

Health and Rural Cooperative Medical Insurance in China: An empirical analysis

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Abstract

China abandoned its free universal health care system and privatized it since 1980s. The direct consequence was that many people lost their access to health care, especially those without employers, including farmers in rural China, which in turn significantly reduced their medical care utilization. A new wave of rural cooperative medical insurance was first promoted in selected areas in 2003 and has since spread to the whole nation. The ultimate goal is to cover all the rural areas by 2010. Using 4 waves of China Health and Nutrition Survey (CHNS) data before and after 2003, our paper shows that in general health insurance has a significantly positive impact on individuals' health status, even during the period of health care privatization. We also find that the new cooperative insurance scheme attracted more individuals with worse health. Although it might be the goal of this new scheme to cover all rural population, it definitely raises concerns about over-utilization and financial sustainability.

Keywords: cooperative health insurance, health status, China

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1 Introduction

In 2003, China launched a new health insurance program, aimed at covering the whole rural population. This new program is called “New Rural Cooperative Medical System” (NRCMS), which is a match fund comprising of central government subsidy, county government contributions and individual contributions (poor rural residents’ contributions are waived). In this paper we are interested in rural residents’ actual participation in this new scheme and what are the factors that affect their decision to join and stay in the program, in addition, we examine the effectiveness of this program on some medical care use.

This program’s design comes from the government’s will to remedy the problems that arose following the previous overhaul of the once-highly-acclaimed universal health care in the 1980’s, accompanying the market reform in rural areas from collective to household responsibility system. This privatization of rural health care created a lot of problems, from which one direct result is the low coverage of health insurance for rural population. “By 1984, village coverage had dropped to 4.8%. In 1989, however, the central government launched a nation-wide ‘rural primary health care’ program and RCMS village coverage progressed to 10% by 1993.” (Carrin et al. (1999)) And “By 1998, only 9.5% of the rural population was insured.” (Liu (2004)) With this low coverage rural Chinese are exposed to health and financial risks, which may have long-term negative effects on economic development when the uninsured can not get medical care—putting poor sick people into poverty traps. Liu, Rao, and Hsiao (2003) estimate the impact of medical expenditure on the poverty headcount rate and conclude that “...medical spending raised the number of rural households living below the poverty line by 44.3%.”

In October 2002, Chinese government put forward a new initiative to gradually establish a New Rural Cooperative Medical System focusing on inpatient-care (Ministry of Health 2004). This new initiative was launched in 2003 and planned to cover the whole rural population by 2010. At the beginning this insurance package had a minimum requirement of 10 Yuan from individuals and 10 Yuan from local governments. Then subsidies from local governments were raised to 20 Yuan (40 Yuan in some eastern provinces) and there was a matching subsidy of 20 Yuan from central government for poorer central and western provinces, which amounts to a 50 Yuan minimum level of premium per insured person. In 2008 it is raised to 80 Yuan (Ministry of Health 2008).

One distinct feature of this new scheme is that it is operating at the county level instead of village level and there is considerable heterogeneity in the specific benefits packages across counties in terms of services covered (esp. outpatient vs. inpatient), deductibles, expenditure caps and co-payment rates, although in general only inpatient care is covered (In 2008, this program is projected to combine outpatient with inpatient care.), deductibles are high, caps are low and co-payment rates are high too. Another feature is that the enrollment unit is required to be households to hopefully reduce individuals' adverse selection problem, although in practice there are many partially enrolled households and therefore adverse selection still exists. (Wang et al. (2006))

It is not necessarily the case that providing a new subsidized insurance scheme will definitely attract all rural residents to the program. Wang and Rosenman (2007) are interested in the differences between rural residents' perceived need and actual demand for health insurance and find that "only less than half of the rural residents realize the need of health insurance and only one fifth of them actually purchase it." On another study Zhang et al. (2004) collected data before the start of this new insurance system and focused on the farmers' willingness to join such a newly developed government subsidized initiative; they find that the probability of individual farmer's willingness to join is only 50% and both community level and individual level social capital are positively associated with this probability. Wagstaff et al. (2007) use the difference-in-differences method to evaluate this subsidized voluntary new rural cooperative insurance in 15 counties (10 were program pilots). They find that enrollment is lower among poor households and higher among households with chronically sick members. Wang et al. (2006) show that individuals with worse health status are more likely to enroll in this new insurance than individuals with better health status, which might show the existence of adverse selection, although this new scheme uses households (by policy design) as the enrollment unit to reduce adverse selection by individuals to a certain extent. This is clearly a problem of incomplete compliance in local practice.

As is mentioned before, due to limited funding sources, many services are either not provided or only partially provided; co-payment rates and deductibles are high, etc. So an important policy question is whether insured residents will increase their utilization of both preventative and medical care. Wagstaff et al. (2007) find that this new insurance scheme has increased outpatient and inpatient utilization by 20-30%, but has no impact on out-of-

pocket spending or utilization among the poor.

As is described above, most studies on this issue used only data either from the pilot period or from the first 2 years or so of the program. Nothing has been known about the relative longer term impact of NRCMS. We use a unique longitudinal dataset from China Health and Nutrition Survey, covering both pre- and post-program periods, to estimate the impact on individual health of both NRCMS and previous several rural insurance schemes. We find that holding health insurance for 2-4 years generally has a big positive effect on individuals' current self-reported health, and that health insurance systems pre-2002 did not show an adverse selection problem while post-2002 NRCMS has not been able to avoid adverse selection at either individual or village level.

2 Data

This paper uses the longitudinal data from the China Health and Nutrition Survey (CHNS). The first round of survey was conducted in 1989 and six follow-up panels were collected in 1991, 1993, 1997, 2000, 2004 and 2006. This longitudinal survey is designed to catch the ongoing changes in China in the last 20 years in health and nutrition, family planning, and demographic, economic factors. It was conducted in “nine provinces (Guangxi, Guizhou, Heilongjiang, Henan, Hubei, Hunan, Jiangsu, Liaoning, and Shandong) that vary substantially in geography, economic development, public resources, and health indicators”. Both urban and rural areas are randomly selected. About 4,400 households and 19,000 individuals were interviewed. This survey covers the time period that China reforms in many aspects and it is expected to show how the society and Chinese people respond to these changes. The CHNS has asked detailed questions on health related issues, including health status, health insurance coverage, medical providers, and health facilities that the household might use under selected circumstances. In addition, regular medical care use, preventive health services use and objective measures are provided. Such data on health status, health behaviors as well as health insurance coverage can help researchers to study the effects of supply and demand factors on private and public health service demand and the outcomes. The analysis of how health insurance affects health status will be especially important for health policy makers.

This paper examines the influence of rural cooperative health insurance

on health outcomes of insurance participants. Therefore we focus the analysis on the rural Chinese residents sub-sample only. China has a very complicated household registration policy. There are two types of household registration, one being urban registration and the other rural registration. Then there are four categories of residents (in terms of location), rural residents with rural registration, rural residents with urban registration, urban residents with rural registration, and urban residents with urban registration. This complex situation is mainly due to urbanization and migration. It is possible that in the same rural household, some members have rural registration and others have urban registration. Our sample keeps only rural residents in the analysis, 91 percent of which have rural registration, compared to only 9 percent having urban registration.

As is mentioned before, the participation in rural cooperative health insurance system has experienced a dramatic decrease due to the health care system reform since 1980s and it remains at a constant low level for years to follow. In 2003, the Chinese government began to experiment the new rural cooperative health insurance program in selected areas and expands it to the national level afterwards. Therefore we observe a big jump in participation rate after 2003. In addition, the promotion of this new rural cooperative health insurance is usually based on county levels. Thus in order to catch such effects, we use community level data as controls. However, the community survey only asked about village cooperative insurance since 1997, hence we keep the data before and after 2003, including 4 waves in 1997, 2000, 2004 and 2006. Moreover, we drop children and adolescents younger than 16 because the survey did not ask about their subjective health status, which results in a sample of 7,473 respondents in 1997, 6,571 in 2000, 7,029 in 2004, and 6,857 in 2006. Finally in order to utilize as most information as possible we pool all four waves of data together.

3 Estimation Strategy

In the empirical analysis, we use the following variables. The key dependent variable is the self-reported health status. It is asked in the following way, "Right now, how would you describe your health compared to that of other people at your age? - Excellent, good, fair, or poor" This is a four-scale question and we code this variable as having integer values of 1-4, with 1 representing poor health and 4 excellent health. This variable has been

widely used as a measure of overall health status of an individual. The main independent variable is last period rural cooperative health insurance status which is also a self-reported insurance measure. Besides, we construct another cooperative health insurance indicator at village level from community level data. Even though during the health care reform, the majority of the rural villages had lost their cooperative health insurance coverage, there are still some villages which kept the coverage for different kinds of reasons. This variable can measure the overall health care access situation of a specific district. Due to the enforcement of the new rural cooperative health insurance since 2003, we generate a time dummy to demonstrate the break time point before and after year 2003 and then generate two interactive terms between individual cooperative insurance take-up and this break time point, and village cooperative insurance enforcement and this break time point to catch the possible differential effects of different waves of rural health insurance systems.

Other control variables include gender, education level, age, marital status, household size, household per capita income, occupation, elder dummy and baseline subjective health status to control for individual and household heterogeneity. We also include province dummies and year dummies to tease out the administrative differences and aggregate shocks to all these provinces.

We will perform an ordered probit model analysis based on the pooled data of four waves and cluster estimation will also be performed to adjust standard errors for possible serial correlation for any given individual. The standard setup in the literature starts with an index model as the following,

$$\begin{aligned} HS_{i,t+1}^* = & \beta_1 Cins_{i,t} + \beta_2 Vins_{v,t} + \beta_3 Cins_{i,t} * Break + \beta_4 Vins_{v,t} * Break \\ & + \beta_5 Break + \beta_6 HS_{i,t} + \beta_7 X_{i,t+1} + \epsilon_{i,t+1} \end{aligned} \quad (1)$$

where HS^* is the individual's latent health status, $Cins$ is an indicator variable taking on 1 if the individual has cooperative health insurance, $Vins$ is whether the village has cooperative health insurance or not, $Break$ takes on 1 if the current period is after 2002 (when the new rural cooperative health insurance started), and X is the vector of all other demographic and economic factors including age, gender, education, occupation, and marital status, regional indicators, time dummies, and income.

4 Results

Table 1 shows the rural cooperative insurance take-up rates by individual and village over the years from 1997 to 2006. Even though 2003 is the starting year of the new rural cooperative insurance, we still observe changes between 1997 and 2000. The participation rates of both individuals and villages were higher in 1997 than those of 2000, continuing the downward trend since the end of 1980s. Things were getting better after 2000 due to the kick-off of the new insurance plan. We find it consistent with the statistics disaggregated by provinces (2). Moreover, the provincial data demonstrates dramatic variation across provinces, with Jiangsu and Shandong having cooperative insurance all over the years and their participation rates being much higher than those of other provinces. One possible explanation could be that the two provinces have relatively better economic situation. Table 3 shows the average village per capita income by insurance status over years. It consistently tells that those villages under cooperative insurance coverage were richer than their uninsured counterparts. The per capita income of participating villages was about 70%, 50% and 25% higher than that of non-participating villages in 2000, 2004 and 2006.

Table 1: Individual and village cooperative insurance take-up rate(%)

Year	1997	2000	2004	2006
Individuals having cooperative insurance	10.91	6.38	10.39	37.55
Villages having cooperative insurance	34.37	18.79	22.37	59.02

Table 2: Cooperative Health Insurance Take-up Rate by Province(%)

Province	Liaoning	Heilongjiang	Jiangsu	Shandong	Henan	Hubei	Hunan	Guangxi	Guizhou
1997	.	0	28.17	30.61	18.37	5.03	1.08	3.9	0
2000	0.00	0.00	30.22	15.81	1.48	0.73	0	3.5	2.87
2004	0.00	7.8	50.19	14.12	0	5.66	11.44	0.44	5.09
2006	50.57	42.57	59.66	41.19	24.94	46.49	13.93	25.79	35.6

Table 4 indicates the average of the four-scale self-reported health status by insurance status. The higher score implies better health. We find that

insured people had better average health than uninsured people before 2006 and the situation changed in 2006, with uninsured people faring better than insured people. This might be due to the strong self-selection into the new insurance coverage after 2003 because poor people with worse health have access to the health insurance without much cost, thanks to the generosity of the central government. Thus, people with poorer health would be more likely to participate in the new insurance scheme than healthier people. This makes the health outcome and health insurance status simultaneously affect each other, resulting in a possible endogeneity in our estimation for the post-2002 waves of data. To reduce such effects, first we use cooperative insurance in the last period as our main policy variable to explore whether it has any influence on Chinese rural residents' health, and it is also a better indicator than current insurance status, taking into account the time lag between starting an insurance and having better health. Furthermore, a break time dummy (equal to 1 if post-2002) is also applied to catch the effects of the enforcement of new cooperative insurance.

Basic demographic and economic information is shown in Table 5. We define people to be elderly if they are older than 55. Over the study course, the sampled individuals are getting older. It is unsurprising that very few people in rural China received education more than higher school. Over these years, more rural residents quitted their agricultural jobs, migrating to other areas or taking up non-agricultural jobs. The per capita income of each household has been adjusted for local inflation and reflects the real income level.

Table 6 presents the preliminary regression results of an ordered probit analysis. Even though the coefficients of such models cannot be interpreted directly, they can reflect the direction and magnitude of variables of interest. The impact of the lagged individual cooperative insurance is significantly positive on individual's health status. In other words, health insurance coverage can improve people' health. The baseline health also affects the current health significantly which is consistent with Grossman's (1972) health production theory. Although the Break dummy is not significantly, its interactive terms with individual insurance and village insurance have significantly negative impacts on health. The summary statistics already tells that after the launch of the new cooperative insurance plan, more people with worse health participated. The negative interactive coefficients imply that villages with an overall poorer health situation are more likely to participate in the new insurance and individuals with poorer health are more likely to take

Table 3: Average Per Capita Income by Cooperative Insurance Status(Yuan)

Year	2000	2004	2006
Villages having cooperative insurance	2996.20	3017.46	2814.07
Villages without cooperative insurance	1765.24	2010.48	2251.61

Table 4: Self-Reported Health Status by Cooperative Insurance

Year	1997	2000	2004	2006
Insured	2.95	2.85	2.71	2.60
Uninsured	2.82	2.75	2.67	2.66

Table 5: Summary Statistics on Demographics

Variables	1997	2000	2004	2006
Male	0.51	0.48	0.49	0.48
Age	39.73	42.77	45.70	47.44
Elder	0.19	0.22	0.29	0.33
Married	0.71	0.78	0.84	0.85
Education _j High School	0.03	0.04	0.05	0.07
Han	0.86	0.84	0.86	0.86
HH Size	4.33	4.07	3.87	3.97
Per Capita Income	1424	1272	2318	2079
Agriculture	0.71	0.73	0.63	0.61

up the insurance. It is widely known that economic condition is one determinant in health insurance take-up. Table 3 shows a decreasing gap of the income variation between insured villages and uninsured villages over time. From another perspective, it reflects that more villages with lower income and poorer health have participated in the program.

Table 6: Effects of Rural Cooperative Health Insurance on Health Outcomes

Variables	Coefficients
Individual Insurance (t-1)	0.307***
Village Insurance (t-1)	0.015
Health (t-1)	0.294***
Individual Insurance*Break	-0.269***
Village Insurance*Break	-0.147**
Break	0.006
Other Insurance	0.058
Male	0.208***
Age	-0.026***
Age squared	0.000
Elder	-0.083*
Married	-0.037
Higher Education	-0.020
Han	-0.038
HH Size	0.008
Adjusted Per Capita Income	0.000***
Agricultural Work	-0.065**
Liaoning	-0.106*
Heilongjiang	0.247***
Shandong	0.207***
Henan	-0.178***
Hubei	-0.205***
Hunan	-0.052
Guangxi	-0.367***
Guizhou	-0.270***

In addition, we find that rural male residents are more likely to have better health than females and the marital status is not significant after we control

for economic situation and baseline health status. The natural aging process can significantly deteriorate people’s health. More individual income provides more access to health care and generates better health outcomes. From the macro level, we find that except Heilongjiang and Shandong, all other 6 provinces demonstrate overall worse health situation compared to Jiangsu province. It might be attributed to both economic status and environment conditions.

Table 7 gives the results on marginal effects of individual cooperative health insurance on different health outcomes. The cooperative insurance significantly influences all four health outcomes. It reduces the probability of having poor health condition by 2 percentage points and the probability of having fair health 9 points. Similarly it increases the probability of having good health by 4 percentage points and the probability of having excellent health by 7 points.

Table 7: Marginal Effects of Individual Cooperative Insurance on Health

Self-reported Health	Poor Health	Fair Health	Good Health	Excellent Health
Marginal effects	-0.019***	-0.087***	0.040***	0.067***

5 Conclusion

The determinants of individuals’ health include initial health endowments and health investment. In rural China, people invest in health mainly by spending out of pocket on health care and many people do not trust the effects of health insurance because of the uncertainty of health they need to pay premiums first and find the impacts in the unexpected later periods. Although China government has launched the new cooperative health insurance in most rural areas, we still observe the below 100% participation rates. This study explores whether the cooperative health insurance improves health and how large the effects are.

We find both statistical and economic significant effects of cooperative health insurance on Chinese rural residents’ health after controlling for initial health status, other health investment, the launch time of new health

insurance plan and all other related factors. We also observe severe adverse selection phenomenon among rural residents which strongly affects people's health.

Individual insurance take-up is mainly determined by village participation behavior. Enforcement of the new insurance at village level is recommended. Education on the positive health outcomes caused by insurance may be another effective way to increase the participation rate and improve the overall health of rural residents.

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