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Intensity and Determinants of Rural Migrant Workers' Multidimensional Poverty in China

Dan Xu[1], Dongshen Luo[2], Xiu He[2], Tingting Lin[3] & Chengchao Wang[1]

[1] School of Architecture and Planning, Foshan University, Foshan, China

[2] Key Laboratory for Humid Subtropical Eco-geographical Processes of the Ministry of Education, Fujian Normal University, Fuzhou, China

[3] School of Economics, Foshan University, Foshan, China

Correspondence: Chengchao Wang, School of Architecture and Planning, Foshan University, Foshan 528225, Guangdong Province, China. Tel: 1-086-757-2751. E-mail: wchc79@163.com

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Abstract

Multidimensional poverty of rural migrant workers is becoming an important component of urban poverty of China, accompanied by large-scale rural-urban migration during past decades. However, less studies have been conducted to explore the poverty of rural-urban migrant workers. The study intends to fill the gaps by investigating multidimensional poverty of rural migrant workers based on a case study in Fuzhou City, Southeast China. The Alkire–Foster method and a logistic regression modeling are adopted to examine the magnitude and determinants of multidimensional poverty. Four dimensions and ten indicators are selected for measurements of multidimensional poverty. About seventy three percent of the sample households (n=319) are found to experience multidimensional poverty, which is remarkably higher than previous studies. Especially, the deprivation incidence of dwelling conditions and working conditions which were neglected in previous studies, was remarkable high. Spatial heterogeneity of multidimensional poverty has been highlighted in our study. The incidence of multidimensional poverty in '*village in the city*' is the highest, following by *suburban areas* and *town center* (k=0.33). Results also reveal that income and living standards are the two most important contributors of overall poverty. The important determinants of multidimensional poverty are as follows: occupational skills, migration type, occupational type, social integration, and expenditure on social activities. The results confirmed that low skills, low social integration in cities, and poor social capital are key determinants of rural migrant workers' poverty in urban areas of China. Finally, some policy implications for poverty alleviation of rural migrant workers are presented in the study.

Keywords: rural migrant worker, multidimensional poverty, determinant, Alkire–Foster method, spatial heterogeneity

1. Introduction

Poverty is a multifaceted concept and different countries with disparate socioeconomic conditions may have different perceptions of poverty (Yu, 2013; Alkire and Fang, 2019). Poverty is also a dynamic concept and the conception has transitioned over time in the same country (Dartanto and Otsubo, 2015). Poverty has been widely defined as deprivations of resources or capabilities (Jansen et al., 2015). The deprivations generally include several human dimensions, such as basic needs, capabilities and social exclusion (Jansen et al., 2015; Wang et al., 2021). As a result, three approaches – economic well-being, capability, and social exclusion – have been adopted to define the poverty (Wagle, 2002). For economic well-being approach, persons could be defined as the poor if they are deprived of basic needs or minimum incomes to afford them (Alemu et al., 2011). As for the method of capabilities, people could be considered the poor if they are deprived of capabilities, such as education, and health. In addition, people are also defined as the poor if they are excluded from the mainstream economic, political, and cultural activities (Wagle, 2002). In a word, poverty is a multidimensional and dynamic concept and could be measured with multidimensional measurements based on the specific deprivations of the population.

Measurement of poverty is correspondingly multidimensional and dynamic, given the multifaceted and dynamic nature of the poverty. The measurement of absolute poverty has been consistent, because the absolute poverty has been defined by human's physiological thresholds, such as the minimum food-calorie intake and basic needs, or the minimum income required for survival (Dartanto and Otsubo, 2015). For instance, the World Bank's US$1

per day absolute poverty line has been commonly adopted in studies of cross-country comparison (Ravallion and Chen, 2009). China defined the absolute poverty as the per capita income of the household being less than 2300 China Yuan (CNY) person^{-1} per year in 2010 (Yu, 2013). However, measurement of relative poverty is dynamic and site-specific because the variability and heterogeneity of the minimum acceptable way of life (Goedemé and Rottiers, 2011). For instance, a relative poverty line has been set at a particular percentage (e.g. 50% or 60%) of the mean or median per capita income (Fouarge and Layte, 2005). The multidimensional indices of poverty have been more often used in many empirical studies (Alkire and Foster, 2011). Four dimensions including income, education, health and living standards, were more commonly adopted in previous studies of multidimensional poverty (Wang et al., 2021). Each dimension of poverty was measured by one or several indicators. Some thresholds of each dimension or variable are ascertained to distinguish the poor from the non-poor based on the survival needs or mean/median values (Jansen et al., 2015). However, many dimensions, such as working conditions, dwelling conditions, have less been discussed especially in previous studies of developing countries.

Determinants of multidimensional poverty could be attributed to tremendous macro and micro variables. As a result, two approaches—micro perspective and macro analysis—have been adopted to identify the determinants of poverty. As for the micro perspective, determinants of multidimensional poverty have been investigated based on household interviews. Results showed that the household head's profiles (e.g. age, gender and education), family size, number of earners, landholdings, employment status, education, health status, household assets, and location of residence (Zhang et al., 2018) were important micro determinants of poverty. Apart from these individual and family factors, many macro socioeconomic factors have also contributed to the poverty. Studies demonstrated that many socioeconomic factors, such as economic growth, economic inequality, structural transition, labour market, unemployment, industrial employment, infrastructure, federal grants, and welfare policies, are considered as important determinants of regional poverty (Chen and Wang, 2015). In addition, social capital (e.g. trust and civic participation) (Jansen et al., 2015) and unfavourable geographical conditions (e.g. high elevation, steep slope, mountainous terrain, severe soil erosion, frequent natural disasters, remoteness, poor accessibility) are also important determinants of multidimensional poverty (Wang et al., 2020). However, less studies could clarify the determinants of poverty by linking traditionally micro socioeconomic variables and social capital at the household level.

Along with a shift in manufacturing from these developed countries of North America, Europe, and East Asia to China, China has been successfully transformed into the "world factory" since the 1980s (Chan and Selden, 2014). Urbanization and industrialization have risen substantially during the past decades, and the urbanization rate increased from 26.41% in 1990 to 63.89% in 2020 (NBSC, 2021). The urbanization of China has not only accelerated rapid economic growth over the past decades, but also brought about large-scale rural migrant workers (*Nongmingong*) who had rural household registration (*Hukou*) but worked in non-agricultural sectors or migrated outside of local towns to work for more than six months during the past year (Chan and Selden, 2014). Statistic data showed that there was 292.51 million rural migrant workers in China in 2021. Among them, the number of rural migrant workers who lived in urban areas reached 133.09 million (NBSC, 2021). Owing to a series of institutional barriers (such as household registration system) and discrimination, rural migrant workers could not be treated as urban residents. They suffered from many deprivations, such as low incomes, poor living conditions, occupational risks, bad working conditions (Chan and Selden, 2014). However, less studies have discussed the multidimensional poverty of rural migrant workers in China.

This paper aims to fill this gap by investigating the multidimensional poverty of rural migrant workers based on a case study in Fuzhou City, Fujian Province, China. This study aims at addressing the following two main questions: 1) How to construct a set of scientific measurement indices to evaluate the multidimensional poverty of rural migrant workers in China? 2) What are the key determinants of multidimensional poverty of rural migrant workers in China?

2. Methodology

2.1 Data Source

The data-set used in this paper was obtained from a questionnaire survey conducted in Fuzhou City, the provincial capital of Fujian Province, Southeast China. Fuzhou City was selected as the study area of Chinese rural migrant workers because it was a typical representative of coastal migrant destination in China. Fuzhou City is a large city with prosperous manufacturing and service sectors, which have attracted numerous rural migrant workers. Statistical data of the China's Seventh Population Census showed that the number of migrant population was 2.92 million in 2020 in Fuzhou City, and the number of rural migrant workers was about 2.19 million in 2020 (NBSC, 2021). These migrant workers are mainly engaged in the service industry, construction, clothing and textile industry, automobile manufacturing, electrical machinery and equipment manufacturing, and manufacturing of computers, communications and other electronic equipment, etc.

After selection of Fuzhou City as the study area, the stratified sampling and random sampling methods were

used to confirm the respondents. Specific selection process was as follows. First, the Fuzhou City has been divided into three categories based on the location (i.e. the distance to the city center in ascending order): *town center*, '*village in the city*' (*chengzhogncun*) and *suburban areas*. Among them, '*village in the city*' is a special form of rural settlements that are surrounded by skyscrapers. It becomes the concentration place of rural migrant workers owing to its proximity to the city center and low house rent. Second, two to four communities/villages were randomly chosen as the sources of respondents. More study sites have been selected in '*village in the city*', owing to concentrated distribution of migrant workers, high heterogeneity and intensity of migrant workers' multidimensional poverty. Third, about 5% of the rural migrant workers were randomly selected as the interviewees. The distribution of sampling sites could be shown in Figure 1.

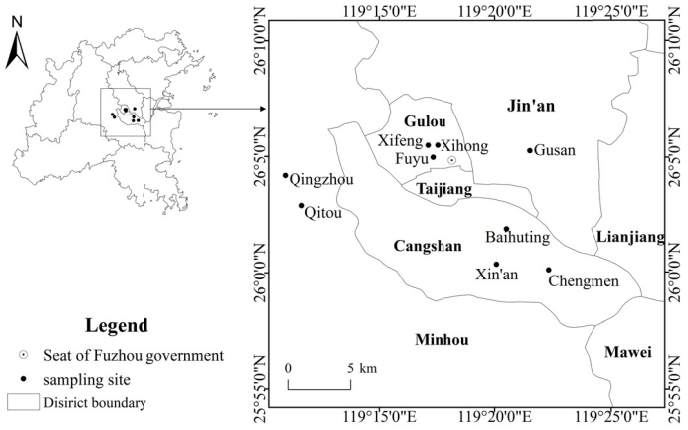

Figure 1. Location of study area

The field survey was conducted from July 7, to September 15, 2021. Our field surveys were carried out in accordance with relevant guidelines and regulations. All participants were supplied with information brochures explaining the purpose of the survey, and ways of protecting their privacy. All participants gave written informed consent for the survey. We used a questionnaire to conduct face-to-face interviews with these respondents. The questionnaire consists of five parts (including 82 questions): (1) conditions of household livelihoods; (2) working and living conditions in migrating destination; (3) utilization of public services and facilities; (4) perceptions on rural poverty and initiative; (5) social network and integration. Each interview cost about 50 minutes. After eliminating 4 invalid responses, we collected 319 valid questionnaires. The distribution of these questionnaires is shown in Table 1.

Table 1. The distribution of interviewees of the study in Fuzhou City, China

Location type	Sampling community/village	District/county	Interviewee
Town center	*Fuyu*	*Gulou*	40
	Xihong	*Gulou*	28
	Xifeng	*Gulou*	20
village in the city	*Chengmen*	*Cangshan*	64
	Baihuting	*Cangshan*	43
	Xin'an	*Cangshan*	15
Suburban area	*Gusan*	*Gulou*	43
	Qingzhou	*Minhou*	20
	Qitou	*Minhou*	46
Total			319

Source: Our field survey.

2.2 Model Specification

2.2.1 Measurement of Multidimensional Poverty

1) Deprivation Dimensions and Indicators

The Multidimensional Poverty Index (MPI) has been proposed by the United Nations Development Programme (UNDP) for the 2010 Human Development Report. Three dimensions—health, education and living standards—composing of ten indicators have been used to form MPI (UNDP, 2010). The framework has been widely adopted in studies of poverty measurement (Alkire and Foster, 2011). However, the dimensions and indicators need to be adjusted to match the local conditions, owing to the high spatial and temporal heterogeneity of multidimensional poverty. Previous research demonstrated that low income, poor working conditions, long working hours were primary deprivations of migrant workers (Chan and Selden, 2014). We basically kept some original MPI dimensions unchanged but added some new dimensions with consideration of the actual livelihoods of the migrant workers. Therefore, a new framework has been constructed to evaluate the poverty of migrant workers. In total, four deprivation dimensions—income, living standards, dwelling conditions, working conditions—including ten indicators were selected to form our updated MPI (Table 2). In this updated MPI, four dimensions were weighted equally, and indicators of the same dimension were also weighted equally to form the composite index, having applied the principles defined by Alkire and Santos (2011).

Defining the research objects and thresholds of deprivations was important precondition for measurement of poverty. First, rural migrant workers who permanently work and reside in urban areas are our research groups. Our research focus is the multidimensional poverty of the rural migrant workers in urban destinations (i.e. Fuzhou City), other than the poverty of other family members in other places (e.g. rural birth place). As a result, rural migrant workers may be conceived individually, or be considered as households only when anyone of his/her family members are living with him/her in migrating destinations. We uniformly considered our study unit as the individuals, and focused on the living standards per capita when the interviewees were living with some family members. A migrant worker has been identified as deprived under a certain indicator if the score is less than the related deprivation cutoff (Alkire and Foster, 2011). The selection basis of the deprivation cutoffs of these indicators are as follows. The income dimension is measured with average wages of employed persons in urban private sectors in 2021 in Fujian Province. The average income of urban private sectors in the provincial level is 62, 433 RMB person^{-1} yr^{-1}, corresponding to about 5, 200 RMB person^{-1} month^{-1}. Thus, the threshold of income is 5, 200 RMB person^{-1} month^{-1}. A worker has been identified as deprivation in income dimension if his/her income is below the threshold.

As far as the living standards are concerned, some indicators, such as, electricity, drinking water, sanitation (toilet facilities), flooring, cooking fuel, and assets, are chosen to measure the deprivations of rural households trapped in severe poverty (Alkire and Santos, 2011). However, the deprivations of rural migrant workers in China were different from rural households. Therefore, the living standards dimension is measured with three indicators: Engel's coefficient, ownership of durable goods, and day off. Engel's coefficient is the ratio of food expenditure to total expenditure. It is often used to measure the living standards of a family or a country. A household/person could be defined as the poor if its Engel's coefficient is greater than 60%. Therefore, the deprivation cutoff of Engel's coefficient is set at 0.6. The deprivation cutoff of ownership of durable goods was selected based on previous studies (Wang et al., 2021). The traditional measurement of the living standards was mainly unfolded from the material dimension. While the weekend for relaxation and leisure is neglected. A lot of previous studies have proved that a certain amount of rest is fundamental for workers to maintain physical and mental health. One day off each week is normal for the majority of manufacturing and service sectors. Therefore, 4 days off every month is chosen as the threshold. Specific deprivation cutoffs could be shown in Table 2.

As for the dwelling conditions, housing rent, bathroom type, and dwelling environment are used to reflect the dwelling conditions of rural migrant workers. The rent of one bed-room apartment closing to the survey sites is about 1, 600 RMB month^{-1} in 2021. The 50% of the mean value (800 RMB month^{-1}) was adopted as the deprivation cutoff of housing rent. Having no bathrooms in their dwellings may be detrimental to reserve privacy and amenity. It is not convenient to share bathrooms with others. In addition, dwelling environment is also an important attribute of dwelling conditions. Previous showed that poor migrant workers generally lived in neighborhoods with poor sanitation and severe noise pollution. As a result, the noisy or poor sanitary neighborhood is chosen as the deprivation cutoff of dwelling environment.

As far as the dimension of working conditions is concerned, three indicators including working hour, occupational risk, and working environment are used to represent the working conditions of migrant workers. A lot of previous studies demonstrated that migrant workers, especially the immigrant workers, were substantially

exposed to adverse working conditions than natives. The Adverse working conditions generally include physical factors (e.g. vibrations, dust, noise and heat), mechanical factors (e.g. painful positions, heavy loads and standing or walking), occupational risks (e.g. injuries, toxic hazards) etc. The deprivation cutoff of the working hour is 8 hours per day.

The threshold of occupational risk has been confirmed if it involves any of these risks, such as working at heights, risk of injury, risk of accident, exposure to toxic substances, high dust, excessive noise, etc. Working with extreme temperatures (e.g. high temperature) and poor ventilation has been reported as one of the characteristics of migrants' working environment. The deprivation cutoff of working environment is determined by whether possessing the ventilation and cooling systems in workplaces of the summer.

Table 2. Deprivation dimensions, indicators, weights, and cutoffs of MPI

Dimension	Indicator	Weight	Deprivation cutoff
Income	Income	1/4	If workers' wage is less than 5200 RMB person^{-1} month^{-1}
Living standards	Engel's coefficient	1/12	More than 0.6
	Durable goods	1/12	Possessing less than 3 types in colour TV, personal computer, refrigerator, air conditioner, washing machine, and car
	Day off	1/12	Less than 4 days off every month
Dwelling conditions	Housing rent	1/12	Less than 800 RMB person^{-1} month^{-1}
	Bathroom type	1/12	Having no independent bathroom in their dwellings
	Dwelling environment	1/12	The neighborhood is noisy or dirty
Working conditions	Working hour	1/12	More than 8 hours month^{-1}
	Occupational risk	1/12	Involving any one risk, such as working at heights, risk of injury, risk of accident, exposure to toxic substances, high dust, excessive noise, etc
	Working environment	1/12	Having no cooling and ventilation equipment such as electric fans or air conditioners (AC) in summer

Note: 1 USD=6.8974 RMB in 2020, the same below; the magnitude of physical demands for various jobs is divided into 4 levels: low=1, light=2, moderate=3, high=4.

2) Alkire – Foster Counting Methodology

The Alkire – Foster method has been used in our study to measure the multidimensional poverty of rural migrant workers in China based on previous studies (Alkire and Foster, 2011; Wang et al., 2021). Generally, three key processes were employed to accomplish the measurement: identification, aggregation and decomposition. For the process of identification, the method of dual cutoff identification is used to identify poor workers based on two cutoffs: deprivation and poverty cutoffs. First, a deprivation cutoff is adopted to identify whether a worker is deprived in each dimension, and the worker's deprivation score is defined as the summation of weighted scores of all dimensions. If a worker's achievement level in a given dimension is below the deprivation cutoff, the worker is considered as deprivation in that dimension. Second, a poverty cutoff is adopted to determine whether a worker could be considered as the poor (Wang et al., 2021). A worker is identified as poor if its deprivation score is greater than or equal to a given poverty cutoff (k) (Alkire and Foster, 2011).

The adjusted headcount ratio (M_0), also referred to the multidimensional poverty index, is calculated by multiplying the headcount ratio (H) and the intensity (A). The headcount ratio (H), namely the incidence of poverty, is defined as the proportion of workers who are poor in multiple dimensions. It is calculated as the number of workers who are identified as multidimensional poverty (q) divided by the number of total workers

(n).

$$H = \frac{q}{n} \tag{1}$$

The intensity of poverty (A) shows the average deprivation share among the poor and is expressed as following equation:

$$A = \frac{\sum_1^q c(k)}{q} \tag{2}$$

where c(k) is the weighted value of deprivations experienced by one poor worker, q is the number of poor workers. That's to say, the intensity of poverty (A) could be calculated by adding up the deprivation scores of the poor, and dividing them by the total number of poor workers (q).

The adjusted multidimensional headcount ratio (M_0) is defined as follows:

$$M_0 = H \times A = \frac{\sum_1^q c(k)}{n} \tag{3}$$

M_0 can be obtained as the sum of the weighted deprivations that the poor (and only the poor) experience, divided by the number of total workers (n).

Decomposition by dimensions could reveal how the underlying structure of deprivations. Decomposition analysis can calculate the percentage contributions of different indicators on multidimensional poverty index and then identify the primary causes of poverty. Therefore, decomposition analysis could provide targeted policies for poverty alleviation (Alkire and Foster, 2011). The percentage contributions can be shown as follows:

$$S = \frac{W_i CH_i}{M_0} \tag{4}$$

where S is the percentage contribution, W_i is the weight of ith indicator, CH_i is the percentage of workers deprived of ith indicator. While M_0 reflects the multidimensional poverty index.

2.2.2 Determinants of Multidimensional Poverty

The Binary Logistic Regression Model has been employed to examine the determinants of multidimensional poverty. The dependent variable is a dichotomous variable which represents whether a worker is poor or not: 1 if a worker is poor and 0 otherwise. The independents are various socioeconomic and demographic variables at the level of worker or individual.

The model is specified in the following equation:

$$Logit(p) = \ln\left(\frac{p_j}{1-p_j}\right) = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \ldots + \beta_n X_n \tag{5}$$

Where X_1, X_2, …X_n are the predictor variables, β_0 is the general intercept, β_1, β_2, β_3, …β_n are the regression coefficients, and pj denotes the probability that the j-th worker is poor. The independent variables included three categories: continuous variables, binary variables and categorical variables. For categorical variables, a positive sign of estimated coefficients means that the probability of being poor is higher than reference category and vice versa keeping all other characteristics constant (Alkire and Foster, 2011; Wang et al., 2021).

3. Results

3.1 Measurement of Multidimensional Poverty

3.1.1 Poverty Estimates of Uni-dimensional Poverty

Deprivation incidence of different indicators and dimensions could be calculated by Equation (1). The percentage of respondents who experienced deprivation with regard to each indicator is calculated. All dimensions -- income, living standards, dwelling conditions, and working conditions -- have higher incidence of deprivation (Table 3). It has been shown that deprivation in housing rent is the highest among all the indicators. The percentage of respondents whose housing rent being below 800 RMB person^{-1} month^{-1} is 78.37%. And the incidence of deprivation is the highest in '*village in the city',* following by *suburban areas* and *town center.* Conversely, the deprivations of independent bathrooms is the lowest. About 25% of respondents deprived of independent bathrooms and the deprivation in *suburban areas* (27.27%) is higher than that of others. As far as

the dimension of income is concerned, the overall incidence of deprivation of income is 48.90%. That's to say, nearly half migrant workers' income is below the average value at the provincial level. And the incidence of deprivation for workers living in '*village in the city'* is higher than that of workers in *suburban areas* and *town center.*

As far as the dimension of living standards is concerned, migrant workers are substantially deprived in indicators of Engel's coefficient, durable goods, and day off. The former two indicators reflect the material poverty, while the latter indicator reveals the break poverty of the migrant workers. More than 40% of all respondents' food costs are more than 60% of their total expenditure. And the value of workers living in suburban areas is the highest. It should be noted that the respondents' Engel's coefficient just illustrates the consumption structure of family members who are living in Fuzhou City. It is not the Engel's coefficient of a whole household if some family members live in other places. The overall incidence of deprivation in durable goods is 52.04%. And the incidence of deprivation for suburban workers is still higher than that of workers living in *city center* and *'villages in the city'* (Table 3). The deprivation of day off for all workers are conspicuous. About 62% of migrant workers has less than 4 days off every month, and the incidence of deprivation for suburban workers is still the highest. Specific information could be seen in Table 3.

As for the deprivation of dwelling conditions, about 80% of migrant workers' housing rent is less than 800 RMB person^{-1} month^{-1}, which means that most rural migrant workers' living conditions are poor. And 24.14% of respondents have to share bathrooms with other persons. While 27.59% of workers' houses are characterized by poor neighborhood environment. As is shown in Table 3, there is a remarkable spatial heterogeneity in the deprivation of dwelling conditions. As far as the working conditions are concerned, results showed that the incidence of deprivation in working conditions is prominent. Especially, the deprivation of working hour is extraordinarily high. Nearly 60% of migrant workers have been deprived in working hour, which means that these migrant workers have to do long hours' work. The percentage of respondents with occupational risks and poor working environment is 31.66% and 32.60%, respectively. Workers living in '*villages in the city'* are afflicted with the severest deprivation in three indicators. The supply of job categories in different locations may explain the spatial heterogeneity.

Table 3. Incidence of deprivation of indicators of poverty for rural migrant workers (%)

Dimension	Indicator	Total	Town center	village in the city	Suburban area
Income	Income per capita	48.90	47.73	55.76	33.33
Living standards	Engel coefficient	46.71	40.91	46.67	54.55
	Durable goods	52.04	46.59	52.73	57.58
	Day off	62.38	64.77	58.18	69.70
Dwelling conditions	Housing rent	78.37	57.95	90.30	75.76
	Bathroom type	25.08	21.59	26.06	27.27
	Housing environment	40.13	34.09	40.00	48.48
Working conditions	Working hour	59.87	56.82	63.03	56.06
	Occupational risk	33.54	18.18	43.03	30.30
	Working environment	40.13	36.36	41.82	40.91

3.1.2 Overall Multidimensional Poverty Estimates

One critical step is to choose the number of dimensions in which a worker has to be deprived so as to be considered multidimensionally poor. The poverty cutoff (k) could reflect the share of weighted indicators in which a worker must be deprived in order to be considered as multidimensionally poor (Alkire and Santos, 2014; Wang et al., 2021). The selection of the specific k value primarily depends on the context of the respondents. Results of multidimensional poverty estimate for different poverty cutoffs (k) can be shown in Table 4. Along with the increasing poverty cutoffs (k), the multidimensional headcount ratio (H) and adjusted headcount ratio (M_0) decreased, and the multidimensional poverty intensity (A) increased. For example, when k=0.2, the multidimensional headcount ratio (H), poverty intensity (A) and adjusted headcount ratio (M_0) was 84.95%,

0.538, and 0.457 respectively. When k=0.6, the multidimensional headcount (H), poverty intensity (A) and adjusted headcount ratio (M_0) changed to 33.54%, 0.704, and 0.236 respectively. Comparing to conditions of k=0.2, the multidimensional headcount ratio (H) and adjusted headcount ratio (M_0) decreased by55.42% and 45.37% respectively, and poverty intensity (A) increased by 22.65%.

Level of multidimensional poverty changes according to the selection of poverty cutoffs (k). Based on previous studies, a cutoff (k=0.33) is selected because it has a normative justification and provides a wide distribution of poverty results (Alkire and Santos, 2014; Wang et al. 2021). When all 10 indicators are present, this implies that a worker must be deprived in at least four indicators to be identified as multidimensionally poor. Therefore, k was set to 0.33 in this study, which implied that the selected poor workers should be deprived in at least two weighted dimensions. After calculation, 72.73% % of respondents were found to be deprived in at least two weighted dimensions (Table 4).

Table 4. Multidimensional poverty estimates for different poverty cutoffs

Poverty cutoffs k	Multidimensional headcount ratio H	Multidimensional poverty intensity A	Adjusted headcount ratio M_0
0.1	0.9561	0.496	0.474
0.2	0.8495	0.538	0.457
0.3	0.7524	0.574	0.432
0.33	0.7273	0.583	0.424
0.4	0.6552	0.608	0.398
0.5	0.4608	0.736	0.339
0.6	0.3354	0.704	0.236
0.7	0.1505	0.774	0.116
0.8	0.0470	0.842	0.040

3.1.3 Multidimensional Poverty Estimates in Different Dwelling Locations

Our results demonstrated that there was substantially spatial heterogeneity in multidimensional poverty. As is shown in Table 5, the multidimensional headcount ratio (H) of rural migrant workers in *'village in the city'* is the highest, followed by workers living in *suburban areas* and *town centers*, when k≤0.4. The incidence of multidimensional poverty is the lowest in city center. However, when 0.5≤k≤0.6, the multidimensional headcount ratio (H) in '*village in the city*' is the highest, while the incidence of multidimensional poverty in *suburban areas* is the slightest. When k≥0.7, the multidimensional headcount ratio (H) for three locations shows in descending order: *town centers*, '*village in the city*', and *suburban areas.* The agglomeration of multidimensional poverty has shifted from suburban areas to urban fringes (Table 5). As far as the Adjusted Headcount Ratio (M_0) is concerned, the Adjusted Headcount Ratio (M_0) for workers living in '*village in the city*' is the highest, when when 0.1≤k≤0.6. While the Adjusted Headcount Ratio (M_0) for workers living in *town centers* is the highest When k≥0.7. Specific spatial heterogeneity could be shown in Table 5.

When poverty cutoffs being k=0.33, the incidence of multidimensional poverty in t*own center, 'village in the city'*, and *suburban areas* is 56.82%, 81.21% and 72.73%, respectively. While the Adjusted Headcount Ratio (M_0) in *town center, 'village in the city',* and *suburban areas* is 0.361, 0.471, and 0.390, respectively (Table 5).

Table 5. Multidimensional poverty estimates for workers living in different locations

Poverty cutoffs k	Headcount ratio H			Adjusted headcount ratio M_0		
	Town center	Village in the city	Suburb	Town center	Village in the city	Suburb
0.1	0.8864	0.9879	0.9697	0.420	0.514	0.446
0.2	0.6364	0.9455	0.8939	0.379	0.507	0.434
0.3	0.5682	0.8364	0.7879	0.361	0.479	0.409
0.33	0.5682	0.8121	0.7273	0.361	0.471	0.390
0.4	0.5568	0.7030	0.6667	0.357	0.432	0.370
0.5	0.4091	0.5394	0.3333	0.321	0.374	0.275
0.6	0.3068	0.3818	0.2576	0.228	0.266	0.172
0.7	0.2159	0.1515	0.0606	0.170	0.116	0.045
0.8	0.0795	0.0485	0.0000	0.066	0.040	NA

Note: NA means not applicable.

3.1.4 Decomposition of Adjusted Headcount Ratio

Under the conditions of k=0.33, the Adjusted Headcount Ratio (M_0) could be decomposed according to indicators to clarify the contribution of deprivations in each dimension or indicator to overall poverty. The decomposition results based on equation (4) are shown in Figure 2. Among four dimensions, the dimension of income (28.46%) contributed most to overall poverty, followed by living standards (27.60%), dwelling conditions (25.14%), and working conditions (18.79%). The contribution of four dimensions to multidimensional poverty is comparatively balanced. Therefore, the estimates of uni-dimensional income poverty inevitably underestimate the incidence of poverty. The poverty in dimensions of income, living standards, and dwelling conditions, has become great challenges for rural migrant workers of China. While the poverty in dimensions of working conditions is relatively slight.

The five greatest contributors to multidimensional poverty in the descending order are income, housing rent, day off, durable goods, and working hour (Figure 2). In other words, income is the greatest contributors to multidimensional poverty. Insufficient break time is the greatest contributor to the dimension of poverty in living standards, while ownership of durable goods and Engel's coefficient are secondary contributors. Housing rent is the greatest contributor to the dimension of poverty in dwelling conditions. While housing environment and owning an independent bathroom are secondary contributors. Working hour is the greatest contributor to the dimension of poverty in working conditions, while occupational risks and working environment are secondary contributors (Figure 2).

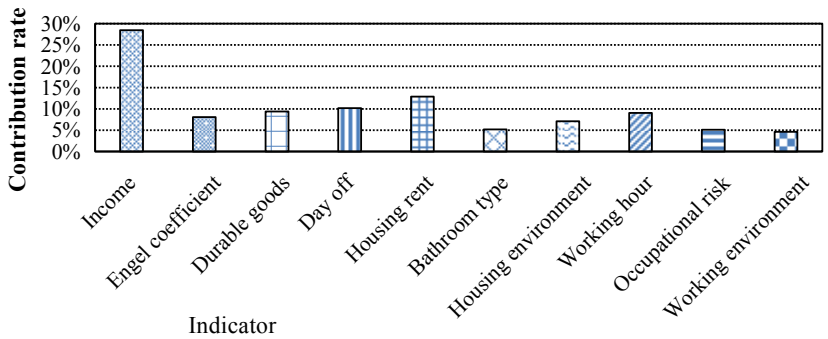

Figure 2. Contribution rate of indicators of multidimensional poverty (k=0.33)

3.2 Multilevel Determinants of Multidimensional Poverty

The method of binary logistic regression has been used to examine the determinants of multidimensional poverty. The dependent variable is a dichotomous variable which represents whether a rural migrant worker is poor or not.

Given the poverty cutoff (k=0.33), the dependent is 1 if a worker's weighted deprivation score is above the poverty cutoff (k=0.33) and 0 otherwise. Independent variables are a series of socioeconomic and demographic variables at the level of individuals (Table 6). These independent factors could be divided into four dimensions: individual/household demographic conditions, social integration factors, occupational characteristic, and social capital.

Table 6. Summary of independent variables

Variables	Descriptions	Mean	S.D.	Min	Max
Individual demographic factors					
Age	Age of interviewees	43.67	11.20	19	70
Gender	Gender of interviewees (0=female; 1=male)	0.68	0.47	0	1
Marital status	0=unmarried, divorced or widowed; 1=married	0.88	0.32	0	1
Educational attainment	1=Illiterate or primary school; 2= middle school; 3= high school 4= college and more	1.62	0.86	1	4
Household registration	0=Non-Fujian Province; 1= Fujian Province	0.32	0.47	0	1
Number of children	Number of children that not working in his/her household	0.99	0.93	0	5
Social integration factors					
Working years in Fuzhou City	How many years did you migrate to Fuzhou City?	12.20	9.62	0.5	41
Number of family members in Fuzhou City	Number of family members living together (including the interviewees)	2.39	1.70	1	11
Occupational characteristic					
Occupational skills	1=low; 2= medium; 3=high	1.78	0.82	1	3
Occupational type	1=casual or part-time jobs; 2=factory work; 3= construction work; 4= office clerks and service work; 5= managers, business owners, and professionals	3.15	1.43	1	5
Social capital					
Expenditure on social activities	Average cost in social activities (RMB person^{-1} month^{-1})	163	323	0	3000
Frequency of contact with locals	1=never; 2=rarely; 3=occasionally; 4=often	2.51	0.80	1	4

Note: 1 USD=6.8974 RMB in 2020.

The logistic model fitted the data quite well. The value of -2Log likelihood is 192.702, which indicates the high statistical significance of the model. The value of Nagelkerke R Square is 0.624 (greater than 0.5), which shows the high goodness of fit of the model (Wang et al., 2021). The value of chi-square is 179.159 (with p= 0.000), and the model correctly predicted 92.4% of the observations, which implies how well the model fits the data. The estimates of the logistic regression are shown in Table 7.

Results demonstrate that six indicators from four dimensions were significantly positively associated with the likelihood of multidimensional poverty. To be specific, rural migrant workers who have experienced trans-provincial migration were more probable being multidimensional poor. Long-distance and trans-provincial migration generally implies more obstruction in destinations, such as higher job-seeking cost, prominent cultural difference, and less social network and employment information. Social integration has the potential to overcome the original disadvantages and promote poverty alleviation. Our results displayed that migrant workers with high social integration (i.e. more working years in destination, and more family members staying together) had the lower probability of being poor. More working years in the destination may imply more accumulation in

vocational knowledge, skills, and social connections, which are important prerequisites for poverty reduction. More family members staying together suggests more support from the family to get rid of poverty.

There was a higher chance of being poor if a migrant worker had low occupational skills. As for the Occupational type, results showed that workers in construction sectors has higher likelihood of multidimensional poverty compared to workers with high level of occupational skills. These workers are substantially deprived in dimension of working conditions and dwelling conditions. Expenditure on social activities were also negatively correlated with poverty status. If a migrant worker has more expenditure on social activities, it has the less probability of being multidimensional poor. The result implies that higher social capital of migrant workers may reduces the risk of trapping into multidimensional poverty. While some variables, such as age, gender, marital status, educational attainment, number of children, and frequency of contact with locals, were not statistically significantly associated with the probability of being multidimensional poor.

Table 7. Determinants of multidimensional poverty

Variables	B	S.E.	Sig.	Exp(B)
Individual demographic factors				
Age	0.029	0.026	0.268	1.029
Gender (ref. male)				
Female	-0.034	0.567	0.952	0.966
Marital status (ref. married)				
Unmarried/divorced/widowed	-1.110	0.680	0.103	0.330
Educational attainment (ref. college and more)			0.349	
Illiterate or primary school	1.150	1.130	0.309	3.159
middle school	1.588	1.071	0.138	4.895
high school	0.923	1.240	0.457	2.516
Household registration (ref. Fujian Province)				
Non-Fujian Province	1.070	0.446	0.016**	2.917
Number of children	0.085	0.256	0.739	1.089
Social integration factors				
Working years in Fuzhou City	-0.066	0.024	0.006***	0.936
	-0.332	0.166	0.045**	0.717
Number of family members in Fuzhou City				
Occupational characteristic				
Occupational skills (ref. high level)			0.000	
Low skills	3.974	0.834	0.000***	53.180
Medium skills	0.353	0.447	0.430	1.423
Occupational type (ref. managers, business owners, and professionals)			0.425	
Casual or part-time jobs	18.189	5444.946	0.997	79329484.975
Factory work	0.848	0.726	0.243	2.336
Construction work	0.906	0.489	0.064*	2.475
Office clerks and service work	0.465	0.719	0.518	1.592
Social capital				

Expenditure on social activities	-0.001	0.001	0.047**	0.999
Frequency of contact with locals (ref. often)			0.255	
Never	1.281	1.269	0.313	3.598
Rarely	-0.583	0.515	0.258	0.558
Occasionally	0.070	0.568	0.902	1.073
Constant	-1.792	1.520	0.238	0.167

Note: ***, **, * denote statistical significance at 1%, 5% and 10% respectively.

4. Discussion and Conclusions

Poverty is widely considered as a multidimensional and dynamic phenomenon in the world. Poverty has been generally measured with multidimensional dimensions and heterogeneous criteria based on specific socioeconomic conditions. A lot of previous empirical studies have been conducted to measure rural multidimensional poverty and clarify the primary determinants of multidimensional poverty during the past decade (Jansen et al., 2015; Wang et al., 2021). Their investigating respondents are rural households or part family members who stay in rural areas. However, these studies have neglected the rapid urbanization and resultant poor rural-urban migrant workers. The prevalent urbanization has brought about large-scale rural-urban migrants and special households with multi-local livelihoods in developing countries owing to diversified limitations (e.g. household registration). During the process of urbanization, the majority of the rural poor have been transformed into the urban poor because substantial rural-urban exodus of the poor seeking for better economic opportunities has landed in urban areas. The poor rural-urban migrant workers are a unique poor group in China and some other developing countries. However, the poverty of the rural-urban migrant workers has been overlooked in China. Thus, studies on poverty of rural-urban migrant workers are crucial for future poverty-alleviation in China and other developing countries.

Measurement of multidimensional poverty needs to be in accordance with specific research subjects and socioeconomic conditions. For example, the MPI is originally an aggregation of overall deprivations of the rural population trapped in extreme poverty in many developing countries (Alkire and Santos, 2011). However, the MPI could not be applicable in measurement of poverty of rural-urban migrant workers in China. Framework and indicator system of rural multidimensional poverty in previous studies are not viable in our study. New MPI should be proposed to substitute the original one designed for rural multidimensional poverty, to clarify the new characteristics of multidimensional poverty for rural-urban migrant workers in China. Moreover, given the prevalent multi-local livelihoods of rural households in China, measurement of multidimensional poverty at the individual level can identify substantial individual differences in poverty (especially in different locations) that are masked at the household level. Thus, the research unit/object moving from the household to the individual scale has been presented in some recent poverty studies (Lekobane, 2022).

The study examined the migrant workers' poverty magnitude and determinants from a multifaceted perspective based on a case study in Fuzhou City, Southeast China. This study refined definitions of multiple deprivations that contributed to relative poverty and filled gaps in multidimensional poverty research in urban poverty in China. First, we measured multidimensional poverty of rural-urban migrant workers based on field survey data and a new methodology developed by Alkire and Foster (2011). Four dimensions including income, education, living standards, dwelling conditions, and working conditions comprising of ten indicators, have been selected to build up the Multidimensional Poverty Index (MPI). Results showed that the headcount ratio of multidimensional poverty (k=0.33) was 72.73%, which meant that more than 70% of migrant workers were deprived in at least two weighted dimensions. Results also demonstrated that deprivations in four dimensions are similar, which implied that migrant workers were all substantially deprived in four dimensions. Results revealed that income, housing rent and break time were the most important contributors of multidimensional poverty, which jointly accounted for 51.51% of overall poverty.

The estimation of multidimensional poverty showed that the uni-dimensional income measurement could underestimate the actual poverty of the migrant workers. The conclusion was consistent with many previous studies of the working poor (Weon, 2021). Previous studies proved that the income measurement inadequately estimated the livelihood hardship of the urban workers whose income may be above the official poverty line (Weon, 2021). It should be noted that the incidence of income deprivation to a large extent depended on the selection of the threshold of deprivation. The average income of urban workers in private sectors in 2021 in

Fujian Province has been adopted as the threshold of income deprivation in our study. The incidence of income deprivation would decrease greatly if a certain percent (i.e. ranging from 40% to 60%) of mean income is adopted as the threshold (Weon, et al., 2021). For example, if the 60% of the mean income is considered as the income threshold of deprivation (i.e. 3,120 RMB person^{-1} month^{-1}), the incidence of income deprivation has greatly decreased from 48.90% to 19.44%. The results further proved that the deprivations of rural migrant workers were much more severe in living standards, dwelling conditions, and working conditions than income if income threshold was selected as previous studies.

The results of the deprivations in rural migrant workers' working conditions, such as long working hours and poor working environment, were consistent with previous studies of China and some European countries (Chan and Selden, 2014). Compared with non-migrant workers, migrant workers are more likely to be exposure to negative working conditions (such as long working hours, less days off, shift work, working at very high speed, standing when working) (Chan and Selden, 2014). But these results were inconsistent with previous studies of the working poor in developed countries, where the working poor had less working hours owing to engaging in precarious employment (Weon, 2021). These differences may be attributed to different research groups with distinct citizenship. The former groups referred to the deprived migrants who migrated from rural areas or less developed countries for better livelihoods. While the latter working poor generally referred to the urban citizens whose salaries were below the certain income line.

Migrant workers' poverty in dimension of dwelling conditions has been highlighted in our study. The majority of rural migrant workers tends to live in special houses, such as peasant self-built houses in *'village in the city'*, temporary shed in construction sites or industrial factory dormitories. The results are consistent with previous studies of China that rural migrant workers are trapped in housing poverty, including low ownership, overcrowding, inaccessible location, and poor privacy (Xie and Chen, 2018). And these results are also consistent with research in developed countries that migrant farmworkers coming from developing nations generally have the worst housing conditions (Keim-Malpass et al., 2015). As for the living standards, results show that migrant workers are highly deprived in three variables (i.e. day off, durable goods, and Engel's coefficient). These results in poverty of facility ownership and consumption are consistent with prior literature that rural migrant workers are living a marginalized life compared to the urban residents (Wang et al., 2021). As for the less break time of migrant workers, the result is consistent with previous studies that low-wage migrant workers tend to work longer hours to get more income. However, less studies considered a certain days off (such as two days off per month) as the basic needs to maintain health and an indispensable indicator of living standards.

Results demonstrated that income, housing rent and day off were three key contributors of multidimensional poverty, while occupational risks and working environment were less important contributors. The results were consistent with some previous studies, which considered income, poor housing conditions, and lengthening working hours as top three contributing factors of migrant workers' multidimensional poverty (Arici et al., 2019). But results on contribution of occupational risks and working environment were inconsistent with some previous studies, which considered occupational risks and working environment as important attributes of migrant workers' poverty (Arici et al., 2019). These research disparities may lie in differences in top priority of concern, perceptions of occupational risks and working environment and selection of respondents. In addition, spatial heterogeneity of multidimensional poverty has been highlighted in our study. The incidence of multidimensional poverty in *'village in the city'* is the highest, following by *suburban areas* and *town center*, when k is less than 0.4. The results are consistent with previous studies that spatial inequality of multidimensional poverty is prevalent in urban areas (Liu et al., 2017).

The determinants of multidimensional poverty of rural migrant workers have been conducted by the logistic regression model to clarify the effects of micro factors on probability of being poor. Results showed that household registration, working years in destination, family members staying together, occupational skills, occupational type, and expenditure on social activities were important determinants of rural multidimensional poverty. Three indicators, including working years in destination, family members staying together and expenditure on social activities were significantly negatively associated with the probability of being poor and the other variables (i.e. non-Fujian household registration, low skills, and construction work) had a were positive relationship with poverty. Results on the impacts of social integration on poverty were consistent with many previous studies that lack of social integration/cohesion was a crucial cause of severe poverty of urban migrants (Hong et al., 2014). Results showed that social capital measured by some variables, such as expenditure on social activities, and membership of a group, and personal networks, had a significantly negative impact on the likelihood of being poor (Dartanto and Otsubo, 2015). The results are also consistent with prior studies that

migrants' place of origin has remarkable impacts on multidimensional poverty (Ingelaere et al., 2018). While occupational skills and occupational type are also important determinants of migrant workers' poverty because they are closely linked with incomes (Sofo and Wicks, 2017).

These results of this study offer critical policy implications for poverty alleviation of rural migrant workers. First, the results suggested that the primary battleground for poverty alleviation should be moved from rural areas of China to urban areas accompanied by large-scale rural-urban migration. Second, the policy focus of migrant workers' poverty alleviation should be changed from onefold income growth to multiple improvement in income, dwelling conditions, working conditions, and living standards. Third, some low-rent houses adjacent to town centers, such as *'villages in the cities'*, should be retained for housing numerous migrant workers in rapidly urbanizing regions by virtue of better location and low rent. Further urbanization through changing *'villages in the cities'* into urban areas of skyscrapers may force migrant workers to live in remote suburban areas with less employment opportunities, which may aggravate the poverty of migrant workers. Fourth, social protection to improve the working conditions of rural-urban migrant workers' working conditions need to be reinforced in cities of China. Migrant workers are more likely to be exposed to certain working and employment conditions that may place them at higher risk of future health problems. The health protection need to be emphasized to decrease occupational risks and reduce exposure to toxic substances. Fifth, family oriented migration should be encouraged by providing more public services for the rural migrants because family migrants generally have low poverty incidence than individual migrant.

Several limitations warrant discussion. First, some research hypotheses have not been verified due to the limited sample size of our data set. Future study using larger samples may alleviate this potential problem. Second, spatial heterogeneity at larger geographic scales (e.g. regional, national scale) has not been discussed. Further research using more survey data of different regions in China would advance the study. Third, the study adopted a static method to elucidate poverty migrant workers of China based on cross-sectional data. This may not clarify the dynamics of migrants' poverty. Future research would resort to longitudinal survey data or retrospective approaches to rectify the current research gap.

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