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Research on the Impact of Health Fiscal Expenditure on Relative Poverty in Rural China

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Abstract: Health fiscal expenditure plays an important role in adjusting the price of medical services and reducing the medical burden of residents. If we only expand the overall scale of health fiscal expenditure and ignore the structural problems of health fiscal expenditure, it will increase the medical burden of rural residents and make them face the risk of falling into relative poverty. Based on the China General Social Survey data in 2015, 2018 and 2021, this paper uses the Probit model and the IVProbit model to test the impact of health fiscal expenditure on relative poverty in rural China. The study found that: first, with the expansion of health fiscal expenditure, the probability of rural residents falling into relative poverty increases; second, with the expansion of health fiscal expenditure, rural residents with poor health are more likely to fall into relative poverty than rural residents with good health; third, with the expansion of health fiscal expenditure, rural residents in the central and eastern regions are more likely to fall into relative poverty than rural residents in the western region. This paper suggests optimizing the structure of health fiscal expenditures, increasing the proportion of preventive expenditures, deepening the reform of public hospitals, and avoiding excessive expansion of public hospitals.

Keywords: Medical Care; Fiscal Expenditure; Rural Areas; Relative Poverty.

1. Introduction

Poverty is a prominent problem in the process of social and economic development in developing countries. China has implemented large-scale poverty alleviation projects in rural areas for many years, effectively increasing the income level of rural residents. According to China's current poverty standards, the original rural poor population has been lifted out of poverty, but this is only poverty under the absolute standard, and the problem of relative poverty in China's rural areas still exists for a long time. The low-income group is the main group trapped in relative poverty. At this stage, there are still large-scale low-income groups in rural China. According to statistics, there are 6.79 million urban population receiving the government's minimum living guarantee, while the rural population receiving the government's minimum living guarantee has reached 33.38 million (National Development and Reform Commission of the People's Republic of China, 2023). If the problem of relative poverty in rural areas cannot be effectively alleviated, it may cause large-scale return to poverty and have a negative impact on social harmony and stability and high-quality economic development. Disease was once the leading cause of poverty among rural Chinese residents. 95.78% of poor families in China have suffered from diseases and are burdened with heavy medical burdens (Lin, 2016; Zhai, 2021). In recent years, in order to reduce the medical burden of patients and improve the quality of medical services, the government has continuously increased health expenditure. Relevant data show that the proportion of health fiscal expenditures in total fiscal expenditures has risen from 4% in 2007 to 7.8% in 2021 (Wang and Yang, 2023). However, the problem of "difficult and expensive medical treatment" in rural areas still exists, and rural residents may fall into relative poverty again due to the heavy medical burden. Therefore, it is of great significance for the improvement of China's rural public health policy and the development of human poverty reduction to test the effect of health fiscal expenditure on relative poverty in China's rural areas.

There are disputes in the academic circles about the view that increasing the government's health expenditure can reduce the medical burden of patients. Some scholars support this view. Some scholars have found through empirical research that increasing health expenditures can effectively improve the health environment and improve the level of health services, thereby improving residents' health literacy and reducing the incidence of diseases (Bilgili et al., 2021). Some scholars believe that the government promotes the improvement of the social medical security system and reduces the medical burden of patients by increasing health fiscal expenditures (Gu, 2010; Liang, 2019; Xie & Yang, 2020; Zheng et al., 2022). Other scholars are skeptical of this view. Some scholars believe that only increasing the scale of health fiscal expenditures will not play a role in reducing the medical burden of patients. If the proportion of therapeutic expenditures in health fiscal expenditures is too large, it will crowd out preventive expenditures, thereby increasing the incidence of diseases and the frequency of medical treatment (Hennessy, 2008; Cole et al., 2019). The uneven distribution among public hospitals will have an adverse impact on residents' medical expenses (Wang & Yang, 2023). Some scholars also believe that China's health fiscal expenditure is tilted towards the treatment field, and the guidance for health protection and disease prevention is insufficient, which has exacerbated the rapid expansion of public hospitals, increased medical costs, and in turn increased the medical burden of patients (Zhu et al., 2021; Du, 2023).

The research results of the existing literature in the field of health fiscal expenditure have important reference significance, but there are still three problems to be solved urgently. First of all, although the existing literature has

studied the impact of health fiscal expenditure on residents' medical burden, it has not further extended from residents' medical burden to the relative poverty of residents. In daily life, medical burden is likely to become an important factor for residents to fall into relative poverty. Secondly, the existing literature does not focus on rural residents when studying health expenditure. In China, there is a large gap between urban and rural development, and various medical and health resources are tilted towards cities, while rural areas are relatively backward. For this, when studying the impact of health fiscal expenditure on relative poverty, it is necessary to consider the particularity of China's rural areas, and it is not appropriate to include urban and rural residents in a unified research framework. Thirdly, the existing literature tends to study the total effect of health expenditure, but does not analyze the heterogeneity among different groups. Based on the above problems, this paper will make marginal contributions from the following two aspects. First, taking Chinese rural residents as the research object, the research perspective focuses on the impact of health fiscal expenditures on the relative poverty of Chinese rural residents; second, in view of the differences in the health status of rural residents and regional economic development levels, from the two perspectives of health status and regions, it explores the heterogeneity of health fiscal expenditures on the relative poverty of Chinese rural residents.

2. Data Sources and Descriptive Statistics

2.1. Data Sources

All the data used in this paper come from the China Statistical Yearbook and the Chinese General Social Survey (CGSS). The data on health expenditure comes from the China Statistical Yearbook in 2016, 2019 and 2022, and the rest of the individual-level data comes from CGSS. As a national survey project, CGSS data is organized and implemented by Renmin University of China. The data of this project basically covers all provinces in the country. It has the advantages of wide survey scope, large sample size, and strong comprehensiveness. The CGSS data contains all the information needed in this paper, such as the basic situation of the individual and the family, the income level of the individual and the family, work experience, and the location, etc., which laid the data foundation for the empirical research of this paper. This paper selects three phases of CGSS data in 2015, 2018, and 2021 to construct mixed cross-sectional data to expand the sample size and make the sample more representative. In view of the fact that the research objects are rural residents, this paper only retains rural samples, and excludes the people who are studying. Through data sorting, 12034 effective samples are finally obtained.

2.2. Variable Definitions and Descriptive Statistics

Table 1 is the definition and descriptive statistics of the main variables. Rural relative poverty is the explained variable that this paper focuses on. This article draws on the results of existing research and uses 40% of the median per capita disposable income in rural China as the criterion for judging rural relative poverty. If the individual's annual income is lower than this standard, the individual is considered to be in relative poverty (Shen & Li, 2020; Wang & Sun, 2021). As shown in Table 1, the proportion of rural residents falling into relative poverty in the total sample is 32.78%. Health expenditure is the core explanatory variable that this paper focuses on during the empirical analysis. Health fiscal expenditure is an important basis for local governments to improve local medical conditions and improve the health of residents, and the scale of health fiscal expenditure can reflect the financial investment of local governments in the field of health. This paper uses the total expenditure of each province in the field of health to measure the scale of local government fiscal expenditure in related fields. In order to avoid biased estimation due to the existence of outliers in the process of empirical analysis, this paper performs logarithmic processing on health expenditure and other income variables.

In this paper, the control variables are divided into four categories: demographic characteristics, family characteristics, time characteristics and regional characteristics. Demographic characteristics include basic information such as age, gender, education level, and health status of rural residents. In view of the fact that not all rural residents in China are employed in the agricultural field when they are employed, there are still some groups engaged in non-agricultural work. Due to the difference in income levels between agricultural work and non-agricultural work, it may affect the relative poverty in rural areas. In this regard, this paper adds non-agricultural experience as a control variable to the demographic characteristic variables. Among the control variables such as family characteristics, in view of the relationship between the family size, the number of children, and the income level of the spouse and family income, which may have an impact on rural relative poverty, this paper controls from three aspects: the size of the family population, the number of children, and the income of the spouse. Since this paper uses three periods of mixed cross-sectional data in 2015, 2018, and 2021, and the survey scope of the data covers many provinces in western, central, and eastern China, this paper controls the survey year and the area where the respondents are located in the time characteristics and regional characteristics variables.

3. Theoretical Basis and Econometric Model

3.1. Theoretical Basis and Research Hypothesis

The theoretical basis of this article is the government failure theory (Government failure). According to the government failure theory, when the public sector provides public goods, there is low resource allocation efficiency, accompanied by excessive public expenditure, which makes public policy fail to achieve the expected goals, resulting in public policy failure (Samuelson, 1992). There is also a phenomenon of government failure in the medical service market. Excessive or insufficient government intervention can lead to inefficiency in medical services and thus increase unnecessary medical costs, which will eventually be passed on to patients. The deep-rooted reason is that there is a problem of resource allocation mismatch in China's medical and health market, and the continuous expansion of health fiscal expenditure has aggravated this problem. Among many hospitals in China, since public hospitals have a relatively large advantage in the medical service market, especially public hospitals with higher administrative levels usually have more advanced medical facilities and better doctors, this makes patients with common diseases and rare diseases who

"use their feet" are overly concentrated in these few public hospitals.

Table 1. Variable Definitions and Descriptive Statistics

Variable name	Variable definitions	Average	Standard deviation	Minimum value	Maximum value
Explained variable					
Personal relative poverty	1 if the personal annual income is below the relative poverty line, 0 if not	0.3278	0.4694	0	1
Core explanatory variable					
The scale of health expenditure	The logarithm of the total expenditure of each province in the field of health care	6.2890	0.4670	4.3190	7.2503
Control variables					
Demographic characteristics					
Age	Individual age				
18-44 years old	1 if the individual is in the 18-44 age group, 0 if not	0.3425	0.4746	0	1
45-64 years old	1 if the individual is in the 45-64 age group, 0 if not	0.4918	0.5000	0	1
over 65 years old	1 if the individual is over 65 years old, 0 if not	0.1657	0.3718	0	1
Gender	1 for male, 0 for female	0.4556	0.4980	0	1
Ethnic	1 for Han nationality, 0 for no	0.9157	0.2779	0	1
Political party	1 if you have not joined any party, 0 if you are not	0.9098	0.2864	0	1
Marital status	1 if married, 0 if not	0.9796	0.1415	0	1
Education level					
Primary school education and below	Primary school education and below is 1, otherwise is 0	0.4503	0.4975	0	1
Junior high school education	Junior high school education and below is 1, otherwise is 0	0.3523	0.4777	0	1
High school education or above	High school education and below is 1, otherwise is 0	0.1974	0.3980	0	1
Health status	BMI is 1 between healthy range 18.5-23.9, otherwise it is 0	0.5546	0.4970	0	1
Work experience	1 if you have non-agricultural work experience, 0 if you don’t	0.5996	0.4900	0	1
Family characteristics					
Family size	Total number of family members	3.2160	1.4130	1	7
Number of Children	Number of children	1.7697	0.7467	0	3
Spouse income	Logarithm of spouse's annual income	7.5929	4.1591	0	16.1111
Time characteristics					
Survey year					
2015	Survey time in 2015 is 1, no is 0	0.3570	0.4791	0	1
2018	Survey time in 2018 is 1, no is 0	0.4127	0.4923	0	1
2021	Survey time in 2021 is 1, no is 0	0.2303	0.4211	0	1
Regional characteristics					
Respondent's region					
Western China	1 if the location is in the west, 0 if not	0.3021	0.4592	0	1
Central China	1 if the location is in the middle, 0 if not	0.2909	0.4542	0	1
Eastern China	1 if the location is in the east, 0 if it is not	0.4069	0.4913	0	1

The existing health fiscal expenditure is subsidized according to the administrative level of the hospital. The higher the administrative level, the stronger the ability of public hospitals to absorb financial resources. In recent years, the intensity and scale of health fiscal expenditures have continued to increase, which has also prompted the excessive expansion of public hospitals in scale and increased unnecessary medical costs. These medical costs will eventually increase the medical expenses of residents. For residents with poor health, this is a heavy medical burden. At present, the financial subsidies for public hospitals in various provinces mainly come from local finances. Different regions have different levels of economic development, and the scale of health fiscal expenditures also varies greatly. Based on this, this paper proposes the following three hypotheses:

Hypothesis 1: The expansion of health fiscal expenditure has aggravated the medical burden of rural residents and made them fall into relative poverty.

Hypothesis 2: The impact of health fiscal expenditure on rural relative poverty is heterogeneous due to differences in

residents' health status.

Hypothesis 3: There are regional differences in the impact of health expenditure on rural relative poverty.

3.2. Construction of Econometric Models

This paper uses the instrumental variable method to test the effect of health fiscal expenditure on relative poverty in China's rural areas. As the core explanatory variable concerned in this paper, health fiscal expenditure has a two-way causal relationship with the explanatory variable rural relative poverty. Theoretically, health fiscal expenditure increases the medical burden of rural residents, making them fall into relative poverty, and the ability of rural residents to pay taxes will also decline after falling into relative poverty, which can affect the intensity of health fiscal expenditure. In this regard, this paper draws on the practice of existing literature and uses the number of medical and health institutions in each province as an instrumental variable of health fiscal expenditure (Wang Yuxiao et al., 2020). Since the construction of medical and health institutions requires government financial investment, the number of medical and health institutions in each province has a certain dependence on the provincial health fiscal expenditure, so there is a correlation between instrumental variables and endogenous variables. Rural residents fall into relative poverty due to medical expenses, but rural residents do not need to bear the cost of the increase in the number of medical and health institutions, let alone increase the frequency of disease due to the construction of medical and health institutions, so there is no correlation between instrumental variables and explained variables. This paper first uses the Probit model for baseline regression, and introduces the instrumental variable of the number of medical and health institutions in each province, then discusses the endogeneity with the IVProbit model, and compares the results of the baseline regression with the endogenous analysis results to test the robustness of the impact of health fiscal expenditure on rural relative poverty.

The Probit model constructed in this paper in the benchmark regression is as follows:

$$P = \beta_0 + \gamma_1 E + \gamma_2 K_i + \varphi_i \quad (1)$$

As shown in formula (1), P is the explained variable that this paper focuses on, indicating whether rural residents are trapped in relative poverty. E is the core explanatory variable concerned in this paper, which represents the health expenditure of each province. K_i is a control variable, covering five control variables including demographic characteristics, family characteristics, parental resource endowment characteristics, time characteristics, and regional characteristics. β_0 is a constant term, γ_1 and γ_2 are coefficients of core explanatory variables and control variables respectively, and φ_i is a random error term.

The IVProbit model constructed in this paper in the endogenous discussion is as follows:

$$E = H[\rho I_i + \theta_i K_i + \varepsilon_i] \quad (2)$$

$$P = H[\alpha_1 I_i + \alpha_2 E + \sigma_i K_i + \mu_i] \quad (3)$$

As shown in formulas (2) and (3), $H[\cdot]$ is an explicit function, when $\rho I_i + \theta_i K_i + \varepsilon_i$ is greater than 0, the value is 1, otherwise it is 0. I_i represents the instrumental variable of the number of medical and health institutions in each province, and ε_i and μ_i are random error items.

4. Empirical Analysis Results

4.1. Benchmark Regression Results

Table 2 reports the baseline regression results of the impact of health expenditure on relative poverty in rural China. This paper uses the Probit model to empirically test the effect of health expenditure on relative poverty in rural China. In order to obtain robust empirical results, the method of sequentially adding control variables is used for econometric analysis. As shown in Supplementary Table 2, the control variables of Model (1) include demographic characteristics, time characteristics, and regional characteristics. The control variables included in Model (2) add a control variable of family characteristics on the basis of Model (1). This paper focuses on reporting the measurement results of Model (2). In Model (1) and Model (2), the regression coefficients of health fiscal expenditure on rural relative poverty are 0.1480 and 0.1580, respectively, and both are significant at the 1% level, which shows that health fiscal expenditure always has a positive impact on rural relative poverty. In the measurement results of Model (2), the average marginal effect of health fiscal expenditure on rural relative poverty is 0.0460, which is significant at the 1% level, which means that for every unit increase in health fiscal expenditure, the probability of rural residents falling into relative poverty increases by 4.6%. With the expansion of the total scale of health fiscal expenditure, the risk of increasing rural relative poverty is also increasing.

4.2. Endogeneity Discussion

Table 3 reports the regression results of the IVProbit model on the impact of health expenditure on relative poverty in rural China. In order to further test the accuracy of the benchmark regression results, this paper introduces the variable of the number of medical and health institutions in each province as an instrumental variable of the scale of health fiscal expenditure in each province to alleviate the impact of endogenous problems in the model, and uses the IVProbit model to conduct empirical analysis again. As shown in Table 3, the Wald test is always significant at the 1% level, indicating that there is an endogeneity problem in the model. As a weak instrumental variable test, the AR test is also significant at the 1% level, indicating that the instrumental variable introduced in this paper is not a weak instrumental variable. The measurement results show that after sequentially adding control variables, the impact coefficient of health fiscal expenditure on rural relative poverty in Model (2) is 0.3748, which is significant at the 1% level. Increasing the scale of health fiscal expenditure can have a significant positive effect on rural relative poverty, which is basically consistent with the baseline regression results. Health fiscal expenditure is an important support for local governments to improve the level of rural medical and health care and prevent poverty due to illness. However, our measurement results show that simply increasing the overall scale of health fiscal expenditure cannot effectively curb the problem of relative poverty in rural areas, but will instead increase the risk of rural residents falling into relative poverty. Therefore, Hypothesis 1 of this paper is established.

Table 2. Regression Results of the Probit Model on the Impact of Health Expenditure on Relative Poverty in Rural China

Variable name	Model (1)			Model (2)	
	Coefficient	Robust standard error		Coefficient	Robust standard error
Core explanatory variable					
The scale of health expenditure	0.1480***	0.0320		0.1580***	0.0320
Control variables					
Demographic characteristics					
Age (Control group: 18-44 years old)					
45-64 years old	0.1350***	0.0310		0.0890***	0.0320
over 65 years old	0.6500***	0.0430		0.5540***	0.0450
Gender	-0.6910***	0.0270		-0.8380***	0.0300
Ethnic	-0.1040**	0.0470		-0.0900*	0.0470
Political party	0.1770***	0.0520		0.1660***	0.0520
Marital status	-0.0730	0.0920		-0.1260	0.0940
Education level (Control group: Primary school education and below)					
Junior high school education	-0.1440***	0.0310		-0.1130***	0.0310
High school education or above	-0.3640***	0.0430		-0.3000***	0.0430
Health status	-0.0770***	0.0260		-0.0730***	0.0260
Work experience	-0.6580***	0.0290		-0.6280***	0.0300
Family characteristics					
Family size				0.0250***	0.0100
Number of Children				0.1210***	0.0190
Spouse income				-0.0430***	0.0030
Time characteristics					
Survey year (Control group: 2015)					
2018	0.0860***	0.0310		-0.0320***	0.0350
2021	0.1770***	0.0380		-0.1700***	0.0340
Regional characteristics					
Respondent's region (Control group: Western China)					
Central China	0.0020	0.0340		0.0930	0.0310
Eastern China	-0.1920***	0.0330		0.1790***	0.0390
Constant term	-0.7650***	0.2180		-0.6930	0.2260
Pseudo R^2	0.1739			0.1879	
Average Marginal Effect of Health Expenditure	0.0440***			0.0460***	
Number of observations	12034			12034	

Note: (1) ***, **, and * represent significant at the 1%, 5%, and 10% levels, respectively.

Continuously expanding the scale of health fiscal expenditure can lead to an increase in medical costs and expenses, increasing the medical burden of rural residents, and increasing the risk of returning to poverty due to illness in rural areas. The policy goal of local governments to expand health fiscal expenditure is to improve the level of medical services and reduce the medical burden of patients. However, after public hospitals receive government financial subsidies, they promote the increase of total health expenses through excessive expansion (Zhu Hengpeng et al., 2021). As an important target of the government's financial subsidies in the field of health care, public hospitals can gain the ability to over-expand through government financial subsidies, such as excessively increasing the number of hospital beds and medical equipment, increasing the number of hospital admissions and medical costs in hospitals, which in turn leads to rising medical expenses for patients. The current method of financial investment according to the level of hospitals will also induce public hospitals to adopt over-expansion behaviors. Hospitals obtain more financial subsidies through over-expansion. On the contrary, they expand the scale through subsidies to improve the level of hospitals in order to obtain more financial investment. In the process, the medical costs of hospitals are also increasing. Expanding the scale of health fiscal expenditures and inducing excessive expansion of hospitals will also transfer the increased medical costs to rural residents, thereby increasing the risk of rural residents returning to poverty due to illness. Due to the large development gap between urban and rural areas and the incomplete hierarchical diagnosis and treatment system, when the medical needs of rural residents cannot be met in relatively backward rural areas, they usually choose hospitals with higher grades in cities for treatment. However, hospitals with higher grades are more likely to adopt over-expansion behaviors. The medical costs after such over-expansion will increase the medical burden of rural residents, thereby increasing the possibility of rural residents returning to poverty due to illness.

4.3. Heterogeneity Analysis

Table 4 shows the regression results of the impact of health fiscal expenditure on the relative poverty of rural groups with different health status. According to the health status of individual rural residents, the samples were classified into healthy and unhealthy groups. Model (1) and Model (2) are sub-sample regression models for healthy and non-healthy populations, respectively. The measurement results show that, for rural residents in good health, the regression coefficient of

health fiscal expenditure on China's rural relative poverty is 0.1120, which is significant at the 1% level, and the average marginal effect is 0.0320, which is significant at the 5% level. From the perspective of regression coefficient, whether it is rural healthy people or rural unhealthy people, increasing the scale of health fiscal expenditure has a positive impact on rural relative poverty. From the point of view of marginal effects, every unit increase in the scale of health fiscal expenditure can make the probability of healthy rural residents falling into relative poverty is 3.2%, while the probability of unhealthy rural residents falling into relative poverty is 6.1%. It shows that increasing the scale of health fiscal expenditure will make unhealthy rural residents have a higher probability of falling into relative poverty. According to the previous analysis, the government increases health expenditures and induces excessive expansion of hospitals, thereby increasing medical costs and patients' medical burden. Compared with healthy rural residents, unhealthy rural residents have poorer health status and higher medical needs. When hospitals increase medical costs under the guidance of health fiscal expenditures, the burden on unhealthy rural residents will be increased, and the probability of this group of people falling into relative poverty will increase. Therefore, hypothesis 2 of this paper is established.

Table 3. Regression Results of the IVProbit Model on the Impact of Health Expenditure on Relative Poverty in Rural China

Variable name	Model (1)			Model (2)	
	Coefficient	Robust standard error		Coefficient	Robust standard error
Core explanatory variable					
The scale of health expenditure	0.3955***	-0.0446		0.3748***	-0.0449
Control variables					
Demographic characteristics					
Age (Control group: 18-44 years old)					
45-64 years old	0.1248***	-0.031		0.0779**	-0.0323
over 65 years old	0.6235***	-0.0429		0.5283***	-0.0454
Gender	-0.6806***	-0.027		-0.8305***	-0.0299
Ethnic	-0.1370***	-0.0469		-0.1180**	-0.0474
Political party	0.1720***	-0.052		0.1620***	-0.0522
Marital status	-0.0611	-0.0934		-0.1157	-0.0949
Education level (Control group: Primary school education and below)					
Junior high school education	-0.1418***	-0.0306		-0.1108***	-0.031
High school education or above	-0.3708***	-0.0427		-0.3055***	-0.0433
Health status	-0.0799***	-0.026		-0.0758***	-0.0263
Work experience	-0.6700***	-0.0292		-0.6393***	-0.0295
Family characteristics					
Family size				0.0237**	-0.0096
Number of Children				0.1221***	-0.019
Spouse income				-0.0438***	-0.0034
Time characteristics					
Survey year (Control group: 2015)					
2018	0.0255	-0.0315		0.0408	-0.0318
2021	0.0581	-0.0412		0.0753*	-0.0417
Regional characteristics					
Respondent's region (Control group: Western China)					
Central China	-0.0583*	-0.035		-0.0854**	-0.0353
Eastern China	-0.2416***	-0.0336		-0.2143***	-0.0341
Constant term	-2.1898***	-0.2844		-1.9361***	-0.2913
Log pseudolikelihood	-8821.2133			-8686.914	
Wald test	0.0000			0.0000	
AR test	0.0000			0.0000	
Number of observations	12034			12034	

Note: (1) ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively; (2) Wald test is the P value of exogenous test, and AR test is the P value of weak instrumental variable identification test.

Table 5 shows the regression results of the impact of health expenditure on rural relative poverty in different regions. According to the provinces where the rural residents are located, the samples were divided into three categories: the western region, the central region, and the eastern region for heterogeneity analysis. Model (1), Model (2), and Model (3) are the sub-sample regression models of the above three types of regions respectively. The measurement results show that, for rural residents in the western region, the regression coefficient of the impact of health fiscal expenditure on relative poverty in China's rural areas is 0.0080, but the effect is not significant, and the average marginal effect is 0.0030, which is not significant; The regression coefficient of the impact of expenditure on China's rural relative poverty is 0.2950, which is significant at the 1% level, and the average marginal effect is 0.0760, which is significant at the 1% level. From the perspective of regression coefficients, for rural residents in the central and eastern regions, increasing the scale of health fiscal expenditure has a significant positive impact on rural relative poverty, but for rural residents in the western region, the effect is not significant. From the point of view of marginal effects, for every unit increase in the scale of health fiscal expenditure, the probability of rural residents falling into relative poverty in the western region, central

region and eastern region is 0.3%, 9.8% and 7.6% respectively. It shows that compared with the western region, the rural residents in the central and eastern regions are more likely to be affected by health expenditures and fall into relative poverty. The reason is that the economies of the central and eastern regions are relatively developed, and the scale of health fiscal expenditures is larger, making the relative poverty of local rural residents more susceptible to the impact of health fiscal expenditures. Therefore, Hypothesis 3 of this paper is established.

Table 4. Regression Results of Health Fiscal Expenditure on the Relative Poverty of Rural Groups with Different Health Status

Variable name	Model (1)			Model (2)	
	Coefficient	Robust standard error		Coefficient	Robust standard error
Core explanatory variable					
The scale of health expenditure	0.1120**	0.0440		0.2100***	0.0470
Control variables					
Demographic characteristics					
Age (Control group: 18-44 years old)					
45-64 years old	0.1340***	0.0440		0.0300	0.0480
over 65 years old	0.5980***	0.0620		0.4900***	0.0670
Gender	-0.8370***	0.0410		-0.8450***	0.0450
Ethnic	-0.1330**	0.0620		-0.0300	0.0730
Political party	0.0800	0.0700		0.2830***	0.0800
Marital status	-0.1500	0.1200		-0.1020	0.1510
Education level (Control group: Primary school education and below)					
Junior high school education	-0.0820**	0.0420		-0.1540***	0.0470
High school education or above	-0.2780***	0.0580		-0.3250***	0.0650
Work experience	-0.6320***	0.0400		-0.6210***	0.0440
Family characteristics					
Family size	0.0190	0.0130		0.0350**	0.0140
Number of Children	0.1130***	0.0260		0.1300***	0.0290
Spouse income	-0.0470***	0.0050		-0.0390***	0.0050
Time characteristics					
Survey year (Control group: 2015)					
2018	0.1430***	0.0410		0.0280	0.0470
2021	0.2490***	0.0520		0.0910	0.0580
Regional characteristics					
Respondent's region (Control group: Western China)					
Central China	-0.0360	0.0450		-0.0300	0.0550
Eastern China	-0.1830***	0.0450		-0.1580***	0.0500
Constant term	-0.3510	0.3020		-1.1840***	0.3430
Average Marginal Effect of Health Expenditure	0.0320**			0.0610***	
Number of observations	6674			5360	

Note: (1) ***, **, and * represent significant at the 1%, 5%, and 10% levels, respectively.

5. Conclusion and Suggestion

This paper uses CGSS data to test the effect of health fiscal expenditure on relative poverty in rural China. On the basis of using the Probit model for baseline regression, this paper introduces the instrumental variable of the number of medical and health institutions in each province, combined with the IVProbit model, to alleviate the impact of endogeneity, and draws the following conclusions: First, as the scale of health fiscal expenditure expands, the probability of rural residents falling into relative poverty will increase. Rural residents in poor health are more likely to be impoverished in relative poverty than those in good health. Our measurement results show that the probability of rural residents with poor health status falling into relative poverty is nearly 3% higher than that of rural residents with good health status; third, as the scale of health fiscal expenditure expands, the impact on rural relative poverty in the central and eastern regions is more significant, and the impact on the western region is not obvious, and the probability of rural residents in the central and eastern regions falling into relative poverty is 9.5% and 7.3% higher than that in the west, respectively.

In order to reduce the negative impact of the scale expansion of health fiscal expenditure on rural relative poverty, this paper puts forward policy suggestions from two aspects: optimizing the structure of health fiscal expenditure and deepening the reform of public hospitals. On the one hand, optimize the structure of health fiscal expenditure and provide balanced financial subsidies for the supply side and the demand side in the process of medical and health services. At present, the health fiscal expenditure has a relatively large subsidy for hospitals (supply side), but the subsidy for residents (demand side) is still insufficient. It is necessary to reasonably increase the proportion of government health finance expenditures on residents' disease prevention and health protection, and appropriately increase the proportion of rural residents' medical security expenditures. Appropriately increasing the financial expenditure on disease prevention and medical security will help improve the health literacy of rural residents and reduce the medical burden of rural residents. On the other hand, deepen the reform of public hospitals and improve the efficiency of public hospitals in using financial subsidies. Through the reform of public hospitals, guide hospitals to avoid excessive expansion, effectively curb the unreasonable growth of medical expenses, use limited financial resources to improve hospital

management efficiency and medical service quality, reduce medical costs, and reduce the medical burden of rural residents.

Table 5. Regression Results of Health Fiscal Expenditure on Rural Relative Poverty in Different Regions

Variable name	Model (1)		Model (2)		Model (3)
	Coefficient		Coefficient		Coefficient
Core explanatory variable					
The scale of health expenditure	0.0080		0.3360***		0.2950***
	(0.0490)		(0.1020)		(0.0490)
Control variables					
Demographic characteristics					
Age (Control group: 18-44 years old)					
45-64 years old	0.0700		0.0960		0.1130**
	(0.0570)		(0.0610)		(0.0530)
over 65 years old	0.5240***		0.7740***		0.4620***
	(0.0800)		(0.0880)		(0.0730)
Gender	-0.7020***		-1.0160***		-0.8320***
	(0.0500)		(0.0580)		(0.0500)
Ethnic	-0.0530		-0.2160*		-0.0720
	(0.0590)		(0.1110)		(0.1130)
Political party	0.1140		0.1560		0.2470***
	(0.0890)		(0.1000)		(0.0870)
Marital status	0.0070		-0.1780		-0.3130
	(0.1300)		(0.1860)		(0.1840)
Education level (Control group: Primary school education and below)					
Junior high school education	-0.0990*		-0.1140**		-0.1050**
	(0.0540)		(0.0570)		(0.0520)
High school education or above	-0.3640***		-0.1440*		-0.3410***
	(0.0820)		(0.0780)		(0.0710)
Health status	-0.0260		-0.0900*		-0.0910**
	(0.0460)		(0.0490)		(0.0430)
Work experience	-0.5040***		-0.6500***		-0.7550***
	(0.0500)		(0.0550)		(0.0510)
Family characteristics					
Family size	0.0020		0.0290*		0.0340**
	(0.0170)		(0.0170)		(0.0160)
Number of Children	0.0900***		0.1140***		0.1360***
	(0.0340)		(0.0340)		(0.0320)
Spouse income	-0.0490***		-0.0400***		-0.0410***
	(0.0060)		(0.0060)		(0.0060)
Time characteristics					
Survey year (Control group: 2015)					
2018	0.1870***		0.1990***		-0.1060**
	(0.0540)		(0.0620)		(0.0500)
2021	0.3600***		0.1310*		-0.0320
	(0.0650)		(0.0740)		(0.0680)
Constant term	0.0830		-1.7180**		-1.4860***
	(0.3600)		(0.6690)		(0.3710)
Average Marginal Effect of Health Expenditure	0.0030		0.0980***		0.0760***
Number of observations	3636		3501		4897

Note: (1) ***, **, * represent significant at 1%, 5% and 10% levels respectively; (2) Robust standard errors are in brackets.

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