

Evaluation of Precision Poverty Alleviation Effect of Medical Insurance Policy

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Abstract

In this paper, based on the data of family follow-up survey in China from 2014 to 2018, the fixed effect model is used to empirically analyze the impact of medical insurance on family income. Research conclusions: First, participating in medical insurance has a significant positive impact on personal income increase. Compared with those who did not participate in medical insurance, the income of individuals who participated in medical insurance increased by about 28%, which means that medical insurance has a precise poverty alleviation effect. Second, there are obvious differences in the income-increasing effects of medical insurance on different groups. For men, western and eastern China, there is no significant income-increasing effect of medical insurance. Third, one's own health has strengthened the income-increasing effect of medical insurance. Disease shock is an important factor that leads to rural individuals and families falling into economic crisis. In order to effectively prevent poverty caused by illness and returning to poverty due to illness, the government should constantly improve the design of medical insurance system, society and individuals should raise their awareness of the importance of medical insurance, strengthen the publicity of medical insurance participation, encourage people to actively purchase and participate in social basic medical insurance, ensure the effective improvement of medical insurance participation rate, and give full play to the basic medical insurance's all-round protection function.

Keywords

New rural cooperative medical system, Income, Targeted poverty alleviation.

1. Introduction

Focusing on the problems of poverty caused by illness and returning to poverty due to illness, basic medical insurance can effectively improve the ability of rural residents to resist disease risks. Moreover, compared with the poverty alleviation measures such as government assistance and direct subsidies, the basic medical insurance needs not only the design and improvement of the government system, but also the people's active purchase and participation in medical insurance, which is an important tool for accurate poverty alleviation in China. Income is a key indicator to measure the effect of precise poverty alleviation. Whether medical insurance can improve people's ability to resist disease risks, and whether it can also increase residents' income and produce a direct effect of precise poverty alleviation and income increase, the existing research has not reached a unanimous conclusion, which needs further investigation. Based on this, this paper uses the data of CFPS national follow-up survey to empirically analyze the impact of medical insurance on income, which is of great significance for achieving accurate poverty alleviation and promoting common prosperity.

2. Literature References

Yin et al. (2023) systematically evaluated the poverty alleviation effect of ex situ poverty alleviation relocation based on the microscopic tracking data of poverty-stricken households in three counties of G City, S Province in western China[1]. The empirical analysis results show that ex situ poverty alleviation relocation has significantly improved the per capita net income of families, and has obvious poverty reduction and income increase effects. Duan(2021) and Guo(2021) evaluated the precise poverty alleviation effect of policy-based agricultural insurance, and found that policy-based agricultural insurance significantly improved the family's risk resistance and income[2, 3]. Chen et al. (2018) studied the poverty reduction effect of public transfer payment from the perspectives of income poverty and multidimensional poverty, and found that public transfer payment significantly reduced the poverty probability, and the poverty reduction effect changed in an inverted 'U' shape with the increase of the sample's poverty probability[4]. In addition, measures such as education, industrial poverty alleviation, special financial funds and financial support also have a significant impact on the income of poor families[5, 6]. From the perspective of consumption expenditure of precision poverty alleviation effect, various precision poverty alleviation effects increase the per capita consumption expenditure of families, improve the consumption structure of families, increase the expenditure on food, clothing, housing, transportation, communication, education and entertainment, and reduce the expenditure on medical care[7, 8, 9].

Disease is the most important risk factor among the causes of poverty and return to poverty for individuals or families in China. For low-income families, the ability to resist the impact of diseases is relatively weak, and economic restrictions prevent them from receiving better treatment and medication. The attack of major diseases and long-term illness have led to the decline of family quality of life and labor ability, and then they have fallen into a vicious circle of disease and poverty[10, 11, 12]. Medical insurance is an important means to cope with the impact of diseases, which can effectively solve the problems of poverty caused by illness and returning to poverty due to illness in low-income families through stabilizing effect and enhancing effect[13, 14, 15]. Based on this, many scholars pay attention to analyzing the effect of medical insurance policy on family income and expenditure, focusing on a large number of poor rural residents in China and medical insurance in rural areas. For rural residents, social medical insurance is mainly the new rural cooperative medical system. Some studies have found that affordable public services such as the new rural cooperative medical system can directly and indirectly alleviate poverty by reducing the probability of out-of-pocket medical expenses and catastrophic medical expenses, effectively reducing the vulnerability of rural families, and the poverty reduction effect is obvious[16, 17, 18]. However, there are also differences in the poverty reduction effects of different functions of the new rural cooperative medical system. The research shows that the outpatient co-ordination insurance of the new rural cooperative medical system does not have a significant poverty reduction effect, while the hospitalization co-ordination insurance can effectively reduce the incidence of poverty among rural residents. However, some studies have found that medical insurance has not significantly improved the income and consumption expenditure of residents, achieving the expected poverty reduction effect, or the impact effect is very small[19, 20, 21]. In view of the insignificant poverty reduction effect of medical insurance, scholars have found that this may be related to the 'upward movement' of the object orientation of medical insurance system design, which makes it impossible to accurately play the role of medical insurance[22, 23]. It may also be related to the continuous expansion of national medical expenses. In the face of increasing medical pressure, the reimbursement ratio of medical insurance can only be continuously reduced, which in turn leads to the weakening of the poverty reduction effect of medical insurance[24, 25].

3. Research Design

3.1. Data Source

This paper uses the data of China Family Tracking Survey (CFPS) released by Peking University. This paper focuses on the evaluation of poverty alleviation effect of medical insurance policy in rural areas, so in the process of data processing, the samples with urban hukou and long-term settlement in towns are deleted. At the same time, focus on the new rural cooperative medical system (referred to as the new rural cooperative medical system), and focus on the poverty alleviation effect of medical insurance for rural working-age population. In the process of data processing, in order to ensure that the samples are all working-age population, the samples with educational status of studying are deleted. With the research demand as the limiting condition, after strict and serious data cleaning and sorting, it is finally determined that the data observation value of this study is 17190.

3.2. Descriptive Statistical Analysis

Table 1 shows the definitions and basic statistical characteristics of all variables involved in the study. Descriptive statistical analysis shows that the average per capita net income of families is 14,705 yuan, slightly higher than the per capita net income of farmers announced by the Ministry of Agriculture and Rural Affairs in 2018 (Ministry of Agriculture and Rural Affairs, 2018). With the continuous improvement and popularization of the new rural cooperative medical insurance policy, the participation rate of rural residents in medical insurance has been increasing, and the participation rate of the new rural cooperative medical insurance in this study sample has reached 89.8%. From the gender distribution of the samples, male samples account for 51.0% and female samples account for 49.1% of the total samples, and the distribution is relatively balanced.

Table 1: Definition of Variables and Descriptive Statistical Analysis

Variable	Definition	Mean	Std.Dev	Min	Max
Dependent Variable					
income	Per capita net income of families in the past 12 months (RMB)	14705	13141	0	12000
Independent Variable					
medinsur	Participation is 1; No is 0	0.898	0.302	0	1
Regulated Variable					
Self-Health	Unhealthy is 1; Less healthy is 2; Generally 3; Relatively healthy is 4; Very healthy at 5	3.103	1.214	1	5
Control Variables					
Individual characteristics					
gender	Male is 1; Female is 0.	0.510	0.500	0	1
age	Actual age at the time of interview (Years)	42.70	9.869	16	60
edu					
Primary School	Primary school and below is 1; No is 0	0.485	0.500	0	1
Junior School	Junior high school is 1; No is 0	0.369	0.482	0	1
Senior High School	High school is 1; No is 0	0.114	0.317	0	1
College	College degree or above is 1; No is 0	0.032	0.177	0	1
married	Marriage and cohabitation are 1; Unmarried, divorced and widowed	0.914	0.280	0	1

endowinsur	Participating in endowment insurance is 1; No is 0	0.333	0.471	0	1
Family characteristics					
familynum	Total number of households (persons)	4.480	1.832	1	13
water	Rainwater, rivers and lakes/pond water is 1; No is 0	0.050	0.218	0	1
unclean/ dirty	Well water, cellar water and tap water are 1; No is 0	0.941	0.235	0	1
common	Barreled water/purified water/filtered water is 1; No is 0	0.009	0.093	0	1
clean	Firewood and coal are 1; No is 0	0.398	0.490	0	1
cookfuel	Liquefied gas and natural gas are 1; No is 0	0.348	0.476	0	1
unclean/ dirty	Solar energy and electricity are 1; No is 0	0.253	0.435	0	1
common	Number of households participating in paid labor (persons)	0.359	0.762	0	6
clean	Total number of houses owned by families	1.023	0.207	0	6
jobnum	Members of social organizations are 1; No is 0	0.134	0.340	0	1
housesum	Engaged in own agricultural production and management for 1; No is 0	0.549	0.498	0	1
Social characteristics					
socialmem	Self-employment is 1; No is 0	0.111	0.314	0	1
jobclass	Working in agriculture is 1; No is 0	0.013	0.114	0	1
agricultural production	Engaged in employment is 1; No is 0	0.327	0.469	0	1
private enterprises	Internet access is 1; No is 0	0.610	0.488	0	1
working in agriculture	Very dissatisfied is 1; Less satisfied is 2; Generally 3; Satisfied with 4; Very satisfied with 5	3.785	1.043	1	5
employed	Accepting government subsidies is 1; No is 0	0.426	0.494	0	1
inter	Accepting social assistance is 1; No is 0	0.010	0.098	0	1
satisfy	1 in 2014; No is 0	0.333	0.471	0	1
govhelp	1 in 2016; No is 0	0.333	0.471	0	1
sochelp	1 in 2018; No is 0	0.333	0.471	0	1
year	1 in the west; No is 0	0.345	0.475	0	1
2014	1 in the middle; No is 0	0.258	0.437	0	1
2016	1 in the east; No is 0	0.269	0.443	0	1
2018	1 in the northeast; No is 0	0.129	0.335	0	1
origin_diqu					
west					
middle					
east					
northeast					

3.3. Empirical Analysis Model

In this paper, the Fixed Effect Model (FEM) is mainly used as the basis and main model of empirical analysis to explore whether the participation in the new rural cooperative medical system has an impact on personal net income and what impact effect it has. Panel data includes two dimensions: section and time. Let I ($i=1,2,\dots,N$) represent the number of section individuals, and t ($t=2014,2016,2018$) represent the time (year). The linear model of panel data is as follows:

$$\ln fincome_{it} = \alpha_i + \lambda_t + medinsur_xnh_{it}\beta_1 + x_{it}\beta_2 + \epsilon_{it} \quad (1)$$

Among them, $\ln fincome_{it}$ is $N \times 1$ dependent variable, which indicates the personal net income of individual i in t years; $medinsur_xnh_{it}$ is $N \times k$ independent variable, indicating whether individual i participates in the new rural cooperative medical system in t year; x_{it} is the control variable of $N \times k$; ϵ_{it} is the model error term; β_1 and β_2 are parameters to be estimated, indicating the marginal effects of $medinsur_xnh_{it}$ and other control variables on $\ln fincome_{it}$; α_i stands for individual effect, which means those influencing factors that do not change with time; λ_t stands for time effect, which is used to control the influence of factors that change with time. When α_i and x_{it} are related, that is, $\text{corr}(\alpha_i, x_{it}) \neq 0$, the model is a fixed effect model.

4. Empirical Analysis and Discussion

4.1. Direct Effect of Medical Insurance Policy on Individual Income

Table 2 reports the effect of rural residents' participation in the new rural cooperative medical system on their personal net income. The regression results show that the influence coefficient of participating in medical insurance on the personal net income of rural residents is 0.119, and the coefficient value is significant at the statistical level of 1%, which confirms the research hypothesis 1 that participating in the new rural cooperative medical system will significantly improve the personal net income of rural residents compared with those who have not participated in the new rural cooperative medical system. The reason is that medical insurance, as the most important part of social insurance, has the function of redistribution, which can avoid health risks and promote economic development. With the development of social economy, the transfer of rural surplus labor force is more and more frequent, but constrained by the household registration system and the education level of the labor force, these migrant workers, especially the first generation of migrant workers, are engaged in physical labor, and their work performance is seasonal, periodic and unstable, which also determines that rural migrant workers cannot participate in medical insurance for urban workers.

Table 2: Study on the Influence of Medical Insurance on the Personal Net Income of Rural Residents

Infincome	Panel (OLS)		Panel (IV)	
	Coef.	Std. Err.	Coef.	Std. Err.
medinsur	0.119***	0.036	0.281***	0.109
gender	0.239	0.641	0.237	0.641
age	0.002	0.020	0.003	0.020
edu (Control Group: Primary School)				
Junior School	0.019	0.051	0.019	0.051
Senior High School	0.085	0.095	0.084	0.095
College	0.187	0.147	0.182	0.147
married	0.021	0.074	0.021	0.074
endowinsur	0.063***	0.021	0.054***	0.021
familynum	-0.060**	0.007	-0.062***	0.007
water	0.010**	0.037	0.011	0.037
cookfuel	0.076***	0.013	0.075***	0.013
jobnum	0.125***	0.012	0.125***	0.012
housenum	-0.011	0.038	-0.011	0.038
socialmem	0.024	0.024	0.024	0.024
jobclass(Control Group: Agricultural -)				
private enterprises	0.179***	0.039	0.179***	0.039
working in agriculture	0.243***	0.067	0.242***	0.067
employed	0.270***	0.030	0.270***	0.030
inter	0.043**	0.020	0.041**	0.020
satisfy	0.010	0.008	0.010	0.008
govhelp	0.061***	0.018	0.060***	0.018
sochelp	0.088	0.071	0.083	0.071
year	Yes	Yes	Yes	Yes
origin_diqu(Control Group: west)				
middle	0.157	0.151	0.161	0.152
east	0.223	0.129	0.226*	0.129
northeast	0.023***	0.239	0.009	0.239
constant	8.356***	0.876	8.202***	0.882
R-squared	0.222	0.222	0.2188	0.2188

Note: *, ** and *** are significant at the statistical level of 10%, 5% and 1% respectively.

In the basic regression of medical insurance to personal net income, there may be endogenous problems. Based on this, this paper further uses the linear IV-2SLS model for regression analysis, and selects the average participation rate of individuals in the urban area as an explanatory variable to participate in the new rural cooperative medical system. For residents living in the same area, they have the same or very similar regional culture, so the average participation rate at the urban level will have an impact on residents' participation behavior. At the same time, the average participation rate in urban areas will not directly affect the net income of individuals. After the identification and testing of instrumental variables, it is very appropriate to select the average participation rate in urban areas, which can overcome endogenous problems. After dealing with the endogenous problems, regression was conducted again. The results showed that the participation in the new rural cooperative medical system

did have a positive and significant impact on the personal net income of rural residents, but the coefficient value changed from 0.119 in the basic regression to 0.281, which fully explained that the basic linear regression underestimated the impact of medical insurance policy on residents' income to some extent.

4.2. Heterogeneity Analysis

The effect of medical insurance policy on poverty alleviation of different groups in rural areas may be different. This paper focuses on gender differences and regional differences, and focuses on the impact of medical insurance policy on individual net income of different groups. From the perspective of gender, the empirical analysis results show that there are great differences in the influence of medical insurance on the personal net income of men and women. On the whole, medical insurance has a positive effect on women's and men's personal net income, but the effect on men is not significant, but it has a significant promoting effect on women's personal net income. This difference between men and women is likely to be related to women's conservative ideas in all aspects. Whether in life, work, entrepreneurship and other processes, women are more sensitive to potential risks and all kinds of behaviors are more conservative than men. At the same time, in the economic society, most women's economic strength is inferior to that of men, which can be seen from the number of women in the wealth list. Although many women participate in the labor market, due to many factors, women's economic status is still at the middle and low level, which in turn makes women more risk-averse, and participating in medical insurance has more obvious psychological comfort and economic support for women, which ultimately shows that the medical insurance policy has a particularly significant effect on women's poverty alleviation.

Table 3: Gender Differences in the Influence of Medical Insurance on Rural Residents' Personal Net Income

Infincome	Panel (Female)		Panel (Male)	
	Coef.	Std. Err.	Coef.	Std. Err.
medinsur	0.153***	0.052	0.079	0.049
origin_diqu(Control Group: west)				
middle	-0.474*	0.283	0.384**	0.182
east	0.026	0.220	0.302**	0.160
northeast	-0.205	0.389	0.131	0.304
Constant	10.840***	1.644	7.713***	0.936
R-squared	0.1459	0.1459	0.2089	0.2089
Observed	8421	8421	8769	8769

There are also regional differences in the influence of medical insurance on the personal net income of rural residents. Data analysis shows that for rural residents in central and northeast China, participating in the new rural cooperative medical system has a significant positive effect on their personal net income. For rural residents in the western and eastern regions, participating in the new rural cooperative medical system has a positive impact on their personal net income, but it is not significant. Combined with the social and economic development of each region, this is closely related to the economic development and resource allocation of different regions. In the western region, where the economic development is relatively backward, the income sources of residents in rural areas are very limited. Compared with the impact of medical insurance on income, broadening the channels for working and

increasing diversified channels for working are important factors to increase income, so the poverty alleviation effect of medical insurance is not very significant.

Table 4: Effect of Medical Insurance on Personal Net Income of Rural Residents in Different Regions

Infincome	Panel(west)		Panel(middle)		Panel(east)		Panel(northeast)	
	Coef.	Std.Err	Coef.	Std.Err	Coef.	Std.Err	Coef.	Std.Err
medinsur	0.013	0.073	0.197***	0.075	0.072	0.064	0.249***	0.070
endowinsur	0.173***	0.043	0.004	0.039	-0.009	0.038	-0.013	0.047
year	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Constant	7.918***	1.084	8.119***	2.242	11.400***	2.207	14.570***	2.743
R-squared	0.1788	0.1788	0.1633	0.1633	0.1397	0.1397	0.1309	0.1309
Observed	5928	5928	4428	4428	4620	4620	2214	2214

4.3. Health effect test of medical insurance policy

Through the test of regulatory effect, this paper finds that the health status of rural residents has strengthened the precise poverty alleviation effect of medical insurance policy. Under the condition that rural residents' own health status is better, the positive effect of medical insurance on personal net income is significantly enhanced, which shows that medical insurance and their own health status have obvious promoting effects. On the whole, medical insurance has psychological comfort for rural residents to resist disease risks and economic support behavior to reduce actual disease expenditure. For rural residents with relatively poor health, the positive impact of medical insurance on personal net income is mainly reflected in the actual behavior of reducing disease burden. For healthy rural residents, the psychological comfort and economic support behavior of medical insurance are reflected, which ultimately shows the strengthening role of their own health in the precise poverty alleviation process of medical insurance policy.

Table 5: Regulatory Effect of Health in Precise Poverty Alleviation by Medical Insurance Policy

Lnfincome	Panel (A)			Panel (B)		
	Coef.	Std.Err	P> z	Coef.	Std. Err.	P> z
medinsur	0.122	0.030	0.000	0.122	0.030	0.000
self-health	0.014	0.006	0.017	0.014	0.006	0.017
medinsur * self-health				0.019	0.004	0.000

5. Conclusion

Based on CFPS from 2014 to 2018, this paper empirically analyzes the precise poverty alleviation effect of medical insurance policy by using panel data fixed effect model and instrumental variable IV model. The research finds that: First, rural residents' participation in the new rural cooperative medical system has a significant positive impact on their personal net income. Second, the precise poverty alleviation effect of medical insurance policy has different effects on men and women. On the whole, participating in the new rural cooperative medical system has a positive impact on residents' personal income, but it has a significant effect on women, but not on men. Thirdly, there are regional differences in the precise poverty

alleviation effect of medical insurance policy. Compared with the central and northeastern regions, the medical insurance policy does not have a significant precise poverty alleviation effect in the western region and the eastern region with slightly lagging economic development. Fourth, in the process of medical insurance policy promoting accurate poverty alleviation, individual's own health plays a strengthening role.

Based on the research conclusion, in order to give full play to the positive role of medical insurance policy in social and economic development, the following suggestions are put forward: First, we must accelerate the provincial overall planning of basic medical insurance and further enhance the fairness and coordination of medical insurance. Secondly, the government should optimize the payment methods and procedures, keep the payment system smooth, make full use of convenient ways such as mobile phone Alipay, WeChat WeChat official account and bank software binding withholding, and highlight the convenience of participating in insurance. Finally, we should improve the policies and procedures for people with new formats and difficulties to participate in insurance. For the long-term and flexible jobs of rural migrant workers, such as construction workers, take-away workers and entrepreneurs with new formats, we should formulate medical insurance policies suitable for these groups according to their own needs.

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