban households on the edge of subsistence allowance. It will utilize data from the China Family Panel Studies (CFPS) and employ the Alkire-Foster (AF) method to measure indicators of the marginal status of urban households on the edge of subsistence allowance across four dimensions, including living standards, education, health, and social security. The study will analyze the mechanisms and current status of multidimensional marginality formation and propose governance strategies for the marginal status of urban households on the edge of subsistence allowance in the context of new development stages.

This paper will use the identified shortcomings as a starting point for research, aiming to provide theoretical innovation in measuring the marginal dimensions of urban households on the edge of subsistence allowance and proposing governance pathways for marginal conditions.

3. Constructing a Multidimensional Framework for Identifying Marginalized Groups

3.1. Indicator Explanation and Determination of Deprivation Thresholds

3.1.1 Material Dimension

Material wealth is the core criterion for identifying urban marginalized groups eligible for minimum subsistence allowance. The primary measure of this is income level, with per capita household income being a crucial dimension for assessing a household's material wealth. Currently, there is no explicit delineation of the threshold for urban minimum subsistence allowance in China. Based on the average standard of 677.6 yuan per person per month for urban minimum subsistence allowance in the fourth quarter of 2020, as reported by the Ministry of Civil Affairs[18], using a 1.5 times standard multiplier, we can extrapolate that the threshold for the annual per capita net income of urban marginalized households is 12,196.8 yuan [1]. The construction of the household income variable in this study primarily relies on five rounds of household economic questionnaire data collected between 2012 and 2020. Per capita household net income is used as an indicator for the multidimensional measurement of urban households on the edge of subsistence allowance. The deprivation threshold is defined as the per capita household income threshold for urban marginalized households, calculated from the annual statistical data of the Ministry of Civil Affairs. If the per capita

household income falls below this threshold, it is assigned a value of 1, indicating poverty in the economic dimension; otherwise, it is assigned a value of 0.

Living standards are a crucial manifestation of material wealth. The content of living standards includes numerous aspects such as water usage, cooking energy, electricity, financial assets, housing assets, and the total value of per capita durable consumer goods. Based on the development of various aspects of urban economic and social conditions, this study selects two indicators: household housing and the total value of durable consumer goods. Households that have partial residential property rights, public housing, low-cost rental housing, public rental housing, market rental commercial housing, homes of relatives and friends, or other residences with living conditions are considered marginalized in the living dimension and are assigned a value of 1; otherwise, they are assigned a value of 0.

In the CFPS questionnaire, the total value of durable consumer goods is collected. Therefore, this study adopts a method of identifying relative poverty by comparing with 60% of the median value of the sample data. Households with a total value of durable consumer goods below 60% of the median are considered marginalized. For 2020, the calculated median value of durable consumer goods is 10,000 yuan, resulting in a deprivation threshold of 6,000 yuan [2] If a household's total value of durable consumer goods is below this threshold, it is assigned a value of 1; otherwise, it is assigned a value of 0.

3.1.2 Education Dimension

According to the relevant 2023 national statistical report, the net enrollment rate and the primary school graduation rate for primary school-age children in China in 2021 were 99.9% and 99.3%, respectively. Therefore, enrollment rates are not suitable for measuring the current status of marginalized urban households eligible for minimum subsistence allowance. This study selects years of education as the evaluation indicator for the education dimension. China has achieved basic balance in compulsory education, with a nine-year compulsory education retention rate of 95.4%. Given the comprehensive implementation of compulsory education policies in China, individuals in urban households with an average education level of less than nine years are considered to be in a marginalized state in the education dimension, and are assigned a value of 1; otherwise, they are assigned a value of 0.

3.1.3 Health Dimension

Health status is a reasonable indicator for measurement. Considering that medical conditions in urban areas are generally better than those in rural areas, and given the limitations of CFPS data, indicators such as nutritional status and child mortality are more applicable to rural poverty. Therefore, this study uses "whether there are members with chronic diseases" and "whether any members were hospitalized due to illness" as substitute indicators for nutritional status and child mortality. If any household member has had a chronic illness within the past six months or has been hospitalized due to illness in the past year, the household is considered to be in a marginalized state in the health dimension and is assigned a value of 1; otherwise, it is assigned a value of 0.

3.1.4 Social Security Dimension

The social security dimension has been widely used in multidimensional poverty research to explore its corresponding mechanisms[20][21]. With the accelerated aging of urban populations in China, the importance of social insurance is increasing, particularly pension insurance and medical insurance[22]. Additionally, considering that the current population structure of most urban Chinese families follows a "4-2-1" pattern, where the presence of elderly and children imposes economic burdens on the family, pension insurance serves as a safeguard for the elderly after they retire from the workforce, thereby reducing the family's financial burden. Simultaneously, this family structure increases the implicit economic pressure due to the risk of sudden illness. If an adult member of an urban household is unable to receive pension insurance and medical insurance, the household is considered to be marginalized in the social security dimension and is assigned a value of 1; otherwise, it is assigned a value of 0.

3.2. Weight of Indicators

Based on extensive literature, the current research employs the equal-weight method to assign weights to various poverty indicators[23]. Therefore, this study assigns equal weight to each dimension, with material level, education, health, and social security each given a weight of 1/4. The individual indicators within each of the four dimensions are then equally distributed.

Table 2 Indicators and Dimensions of the Multidimensional Measurement of Urban Households on the Edge of Subsistence Allowance

Dimension	Indicator	Deprivation Threshold	Weight
Material level	Per capita household net income	Below the urban minimum subsistence allowance threshold calculated from Ministry of Civil Affairs data = 1	1/12
	Housing	Only partial residential property rights, public housing, low-cost rental housing, public rental housing, market rental commercial housing, homes of relatives and friends, or other residences with living conditions = 1	1/12
	Total value of durable consumer goods	Below 60% of the median value of durable consumer goods in sample data = 1	1/12
Education	Years of education	Adult members with less than 9 years of education = 1	1/4
Health	Hospitalization due to illness	Hospitalized due to illness in the past year =1	1/8
	Chronic disease	Suffering from a chronic disease in the past six months =1	1/8
Social security	Medical insurance	Family members not enrolled in medical insurance =1	1/8
	Pension insurance	Adults not enrolled in pension insurance =1	1/8

3.3. Constructing the Multidimensional Index for Urban Households on the Edge of Subsistence Allowance

This study uses the Alkire-Foster (AF) method to calculate the multidimensional deprivation of urban households on the edge of subsistence allowance in China, analyzing their marginalization through indicator calculations. The core of the AF method lies in using dual thresholds to identify impoverished populations, aiming to compute the Multidimensional Poverty Index. Based on the subject of this study, the process is primarily divided into the following steps. First, identify the deprivation status of the sample of urban households on the edge of subsistence allowance in each dimension. Second, calculate weighted scores for each dimension. Based on the critical value of total dimension deprivation, identify whether an individual is in a multidimensional marginalized state. Next, categorize according to different dimensions and decompose the multidimensional marginalization index M_k , calculating the contribution of each dimension to the marginalization state.

3.3.1 Single-dimension Poverty Identification

A state matrix $X = [x_{ij}]$ can be used to reflect the status values of n individuals across m dimensions. In this matrix, the row vector x_i represents the primary status of individual i across n dimensions, while the column vector x_j represents the status of all individuals under dimension j. The element

x_{ij} indicates the status of individual i under dimension j. For any given household d, the column vector $x_{dj}=\left(x_{1j},x_{2j},\cdots x_{ij}\right)$ represents the values of household d across these j indicators.

Using the single-dimension critical value set by formula (3-1), the marginal status of each household in each indicator is identified by z_{ij}, converting matrix X into a deprivation matrix g_{ij} consisting only of 0 and 1, as shown in formula (4-2). When $x_{ij} \geq z_j$, it indicates that individual's indicator level is above the threshold, meaning their rights under this indicator are not deprived, and there is no poverty. Conversely, when $x_{ij} < z_j$, it indicates that individual i is in relative poverty under dimension j, and we denote this by $g_{ij}=1$. This is shown in formula (3-1):

$$g_{ij}=\begin{cases}1, x_{ij} < z_j \\ 0, x_{ij} \geq z_j\end{cases} \tag{3-1}$$

$$X=\begin{bmatrix}x_{11} & \cdots & x_{1j} \\ \vdots & \ddots & \vdots \\ x_{i1} & \cdots & x_{ij}\end{bmatrix} \rightarrow g_{ij}=\begin{bmatrix}g_{11} & \cdots & g_{ij} \\ \vdots & \ddots & \vdots \\ g_{j1} & \cdots & g_{ij}\end{bmatrix} \tag{3-2}$$

3.3.2 Multidimensional Poverty Identification

In setting the weights for each dimension, existing literature often employs the equal-weight method, assigning equal weights to each indicator. Using weights $w=(w_1,w_2,\cdots w_j)$, we obtain the weighted marginal deprivation value matrix $\sum_{j=1}^{d} w_j = 1$, where $j \in [1,d]$ and $w_j \in [0,1]$. The weighted marginal critical value is $k=w_j z_j$, where 0<k<j.

Thus, by assigning weights to the deprivation matrix g_{ij}, we obtain the matrix C, which represents the weighted marginal scores for each household across various dimensions. The overall weighted marginal score for a household, represented by the column vector, is derived from the sum of the weighted scores across all dimensions.

To identify multidimensional marginalization, we compare the weighted marginal score $C_i(k)$ of each household with the threshold k. If the marginal score of a household is less than k, the household is not considered to be in a multidimensional marginal state. If the marginal score of a household is greater than or equal to k, the household is classified as being in a multidimensional marginal state. Then assign values to multidimensional marginal states. For each individual i in dimension j, if the individual is marginalized (i.e., deprived), the marginal count I_k is 1. If the individual is not marginalized in dimension j, the marginal count is 0. This is represented by formula (3-3).

$$I_k=\begin{cases}1, C_i(k) > k \\ 0, C_i(k) \leq k\end{cases} \tag{3-3}$$

3.3.3 Calculation of the Multidimensional Poverty Index

Multidimensional Marginalization Incidence (H) measures the proportion of the population that is marginalized, reflecting the extent of marginalization in a country or region. A higher incidence indicates a larger number of marginalized households in that area. H is calculated using the following formula (3-4), where q represents the total number of marginalized individuals across all dimensions, and n is the total number of individuals in the sample.

$$H = q / n = \frac{1}{n}\sum_{i=1}^{d} I_k \tag{3-4}$$

Average Deprivation Share (A) calculates the proportion of deprivation experienced by marginalized individuals across all indicators. This metric reflects the depth of marginalization among the marginalized population. A higher average deprivation share indicates that the marginalized individuals experience deprivation across multiple dimensions. The average deprivation share is calculated using formula (3-5):

$$A = \frac{\sum_{i=1}^{d} C_i(k)}{\sum_{i=1}^{d} I(k)} \tag{3-5}$$

Multidimensional Marginalization Index quantifies the extent of marginalization by combining Multidimensional Marginalization Incidence (H) with Average Deprivation Share (A). The index is calculated using formula (3-6):

$$M_k = HA = \frac{1}{n}\sum_{i=1}^{d} I_k * \frac{\sum_{i=1}^{d} C_i(k)}{\sum_{i=1}^{d} I(k)} \tag{3-6}$$

3.3.4 Decomposition of the Multidimensional Marginalization Index

Decomposing the Multidimensional Marginalization Index is a crucial step in applying the Alkire-Foster (AF) method. This process allows for measuring the contribution of each dimension to the overall index, identifying the primary factors leading to marginalization. By decomposing the index across different indicators, we can assess the contribution of material level, education, health, and social security dimensions to the overall marginalization index, and thereby pinpoint the key marginalized groups. The present study investigates the marginalization of urban households on the edge of subsistence allowance under different dimensions based on the decomposition of the Multidimensional Marginalization Index.

We define β_i as the marginalization rate for dimension i, also referred to as the marginal contribution rate. The decomposition of the marginal indicators is given by formula (3-7).

$$\boldsymbol{\beta}_j = \frac{\sum_{i=1}^{n} \breve{w}_j g_{ij}}{\sum_{i=1}^{n} C_i(k)} \tag{3-7}$$

4. Empirical Analysis of the Characteristics of Urban Households on the Edge of Subsistence Allowance

4.1. Data Source

This study uses data from the China Family Panel Studies (CFPS) conducted in 2012, 2014, 2016, 2018, and 2020. The data was filtered to retain information specific to urban households on the edge of subsistence allowance, excluding missing and abnormal values for relevant indicators. After consolidation, the final dataset comprises 47,203 urban household samples across these five survey years. The CFPS sample distribution is random and reasonable, ensuring that it represents the overall situation of marginalized urban households in China. Additionally, the stability of respondents across these years facilitates empirical analysis and comparison of results.

4.2. Measurement and Decomposition of the Multidimensional Marginalization Index

4.2.1 Selection of the Multidimensional Marginalization Threshold

Figure 1 displays the levels of various marginalization indicators for 2020 when k=0.1, 0.2, 0.3…1, focusing on the multidimensional marginalization incidence, the average deprivation share, and the multidimensional marginalization index for urban households on the edge of subsistence allowance. The figure clearly illustrates that as the k value increases, the incidence of marginalization and the multidimensional marginalization index decrease, while the average deprivation share increases. This indicates that with the increase in dimensions, the number of individuals in marginalized urban households decreases, but the dimensions of deprivation for the marginalized population increase. Specifically, when k equals eight, the multidimensional marginalization incidence for urban households on the edge of subsistence allowance is 1%. This signifies that in 2020, 1% of households were marginalized across all eight indicators simultaneously, indicating a substantial depth of deprivation within this group.

Table 3 levels of marginalization indicators for 2020

k	average deprivation share	multidimensional marginalization index	multidimensional marginalization incidence
0.100	0.357	0.357	1.000
0.200	0.414	0.332	0.801
0.300	0.488	0.276	0.556
0.400	0.548	0.211	0.385
0.500	0.589	0.160	0.272
0.600	0.696	0.060	0.087
0.700	0.767	0.025	0.033
0.800	0.875	0.005	0.006
0.900	0.922	0.002	0.020
1.000	—	0.000	0.000

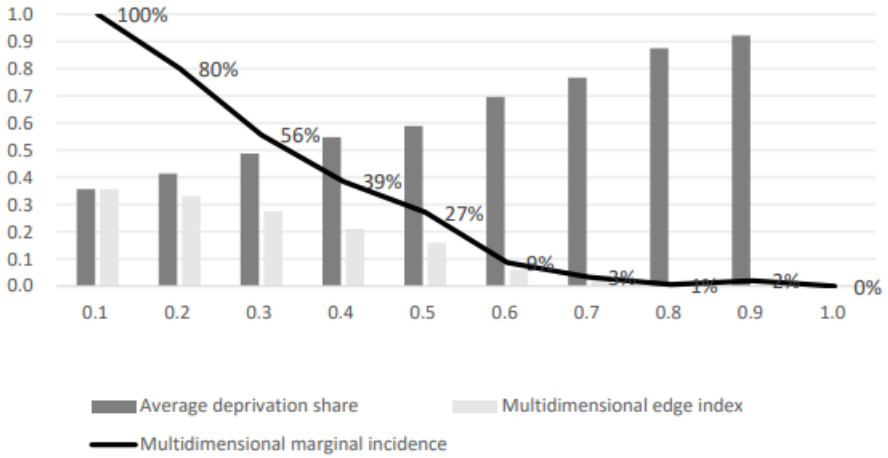


Figure 1 levels of marginalization indicators for 2020

When analyzing the Multidimensional Marginalization Index, selecting an appropriate deprivation threshold k is crucial for accurately assessing the multidimensional marginalization status. According to the Alkire-Foster (AF) method, while calculating multidimensional marginalization indicators, it is essential to establish a multidimensional threshold k. The k value should reflect the real conditions of marginalized urban households on the edge of subsistence allowance based on the calculated results of the multidimensional marginalization index. If k is greater than 0.4, the value of H (marginalization incidence) becomes less sensitive to changes in marginalization dimensions, leading to an incomplete coverage of the marginalized population and an inability to precisely identify the causes of marginalization. If k is less than 0.4, the H value fluctuates too significantly, making it difficult to identify the actual marginalization factors. Therefore, choosing k=0.4 implies that if the indicators do not meet the set critical level, the household is considered to be in a marginalization state. For the subsequent index decomposition and analysis, this study uses a multidimensional critical value of k=0.4 to interpret and analyze the results.

4.2.2 Analysis of Multidimensional Marginalization Contribution

Decomposing the multidimensional marginalization index by indicators can measure the impact of each dimension and indicator on the poverty level of the research subject. By comparing the magnitude of marginal contribution rates, the main factors leading to marginal conditions can be determined. Figure 2 illustrates the marginal contribution rates of various indicators in 2020 when k = 0.4.

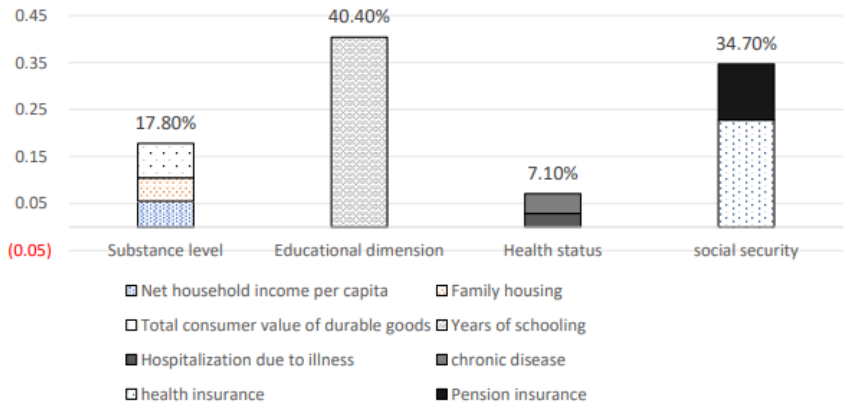


Figure 2 marginal contribution rates of indicators in 2020 when k = 0.4

From Figure 2, we observe the marginal contribution rates of various indicators after decomposing the multidimensional marginalization index. The marginal contribution rates for the dimensions of material level, education, health, and social security are 17.8%, 40.40%, 7.10%, and 34.70% respectively. Specifically, at the level of material well-being, the marginal contribution rate of per

capita household net income is 5.5%, household housing is 5.0%, and durable goods consumption is 7.3%. Within the education dimension, the marginal contribution rate of educational attainment is 40.4%. Regarding health, the marginal contribution rates for hospitalization due to illness and chronic diseases are 2.9% and 4.2% respectively. Within the social security dimension, the marginal contribution rates for medical insurance and old-age insurance are 22.8% and 11.9% respectively. Among the four dimensions in 2020, education has the highest marginal contribution rate, followed by social security. According to the multidimensional marginalization index decomposition by indicators, years of education are the primary factor leading to marginal conditions.

4.2.3 Multidimensional Marginalization Indicators

A static analysis of various indicators and dimensions of urban groups on the edge of subsistence allowance leads to the conclusion that current educational attainment is the most concentrated aspect of marginal issues among urban subsistence allowance marginal households. However, to further assess whether this indicator and dimension are long-term factors leading to marginalization of a group, it is necessary to measure multidimensional marginalization indicators for different years using the AF method and analyze the results of decomposition. The following analysis examines the multidimensional marginalization status from a dynamic perspective.

Table 4 multidimensional marginalization status when k=0.4 from 2012 to 2020

Year	Multidimensional Marginalization Incidence(H)	Average Deprivation Share(A)	Multidimensional Marginalization Index
2012	0.460	0.535	0.246
2014	0.277	0.520	0.144
2016	0.255	0.524	0.133
2018	0.441	0.561	0.247
2020	0.385	0.548	0.211

Table 4 presents the marginal conditions for five years when k = 0.4. From the perspectives of the multidimensional marginalization incidence (H), average deprivation share (A), and multidimensional marginalization index, the following observations can be made. The multidimensional marginalization incidence (H), which reflects the breadth of poverty by indicating the proportion of marginal individuals among the total surveyed population, decreased from 0.460 in 2012 to 0.385 in 2020. Despite fluctuations, there is an overall decreasing trend, suggesting a reduction in the marginal population. This indicates significant efforts made by urban households on the edge of subsistence allowance in the past five years towards poverty alleviation, yielding positive results. The average deprivation share (A) signifies the degree of marginalization across multiple dimensions. From 2012 to 2020, the average deprivation share remained around 0.5, indicating relative stability in multidimensional poverty. The multidimensional marginalization index, calculated as the product of H and A, provides a comprehensive measure of multidimensional marginal conditions. From 2012 to 2016, the multidimensional marginalization index exhibited a decreasing trend, declining from 0.246 to 0.133. However, in 2018, the index increased to 0.247, before decreasing again to 0.211 in 2020. This suggests a gradual reduction in the multidimensional marginality of urban households on the edge of subsistence allowance from 2012 to 2016, with a peak in 2018 followed by a decline by 2020. It indicates that further efforts are needed to improve the current situation of urban groups on the edge of subsistence allowance in China.

In summary, from 2012 to 2020, both the multidimensional marginalization incidence and multidimensional marginalization index exhibited fluctuations. There was a general downward trend from 2012 to 2016, followed by a trend of increase and then decrease from 2018 to 2020. It is noteworthy that the decline in the poverty occurrence rate was significantly higher than the increase in the poverty deprivation degree. The reduction in the multidimensional marginalization index merely indicates a relative decrease in the poverty population. The average deprivation share (A) for each year, as exemplified with k = 0.4, did not decrease. For instance, the average deprivation share in 2014 was 0.520, which increased to 0.548 by 2020, while remaining around 0.5 for other years.

With the increase in the average deprivation share, it suggests that in recent years, poverty has gradually manifested as a multidimensional characteristic.

Although China's poverty alleviation policies have achieved significant results in reducing the urban marginal population, this approach relies heavily on policy formulation and does not effectively enhance endogenous motivation. Urban households on the edge of subsistence allowance lack sustainable development capabilities. To alleviate the depth of marginalization, it is necessary to identify the key factors contributing to the deepening marginalization, and implement targeted and localized policies. Below, we will decompose the multidimensional marginalization index according to dimensions to identify the factors causing marginal conditions.

4.2.4 Dynamic Measurement of Decomposed Multidimensional marginalization Index

By calculating the contribution rates of each dimension to the overall multidimensional marginalization index, we can assess the impact of various indicators on the marginal conditions. From the decomposition results in Table 5, it is evident that the contribution rates of the four dimensions to the multidimensional marginalization index exhibit significant differences. The marginal contribution rate of the education dimension consistently holds a substantial share, yet shows a decreasing trend from 45.60% in 2012 to 40.40% in 2020. The marginal contribution rate of health conditions remained at a relatively low level from 2012 to 2020, reaching as low as 7.10% in 2020. The marginal contribution rate of material well-being peaked in 2016 at 21.60%, but declined in the following years. The marginal contributio rate of social security gradually decreased from 2012 to 2016, reaching a low of 21.50%, then increased to its highest value of 34.70% from 2018 to 2020.

Table 5 contribution rates of each dimension to the overall index

Year	Material level	Education	Health	Social security
2012	18.50%	45.60%	7.30%	28.60%
2014	21.10%	45.80%	10.50%	22.50%
2016	21.60%	45.60%	11.30%	21.50%
2018	17.20%	40.50%	8.50%	33.90%
2020	17.80%	40.40%	7.10%	34.70%

Figure 3 illustrates the contribution rates of the four dimensions to poverty for each year from 2012 to 2020. After weighting the indices for the five survey years, the resulting marginal occurrence rates vary. Each line in the graph corresponds to the changes in one of the four dimensions over this period. Overall, the four indicators exhibit different trends over the five years.

Firstly, in terms of material well-being, the contribution rate to marginal conditions has consistently remained above 17%. There was a noticeable upward trend from 2014 to 2016. Although the contribution rates declined in 2018 and 2020, the decrease was not significant. This indicates that the contribution rate of material well-being holds a certain weight. Addressing the material well-being of urban groups on the edge of subsistence allowance could be a breakthrough point in alleviating marginalization.

Secondly, regarding the education dimension, although there is a downward trend from 2012 to 2020, the education level has consistently remained above 40%, occupying the largest share among the four dimensions. In recent years, China's fiscal revenue for education has continuously increased, and the basic nine-year compulsory education has been largely achieved. However, it is still essential to prioritize residents' education levels and increase investment in education for low-income families. The high share of the education dimension may be attributed to the lag in education itself, as achieving poverty alleviation through education requires a considerable amount of time to help residents improve their educational attainment.

Thirdly, in terms of health, the health dimension consists of hospitalization due to illness and chronic diseases. From 2012 to 2020, the poverty contribution rate in health overall showed an upward trend followed by a decline, but the overall share is relatively small. It increased from 7.30% in 2012 to 11.30% in 2018, then decreased to 7.10% in 2020. The health dimension exhibits a

downward trend overall, mainly due to the enhanced awareness of physical fitness among the people. The adoption of exercise habits and the rise of fitness awareness have become new social trends, with sports becoming integrated into people's lives.

Lastly, in terms of social security, the marginal contribution rate showed a downward trend from 2012 to 2016, followed by an increase from 2018 to 2020. Overall, there is an upward trend. This indicates that in recent years, issues related to social insurance for marginal populations have not been effectively addressed. To solve the problems faced by marginal groups, attention should be paid to the construction and improvement of the basic insurance system, leveraging the crucial role of insurance in safeguarding people's livelihoods.

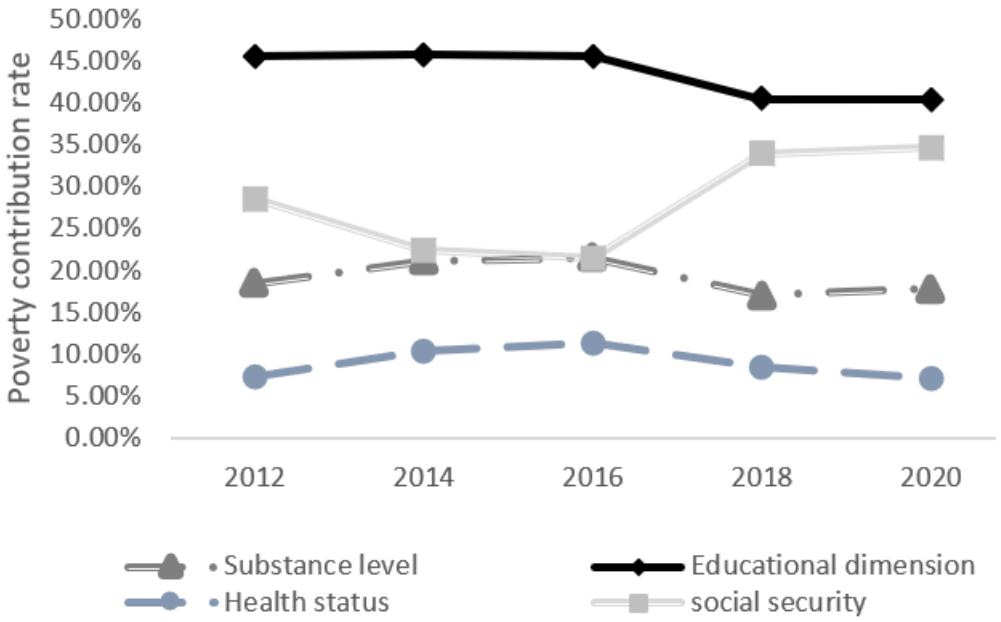


Figure 3 contribution rates of the four dimensions to poverty for each year from 2012 to 2020

5. Summary and Discussion of Multidimensional Marginal Governance for Urban Households on the Edge of Subsistence Allowance

This study, based on five waves of China Family Panel Studies (CFPS) data, examines the multidimensional marginalized status and its changing trends among urban groups on the edge of subsistence allowance in China. The following main conclusions are drawn. First, the construction of a multidimensional measurement framework for urban households on the edge of subsistence allowance is reasonable. The marginal conditions of urban households on the edge of subsistence allowance are not only reflected in material dimensions but also manifest as relative deprivation in dimensions such as education, health, and social security. Among these, the importance of the social security dimension is increasingly prominent. Second, the multidimensional marginalization incidence is decreasing. The study finds that in recent years, while the incidence has decreased, the average deprivation share remains unchanged. The decrease in the multidimensional marginalization index is mainly attributed to the reduction in multidimensional marginalization incidence, indicating a diversified characteristic of marginal conditions. Third, the education dimension has the greatest impact on the multidimensional edge status.

Based on the main research conclusions above, the following policy recommendations are proposed. First, establish a dynamic monitoring indicator system for urban multidimensional marginal groups. Utilize the application of China's urban marginal database as much as possible to track and survey the basic conditions, health status, and social security status of urban families on the edge of subsistence allowance. Develop policies for accurately identifying the scale and impact of China's urban groups on the edge of subsistence allowance. Second, improve the identification

indicators for urban groups on the edge of subsistence allowance to achieve full coverage of marginal populations. When identifying marginal populations, measurements should be taken from multiple dimensions such as education, health, and social security, taking into account the diversity among different groups. Third, prioritize education and encourage investment in education and training. Education level has a significant impact on the marginal conditions of urban households on the edge of subsistence allowance. The government should encourage relatively disadvantaged families to prioritize the education and training of their children, providing facilitative measures and guarantees for investment in their children's education. Additionally, support should be provided to low-educated families through skills training to enhance their professional skills and employability. Fourth, strengthen the social security system to activate effective mechanisms for addressing marginal conditions. Social security can regulate income redistribution, promoting social equity.

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