

Study on the Impact of Health Risks on Chinese Rural Household Income

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Abstract: Based on the China General Social Survey data in 2015, 2018 and 2021, this paper uses a two-stage least squares method to empirically test the effect of health risks on Chinese rural household income and its heterogeneity among different groups. The study found that: first, health risks can significantly reduce the income of rural households in China; second, health risks are difficult to negatively impact the income of rural households with high school education and above, but have a significant negative impact on the income of rural households with middle school and primary education; third, compared with rural households in the central and western regions, the income of rural households in the eastern region is more vulnerable to the negative impact of health risks and causes greater losses. In order to deal with the negative impact of health risks on the income of Chinese rural families, it is recommended to strengthen the health risk prevention of the main labor force in rural families, improve the rural health education system, and balance the health protection policies of rural families in the western, central and eastern regions.

Keywords: Health Risk, Rural, Household Income.

1. Introduction

The income level of rural households in China is related to the quality of life of residents and social well-being. Since the reform and opening up, rural areas have input a large amount of human and material resources into urban development, which has promoted China's urbanization process, but the problem of income gap between urban and rural areas has long existed. At present, the per capita disposable income of urban residents is 49,283 yuan, and that of rural residents is 20,133 yuan (National Bureau of Statistics, 2023). The per capita disposable income of rural residents is only 40.85% of that of urban residents, and the gap between the two is still large. In the long run, if the income level of rural residents and their families cannot be effectively improved, it will be detrimental to the sustainable development of China's economy and the harmony and stability of society. Increasing farmers' income is not only the central task of the Chinese government on agriculture, rural areas and farmers, but also an important measure for the Chinese government to expand domestic demand and promote the economic cycle between urban and rural areas (the State Council, 2023). As a common risk in the daily life of rural families, health risks are closely related to the family income of rural residents. Although the health infrastructure and health service system in China's rural areas are improving day by day, however, the household income of rural residents is relatively low, the awareness of health risk prevention is weak, and there is no effective risk sharing mechanism, which makes it difficult for Chinese rural families to resist the impact of health risks. Therefore, examining the effect of health risks on rural household income in China is of great significance for optimizing the public policy of rural residents' health protection and promoting the high-quality development of China's economy.

The existing literature on health risk research mainly focuses on three aspects: consumption, financial investment

and poverty vulnerability. First of all, some scholars have found that health risks have an inhibitory effect on rural household consumption through research. Relevant studies have shown that the health risks of rural families come from members with poor self-health perceptions in the family, and when facing health risks, the per capita consumption level of rural families is generally low (Edwards, 2010; He & Shi, 2014; Shao & Hao, 2020). Secondly, another group of scholars studied the impact of health status on household financial investment and found that the deterioration of health status can significantly reduce the willingness of rural households to invest in finance and reduce the proportion of financial assets held by rural households (Gollier & Pratt, 1996; Shen & Yu, 2021; Zhang et al., 2022). In order to further examine the impact of health risks on family financial investment, some scholars conducted research on the decision-making of urban elderly people to purchase annuities. The results showed that after considering health risk factors, the elderly are more inclined to use idle funds for preventive savings rather than purchasing annuities (Chen & Fan, 2020). Thirdly, some scholars link health risks with the poverty vulnerability of rural residents. Relevant studies have found that healthy human capital plays an important role in preventing individuals from falling into poverty. When the health status of rural residents deteriorates, their own labor participation time is obviously squeezed out, which leads to a decline in personal income levels, which in turn increases the possibility of rural residents falling into poverty due to illness and returning to poverty (Tu et al., 2018; Liao, 2019; Bao, 2020; Zheng et al., 2022).

The existing literature has important reference value, but there are still two problems to be solved urgently. On the one hand, existing literature focuses on the impact of health risks on consumption, financial investment, and poverty in rural households in China, but there are few studies on the impact on rural household income. On the other hand, existing

literature focuses on the overall impact of health risks, lacking heterogeneity analysis of different groups. In response to the above problems, this paper will make marginal contributions in the following three aspects. First, focus on the income of Chinese rural families, and conduct in-depth research on the impact of health risks on Chinese rural family income. Second, in order to accurately test the impact of health risks on

Chinese rural household income, this paper introduces instrumental variables to alleviate the impact of endogeneity and avoid biased estimates. Third, explore the heterogeneity of the impact of health risks on Chinese rural household income from the perspectives of different education levels and different regions.

Table 1. Variable Definitions and Descriptive Statistics

| Variable name | Variable definitions | Average | Standard deviation | Minimum value | Maximum value |
|--|--|---------|--------------------|---------------|---------------|
| <i>Explained variable</i> | | | | | |
| Total Rural Household Income | Logarithm of annual rural household income | 10.4609 | 1.7041 | 0.0000 | 16.1091 |
| <i>Core explanatory variable</i> | | | | | |
| Degree of health risks | | | | | |
| Lower levels of health risks | The respondent's physical condition is at a relatively healthy level of 1, no 0 | 0.6353 | 0.4814 | 0.0000 | 1.0000 |
| Moderate level of health risks | The respondent's physical health level is 1, no 0 | 0.2123 | 0.4090 | 0.0000 | 1.0000 |
| Higher levels of health risks | The respondent's physical condition is at an unhealthy level of 1, no 0 | 0.1524 | 0.3594 | 0.0000 | 1.0000 |
| <i>Control variables</i> | | | | | |
| <i>Demographic characteristics</i> | | | | | |
| Age | Respondent age | 44.0640 | 9.6428 | 18.0000 | 59.0000 |
| Gender | 1 for male, 0 for female | 0.4269 | 0.4947 | 0.0000 | 1.0000 |
| Ethnic | 1 for Han nationality, 0 for no | 0.9066 | 0.2909 | 0.0000 | 1.0000 |
| Political party | 1 if you have not joined any party, 0 if you are not | 0.9194 | 0.2722 | 0.0000 | 1.0000 |
| Marital status | 1 if married, 0 if not | 0.9814 | 0.1351 | 0.0000 | 1.0000 |
| Education level | | | | | |
| Primary school education and below | Primary school education and below is 1, otherwise is 0 | 0.3661 | 0.4818 | 0.0000 | 1.0000 |
| Junior high school education | Junior high school education and below is 1, otherwise is 0 | 0.4041 | 0.4907 | 0.0000 | 1.0000 |
| High school education or above | High school education and below is 1, otherwise is 0 | 0.2299 | 0.4208 | 0.0000 | 1.0000 |
| Medical insurance | 1 if participating in medical insurance, 0 if not | 0.9410 | 0.2357 | 0.0000 | 1.0000 |
| Personal income | logarithm of personal annual income | 8.2338 | 3.8764 | 0.0000 | 16.1121 |
| Enterprise ownership | | | | | |
| State-owned enterprise | 1 if the enterprise is state-owned or state-controlled, 0 if not | 0.0192 | 0.1371 | 0.0000 | 1.0000 |
| Collective enterprise | 1 if the enterprise is collectively owned or collectively controlled, 0 if not | 0.0099 | 0.0989 | 0.0000 | 1.0000 |
| Private enterprise | 1 if the enterprise is private or privately held, 0 if not | 0.0937 | 0.2914 | 0.0000 | 1.0000 |
| Hong Kong, Macao, and Taiwan enterprises | 1 if the enterprise is a Hong Kong, Macao or Taiwan or foreign-funded enterprise, 0 if not | 0.0025 | 0.0502 | 0.0000 | 1.0000 |
| Other types of enterprises | It is 1 if the enterprise is other types of ownership, and 0 if it is not | 0.8747 | 0.3310 | 0.0000 | 1.0000 |
| <i>Family characteristics</i> | | | | | |
| Family size | Total number of family members | 3.3236 | 1.3753 | 1.0000 | 7.0000 |
| Spouse income | Logarithm of Spouse's Annual Income | 8.1181 | 4.0105 | 0.0000 | 16.0138 |
| Family housing | Number of properties owned by the household | 1.1054 | 0.5288 | 0.0000 | 6.0000 |
| Family car | 1 for family owning a car, 0 for no | 0.2895 | 0.4535 | 0.0000 | 1.0000 |
| <i>Time characteristics</i> | | | | | |
| Survey year | | | | | |
| 2015 | Survey time in 2015 is 1, no is 0 | 0.3749 | 0.4841 | 0.0000 | 1.0000 |
| 2018 | Survey time in 2018 is 1, no is 0 | 0.4085 | 0.4916 | 0.0000 | 1.0000 |
| 2021 | Survey time in 2021 is 1, no is 0 | 0.2166 | 0.4119 | 0.0000 | 1.0000 |
| <i>Regional characteristics</i> | | | | | |
| Respondent's region | | | | | |
| Western China | 1 if the location is in the west, 0 if not | 0.3057 | 0.4607 | 0.0000 | 1.0000 |
| Central China | 1 if the location is in the middle, 0 if not | 0.2884 | 0.4531 | 0.0000 | 1.0000 |
| Eastern China | 1 if the location is in the east, 0 if it is not | 0.4059 | 0.4911 | 0.0000 | 1.0000 |

2. Data Sources and Descriptive Statistics

2.1. Data Sources

The data used in this article comes from the Chinese General Social Survey (CGSS) in 2015, 2018 and 2021.

CGSS data is organized and implemented by Renmin University of China, which is a national academic survey project. The advantage of using CGSS data is that the survey scope of the project basically covers all provinces in the country, and its survey content is relatively comprehensive and continuous, including the information on the respondents themselves and their families needed in this paper. This

provides a solid data foundation for this paper to empirically test the impact of health risks on Chinese rural household income. This paper screens the variables required for empirical analysis through the content of the CGSS questionnaires in 2015, 2018, and 2021 to form mixed cross-sectional data with a time span of six years, including the latest CGSS year data and previous year data, which helps to expand the sample size and enhance the representativeness of the sample. Finally, according to the needs of econometric analysis, this paper retains rural samples in the age range of 16-59 years old, after data cleaning, and excludes students and retirees, the effective sample size is 8709.

2.2. Variable Definitions and Descriptive Statistics

Table 1 is the variable definitions and descriptive statistics involved in this article. The explained variable that this paper focuses on is the total income of rural households in China, which is measured by the annual total income of rural households. In order to avoid the influence of outliers, this paper takes the logarithm of the income variables in the paper. The core explanatory variable that this paper focuses on is the degree of health risk. According to the self-assessed health status of the respondents, the health level of the respondents was divided into three levels: relatively healthy, average, and unhealthy. For the respondents who are in a relatively healthy level, it means that they are in a relatively healthy state, indicating that the degree of health risk they face is relatively low. For respondents who are in general health level, the corresponding health risk level is also moderate. Respondents who are at an unhealthy level may face a higher level of health risk. As shown in Table 1, in the total sample, 63.53% of the respondents faced a low level of health risk, 21.23% of the respondents faced a medium level of health risk, and 15.24% of the respondents faced a high level of health risk.

As shown in Table 1, the control variables are divided into four categories according to Demography characteristics, family characteristics, time characteristics and regional characteristics. Among them, the control variables of Demography characteristics include age, gender, nationality, political outlook, marital status, education level, and income. In view of the fact that medical insurance is a common means of transferring health risks in society, this paper adds medical insurance as a control variable to Demography characteristics. In view of the fact that the health welfare level of the respondent's enterprise may also have the role of transferring health risks, and the health welfare level that can be provided for employees in the work unit is related to the ownership form of the unit. To avoid missing variables, this paper adds the control variable of the nature of the work unit to the Demography characteristics. Considering the correlation between family size, income of other family members, and wealth level with family income, this article selects family population size, spouse income, number of properties owned by the family, and whether the family owns a car as control variables in family characteristics. Due to the use of mixed cross-sectional data from multiple periods and involving multiple provinces, it is necessary to control for time and regional effects.

3. Theoretical Basis and Econometric Model

3.1. Theoretical Basis and Research Hypothesis

This paper is based on the ability poverty theory. According to the ability poverty theory, the measure of personal poverty is not limited to income level, but also includes the ability to enrich one's material life and spiritual life (Sen, 2004). First of all, health risks, as a common background risk in the daily life of rural families, can deprive rural residents of their ability to meet their material and spiritual needs to varying degrees. Health is both an important human capital and a useful capability. When the physical and mental health of rural residents is in a good state, they can have plenty of energy and enough time to participate in various economic and social activities, and then get more income. Conversely, when the health level of rural residents drops sharply, they have to spend a lot of time and energy on treatment. During this process, people's time to participate in economic and social activities will be squeezed out. This is the economic risk caused by health problems. In other words, rural residents will lose the ability to meet life needs due to encountering such health risks. Second, education, as another kind of human capital, can reflect the learning ability of rural residents. Generally speaking, individuals with higher education levels have more health knowledge reserves and higher income levels. Health knowledge and personal income acquired through education may help rural households resist the impact of health risks on the economic level. Thirdly, due to differences in the level of economic development in different regions, there may be differences in the economic losses suffered by rural families in different regions when they face health risks. Although the income level of rural households in the eastern region is higher than that in the central and western regions, they also suffer greater economic losses when encountering health risks. Based on this, this paper proposes the following hypotheses:

Hypothesis 1: Health risks can reduce rural household income.

Hypothesis 2: Health risks are difficult to significantly reduce the income of rural households with higher education, but can significantly reduce the income of rural households with low education.

Hypothesis 3: Compared with the central and western regions, rural households in the eastern region are more vulnerable to the economic shock of health risks.

3.2. Construction of Econometric Models

In this paper, instrumental variables are introduced to alleviate the impact of endogeneity. There is a two-way causal relationship between the degree of health risk as the core explanatory variable and the explained variable rural family income. An increase in the degree of health risk may reduce the income of rural households. Conversely, the low level of rural household income makes it difficult for rural households to resist negative health shocks, which also increases the degree of health risk. If no measures are taken to solve the endogeneity problem in the econometric model during the empirical analysis, it will lead to biased estimation. This paper draws on the practice of existing research and tries to introduce "per capita rural health risk level in each province" as an instrumental variable of health risk level (Ouyang, 2019). The degree of health risk per capita in rural areas in each province not only reflects the degree of health risk faced

by rural respondents in each province, but also has no direct relationship with the family income of rural respondents, which is consistent with the premise that there is a correlation between instrumental variables and endogenous variables, but has nothing to do with explained variables. Based on the introduction of instrumental variables, this paper uses the Two Stage Least Square (2SLS) method to test the impact of health risks on Chinese rural household income and solve the endogenous problem in the model.

The 2SLS model constructed in this paper is as follows:

$$\ln(R_j) = \alpha_0 + \alpha_1 T_i + \alpha_2 K_i + \delta_i \quad (1)$$

As in formula (1), $\ln(R_j)$ is the logarithm of rural household income in China; α_0 is a constant item; T_i is an instrumental variable, α_1 is the coefficient of the instrumental variable; K_i includes a series of control variables including demographic characteristics, family characteristics, time characteristics, and regional characteristics, α_2 is the coefficient of the control variable; δ_i is the random error item.

Table 2. 2SLS Regression Results of Health Risk on Rural Household Income

| Variable name | Model(1) | | Model(2) | |
|--|-------------|-----------------------|-------------|-----------------------|
| | Coefficient | Robust standard error | Coefficient | Robust standard error |
| <i>Core explanatory variable</i> | | | | |
| Degree of health risks | -0.9420*** | 0.1910 | -0.7410*** | 0.1780 |
| <i>Control variables</i> | | | | |
| <i>Demographic characteristics</i> | | | | |
| Age | -0.0050 | 0.0040 | -0.0010 | 0.0040 |
| Gender | -0.3740*** | 0.0420 | 0.0700* | 0.0410 |
| Ethnic | 0.0150 | 0.0560 | 0.0460 | 0.0510 |
| Political party | -0.0380 | 0.0620 | 0.0190 | 0.0580 |
| Marital status | 0.1930 | 0.1800 | 0.2450 | 0.1600 |
| Education level | | | | |
| (Control group: Primary school education and below) | | | | |
| Junior high school education | 0.0450 | 0.0550 | 0.0080 | 0.0500 |
| High school education or above | 0.3740*** | 0.0650 | 0.2100*** | 0.0600 |
| Medical insurance | 0.2670*** | 0.0920 | 0.1960** | 0.0840 |
| Personal income | 0.1320*** | 0.0100 | 0.1250*** | 0.0090 |
| Enterprise ownership (Control group: State-owned enterprise) | | | | |
| Collective enterprise | -0.0080 | 0.2500 | -0.0130 | 0.2440 |
| Private enterprise | 0.0320 | 0.1530 | 0.0370 | 0.1410 |
| Hong Kong, Macao, and Taiwan enterprises | -0.1160 | 0.2610 | -0.1180 | 0.2310 |
| Other types of enterprises | -0.2420* | 0.1430 | -0.1880 | 0.1320 |
| <i>Family characteristics</i> | | | | |
| Family size | | | 0.0840*** | 0.0130 |
| Spouse income | | | 0.1320*** | 0.0070 |
| Family housing | | | 0.1640*** | 0.0260 |
| Family car | | | 0.2960*** | 0.0410 |
| <i>Time characteristics</i> | | | | |
| Survey year (Control group: 2015) | | | | |
| 2018 | 0.1150*** | 0.0380 | 0.0410* | 0.0360 |
| 2021 | 0.3500*** | 0.0500 | 0.1310*** | 0.0490 |
| <i>Regional characteristics</i> | | | | |
| Respondent's region (Control group: Western China) | | | | |
| Central China | 0.0910* | 0.0520 | 0.1280*** | 0.0480 |
| Eastern China | 0.3460*** | 0.0470 | 0.3090*** | 0.0430 |
| Constant term | 10.6040*** | 0.3720 | 8.3660*** | 0.3860 |
| weak instrumental variable test | 157.3050*** | | 152.8760*** | |
| DWH test | | | | |
| Robust score chi2 | 17.9324*** | | 12.8264*** | |
| Robust regression F | 18.0387*** | | 12.8772*** | |
| Number of observations | 8709 | | 8709 | |

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

4. Empirical Analysis Results

4.1. 2SLS Model

Table 2 shows the 2SLS regression results of the impact of health risks on rural household income in China. As shown in Table 2, Model (1) and Model (2) show the measurement results after sequentially adding control variables. Through the Durin-Wu-Hausman Test (DWH), it is found that the test results of Model (1) and Model (2) are significant at the 1% level, indicating that the core explanatory variable of health risk is an endogenous variable, and instrumental variables need to be introduced to alleviate the impact of endogenous variables. Through the weak instrumental variable test, it is found that the F statistics of Model (1) and Model (2) are both much greater than 10, and are significant at the 1% level, indicating that there is a strong correlation between the instrumental variables selected in this paper and endogenous variables, and the possibility of weak instrumental variables is ruled out. In Model (1), three control variables including demographic characteristics, time characteristics, and regional characteristics are added. The results show that the impact coefficient of health risk on rural household income is -0.9420, which is significant at the 1% level. In order to ensure the robustness of measurement results, this paper further increases the control variables. In Model (2), the control variables of family characteristics are added, and the results show that the impact coefficient of health risks on rural household income is -0.7410, which is also significant at the 1% level. The measurement results of Model (1) and Model (2) both show that health risks have a significant negative impact on the income of Chinese rural families, that is, as the degree of health risks increases, the total income of Chinese rural families can be reduced, so Hypothesis 1 of this paper is established.

Health risks can reduce the labor supply time of family members. Labor is the basic way for people to obtain income, and labor supply time can reflect people's investment in production activities. Grossman (1972) believed that health can have a crowding out effect on individual labor supply time (Crowding out Effect). As an important human capital, health is the prerequisite for people to effectively participate in various production activities. The higher the health risk level of the individual, the worse the health level, and the individual needs to spend a lot of time on health services, which also makes the labor supply time of the individual squeezed out. In addition, when an individual's health level declines, not only the individual's labor supply time is occupied, but also the labor supply time of other family members, because other family members need to squeeze out of their own labor supply time to take care of members who are experiencing health risks. Therefore, when a member of the family suffers from a health risk, the labor supply time of the member who suffers from the health risk and other members who do not suffer from the risk will be squeezed out, which will reduce the family's labor income and further affect the total family income.

The source of income of Chinese rural families is relatively single. The main income of rural families comes from the wage income of the main labor force in the family. This relatively single family income channel is difficult to disperse the economic risks caused by health problems. In recent years, the proportion of operating income of rural households in

China has been decreasing, while the proportion of wage income has been increasing (Xia et al., 2021). This shows that in the income structure of rural households, the proportion of wage income is getting higher and higher, and rural households are increasingly dependent on wage income. At this stage, as the hollowing out of China's rural areas is gradually intensified, the young and strong rural labor force flows to the cities. In many rural families, only the elderly and left-behind children are left. If the main labor force in the family encounters health risks, their labor supply time will also be reduced, which will inevitably lead to a decline in family wage income, thereby reducing the overall income level of the family. In short, a relatively single family income channel will greatly increase the impact of health risks on family income levels.

Chinese rural families lack an effective health risk sharing mechanism. As a common health risk sharing mechanism in society, medical insurance is currently difficult to meet the health needs of Chinese rural families. On the one hand, the existing rural public medical insurance has a limited coverage and cannot effectively share large health risks. Chinese rural families mainly purchase medical insurance for urban and rural residents. As a kind of public basic medical insurance, there are various restrictions in terms of insurance amount, covered diseases and sharing mechanism. When rural families face a large impact of diseases, it is difficult for urban and rural residents' medical insurance to effectively share the health risks of rural families. On the other hand, China's multi-level medical insurance system is not yet perfect, and the participation rate of rural households in supplementary medical insurance is low. Commercial medical insurance, corporate supplementary medical insurance, and social medical assistance are all supplements to basic medical insurance. Different forms of supplementary medical insurance can break through the limitations of basic medical insurance in terms of deductibles, ceilings, and catalogs of diseases, and help rural families reduce the economic burden caused by health risks. However, due to the high cost of insurance premiums and insufficient publicity, the enthusiasm of Chinese rural families to participate in insurance is not high, and the importance of supplementary medical insurance is insufficiently understood.

4.2. Heterogeneity Analysis

Table 3 shows the regression results of health risks on the household income of rural residents with different levels of education. According to the education level of rural residents, they are divided into rural households with primary school and below, rural households with middle school, and rural households with high school and above, and examine the heterogeneity of the impact of health risks on family income among these three types of rural households. Model(1), Model(2), and Model(3) are sub-sample regression models of the above three types of rural households. As shown in Table 3, for rural households with primary school education and below, the impact coefficient of health risk on rural household income is -0.5440, and it is significant at the 1% level. For rural households with a middle school education, the impact coefficient of health risk on rural household income is -0.7840, and it is significant at the 1% level, indicating that as the degree of health risk increases, the total income of rural households with a middle school education will also decrease. For rural households with high school education and above,

although the coefficient of impact of health risks on rural household income is -1.3820, it is not significant, indicating that although the increase in health risk can have a negative impact on total household income, it is difficult to have a significant impact on rural households with high school education and above. The reason for the above differences is

that when the education level of rural residents increases to high school and above, the knowledge, experience, and economic ability of rural residents in preventing health risks also increase, thereby reducing the negative impact of health risks on total household income. Based on this, Hypothesis 2 of this paper is established.

Table 3. Regression Results of Health Risks on the Family Income of Rural Residents with Different Levels of Education

| Variable name | Model(1) | Model(2) | Model(3) |
|--|------------------------|------------------------|-----------------------|
| | Coefficient | Coefficient | Coefficient |
| <i>Core explanatory variable</i> | | | |
| Degree of health risks | -0.5440*** (0.1910) | -0.7840*** (0.2880) | -1.3820 (1.2770) |
| <i>Control variables</i> | | | |
| <i>Demographic characteristics</i> | | | |
| Age | 0.0070 (0.0050) | -0.0020 (0.0060) | 0.0010 (0.0180) |
| Gender | 0.1230 (0.0770) | 0.0480 (0.0600) | 0.0780 (0.0970) |
| Ethnic | -0.0640 (0.0690) | 0.1880** (0.0940) | 0.0930 (0.1160) |
| Political party | 0.4550* (0.2610) | 0.0040 (0.1020) | 0.0150 (0.0800) |
| Marital status | 0.0960 (0.2580) | 0.3960 (0.2620) | 0.2750 (0.3330) |
| Medical insurance | 0.3370** (0.1510) | 0.0960 (0.1170) | 0.0320 (0.1930) |
| Personal income | 0.1180*** (0.0130) | 0.1210*** (0.0140) | 0.1510*** (0.0280) |
| Enterprise ownership (Control group: State-owned enterprise) | | | |
| Collective enterprise | -0.8480 (0.7510) | 0.5850** (0.2860) | -0.4180 (0.5610) |
| Private enterprise | -0.1590 (0.2080) | 0.0800 (0.1960) | -0.0370 (0.4690) |
| Hong Kong, Macao, and Taiwan enterprises | 0.0290 (0.4990) | -0.3400 (0.3150) | -0.0460 (0.5810) |
| Other types of enterprises | -0.4760** (0.1860) | -0.0890 (0.1850) | -0.4380 (0.4940) |
| <i>Family characteristics</i> | | | |
| Family size | 0.1390*** (0.0210) | 0.0730*** (0.0190) | 0.0270 (0.0270) |
| Spouse income | 0.1640*** (0.0130) | 0.1180*** (0.0110) | 0.1130*** (0.0130) |
| Family housing | 0.1830*** (0.0630) | 0.1750*** (0.0400) | 0.1320*** (0.0450) |
| Family car | 0.3550*** (0.0860) | 0.2920*** (0.0610) | 0.1980** (0.0920) |
| <i>Time characteristics</i> | | | |
| Survey year (Control group: 2015) | | | |
| 2018 | 0.0090 (0.0600) | 0.0480 (0.0530) | 0.0970 (0.1120) |
| 2021 | 0.0470 (0.0900) | 0.1130 (0.0750) | 0.2790** (0.1320) |
| <i>Regional characteristics</i> | | | |
| Respondent's region (Control group: Western China) | | | |
| Central China | 0.2460*** (0.0740) | 0.0530 (0.0760) | 0.0500 (0.1130) |
| Eastern China | 0.3230*** (0.0770) | 0.2220*** (0.0650) | 0.4560*** (0.0960) |
| Constant term | 7.1590*** (0.6480) | 8.4800*** (0.5120) | 9.7510*** (1.7060) |
| Number of observations | 3188 | 3519 | 2002 |

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

Table 4. Regression Results of Health Risk on Rural Household Income in Different Regions

| Variable name | Model(1) Coefficient | Model(2) | Model(3) Coefficient |
|---|-------------------------|------------------------|-------------------------|
| <i>Core explanatory variable</i> | | | |
| Degree of health risks | -0.4200 (0.2690) | 0.4990 (0.4160) | -1.9610*** (0.4070) |
| <i>Control variables</i> | | | |
| <i>Demographic characteristics</i> | | | |
| Age | -0.0020 (0.0060) | -0.0270*** (0.0080) | 0.0160** (0.0070) |
| Gender | -0.0750 (0.0660) | 0.3330*** (0.0890) | 0.0480 (0.0780) |
| Ethnic | 0.1250** (0.0570) | 0.2720 (0.1960) | -0.0830 (0.1590) |
| Political party | -0.1240 (0.1140) | -0.0320 (0.1420) | 0.2140** (0.0990) |
| Marital status | 0.1880 (0.2210) | 0.9020* (0.4820) | -0.1060 (0.2400) |
| Education level (Control group: Primary school education and below) | | | |
| Junior high school education | 0.1430 (0.0910) | 0.1160 (0.1010) | -0.0560 (0.0920) |
| High school education or above | 0.2620** (0.1250) | 0.1870 (0.1300) | 0.3030*** (0.0950) |
| Medical insurance | 0.3280* (0.1910) | 0.0870 (0.1410) | 0.2140 (0.1360) |
| Personal income | 0.1350*** (0.0160) | 0.1340*** (0.0150) | 0.0950*** (0.0180) |
| Enterprise ownership (Control group: State-owned enterprise) | | | |
| Collective enterprise | 0.0530 (0.2320) | -0.3680 (0.4890) | 0.0990 (0.5260) |
| Private enterprise | -0.2040 (0.1650) | -0.2280 (0.2480) | 0.2650 (0.3690) |
| Hong Kong, Macao, and Taiwan enterprises | 0.4460* (0.2680) | -0.2500 (0.4050) | 0.0770 (0.5420) |
| Other types of enterprises | -0.3270** (0.1300) | -0.2310 (0.2480) | -0.0550 (0.3490) |
| <i>Family characteristics</i> | | | |
| Family size | 0.0870*** (0.0220) | 0.1020*** (0.0240) | 0.0750*** (0.0250) |
| Spouse income | 0.1140*** (0.0120) | 0.1610*** (0.0140) | 0.1220*** (0.0120) |
| Family housing | 0.1550*** (0.0540) | 0.2220*** (0.0710) | 0.1530*** (0.0400) |
| Family car | 0.4070*** (0.0740) | 0.3540*** (0.0950) | 0.1660** (0.0720) |
| <i>Time characteristics</i> | | | |
| Survey year (Control group: 2015) | | | |
| 2018 | -0.0550 (0.0580) | -0.0320 (0.0690) | 0.1330* (0.0700) |
| 2021 | -0.0770 (0.0840) | -0.0550 (0.0990) | 0.4040*** (0.0840) |
| Constant term | 8.1410*** (0.5710) | 6.6310*** (0.8810) | 10.1880*** (0.8030) |
| Number of observations | 2662 | 2512 | 3535 |

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

Table 4 shows the regression results of health risk on rural household income in different regions. According to the geographical location of the provinces where rural residents live, they are divided into western regions, central regions,

and eastern regions, and the sub-sample regression models of the three groups of regions are represented by Model (1), Model (2), and Model (3). As shown in Table 4, for rural families in the western region, the impact coefficient of health

risks on rural family income is -0.4200, but the effect is not significant. For rural households in the central region, the coefficient of impact of health risks on rural household income is 0.4990, but the effect is not significant. However, for rural families in the eastern region, the impact coefficient of health risks on rural household income is 1.9610, and the absolute value of the impact coefficient is much larger than that of rural families in the western and central regions, and it is significant at the 1% level. This shows that there are obvious regional differences in health risk to rural household income. That is to say, compared with rural families in the central and western regions, as the degree of health risk increases, the income level of rural families in the eastern region suffers the most negative impact, so hypothesis 3 of this paper is established. The possible reason is that although the overall income level of rural households in the eastern region is higher than that in the central and western regions, the economic losses suffered by members of rural households in the eastern region are much greater than those in the central and western regions after encountering health risks. In addition, in recent years, the Chinese government has increased policy support for rural areas in the central and western regions, and has carried out large-scale poverty alleviation projects and infrastructure construction projects for many years, which has gradually narrowed the gap in the field of health services in the central and western regions. These policies have effectively helped rural families in the central and western regions resist health risks.

5. Conclusion and Suggestion

Based on the CGSS data, this paper examines the effect of health risks on Chinese rural household income. The article alleviates the endogenous influence in the econometric model by introducing instrumental variables, and chooses the 2SLS model for empirical analysis. The study found that: first, health risks have a significant negative effect on the income of rural households in China, and as the degree of health risk increases, the total income of rural families will also decrease; second, the impact of health risks on the income of rural households with different educational levels is different. Health risks cannot have a significant negative effect on the income of rural households with high school education and above, but can have a significant impact on the income of rural households with middle school and primary education and below; third, the impact of health risks on rural household income in different regions is different. , health risks can have a significant negative impact on the income of rural households in the eastern region, and rural households in the eastern region suffer relatively large economic losses when facing health risks.

In order to reduce the negative impact of health risks on Chinese rural household income, the following measures are suggested: First, strengthen the health risk prevention of the main labor force in rural households. The health problems of the main labor force in rural families have become an important source of family health risks. Since the wage income of the main labor force in a rural family is the main source of family income, its health level is directly related to the family income level. Although the current risk sharing mechanism based on medical insurance for urban and rural residents is universal, it is not specific to the health risks of the main labor force in rural families, and the corresponding prevention mechanism needs to be further improved. Second, improve the rural health education system. Strengthen the

popularization of health knowledge in rural areas, pay attention to the publicity of rural health culture, and create a healthy cultural atmosphere of "building up the body and preventing risks" in rural areas. again. The health protection of rural families in developed areas cannot be ignored. Theoretically, it is of great significance to tilt health policies towards less developed regions in the central and western regions, but our empirical analysis also shows that health risks have the greatest impact on rural household income in the eastern region. In this regard, it is necessary to balance the health protection policies of each region according to the characteristics of rural families in the central, eastern, and western regions, and not to lose sight of the other.

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