

Relationship between Household Income, Region and Household Healthcare Expenditure——Empirical research based on the data of China Family Tracking Survey (CFPS)

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Abstract. China's economy has been rapid development in recent years, the residents income is also rising, China's household per capita disposable income growth, the corresponding family health spending also presents the fast growth, while at the same time family per capita health spending continues to grow, but nearly 10 years of family health spending growth is greater than the household disposable income growth, today, After housing and food, medical expenses have become the biggest consumption expenditure of most Chinese households. The medical expenditure caused by diseases is an important factor affecting family happiness, and the aggravation of medical burden decreases family happiness. The differences between urban and rural areas and different regions not only affect the income of families, but also affect the medical expenditure of families from the aspects of medical service quality and health awareness. In addition, the implementation of medical insurance policy also alleviates the medical burden of families to a certain extent. This paper selects microscopic data of CFPS surveyed in 2016 and 2018, and conducts empirical analysis on data of tens of thousands of families with different living conditions in various regions. The results show that income is an important factor affecting family medical expenditure, and family size and health care focus will also affect family medical expenditure. Urban and rural residents and residents in different areas also show differences in medical expenditure

Keywords: household income; health expenditure; medical system; regional impact.

1. Introduction

In recent years, China's economy has been developing rapidly, and residents' income has been rising continuously. Correspondingly, family medical expenses have also been growing rapidly. Data shows that the annual per capita disposable income of Chinese households has increased from 18,310.8 yuan (in 2013) to 28,228 yuan (in 2019) in five years, an increase of 54.16%. However, at the same time, the per capita medical expenditure increased from 912.1 yuan in 2013 to 1685.2 yuan in 2018, which was significantly faster than the growth of disposable income, reaching 84.76% (China Statistical Yearbook 2019). Today, apart from housing and food expenditures, medical expenditures have become the largest consumption expenditures of the vast majority of Chinese households.

Based on the existing research and common sense, family income is the main factor affecting family medical consumption. The level of family medical consumption is subject to the family's income level. In addition, the education level of residents and the health status of family members will also jointly affect family medical expenditure. Lower income households may not only be at a disadvantage in terms of household wealth, but may also be at a higher risk of disease, which in turn translates into higher health care costs.

Among the major factors affecting family medical expenditure, family health status and family quality of life, disease always occupies the most important part, and many families who are not wealthy themselves bear a large amount of medical expenses due to family members falling ill, thus poverty, in addition to this, the generation of poverty and will continue to lead to disease and the deterioration of the existing disease, The two influence each other to form a vicious circle of "poverty - disease - poverty".

Family medical expenditure is a large amount of expenditure for most families in China. In the short run, medical expenditure will bring certain economic pressure and burden to the family, but in

the long run, it is a kind of consumption to maintain physical health, so health awareness will have an important impact on medical expenditure.

Region is an important factor affecting household medical expenditure. At present, there are great differences in the development of various regions in China, including urban and rural areas, coastal and inland areas, which are not only reflected in the differences in family income in different regions, but also in the differences in various public services, such as medical care and education etc. The existence of these differences is an important factor leading to the large difference in family demand for medical services in different regions. Wang Dehua et al. (2008) can also analyze the current development status of different regions of the country by studying regional differences. Studying how medical expenditure is affected by income and showing regional differences can explain the current social status, and can also make recommendations for families and individuals through the research results, make social calls, and provide a basis for relevant policy formulation .

The second part of this paper will review the existing research and policies; the third part will introduce the data sources selected for the empirical analysis and the interpretation and descriptive statistics of the variable selection; the fourth part will introduce the application of this empirical analysis. At the end, it analyzes and discusses the regression results and the purpose of the research, and puts forward my own suggestions based on this empirical analysis.

2. Literature Review

It is important to study the medical expenditure of the family because the family's ability to pay for medical services can affect the family's happiness. Families with lower incomes will have lower consumption on medical expenses and lower demand for medical services, which is likely to affect the health status, education level, and income of family members, thus aggravating the degree of family distress. Research pointed out that in the countryside, the dropout rate increased with family has certain relevance to health care spending, for example, because the family misfortune and other reasons caused by the medical expenditure increase, family members of school-age students will have to go out to work for a living, but in the present society for the growing importance of education,, and the state's strengthening of subsidies for families in need, even if there is a poor family due to the excessive burden of medical expenditures. Students will also continue their education, but at the moment the family situation will be worse and the happiness level will decrease. (Cao Yan et al., 2008)

Research points out that income level has negative correlation with sick probability, so lower income may be under higher medical burden of the family, but on the other hand, low income and poor families might not go to a doctor when sick because of the large medical expenditure, which may reduce their medical expenses to some extent. (Ye Chunhui et al., 2008; Liu Guo-en, 2011).

In addition, higher-income families are more conscious of their health. They choose to have regular physical examinations and treat their problems. In addition, in terms of medical services, they pursue higher-quality services and a better environment and a better doctor, which increases their spending on health services.

Today, for example, the Britain's national health service system, apart from public hospitals, there are private medical service institutions and medical insurance is that residents can enjoy much more personal services, and the price is higher than that of public medical services, but such private medical service costs are borne by the individuals, so most of the groups who enjoy and consume such medical services are relatively wealthy families, while low-income families are subject to price constraints and thus avoid accepting private medical services. In the United States, private medical service institutions and the commercial medical insurance industry are developing rapidly and are more developed, which also leads to different ways of receiving medical services due to different income levels of families (Li Xiaolei, 1998).

For the current situation in our China, the government has implemented a medical policy to benefit the people. This is an important policy to alleviate the medical burden of low-income families, and

also protect personal health. Medical insurance can stimulate poor families to consume medical services, increase medical expenditures and alleviate, which reduce the harms brought by the disease to health of body and reduce the medical burden of poor families (Wang Xingjun and Zheng Chao, 2014; Hu Hongwei, 2012; Xie Bangchang, 2015). However, there are differences in the guarantee degree of medical system for urban and rural residents, and there is still a gap and inequality in the use of medical services (Chang Xue, 2019).

In addition to the social medical insurance system, there is also commercial medical insurance. The existence of commercial insurance can promote family members' demand for medical services to a certain extent, which in turn manifests as an increase in expenditure on medical services (Chai Huamin, 2013).

Under the current environment in China, the medical consumption expenditure of residents in backward areas is also different from that of residents in more developed areas. For individuals and families with low income, the primary aim of spending is to buy food, housing and other basic living consumption. When the family income reaches a certain level, the family will consider spending on other consumption including the expenditure on medical services. So, the family's expenditure on medical care will increase, and the requirements for the quality of medical care and medical services will be improved, which can reflect the different demands and consumption expenditure levels generated by different household incomes. However, as a necessity of consumption, medical treatment is the object that everyone needs to spend on. No matter the poor and rich, men, women and children all have the chance of getting sick. In order to maintain their health, they will spend on medical treatment in case of sudden diseases and infectious diseases (Li Xiaolei, 1998; Tan Tao et al., 2014).

Research shows that the income elasticity coefficient of medical demand is small, which shows that even if the income of the same family increases to a certain extent, their demand for medical care will not increase significantly. Demand varies very slowly with household income. In addition, the price elasticity of medical services for rural households in China is almost equal to that of urban residents, which can reflect the similarities in the response of urban and rural residents to changes in medical prices (Chen Xinguang et al., 1996; Lan Yuxi, 1997).

Through reading literature, it can be seen that family income has an important impact on family medical expenditure, but the impact of income on medical expenditure shows diversity. The differences among different families are not only reflected in family income, but also reflected in health awareness, etc., with great regional differences. For this, we will continue to make an analysis to find how and to what extent each factor affects a family's medical expenses.

3. Data Selection and Variable Description

3.1 Data Sources

The sample data analyzed in this article comes from the China Family Panel Studies (CFPS) project, the target sample size of CFPS can reach 16,000 households, and all family members in the survey object sample, the survey content includes the basic situation of the family, the life of family members, etc. The CFPS was launched in 2010 and conducts a survey every two years. The latest 2020 survey has already released some of the content, but the data required for this article has not been released. The data in 2016 and 2018 are consistent with the current situation. and the survey content is relatively complete, which is conducive to further analysis. Therefore, panel data is composed of two periods of data in 2016 and 2018.

3.2 Variable Description and Descriptive Statistics

The selected variables include not only family income, but also indicators in the CFPS that can have an impact on family medical expenditures, such as family size, family debt ratio, major events and other variables. Because of family health is difficult to through the CFPS survey analysis, so it is hard to families the sample in the form of quantitative analysis of health.

The original medical expenditure data and household income differ from other variables by a large order of magnitude, and there are extreme values. In order to reduce the fluctuation of data and facilitate calculation, they are processed by logarithm.

In this paper, family income is taken as the core explanatory variable, and the reason why it is selected as the core explanatory variable has been explained in the introduction and literature review. Families with different incomes also have differences in the level of medical expenditure, and family income has an important impact on the amount of family medical expenditure. In addition, family size, household debt ratio, the occurrence of a major event is also an important factor affecting medical expenditure. The expenditure generated by the occurrence of a major event can reflect the family situation in the current year, such as a traffic accident.

The medical burden will increase with the increase of the total family population, and the debt ratio of the family is similar to the family income, which has an impact on medical treatment. In addition, because of the uncontrollable disease, the variables of whether major family events happen in the year and the expenditure should be included.

Commercial medical insurance plays a certain role in helping participants pay part of their out-of-pocket expenses, which reduces the relative price of medical and health services to a certain extent, thereby increasing medical and health expenditures.

In addition, the proportion of household daily health care expenditure will reflect the individual's health status, which is not a medical expenditure, but has a certain impact on medical expenditure. The proportion of food expenditure mainly reflects the relatively scientific standard of family wealth and poverty, which is called the "Engel coefficient". The larger the family's Engel coefficient, it can be inferred that the family may be poorer, and the medical expenditure may be reduced accordingly .

The investment in education and entertainment and the degree of concern for body beauty will also affect the family's medical expenditure to a certain extent. The investment in education and entertainment and the proportion of investment in beauty can show the degree of family care about their own physical and mental health to a certain extent, thus reflecting the degree of medical needs.

In view of the regional differences in medical care, I set the urban and rural areas and the eastern, central and western regions as dummy variables, so as to divide the data regionally, and then examine the differences in the impact of regions on medical expenditures.

Excluding Hong Kong, Macao and Taiwan, the remaining 31 provinces, municipalities and autonomous regions are divided into three parts: eastern , central and western . The division is not based on geographical divisions, but on the basis of government policies and economic development. situation. The eastern region is China's leading provinces and cities in economic development and other fields (Beijing , Tianjin, Hebei, Liaoning, Shanghai, Jiangsu, Zhejiang, Fujian, Shandong, Guangdong and Hainan), and the central region is the province and city whose economic development is second to that of the eastern region. (Shanxi , Inner Mongolia, Jilin, Heilongjiang, Anhui, Jiangxi, Henan, Hubei, Hunan, Guangxi), and the western region is a relatively underdeveloped area of China's current economic level (Sichuan , Guizhou, Yunnan, Tibet, Shaanxi, Gansu, Qinghai, Ningxia, Xinjiang , Chongqing). In order to facilitate the analysis, and because the consumption difference between eastern and central China is relatively small, and the consumption level in western China is quite different from the other two regions (Ye Jingjing, 2021), in this analysis, we divide the regions into western part and the eastern part merges with the central part.

Among the selected samples, the average household income and medical expenditure of residents in general, urban, rural, central, eastern and western regions in 2016 and 2018 are shown in Table 1, Figure 1 and Figure 2.

Table 1. Average household income and medical expenditure of residents in 2016 and 2018

	Average household health care spending in 2016	Average household income in 2016	Average household medical spending in 2018	Average household income in 2018
overall	6088.32	59821.53	5628.173	63567.24
City	6679.74	75533.20	5879.97	81522.93
rural	5517.25	44650.47	5359.328	44395.81
Central and Eastern	6216.09	65849.77	5646.49	68260.29
west	5737.36	43262.98	5576.05	50212.54

Average household health expenditure and average income in 2016

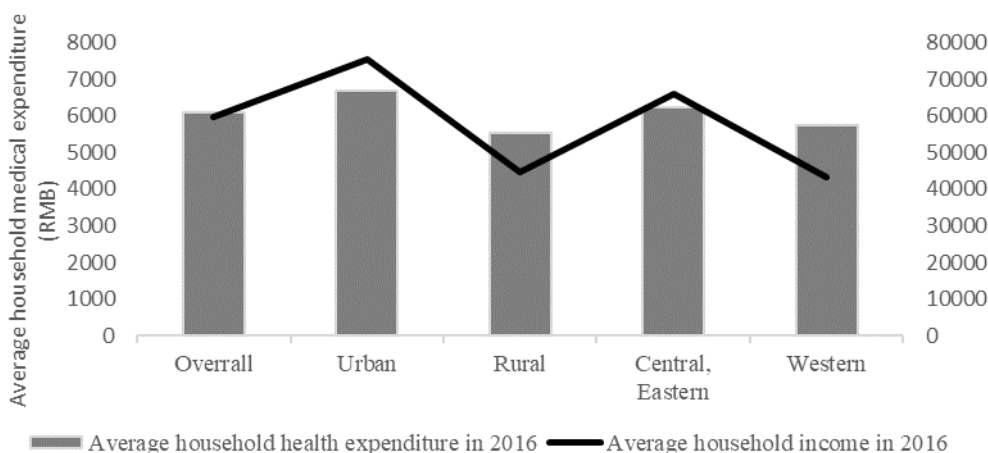


Figure 1. Average household medical expenditure and average household income in 2016

Average household health expenditure and average income in 2018

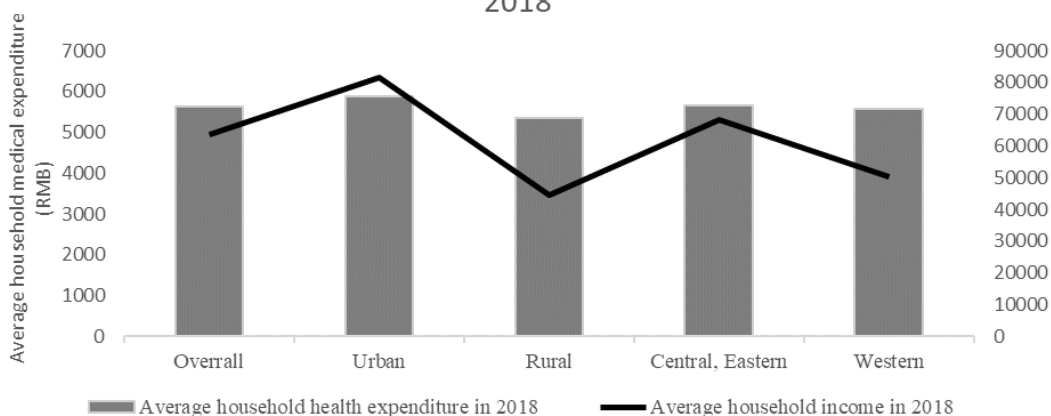


Figure 2. Average household medical expenditure and average household income in 2018

Through the sorting of sample data, it can be found that there are certain differences in household income and medical expenditure of urban and rural families. In 2016 and 2018, the average income of urban households was 1.692 times (2016) and 1.836 times that of rural households (2018), and in 2016 and 2018, the household medical service expenditure of urban residents was only 1.211 times (2016) and 1.097 times (2018) times that of rural household medical service expenditure. It can be seen that the current burden of household medical expenditure in rural areas in China is higher than that of urban residents and more serious.

The data shows that in 2016 and 2018, the average household income of residents in the eastern, central and western regions was 65,849.77 yuan (2016), 68,260.29 yuan (2018), 43,262.98 yuan (2016), and 50,212.54 yuan (2018), respectively. Medical expenditures The average income is 6,216.10 yuan (2016), 5,646.49 yuan (2018), 5,737.37 yuan (2016), and 5,576.05 yuan (2018). The average income of residents in the western region is lower, which is in line with the economic development of the western region. It lags behind the status quo of the eastern and western regions. Generally speaking, in terms of medical expenditure, the household medical expenses of residents in the eastern and central regions are higher, while the medical expenses of residents in the western region are lower than those in the other two regions. The average income of families in the central region was 1.522 times that of the families in the western region in 2016 and 1.359 times that in 2018, but the average medical expenditure of the families in the eastern and central regions was 1.083 times that of the families in the western region in 2016 and 1.013 times that in 2018. Therefore, we can speculate that families in the western region may face greater medical and economic risks than those in the central and eastern regions.

Table 2. Variable description, description and data source

Name	Variables Name	Variable Assignment	Data Sources
Family Medical Expenses	ln_med	Medical expenditures in the past 12 months (logarithm)	CFPS2016, 2018
Household Income	ln_income	Total income for the past 12 months (logarithm)	CFPS2016, 2018
Family Size	familysize	family size	CFPS2016, 2018
Household Debt Ratio	loan_rate	Total Household Debt/Total Household Income	CFPS2016, 2018
Major Event Expenses	ln_bigthing	Significant expenditures in the past 12 months (logarithm)	CFPS2016, 2018
Share of Insurance Expenses	insurance_rate	Insurance Expenses / Gross Household Income	CFPS2016, 2018
Share of Health Care Expenditure	care_rate	Health care expenditure/total household income	CFPS2016, 2018
Share of Food Expenditure	food_rate	Food Expenditure/Total Household Income	CFPS2016, 2018
Proportion of Spending on Entertainment and Education	eec_rate	Recreational Educational Expenses/Total Household Income	CFPS2016, 2018
Percentage of Beauty Spending	beauty_rate	Beauty Spending/Total Household Income	CFPS2016, 2018
Urban or rural	urban	Is it urban population: no=0, yes=1	CFPS2016, 2018
Western Region	west	Whether it is in the western region: no=0, yes=1	CFPS2016, 2018

The variables listed in Table 2 are from CFPS surveys conducted in 2016 and 2018 respectively. The total amount of data is large enough, and there are some large survey deviations and incomplete data, so some problematic samples are deleted, and urban and rural classification and regions are set as dummy variables. In addition, some special data and outliers affecting the continuity of data are deleted. After multiple data processing, a total of 15,391 observations for two years were obtained, which provided sufficient data support for the following process.

Table 3. Variable Descriptive Statistics

Variable	Observations	Average Value	Standard Deviation	Minimum	Maximum value
ln_med	15,391	7.699798	1.415749	2.302585	12.84793
ln_income	15,391	10.68391	1.03245	1.098612	15.52026
familysize	15,391	3.901371	1.885899	1	14
loan_rate	15,391	0.1038256	.6163232	0	20
ln_bigthing	15,391	1.026231	2.942614	0	14.50866
insurance_rate	15,391	0.0259869	0.0908049	0	5
care_rate	15,391	0.0062047	0.0409585	0	2.5
eec_rate	15,391	0.22735	0.6186385	0.0000222	24.0566
beauty_rate	15,391	0.0116924	0.0296616	0	1.55
urban	15,391	0.5249821	0.4993917	0	1
west	15,391	0.2697031	0.4438199	0	1

As shown in Table 3, a total of 15,391 observed values were obtained in this empirical study. In the observed interval, medical expenditure (logarithmic), the maximum value was 12.84793, the lowest value was 2.302585, and the average value was 7.699798. Total household income (logarithmic) was 15.52026, 1.098612, and 10.68391.

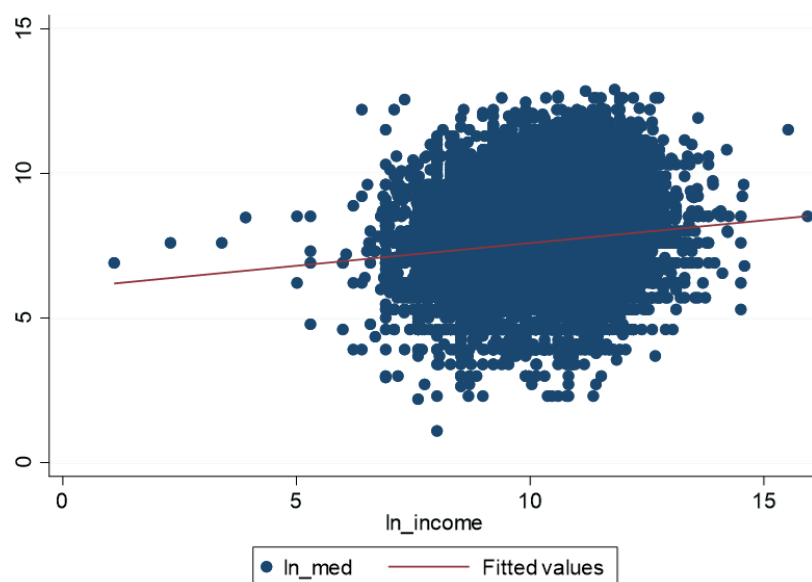


Figure 3. ln_med - ln_income correlation scatterplot

As shown in Figure 3, there is a weak correlation between the core explanatory variable family total income (take the logarithm) and the family medical expenditure (take the logarithm) within the observation interval.

4. Model Settings

Through the existing survey and current situation, we believe that family income, family size, family debt ratio and whether major events occur will have a relatively significant impact on the family medical expenditure in the current year. This paper constructs the following regression model :

$$\ln_med_{it} = \beta_0 + \beta_1 \ln_income_{it} + \beta_2 \text{familysize}_{it} + \beta_3 \text{loan_rate}_{it} + \beta_4 \ln_bigthing_{it} + \tau_t + \epsilon_{it} \quad (1)$$

Among them, \ln_med_{it} is the family medical expenditure of the i -th family in the t -th year (take the logarithm), \ln_income_{it} is the resident family income of the i -th family in the t -th year (take the logarithm), and familysize_{it} is the t -th year. The family size of the i -th family, τ_t is the year fixed effect, and ϵ_{it} represents the residual term.

In addition, we can also analyze its impact on medical expenditure by adding other relevant variables:

$$\ln_med_{it} = \beta_0 + \beta_1 \ln_income_{it} + \beta_2 \text{familysize}_{it} + \beta_3 \text{loan_rate}_{it} + \beta_4 \ln_bigthing_{it} + \beta_5 \text{insurance_rate}_{it} + \beta_6 \text{care_rate}_{it} + \beta_7 \text{food_rate}_{it} + \tau_t + \epsilon_{it} \quad (2)$$

($\text{insurance_rate}_{it}$ is the proportion of commercial insurance expenditure, care_rate_{it} is the proportion of health care expenditure, food_rate_{it} for food expenditure)

In addition, we also want to know how the family consumption concept, education level, and concept of the body reflected by the investment in education and entertainment and the degree of care about body beauty affect the family medical expenditure:

$$\ln_med_{it} = \beta_0 + \beta_1 \ln_income_{it} + \beta_2 \text{familysize}_{it} + \beta_3 \text{loan_rate}_{it} + \beta_4 \ln_bigthing_{it} + \beta_5 \text{insurance_rate}_{it} + \beta_6 \text{care_rate}_{it} + \beta_7 \text{food_rate}_{it} + \beta_8 \text{eec_rate}_{it} + \beta_9 \text{beauty_rate}_{it} + \tau_t + \epsilon_{it} \quad (3)$$

(eec_rate_{it} is the proportion of expenditure in education and entertainment, beauty_rate_{it} is the proportion of expenditure in beauty)

For regional differences, we added two dummy variables, urban and west , to examine the status of household spending in different regions:

$$\ln_med_{it} = \beta_0 + \beta_1 \ln_income_{it} + \beta_2 \text{familysize}_{it} + \beta_3 \text{loan_rate}_{it} + \beta_4 \ln_bigthing_{it} + \beta_5 \text{insurance_rate}_{it} + \beta_6 \text{care_rate}_{it} + \beta_7 \text{food_rate}_{it} + \beta_8 \text{eec_rate}_{it} + \beta_9 \text{beauty_rate}_{it} + \gamma_1 \times \text{urban} + \gamma_2 \times \text{west} + \tau_t + \epsilon_{it} \quad (4)$$

5. Regression Results and Analysis

5.1 OLS regression and fixed time effect regression

In this paper, simple OLS regression and fixed time effect model (FE) are used for estimation, and stata is used to process the data, and the following results are obtained:

Table 4. Empirical Analysis Results

Independent Variable	OLS	FE	OLS	FE	FE	FE
ln_income	0.128***	0.123***	0.127***	0.122***	0.113***	0.109***
	(0.0110)	(0.0112)	(0.0113)	(0.0116)	(0.0116)	(0.0119)
familysize	0.0931***	0.0926***	0.0960***	0.0956***	0.0954***	0.0951***
	(0.00601)	(0.00602)	(0.00602)	(0.00602)	(0.00601)	(0.00602)
loan_rate	0.0151	0.0138	0.0129	0.0123	0.0133	0.0129
	(0.0120)	(0.0120)	(0.0120)	(0.0120)	(0.0120)	(0.0120)
ln_bigthing	0.0301***	0.0302***	0.0305***	0.0305***	0.0300***	0.0300***
	(0.00384)	(0.00384)	(0.00383)	(0.00383)	(0.00383)	(0.00383)
insurance_rate			0.0446	0.0260	-0.0263	-0.0387
			(0.125)	(0.125)	(0.129)	(0.130)
care_rate			2.382***	2.367***	2.445***	2.431***
			(0.274)	(0.274)	(0.274)	(0.275)
food_rate			0.0118	0.00511	0.0143	0.00902
			(0.0193)	(0.0196)	(0.0200)	(0.0202)
eec_rate					-0.105***	-0.104***
					(0.0192)	(0.0192)
beauty_rate					1.172**	1.127**
					(0.410)	(0.411)
_cons	5.934***	5.963***	5.911***	5.946***	6.079***	6.108***
	(0.117)	(0.118)	(0.122)	(0.124)	(0.127)	(0.128)
Year FE	NO	YES	NO	YES	NO	YES
N	15394	15394	15394	15394	15394	15394
R ²	0.033	0.033	0.038	0.038	0.040	0.040

Note: *, ** and *** represent the statistical significance levels of 1 %, 5 %, and 10 %, respectively; the values in parentheses are the t-statistics of their corresponding estimates

Table 3 show that we adopt The method of OLS and FE regression can obtain the result that the core explanatory variable family income is significant at the 1% significance level. It can be seen that family income is a more significant factor affecting the family's medical expenditure, which is in line with our assumptions and also conform to the social status quo. In addition, the size of the family also has a significant impact on the family medical expenditure. With the increase of the family population, the total family medical expenditure will inevitably increase after the medical expenditure of each person is superimposed, so the corresponding medical burden of the family increases, and the medical expenditure of the family will increase. We can get a more accurate result by taking into account the expenditures and debt ratios for supplementary major events introduced by emergencies. In addition, through regression, we can also know that the medical expenses of the families that buy more commercial insurance will decrease to a certain extent; for the families that pay more attention to health care, the medical expenses of the family will also increase significantly; As the Engel coefficient increases, the family medical expenditure will also increase slightly. In addition, the proportion of beauty investment reflects the level of attention family members pay to their body and appearance, and it also increases the family's expenditure on medical care.

5.2 Regional analysis

Table 5. Bringing in regional factors for empirical analysis

Independent Variable	FE	FE	FE
ln_income	0.113*** (0.0121)	0.0882*** (0.0126)	0.0922*** (0.0128)
familysize	0.0937*** (0.00607)	0.103*** (0.00620)	0.101*** (0.00624)
loan_rate	0.0114 (0.0121)	0.0144 (0.0120)	0.0126 (0.0121)
ln_bigthing	0.0300*** (0.00383)	0.0301*** (0.00382)	0.0301*** (0.00382)
insurance_rate	-0.0316 (0.130)	-0.0593 (0.130)	-0.0510 (0.130)
care_rate	2.441*** (0.275)	2.376*** (0.275)	2.385*** (0.275)
food_rate	0.0105 (0.0203)	0.000323 (0.0203)	0.00188 (0.0203)
eec_rate	-0.104*** (0.0192)	-0.104*** (0.0192)	-0.103*** (0.0192)
beauty_rate	1.122** (0.411)	1.109** (0.410)	1.101** (0.410)
west	0.0434 (0.0259)		0.0567* (0.0261)
urban		0.119*** (0.0245)	0.124*** (0.0246)
_cons	6.061*** (0.131)	6.241*** (0.131)	6.186*** (0.133)
Year FE	YES	YES	YES
N	15394	15394	15394
R ²	0.040	0.042	0.042

Note: *, **, and *** represent the statistical significance levels of 1%, 5%, and 10%, respectively; the values in parentheses are the t-statistics of their corresponding estimated values.

Through fixed regional effect, we can know every urban family is relatively the same income of rural households, health care in the family will have more spending, we also can see from the regression results for the condition of the same family, the family in western areas may be spending more on medical services, through comprehensive comparison, The difference between urban and rural areas is more significant than that between eastern, central and western regions, showing that the coefficient of urban is greater than that of western regions. The reason may be that the promulgations and implementation of urban and rural medical policies are more different from the medical system implemented by the state in each region, and urban and rural residents are more different in medical health awareness and convenience of access to medical services, resulting in a large gap between urban and rural residents' family medical expenditure.

Most variables in the regression are significant, and we have the following analysis for several non-significant variables:

Household Debt Ratio: The reason why the impact of debt ratio on medical expenditure is not significant may be different from the reasons of debt. For example, for the debt caused by disease, the disease expenditure is rising, and the debt ratio is also rising. For the families not caused by

disease, the debt may be large, and the expenses to meet their own living needs, but also need to repay the loan, so as to reduce the medical expenditure.

Proportion of Spending on Entertainment and Education: In the result of cultural and entertainment spending accounted for the increase of the impact on health spending, but its coefficient of tiny, insignificant at the same time, the possible reasons, entertainment education expenditure proportion can express their personal attention degree to the health and indirect proportion of ascension, means the families pay more attention to the quality of life, so pay more attention to health, can timely check-up, healing, but at the same time, They are likely to be healthier than other families as a result of increased attention to health, which can reduce medical expenses due to illness to a certain extent.

Urban and rural areas: Regional impact on health spending is uncertainty, urban residents in health care spending will be more, but its coefficient of tiny, and was not significant, it may have caused urban medical care is relatively sound, residents better medical care, as well as the health consciousness is higher, willing to spend more money on health care, for rural families, medical condition is better than city, Rural families pay less attention to health and so on, which may lead to the medical expenditure of rural families than urban residents.

Region: As can be seen from the regression in the same conditions of families and the economic development in western China is relatively good compared to the east, the central region, the western region spending more on health care costs, the reason may be that regional geography, the different living habits, eating habits of life, and the low level of medical development, need to trans-regional, lead to higher medical expenses of the people in the west and However, its coefficient is small and insignificant, indicating that there are many influencing factors. It is necessary to further refine the data by region to improve the accuracy of the judgment of regional influence.

5.3 Robustness Analysis

Family increase in the number of the uncertainty caused by the increase of affect health spending, because of the increased greatly, can increase more in number of cases in the family, so we get rid of a family number too much data to leave family number in family per capita number (3.6) to float data (greater than 2 and less than 6) to return again.

Compared with the regression data (Table 5) that had not been eliminated before, the vast majority of parameters did not change significantly, and some parameters that were not significant had changed significantly. This shows that its robustness is good.

Table 6. Robustness Analysis Results

Variable	FE	FE
ln_income	0.0922*** (0.0128)	0.0854*** (0.0141)
familysize	0.101*** (0.00624)	0.0625*** (0.00949)
loan_rate	0.0126 (0.0121)	0.0162 (0.0123)
ln_bigthing	0.0301*** (0.00382)	0.0284*** (0.00411)
insurance_rate	-0.0510 (0.130)	-0.189 (0.137)
care_rate	2.385*** (0.275)	2.864*** (0.334)
food_rate	0.00188 (0.0203)	0.00182 (0.0222)
eec_rate	-0.103*** (0.0192)	-0.102*** (0.0249)
beauty_rate	1.101** (0.410)	1.173* (0.459)
west	0.0567* (0.0261)	0.0652* (0.0281)
urban	0.124*** (0.0246)	0.147*** (0.0264)
_cons	6.186*** (0.133)	6.420*** (0.149)
Year FE	YES	YES
N	15394	13027
R ²	0.042	0.027

Note: *, **, and *** represent the statistical significance levels of 1%, 5%, and 10%, respectively; the values in parentheses are the t-statistics of their corresponding estimated values.

5.4 Insufficiency

Multiple regression of household income of more than 12% of the influence of medical expenses, which may show some missing variables, such as "family fortune", to overestimate the influence of family income, but in 2016 and 2018 of the databases is not entirely suited to express this return to "family fortune" in the data, so there is a certain deviation.

Due to the simplification of the model and the complexity of the influencing factors, although the number of samples is sufficient, the representativeness of this study is still not strong enough. It is necessary to optimize and construct the model again and further select and process the data from the known existing surveys, so as to obtain a more representative conclusion and result.

6. Conclusion and Implications

6.1 Conclusion

By studying the questions, data, and models, we can figure out the relationship between income and medical expenditures, which are also affected by the size of the corresponding family, and additional medical expenditures due to unavoidable contingencies. The proportion of insurance expenditure, food expenditure and beauty expenditure can reflect the degree of wealth and poverty of

a family as well as their own emphasis on health appearance. Different regions have different medical expenditure, and we can draw the following conclusions:

1. The impact of family income on medical expenditure is more than 13%, which has a significant positive impact on family medical expenditure, indicating that family income is the key factor affecting family medical expenditure. In addition, the increase of family income enables family members to go to hospitals and other medical facilities to receive medical services, thus increasing the family's medical expenses and safeguarding their own health.

2. The increase of family members will bring heavier burden to the family. Medical expenses will increase with the increase of family members, resulting in heavier economic burden for family members.

3. The study of the regional can get, urban families of family health spending is greater than the medical expenditure of rural households, but urban household income is significantly greater than income of rural households, the same to the east of central and western regions to this conclusion still apply, but compared with regional differences, urban and rural difference is larger and more significant. In addition, regional differences are not only reflected in income, but also in regional differences and inconsistent local customs and living habits, which may also lead to the different incidence of disease among residents of different regions to a certain extent, and therefore, medical expenditure varies with regions.

4. Commercial insurance ginseng protect will affect health spending, to some extent by empirical results can be found home insurance spending has negative effects on medical expenses, family insurance rate will increase the risk of medical costs reduced to a certain extent, its reason for commercial insurance to pay part of out-of-pocket medical expenditures, which show the family health spending than falling

6.2 Revelation

To sum up, there are differences in family and individual as well as regional differences in influencing family medical expenditure. We can draw the following enlightenment:

Sustained economic development, the steady development of the national economy, so that the family income continues to grow, so that people accept treatment, rather than no treatment, so that life safety and health are fully guaranteed, which is more conducive to improving the national health index.

For the occurrence of accidental diseases, the government can give corresponding subsidies, so that their diseases can be cured.

Promote the importance of health, encourage residents to participate in health-related sports and entertainment activities, so as to reduce the risk of disease of residents, and provide adequate sports and entertainment venues to meet the needs of residents.

Regional differences are not only reflected in economic policies, but also in local climate, living environment and living habits.

With regard to economic differences, the government should drive rural areas to become richer and increase the income of rural families. The call for active rural revitalization can not only improve rural family income, but also improve the life satisfaction of rural residents, reduce the urban-rural income gap and reduce the proportion of medical expenditure. In addition, the government should attach importance to the development of rural medical care, improve the number and quality of medical institutions in rural areas, fully meet the needs of residents for medical services, so that rural residents can receive treatment, reduce the medical burden of rural residents, and ensure the basic medical service needs of rural population. At the national level, we should actively promote the development of the western region, promote the economic development of the western region, and alleviate the inequity caused by the unbalanced economic development.

In addition, improving the service capacity of primary medical institutions is also an important way to reduce medical expenses. To avoid cross-regional medical treatment caused by a long distance,

it not only improves the ease of medical treatment for residents, but also reduces the medical expenditure, so that residents do not need to change places for medical treatment, but local treatment.

For families and individuals, the need to strengthen the consciousness of health, for example, regular physical examination, regular physical examination can not only to understand the current physical health, and take preventive measures and treatment in time, reduce the risk of disease caused by the physical examination to help reduce unnecessary due to fault diagnosis and misdiagnosis of medical expenses, to ease the burden of medical expenses of the family.

The state should further accelerate the improvement of the existing medical insurance system, so as to further improve the level of medical insurance for residents; In addition, continue to promote the construction of new countryside, improve the conditions of rural medical services, narrow the gap between urban and rural residents to receive medical services, is conducive to promoting social equity; We will continue to reduce the price of medical services, so that residents can obtain necessary medical services at a lower price, improve the health index of the people, and then improve the happiness of the people.

References

- [1] Li Cong, Liu Xihua, Jiang Donghui. How does household debt affect medical expenditure? ——An empirical analysis based on the threshold effect model [J]. *Dongyue Lun Cong*, 2020, 41 (10): 77 - 85.
- [2] Cao Yan, Wang Xiaoqin. A survey on the impact of health care expenditure on the economic status of rural households in my country [J]. *China Health Statistics*, 2008 (03): 302 - 304.
- [3] Ye Chunhui, Feng Jin, Wang Xiaorun. Income, Educational Level and Medical Consumption: An Analysis Based on Farmers' Micro Data [J]. *China Rural Economy*, 2008 (08): 16 - 24.
- [4] Li Xiaolei. Investigation and Research on the Relationship between Family Economic Income and Medical Expenses [J]. *Foreign Medicine (Health Economics)*, 1998 (01): 16 - 20.
- [5] Wang Xinjun, Zheng Chao. Influence of medical insurance on medical expenditure and health of the elderly [J]. *Research on Finance and Economics*, 2014, 40 (12): 65 - 75.
- [6] Hu Hongwei, Qu Yanhua, Gao Min. Analysis of the Effect of Medical Insurance on Family Medical Consumption Level——Also on the Joint Influence of Medical Insurance and Poverty [J]. *Journal of Northwestern University (Philosophy and Social Sciences Edition)*, 2013, 43 (04): 20 - 27.
- [7] Han Jingshu. The Impact of Social Basic Medical Insurance on Family Consumption [J]. *Business Economics and Management*, 2015 (05): 79 - 87.
- [8] Chang Xue. Residents' health and medical expenditure under the overall planning of urban and rural medical insurance [D]. *Nanjing Agricultural University*, 2019.
- [9] Chai Huamin. An Empirical Analysis of Medical Service Demand and Medical Security of Chinese Urban and Rural Residents [J]. *World Economics and Wenhui*, 2013 (05): 107 - 119.
- [10] Tan Tao, Zhang Yanyuan, He Jun. Analysis of Influencing Factors and Elasticity of Medical Consumption Expenditure of Chinese Rural Residents [J]. *Journal of Shanghai University of Finance and Economics*, 2014, 16 (03): 63 - 69+112.
- [11] Chen Xinguang, Rao Keqin, Wei Sheng. Research on the Economic Model of Demand Elasticity for Basic Medical Services in China's Rural Areas [J]. *China Health Service Management*, 1996 (03): 150 - 153.
- [12] Lan Yuxi. Individual income and medical service demand and its elasticity [J]. *Zhonghua Hospital Management Journal*, 1997 (10): 6 - 9.
- [13] Chu Deyin, Huang Wenzheng, Zhao Fei. Regional Differences, Income Inequality and Consumption of Urban and Rural Residents [J]. *Economic Development*, 2013 (01): 46 - 52.
- [14] Xiao Qin, Li Ading. Research on the Influence of Differences in Medical Expenditure in China's Urban and Rural Areas——Based on Residents' Coping and Prevention of Diseases [J]. *Journal of Jiangxi University of Finance and Economics*, 2018 (02): 69 - 78.
- [15] Xu Fuzhi. Research on residents' well-being and its influencing factors system [D]. *Huaqiao University*, 2020.