

Research on Rural Family Women's Poverty from Multi-dimensional Perspective

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Abstract. This paper uses the data of “China Family Panel Studies”, combined with multidimensional poverty theory and AF multidimensional measurement method, based on the perspective of rural female individual. It constructs the system framework of multi-dimensional poverty of rural family women from six dimensions of economy, culture, health, spiritual life, social interaction and time. It measures the multidimensional poverty of women and compares it with the multi-dimensional poverty of rural men. The results show that, overall, the poverty level of rural women is higher than that of men. Among them, the incidence of poverty in women in income and cultural dimensions is significantly higher than that in men, and it is obviously weak in the dimension of decision-making power. Therefore, it is necessary to strengthen poverty alleviation work for rural women in terms of income and culture.

Introduction

At present, there are significant regional and gender differences in poverty in developing countries, and the incidence of female poverty is much higher than that of men, and the situation is deepening[1]. China has achieved remarkable results in promoting poverty alleviation, and the problem of female poverty has also been alleviated. However, the pattern of rural women's poverty is still very serious, the population is still large, and poverty is more extensive[2]. In past poverty studies, indicators for measuring and identifying rural poverty, such as poverty lines, poverty indicators, and different measures of poverty, basically regarded female poverty and male poverty as indifferent poverty, ignoring rural women's vulnerability[3,4]. It is more likely to fall into poverty. Rural women are in a weak position in terms of household resource allocation, various opportunities, and external environment, institutional support and security. This makes it necessary to integrate gender factor into the analysis of poverty[5,6].

Therefore, the problems studied in this paper mainly focus on: (1) the dimensions of rural women and men in poverty; (2) the degree of poverty in each dimension; (3) the possible causes of poverty in all dimensions. This paper intends to establish a framework for the formation of rural female poverty, and then select the poverty dimension of rural households based on the data to measure and compare poverty.

Multidimensional Poverty Measurement Method

The measurement method is as follows: First of all, In-dimension poverty identification. According to the survey database, assume that N represents the number of rural household adults (16 years older), and $D \geq 2$ indicates the number of dimensions of the multidimensional poverty measure, $y = [y_{ij}]$ represents the value of the $N \times D$ dimension matrix, y_{ij} Represents the observation of individual i in the j th dimension, The row vector y_i is the value of the individual i , and the column vector y_j is the value of the j dimension, z_j indicating the poverty threshold of the j th dimension. Defining a deprivation matrix $[g_{ij}^0]$,

$$g_{ij} = \begin{cases} 1 & y_{ij} < z_j \\ 0 & y_{ij} \geq z_j \end{cases} \quad (1)$$

Secondly, Multidimensional poverty identification. The above formula shows the deprivation distribution of each individual in each dimension. To determine whether the household is a multi-dimensional poor household, define a column vector to represent the total number of poverty dimensions that the individual endures, that is, to summarize the deprivation of each household, total number of dimensions, get c_i . Then, compare the total number of deprived dimensions (c_i) with the set multi-dimensional poverty deprivation threshold (k) to determine whether households have multidimensional poverty. If the number of dimensions deprived by the household (c_i) is greater than the set multi-dimensional poverty threshold (k), then the household is considered to be a multi-dimensional poor household, otherwise it is a non-multi-dimensional poor household. ρ_k is a function to identify poverty when considering k dimensions, ρ_k is affected by both z_j and c_i .

$$\rho_k(y_i; z) = \begin{cases} 1 & c_i \geq k \\ 0 & c_i < k \end{cases} \quad (2)$$

Thirdly, Addition of poverty. After identifying the deprivation of each dimension, it is necessary to add up the dimensions to obtain a multidimensional composite index. Alkire and Foster proposed the multidimensional poverty measurement index is:

$$M_0(y; z) = \mu(g^0(k)) \quad (3)$$

$$M_0 = \mu(g^0(k)) = HA \quad (4)$$

$$A = |c(k)| / (qd) \quad (5)$$

M_0 is the adjusted multidimensional poverty index. It consists of two parts: one part is A (the incidence of poverty); the other part is H (the average deprived share). Different dimensions can be assigned to different dimensions when the poverty dimension is aggregated. This paper uses the equal weight method.

Fourth, Decomposition of poverty. Multidimensional poverty index can be broken down according to different dimensions. The multidimensional poverty decomposition formula is as follows, Where s, e, r are assumed to be data matrices of a certain dimension.

$$M(s, e, r; z) = \frac{n(s)}{n(s, e, r)} M(s; z) + \frac{n(e)}{n(s, e, r)} M(e; z) + \frac{n(r)}{n(s, e, r)} M(r; z) \quad (6)$$

The Measurement of Multidimensional Poverty of Rural Family Women

Data and poverty line. First of all, Description of the data in this article. The data in this article is from China Family Panel Studies (CFPS). The sample selected in this paper is the 2014 data. In the year of 2014, the decision-makers of multi-family major issues, such as purchasers and high-priced consumer goods, made detailed investigations. Through the screening of the data, a total of 5,525 eligible rural household samples were obtained, with a total of 16,514 adult individuals.

Secondly, Descriptive analysis of the sample in this paper. The main contents of this paper are as follows: the basic situation of rural households, the highest educational level of family males and females, working hours (paid labor and unpaid labor), self-evaluation of health status, and decision-making power of major family matters. In the survey of the number of rural households, the average population is 5, the highest population reaches 9 people. In the survey data of this paper, the family affairs right is divided into five items. It can be seen that rural household males have far more decision-making power than females in the decision-making power of household expenditure distribution, investment savings insurance, home purchase, and high-priced consumer goods. This shows that the status of women in rural families is lower than that of men, and because women may have more opportunities to care for their children, men are

slightly higher than women in the decision-making power of children. However, from the overall decision on the right to family affairs, women are clearly in a weak position.

Determination of the poverty line in each dimension. This paper selects the six dimensions of income, consumption, education, time, health and decision-making power to measure rural household poverty. The poverty line of each dimension is determined according to the actual situation of rural areas in China. The income poverty line adopts the national standard poverty line; the education dimension is measured by the education level of the family adult population, and the education dimension data is discrete variables, the education poverty line is junior high school level; the self-evaluation method adopted by the health dimension, the family adult males and females evaluate the self-health status, health poverty is set to general and poor conditions; The time dimension is used to measure the working hours and doing housework hours. The longer the length of the dimension, the shorter the leisure time and the shorter the entertainment time. The time poverty line defined in this paper is 10 hours. The decision-making power dimension is used to measure the decision-making power of family adult males and females in major family affairs. If they do not have decision-making power, they are regarded as decision-making power poverty. As shown in Table 1.

Table 1 The selection of each dimension and the critical value of poverty

Type of dimension	Threshold
Income	If the individual's income is lower than the national poverty line, set the value to 1
Consumption	If the individual's consumption is less than 600 yuan, set the value to 1
Education	If the individual's education level is below junior high school, set the value to 1
Health	If the individual feels that the health is normal or poor, set the value to 1
Time	If the individual works more than 10 hours a day, set the value to 1
Decision-making power	If the individual lacks the decision-making power of a major family matter, set the value to 1

Analysis of the results of the measurement

The incidence of poverty in all dimensions. The incidence of poverty in the rural household population. As shown in Table 2. The overall income poverty and consumption poverty of the rural population are as high as 77% and 64.75%, indicating that most of the rural households' income and consumption are in poverty. Women's income and consumption poverty are higher than men's. The high consumption poverty may be mainly due to the fact that in order to compare the poverty of men and women, this paper mainly considers the two aspects of telephone communication costs and online consumption of rural households, and excludes the consumption of clothing, food and other similar consumption of rural households. The educational poverty of rural women is higher than that of males, indicating that the highest level of education in rural households, whether male or female, is in junior high school and below. Women's health poverty is slightly higher than that of men, indicating that more women's health is poor, which may be related to the weaker awareness of rural women's health. Women in time poverty are roughly equal to men. This may be due to the fact that paid labor time and unpaid labor time are selected in this paper. The paid labor time for men and the unpaid labor time for women are roughly the same. In the poverty of decision-making power of rural family population, female poverty is much higher than male poverty-making decision-making power, which is closely related to Chinese rural historical and cultural concepts, living environment and institutional environment. These can be seen that in different dimensions, rural family women are in a certain weak state compared with men.

Table 2 Statistics on the incidence of poverty in all dimensions[%]

Dimension	Total population	Male population	Female population
Income	77.0	69.04	84.84
Consumption	64.75	57.74	71.65
Education	53.95	49.98	57.86
Health	32.0	27.62	36.31
Time	19.38	18.95	19.81
Decision making power	7.93	0.26	15.73

Results of multidimensional poverty estimates. In order to comprehensively evaluate the poverty situation of rural women, this paper uses the multi-dimensional poverty measurement method to estimate the multi-dimensional poverty of rural women, and compares the rural multi-different situation between rural women and men. When considering poverty in one dimension, the incidence of poverty among rural women is 0.9606, that is, 96.06% of women have poverty in any of the six survey dimensions, the poverty incidence is 0.4966, and the poverty index is 0.4770. It can be seen that in one dimension, the incidence of poverty, the incidence of poverty and the multidimensional poverty index of women are higher than that of men. With the increase in the number of survey dimensions, the incidence of poverty among rural women and men has declined, while the share of poverty has increased, and the multidimensional poverty index has also declined. When considering poverty in four dimensions, the incidence of poverty among men is 0.1499, and the multidimensional poverty index is 0.1057, while women still have a poverty incidence of 0.3255 and a multidimensional poverty index of 0.2297. The specific results are shown in Table 3.

Table 3 Analysis of the results of multi-dimensional poverty estimation for rural women and men

K	Female population			Men population		
	H	A	M	H	A	M
1	0.9606	0.4966	0.4770	0.9250	0.4028	0.3726
2	0.8564	0.5367	0.4596	0.7185	0.4702	0.3382
3	0.6434	0.6041	0.3887	0.4275	0.5642	0.2412
4	0.3255	0.7057	0.2297	0.1499	0.6832	0.1024

Decomposition of poverty in different dimensions. Table 4 shows the multidimensional poverty index and the contribution of the six dimensions to the total index under the different dimensions of poverty. For rural family women, when the number of dimensions considered is from 1 to 4, income poverty contributes the most to total poverty, followed by consumption poverty and education poverty. Income poverty and consumption poverty contribute to the total poverty. Time poverty contributes the least to total poverty. For men, regardless of the poverty dimension considered, income and consumption poverty contribute the most to total poverty, and decision-making power poverty contributes the least to total poverty. Comparing rural women and men, we can find that income, consumption and education poverty are the most prominent. The consumption of this paper is mainly to select telephone communication fees and online consumption expenses. It can be seen that the consumption level of rural households in these two aspects is relatively poor. With the popularity of electronic networks, the rural population occupies a large proportion of the population. Therefore, stimulating the consumption of rural people in this area can not only improve the consumption level of rural residents, but also enhance the diversification of life of rural residents. In addition, it can be found that the contribution of rural family decision-making power poverty to total poverty is much higher than that of male decision-making power to total poverty. This indicates that rural family women still have less important decision-making power in family affairs than men. This may be caused by the cultural concepts and living environment of rural China. In terms of time poverty, men are slightly higher than women. Because the time dimension selected in this paper includes paid labor time and unpaid labor time, this may be because men are engaged in paid labor more than women, but because of

housework, etc. Unpaid work is mainly dominated by family women. Therefore, in the contribution of time poverty to total poverty, men are slightly higher than women, but not much higher.

Table 4 Multidimensional poverty index and contribution of each dimension under different K[%]

	K	M	Income	Consumption	Education	Health	Time	Decision making power
Female	1	0.4770	29.64	25.03	20.22	12.69	6.92	5.50
	2	0.4596	28.51	25.20	20.76	13.02	6.92	5.60
	3	0.3887	26.17	24.38	21.89	14.55	7.06	5.93
	4	0.2297	22.91	22.19	21.37	18.05	8.20	7.29
Male	1	0.3726	30.88	25.83	22.36	12.35	8.48	0.12
	2	0.3382	29.37	26.37	22.95	12.99	8.19	0.13
	3	0.2412	26.70	25.74	24.15	15.33	7.93	0.14
	4	0.1024	23.80	23.46	23.17	20.66	8.80	0.12

Analysis of regional differences in multidimensional measurement. By decomposing the poverty of rural families' gender population, As shown in Table 5, it can be found that, firstly, in the eastern, central and western regions, rural female households are more vulnerable to poverty than males. The incidence of rural poverty among rural households in the central and western regions is slightly higher than that in the eastern region, which is consistent with the overall poverty situation in China. However, it can be seen that the poverty depth of the rural population in the western region is not very serious compared with the eastern and central regions, indicating that under the national poverty alleviation policies, the poverty alleviation in the western region has achieved certain results.

Table 5 Sub-regional measurement results analysis

	K	Female			Male		
		H	A	M	H	A	M
Eastern region	1	0.9493	0.4924	0.4675	0.9059	0.3915	0.3547
	2	0.8359	0.5366	0.4489	0.6890	0.4623	0.3185
	3	0.6285	0.6038	0.3795	0.3961	0.5577	0.2209
	4	0.3176	0.7053	0.2240	0.1278	0.6789	0.0868
Central region	1	0.9618	0.4946	0.4757	0.9191	0.3875	0.3562
	2	0.8621	0.5325	0.4591	0.6929	0.4596	0.3184
	3	0.6329	0.5916	0.3744	0.3859	0.5600	0.2161
	4	0.3219	0.7057	0.2272	0.1333	0.6738	0.0898
Western region	1	0.9721	0.5023	0.4883	0.9489	0.4223	0.4007
	2	0.8750	0.5396	0.4721	0.7643	0.4841	0.3700
	3	0.6667	0.6040	0.4027	0.4831	0.5718	0.2762
	4	0.3367	0.7060	0.2377	0.1830	0.6896	0.1262

Secondly, from the cross-decomposition results of regions and dimensions, it can be seen that income, consumption and education poverty contribute the most to total poverty, income poverty is consistent with the overall economic development structure of rural China. Consumption poverty indicates that the electronic network consumption of rural women is low, and it can also reflect that the structure of women's social networks is simple and women lack leisure activities. Education poverty indicates that the education level of rural households in China has not been well alleviated. Third, whether in the east or in the central and western regions, it can be seen that men's decision-making power is much higher than that of women. This shows that China's rural family concept is universally traditional, still maintaining male heads of the country, and women are generally in a lower position. The situation, while the low status of female families often inhibits the poverty alleviation of rural families. From the perspective of the region, the poverty of decision-making power of males in the western region is more serious than that in the eastern and central regions, while the female decision-making power is in a small gap between the eastern, central and western regions, which may have a certain relationship with the regional environment. As shown in Table 6.

Table 6 Sub-regional multidimensional poverty index and contribution of each dimension under different K

		K	M	Income	Consumption	Education	Health	Time	Decision making power
Eastern region	female	1	0.4675	28.82	24.41	20.72	13.01	6.71	6.34
		2	0.4489	27.58	24.57	21.33	13.40	6.67	6.39
		3	0.3795	25.56	23.99	22.10	14.91	6.65	6.78
		4	0.2240	22.77	22.07	21.69	18.26	6.93	8.28
	male	1	0.3547	30.53	26.11	22.65	12.96	7.75	0.09
		2	0.3185	29.32	26.34	23.89	13.68	7.39	0.10
		3	0.2209	26.85	25.89	24.50	15.89	6.89	0.07
		4	0.0868	23.87	23.34	23.28	22.20	7.24	0.06
Central region	female	K	M	Income	Consumption	Education	Health	Time	Decision making power
		1	0.4757	30.14	26.45	20.73	11.97	4.52	6.19
		2	0.4591	29.17	26.40	21.32	12.28	4.43	6.39
		3	0.3744	27.16	25.61	23.45	14.33	4.55	7.15
	male	4	0.2272	23.03	22.38	21.91	18.30	5.64	8.73
		1	0.3562	32.06	26.96	22.00	11.72	5.46	0.17
		2	0.3184	30.08	28.02	22.70	13.11	6.11	0.14
		3	0.2161	26.89	27.04	24.24	16.32	5.52	0.04
Western region	female	4	0.0898	24.07	24.26	23.78	22.24	5.68	0.10
		K	M	Income	Consumption	Education	Health	Time	Decision making power
		1	0.4883	30.18	24.77	19.35	12.82	8.71	4.16
		2	0.4721	29.03	25.06	19.78	13.11	8.79	4.25
	male	3	0.4027	26.57	24.36	21.00	14.52	9.16	4.37
		4	0.2377	22.98	22.18	20.69	17.66	11.14	5.34
		1	0.4007	30.63	25.00	22.34	11.79	10.25	0.11
		2	0.3700	29.11	25.61	22.89	12.36	10.06	0.03
		3	0.2762	26.53	25.01	23.94	14.48	10.07	0.04
		4	0.1262	23.90	23.47	23.07	19.14	11.49	0.09

Conclusion and suggestion

The main conclusions of this paper are as follows: First, on the whole, the poverty index of rural women is higher than that of men. Therefore, more attention should be paid to female poverty. Second, income, consumption and education poverty are the most important aspects affecting rural adult population. It is necessary to promote the development of rural population income and education. Third, women are clearly in a weak position in the decision-making power of major family matters. It can be seen that in rural families, women are still vulnerable groups. Fourth, in terms of time poverty, the difference between women and men is not obvious, indicating that rural women are more responsible for unpaid domestic work, agricultural production activities, raising children and caring for the elderly occupy most of the women's time. Fifth, rural women's poverty presents certain regional differences. Therefore, it is necessary to formulate rural women's poverty alleviation programs according to local conditions.

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