FARMERS' WILLINGNESS TO PAY FOR COOPERATIVE MEDICAL SYSTEM

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1. Introduction

In rural areas most farmers do not have any health insurance. According to official estimate 82.4% of total villages (about 7 hundred millions population) had no health insurance plan in 1998 [(1)]. In the ten counties where we did survey in 1996 94.2% of farmers had to pay all expenditure from their pockets.

Medical expenditures have been hiking up in recent years. More and more patients could not get necessary health care because they could not afford to pay for the more and more expensive health services. In 1993 33.7% of total patients did not visit doctors in rural areas accordance with National Health Survey. And twenty percent of them did not get services because they could not afford to pay. But the proportion increased to 36% in 1998[(2)].

"How can government provide farmers with health security, especially basic package?" It has been an important issue in China. Theoretically community-based financing and social capital theory have showed that it would be possible to set up a type of sustainable Cooperative Medical System (CMS) in any regions. And there have been some successful examples, such as in Indonesia [(3)].

By "Cooperative Medical System" it means that on base of a community citizens pay premium for their medical care and the community mobilize other resources to establish a pool of fund, and reimburse or partially reimburse citizens' medical care. In the past (planning economy era) we experienced CMS from creating to running and collapsing. Now a big challenge is to reestablish practically a kind of sustainable CMS in poor rural areas in a new environment where market system has being set up. For fulfilling the task we face three key issues, which are relative with each other, (1) financing, (2) organizing and managing (including managing fund), and (3) providing good quality services. I will focus on the first issue.

As a big developing country Chinese government can not provide huge budget to support CMS. CMS's fund will come mainly from farmers' premium. But at the same time in poor rural areas most farmers have only very low income and poor health. Therefore it become a crucial question that "are farmers willing to pay for their own CMS?"

2. Sampling and data

By means of typical sampling we select ten counties of eight provinces in Northwest and Southwest of China and did survey there in 1996.

In each county three townships were chosen according to their economic situation: one was very poor, one was at middle level and one was at top in their locals. In each township three villages and then 30 households were randomly selected. We did a survey for these households. Table one shows basic information about these households.

Table 1. Basic information of sample (1996)

	Number	Percentage(%)		Number	Percentage(%)
			Gender		
Household	2976		Male	6493	51.86
Population	12500		Female	6027	48.14
Ethnic			Gross income (Yuan/per capita)	1340 ($170)	
Han (majority)	10513	83.98	~300 Yuan($36)	223	1.95
Minority	2007	16.02	~600 Yuan($72)	1534	13.41
			~1000 Yuan($125)	3594	31.41
Average number per family	4.3		~2000 Yuan($250)	4560	39.85
			~3000 Yuan($360)	1035	9.05
			3000 Yuan~	541	4.72
Education					
Illiterate	3142	28.33	The insured of property		
Primary school	4583	41.31	or life (household)	708	23.63
Middle school	2784	25.10			
High school and above	583	5.26	Average of expenditure		
(Before school)	(1420)		on living (Yuan per capita)	774	
Marriage status			Proportion of living expenditure		60.0
Married	6756	54.09	Income		
Unmarried	5335	42.71			
Divorce	64	0.051	Average of health care	114	
Widow/widower	336	2.69	expenditure (Yuan per capita)		

The average of nominal gross income of whole national rural population was 2807 Yuan (about $345) in 1996[(5)]. It was about 2.09 times of the gross income of sample population. In terms of the indicator of national poverty line, 600 Yuan ($72) /person, 15.36% of sample population were poverty in which 11.03% of farmers were in absolute poverty condition (income were less than 300 Yuan). The disposable net income of whole national rural population were 1926 Yuan, but according to local government reports they were only 700~1100 Yuan in the ten sample counties.

Furthermore the living expenditure of whole rural population was 1572 Yuan, but it was 774 Yuan for sample population. The latter was 49.2% of the former. However the health care expenditure of poor rural were much more than whole rural population. Their ratio was 114:58.

The literacy rate of adults was 71.67% of the sample. But low education persons and illiteracy were about 70%.

Obviously this is a low education and low income population.

3.Utilization of health Services of the farmers

The farmers with low income and low education have to pay almost all for their medical care from their pockets. Their real consumption is a direct reflection of choice behavior and therefore a revealment of their preference. It is necessary to analyze the features of behavior of utilizing health care in order to understand the willingness to pay for CMS. We will discuss the utilization of inpatient and outpatient services separately.

3.1 Hospitalization

Table 2 shows the situation that patients utilized different hospitals in 1996.

Table 2 Inpatients and their distribution in different hospitals

Type of hospital	number of Observation	total admission	average admission per capita	%	average charge per admission (Yuan)
Township	12500	450	0.36	54.4	391
County(secondary)	12500	212	0.17	26.1	1027
Above county (tertiary)	12500	129	0.10	15.9	1685
Other industries' Hospitals	12500	22	0.01	2.7	272
Total		813	0.065		

There were 65 admissions per 1000 persons for the population. Most

hospitalizations were in township level because its charge was much lower than in secondary and tertiary hospitals. The latter indeed was 3~5 times of the former. In addition distance and non-medical expenditure might impact patients' choice. Generally the secondary and tertiary hospitals are far from poor rural areas, so patients who chose a secondary or tertiary hospital had to pay a lot of non-medical goods and services (But we did not measure them).

3.2 To visit doctors in the "last tow weeks"

Table 3 provides information about outpatients' distribution in different clinics or outpatient department of hospitals in the "last two weeks".

Table 3 Outpatients and their distribution in different types of clinics

Type of clinic or outpatient department	Number of observation	Total visits per capita	Average visits	%	Average charge per visit(Yuan)
Village clinic	10309	766	0.13	64	2.9
Township	10185	237	0.04	19	6.0
County(secondary)	10123	46	0.01	3	156.
Above county (tertiary)	10116	21	0.003	2	134.7
Private physician	10169	114	0.02	10	32.9
Other industries' Hospitals	10129	24	0.003	2	26.0
Total		1204	1.15		

On the average one person visited doctors 1.15 times in the last two weeks. Most of visits were in village or township levels (more than 80%). In these two types of clinics total charge was much lower than in the outpatients department of secondary or tertiary hospitals (1/20 ~ 1/30). But there were 10% of visits, in which patients chose to see private doctors although the total charge in private clinics was much higher than even in township clinics.

3.3 consumption of drugs

In the expenditure on “last two weeks” the proportion of drugs appeared to be especially large.

table 4 Expenditure on medical care and consumption of drugs in two weeks

	Amount	Mean of whole sample	Proportion (%)
Persons who purchase drugs without prescription	624		
Times to purchase drugs by patients	1274	0.14	
Expenditure of self-buying drugs (Yuan)	57012.7	4.55	72.7
Expenditure in clinics (including drugs) (Yuan)	21370.8	1.71	27.3
Total expenditure on health care in two-week (Yuan)	78383.5	6.26	

In the “last two-week” there were 624 farmers bought drugs in pharmaceutical stories (not in hospitals/clinics) without a prescription. The average expenditure per buying was 44.7 Yuan (about $5), and it was 4.55 Yuan per person. This was equivalent to 72.7% of the average expenditure per person in the two-week. And the expenditure in clinics included drug fee too. Generally it was about 75% of the expenditure [(2)]. Therefore the expenditure on drugs was about 5.28 Yuan per person and it was 92% of total expenditure in the two-week.

3.4 Illness but not seek medical advice and their reasons

In poor rural areas there are quite many patients, who do not seek medical care when they are ill. By “do not seek medical care” for out patients we define that people themselves feel ill but do not see a doctor. However for inpatients we define it as that

doctors judge patients should have hospitalized, but the patients did not. It is a very serious issue that patients do not seek any medical advise.

In the two-week the population utilized clinic services 1204 times (table 3). But at the same time 413 patients (totally 528 times) did not see any doctor when they were ill. And it was main reason to be unable to afford for health services (44.3%). The rate of being ill but unseeing doctors was 35.5%. It was slight higher than the average level of whole farmers, which was 33.2% [(2)] .

This issue was more serious for inpatients than for outpatients. Totally there were 813 admission in 1996. However there were 712 illness that should have admitted. It could be said that almost fifty percent inpatients did not get health services that should have been provided. And for most of them (81.9%) economic factor resulted in the situation.

Table 5 Distribution of farmers with illness but without seeking medical care and their reasons

	Number	Proportion (%)
Outpatients (in two-week)		
not seek medical care	**431**	
Reasons		
can not afford	**191**	**44.3**
slight illness	**91**	**21.1**
not have time	**11**	**2.6**
inconvenient to see doctors	**3**	**0.7**
self-care	**82**	**19.0**
others	**53**	**12.3**
Inpatients (in 1996)		
not hospitalize	**712**	
Reasons		
can not afford	**583**	**81.88**
have no empty beds	**5**	**0.70**
others	**124**	**17.42**

3.5 Multi-variables analysis of demand for health services in poor rural areas

Utilization of health services reflects farmers' demand for the services. Modeling the demand will make us to understand multidimensional factors that jointly determinate farmer choice behavior in poor areas.

3.5.1 variables selection

According to the theory of health service demand we select three categories of variables as explanatory variables: social, economic and health status. And the real utilization of medical services is chosen as a dependent variable. All variables and their definitions are shown in table 6. We do not take advantage of non-medical cost (such as transportation cost) as explanatory variable because it is difficult to measure them and their value are relatively small in poor rural areas.

Table 6 variables and their description

Name of variables	Description of variables
Dependent variable Y	**volume of care that farmers purchased**
Independent variables	
Social and demographic factor	
Gender: GEND	**GEND=1, male; GEND=0, female**
Race: RACE	**RACE=1, majority (Han); RACE=0, minority**
Marriage status: MARR	**$MARR_1$=1, married; $MARR_1$=0, others**
	$MARR_3$=1, widow/widower; $MARR_3$=0, others
	$MARR_4$=1, divorce; $MARR_4$=0, others
	$MARR_2$: unmarried, control group
Education: EDU	**EDU_2=1, primary school; EDU_2=0, others**
	EDU_3=1, middle school; EDU_3=0, others
	EDU_4=1, high school or above; EDU_4=0, others
	EDU_1: illiteracy, control group
Age: AGE	**AGE_1=1, age<=15; AGE_1=0, others**
	AGE_3=1, 59<age; AGE_3=0, others
	AGE_2: 15<age<=59, control group
Insurance: INSU	**INSU=1, pay from pockets; INSU=0, others**
Economic factors	
Income: INCO	**net disposable income per person in 1996 (Yuan)**
Middle income: MINCO	**MINCO=1, 450 Yuan<income<=1000 Yuan;**
	MINCO=0, Others
High income: HINCO	**HINCO=1, income>1000 Yuan; HINCO=0, others**
Low income: LINCO	**income<=450 Yuan, control group**
RATLI	**ratio of living expenditure to total income, to measure degree of poverty**
Charge: OUTC	**expenditure per visit; to measure outpatient service "price" (Yuan)**
INPC	**expenditure per admission, to measure Inpatient service "price" (Yuan**
VILC	**charge per visit in village clinics (Yuan)**
TOWC	**charge per visit in township clinics (Yuan)**
HOUS	**house square per person (M^2), to measure the wealth**
Health factor	
Health status: HEAL	**HEAL=1, suffer from chronic diseases;**
	HEAL=0, no chronic (by doctor's diagnosis)

3.5.2 Models and estimated results

We estimate three models.

Model one: Y= the number of visiting doctors in clinics/outpatient department in 1996 And Z=Ln(Y),

$$Z=a_0+\Sigma a_i x_i + Ln\ (INCM) + Ln\ (OUTC) + \qquad (1)$$

where all a_i are parameters that will be estimated, x_i is other explanatory variables excepting for income and expenditure per visit.

This function models demand for outpatient services for a whole year (1996). It should be to describe real situation of farmers' consumption behavior and determinants of their health care consumption.

As we have seen previously most outpatient services took place at the village or township levels in the "last two-week" (64% and 19% separately). So we should pay attention to them. Model two and model three will focus on utilization of outpatient services at village level and township level separately. Therefore they will provide some information about farmers' choosing between services in village and township levels.

Model two: Y= the number of visiting village clinics in two-week, Z_1= Ln(Y)

$$Z_1=b_0+b_1GEND+b_2AGE+b_3INCO+b_4HEAL+b_5Charge+b_6RAT+b_7HOUS+\beta \qquad (2)$$

where b_i are parameters that will be estimated.

Model three: Y= the number of visiting township clinics in two-week, Z_2=Ln(Y)

$$Z_2=c_0+c_2INCOM+c_3Charge+c_4HEAL+\gamma \qquad (3)$$

where c_i are parameters that will be estimated.

Table 7 shows the estimated results of these three models.

Table 7. estimated results of demand functions

	model 1		model 2		model 3	
variables	**coefficients**	**t value**	**coefficients**	**t value**	**coefficients**	**t value**
Cons	-0,093	-0.426				
GEND	-0.077	-2.503**	-0.398	-2.41*		
RACE	0.291	6.963**				
MARR1	0.229	4.703**				
MARR3	0.417	3.869**				
MARR4	1.248	7.105**				
EDU2	0.022	0.557				
EDU3	-0.22	-4.577**				
EDU4	-0.350	-4.500**				
AGE1	0.008	0.133	0.104	0.459		
AGE3	0.018	0.326	-0.143	-0.503		
INSU	-0.101	-0.982				
INPC	-0.001	-1.104				
Ln(OUTC)	-0.478	-46.387**				
Ln(INCO)	0.276	11.671**				
VILC			-0.015	-0.653	0.211	1.175
TOWC			0.002	0.152	-0.013	-0.082
MINCO			-0.288	-1.168	0.317	2.666**
HINCO			-0.598	-2.019*	0.381	2.699**
RATLI	-0.311	-3.674**	1.181	3.160**		
HOUS	0.015	14.639**	0.017	2.444*		
HEAL	0.458	10.878**	0.008	0.051	0.079	0.577
Number of obs.=434			number of obs.=54		Number of obs.=65	
F(18, 4322)=194.35			F(10, 44)=7.80		F(5, 60) = 5.91	
Prob.>F = 0.000			Prob.>F = 0.000		Prob.>F=0.0002	
Adj. R-square = 0.45			Adj. R-square=0.56		Adj. R-square=0.54	

* P<0.05 ** P<0.01

Obviously we can get some results as following from table 7.

(1) gender, race, marriage status, education level, income, “price” (measured by charge), ratio of living expenditure to total income, house square per person and health status impact significantly demand for (outpatient) medical services.

(2) Almost all economic factors influence the demand very significantly. The

elasticity of income is about 0.28, and elasticity of “price” is about –0.48. Both of them are low elastic.

The variable of “ratio of living expenditure to income”, which reflects the degree of poverty in the poor areas, shows that the more poverty a farmer is, the less he/she consumes health care.

The housing condition is a very important index to measure a person’s and family’s wealth in rural areas. It shows that ones with better condition utilize more health care significantly.

(3) Comparing with people who are not married, the marriage, divorce and widow or widower consumes more health services. However consumers with higher education utilize less health care than ones with lower education.

(4) Female have larger demand for health care than male in the poor areas,

which is similar with other regions.

(5) Majority (Han) consumes more health care than minority.

(6) It can be resulted from coefficients of outpatient charge (price)(-0.478) and

inpatient charge (price) (-0.001) that hospitalization and outpatient services are complementary but not substitutionary.

(7) The health status, i.e. suffering or not suffering from chronic diseases, is also a key factor, which determinates the demand for health care. The result shows that the former purchase more services than the latter.

(8) From coefficients of “price” (charge) of services in village and township clinics, i.e. coefficients of VILC and TOWC, in model two (-0.015 and 0.002) and mode three (0.211 and -0.013), it can be easily gotten that the services in the village and township levels are substitutional although it does not seem significant, but not complementary.

(9) Comparing low-income group, middle and high-income groups purchase less health services in village clinics (model two) but more in township level. Indeed if we examine briefly the relationship of income levels and the numbers of consuming outpatient services we can discover this is a very obvious trend (table 8). The higher clinic level is, the more higher income farmers purchase relatively.

Table 8 numbers farmers with different income purchase outpatient services in different level

Income	Mean (in village level)	Mean (in township level)	Mean (in county level)
Low-income	**0.118**	**0.035**	**0.004**
Middle-income	**0.139**	**0.040**	**0.006**
High-income	**0.134**	**0.043**	**0.011**
Total	**0.134**	**0.039**	**0.006**

4. Farmers' willingness to join cooperative medical system

The farmers' attitude toward the cooperative medical scheme (oral expression) and behavior to join or not join CMS, and their determinants are the topics in the sector.

. In poor rural areas farmers face serious health risk. Indeed on the average they expended 114 Yuan (about $15) per capita in 1996. It was 14% of their total living expenditure and much higher than the average rate of whole farmers population (8.75%) [(2)] . At the same time 35.5% of outpatients and about 50% of inpatients did not get services when they should have gotten these services. Furthermore some farmer encountered catastrophic diseases risk unfortunately. If a farmer's health expenditure was more than one-third of one year (1996) gross income of his or her family, we call him or her to encounter a catastrophic risk. There were 237 households to encounter a catastrophic disease in the sample population. They are 7.5% of the sample (3012 households). If we change the definition of catastrophe to be more than one-fourth of gross income there were 317 households to be included. They were about 15% of total household. And this was main reason to drive these farmers to become poverty.

Essentially CMS is a pool to share health risk in a community. Theoretically farmers ought to take part in CMS in order to prevent them prom fall in poverty.

However it is a big issue that the farmers perceive or do not perceive these risk. Even if farmers recognize the risks they would compare health risk with other risk, such as property, and under the restriction of budget (disposable income) they would rank all risk to decide which should be shifted to others (that is, buy insurance) and which should be borne by themselves. Of course they would judge if anybody/anything could share their risk in reality.

4.1 Farmers lack in understanding what is CMS

In our questionnaire we set up a question about “What is CMS” and listed five choices of which two were true, that expressed correctly the CMS’s function to share health risk, two were false, that did not inform CMS’s function to share risk, and one was “I don’t know”. In all responses only 32.55% (3661 persons) gave correct choice, 21.92% (2476 persons) made incorrect choices, and 45.51% (5119 persons) chose “I don’t know”. Totally about 70% of the population, in which 2703 persons were covered by some type of CMS, did not understand CMS’s function correctly. The incorrect cognition distorted the farmers’ attitude toward CMS and then impacted their behavior to choose joining CMS or not.

4.2 Attitude toward CMS and behavior to join CMS

In the survey there were 3023 households who answered the question “are you willing to join CMS?”. Among them 1729 households, 57.19% of the sample, answered “yes”. The answer of 100 households (3.31%) were ”no”, and 1194 households (39.50%) gave the answer “I don’t know”. Most farmers seemed willing to join CMS. And 73% of the sample (2177 household) believe that “It is necessary to set up a CMS”. However if we examine farmers’ real behavior we will find out that there exists a big difference between attitude (oral expressing) and real behavior. In the sample there are 591 households, 2002 persons who live in the villages where there do exist CMS. Totally 218 households (47.6%) join a CMS. But in terms of persons 54% of them (1005 persons) join CMS.Table10 provides a comparison of attitude and behavior of farmers who live in villages where there do exist CMS. Among persons (1551) who express to be willing to join CMS there are 47.6% (738 persons) who do not join CMS in reality. Pearson Test shows that there is no significant relation between oral expressing willing and real behavior.

Table 9 comparing attitude with behavior about CMS (persons / %)

Expressing willing	Real behavior		Total
	Joining	Not joining	
Willing to join	813 77.43	738 77.52	1551 77.47
Not willing / "I don't know"	237 22.57	214 22.48	451 22.53
Total	1050 100.00	952 100.00	2002 100.00

Pearson Chi2(1) = 0.002 Pr = 0.96

4.3 Expressing willingness to pay volume for CMS

Even farmers express to be willing to pay for CMS, the amount that they are willing to pay are very limited. For whole sample they are willing pay 12.9 Yuan ($1.5) per person per year on the average. But for subgroup who express to be willing to join CMS they would like to pay 13.5 Yuan per person, and for the rest they say that they can pay 11.9 Yuan. These amounts are equivalent to about one-tenth of their expenditure on health care in 1996. And according to National Health Survey in 1998 the expenditure per visit in rural areas was 40.2 Yuan in the general poor rural areas[(5)]. Therefore the 13 Yuan per person per year is not enough to pay for one outpatient service. How can it afford to pay for a farmer's basic medical care in period of one whole year?

4.4 Attitude and behavior of the insured who do purchase other insurance(s)

In our sample there is a special subgroup who buy other insurance, such as life insurance, property insurance, animal insurance, and so on. There are 708 households in the subgroup, and they are 23.6% of the whole sample. It seems to indicate that many people are able to cognize risks generally and have clear consciousness about shifting or sharing risk even in the poor rural areas. 109 households purchase other

insurance in the villages where there exist CMS and there are 591 households there. The former is 18.5% of the latter. The attitude and behavior of these people in the subgroup may be a reflection of CMS's some issues.

For the 708 households they paid 42.4 Yuan/person/year for their (other) insurance and they are willing to pay 15 Yuan/person/year for CMS on the average. But there is a big difference between their oral expressing and real behavior to joining CMS although they perceive risks that they face. We just examine farmers who live in the village where CMS have been established.

Table 10 Attitude and behavior of farmers who buy other insurance (households)*

Bought other Insurance	Attitude		Behavior		total
	willing to pay	not willing	joined CMS	not joined	
Yes	94	15	51	58	109
No	304	175	229	250	479
Total	398	190	280	308	588

* missing data of three households.

For the 109 households 86% of them (94 households) expressed to join CMS, but only 46.8% of them (51 households) did join CMS in reality. Comparing with the households who do not purchase any other insurance, the insured group has lower proportion of joining CMS than the non-insured group (for the latter the number is 47.8%).

4.5 Attitude and behavior of village leaders and township officials for CMS

Traditionally village leaders and township officials have very strong influence for almost all issues in rural areas in China. These persons' attitude and behavior for CMS (especially behavior) impact directly success/failure.

There are 300 households who are village leaders and 69 households who are township officials.

Most of the leaders or officials (79.9%) believe that it is necessary to set up CMS.

Only 20.1% think it is not necessary or "I not know". Furthermore most of them

(64.2%) express to be willing to join CMS. But in the villages where there do exist CMS most of these families (56.9%) do not join CMS (see table 11). For behavior we examine just objectives that live in the village where CMS are set up.

Table 11 Attitude and behavior of village leaders and township officials for CMS (households)

Categories	Attitude		Total	Behavior		Total
	Willing to join	not willing		join CMS	not join	
Village leader	195	105	300	27	28	55
Township official	42	27	69	1	9	10
Total	237	132	369	28	37	65

4.7 Brief description of farmers' consumption (investment and living consumption) behavior

On the average one household expended 1622 Yuan (about $200) on their business (buying capital goods and seeds, operative cost for producing and so on) in1996. This was 30% of their gross total income. And the proportion of living expenditure was 60%. They also must pay 6% of total for taxation. After keeping reproductive activity and living they almost did not have more money to spend on other respects.

In the producing they have to face natural risk. If they suffer from natural disaster and harvest was not enough, their whole family would face survive issue. This is reason why many families purchase other insurance. Indeed on the average of all households one paid 12 Yuan for other insurance, and on the average of the insured group one paid 231 Yuan for other insurance.

In the living expenditure health care expenditure was 483 Yuan per family and it was 14% of the living expenditure. This proportion is as same 1.75 time as one in general poor rural areas (8.75%). And the food expenditure was 2024 Yuan per family. It was 60% of the living expenditure. It also was higher than the level of general poor rural (54.94%)[(2)].

On the other hand farmers in our sample spend a lot of money to consume some

luxuries, such as alcohol and tobacco. There were 1928 households whose luxury expenditure was more than their health care expenditure, that is, 64.2% of all households spend on luxuries more than on health care.

The income elasticity of demand for health care is about 0.28. It is inelasticity and means that at the present farmers would not increase expenditure on health care sharply as they income increase.

4.8 Multivariable analysis for farmers' willingness to pay for CMS

In the sector we will study variables simultaneously, which impact farmers' attitude and behavior, and compare with willingness of different subgroups.

We use logistic model to describe farmers' choice including willingness and behavior.

We select some new explanatory variables except variables in the model one, model two and mode three. They are as following.

(1) SATIV: to measure farmer's satisfying with village clinic service
SATIV=1, if a farmer satisfies with village clinic service
SATIV=0, if a farmer does not satisfies with village clinic service

(2) SATIT: to measure farmer's satisfying with township clinic service
SATIT=1, if a farmer satisfies with township clinic service
SATIT=0, if a farmer does not satisfies with township clinic service

(3) TECHV: farmer's judge to technical level of village clinic
TECHT=1, if a farmer believes that technical level of village clinic is good or OK
TECHT = 0, others

(4) TECHT: farmer's judge to technical level of township clinic
ECHT=1, if a farmer believes that technical level of township clinic is good or OK
TECHT = 0, others

(5) UNDE: to measure farmer's understanding for CMS

UNDE=1, if a farmer can understand CMS correctly

UNDE=0, if a farmer can not understand CMS correctly

(6) TRUST: to measure farmer's trust to CMS's organizer

TRUST=1, if a farmer trusts organizer of CMS

TRUST=0, if a farmer does not trusts organizer of CMS

(7) CONE: to measure how a farmer evaluates township officials' attitude toward CMS

CONE=1, if a farmer believes that township officials are concerned with CMS

CONE=0, if a farmer do not believes that township officials are concerned with CMS

(8) NUMBF: the number of family's member

(9) INSU: to measure the situation that farmers buy other insurance

INSU=1, if a farmer buys other insurance

INSU=0, if a farmer does not buy other insurance

(10) AGE: age

AGE=1, if age<=59

AGE=0, if age>59

(11) SPEH: farmer's spending on health care in 1996

(12) BENE: to measure that a farmer judges if the benefit from CMS might be larger than cost

BENE=1, if farmer judges that benefit bigger than cost

BENE=0, others

Model four:

$$Pr(W_1=1) = 1/(1+EXP(- \quad - \quad X_i)) \qquad (4)$$

where "W_1=1" means that a farmer is willing to join CMS, and if W_1=0 it means that the

farmer is not willing to join CMS. This model is relative to farmers who live in non-CMS village.

Model five:

$$Pr\ (W_2=1) = 1/(1+EXP(- \quad - \quad X_i)) \qquad (5)$$

This model is only relative to farmers who live in villages where CMS are set up.

Model six:

$$Pr\ (B=1) = 1/(1+EXP(- \quad - \quad X_i)) \qquad (6)$$

where “B=1” means that a farmer choose to join CMS, and if B=0 it means that the farmer choose to not join CMS. This model is only relative to farmers who live in villages where CMSs are set up.

Table12 give the estimated results of these three models.

Table12 estimated results of LOGISTIC models about willingness and choice behavior

Variable	Model : dependent variable W_1			model :dependent variable W_2			model :dependent variable B		
	Coefficient	z	odds Ratio	coefficient	z	odds ratio	coefficient	z	odds ratio
CONSTANT	-5.29	-17.94		-3.08	-3.53		-3.76	-5.86	
GEND	0.04	0.83	1.04	0.19	1.39	1.21	-0.002	-0.02	0.99
RACE	0.12	1.59	1.13	0.67	3.70***	1.96	-1.15	-10.30***	0.23
AGE	0.37	4.69***	1.45	0.09	0.41	1.09	0.07	0.05	1.01
INCO	0.36	9.51***	1.44	1.08	0.74	1.08	0.60	7.66***	1.82
SPEH	0.001	4.13***	1.001	0.001	1.60*	1.00	0.001	3.89***	1.01
UNDE	0.48	8.57***	1.61	-0.52	-3.04***	0.60	-0.40	-3.16***	0.67
SATIV	0.26	3.64***	1.30	1.29	6.59***	3.64	-0.13	-0.83	0.88
SATIT	0.14	2.05**	1.15	-1.24	-6.17***	0.30	0.48	3.12***	1.61
TECHV	-0.09	-1.09	0.91	-0.70	-2.97***	0.50	0.002	0.01	1.00
TECHT	0.40	4.21***	1.49	0.92	3.64***	2.50	-0.20	-1.07	0.82
EDU2	-0.13	-2.07**	0.88	-0.10	-0.63	0.91	0.28	2.38**	1.33
EDU3	-0.14	-2.00**	0.87	-0.35	-1.82*	0.70	-0.16	-1.05	0.86
EDU4	-0.07	-0.51	0.94	0.67	3.29***	1.96	-1.40	-9.96***	0.25
NUMBF	-0.06	-3.01**	0.94	0.10	1.82*	1.10	0.06	1.55	1.06
TRST	0.94	16.07***	2.54	0.95	5.93***	2.58	-0.39	-2.74***	0.68
CONE	1.77	33.27	5.84	2.18	15.03***	8.84	0.63	5.34***	1.89
BENE	1.26	20.85***	3.51	1.38	8.44***	3.97	-0.31	-2.15**	0.73
MARR1	0.01	0.05	1.00	-0.01	-0.09	0.98	0.002	0.02	1.00
MARR3	-0.35	-2.12**	0.71	-0.09	-0.23	0.9	0.77	2.29**	2.16
MARR4[a]	-0.26	-0.80	0.77				0.83	1.19	2.29
	Number of obs. = 10510 Prob.> chi2(21) = 0.000 Log likelihood = -4778 Pseudo R2 = 0.34			Number of obs. = 1977 Prob.> chi2(20) = 0.000 Log likelihood = -723 Pseudo R2 = 0.32			Number of obs. = 1990 Prob.> chi2(20) = 0.000 Log likelihood = -1142 Pseudo R2= 0.19		

*** P<0.10, ** P<0.05, *** P<0.01**

a. For Model Fifth $MARR_4$ 0 predicts success perfect,$MARR_4$ is dropped. 13 observations are not used.

We can do two kinds of comparisons: willingness between farmers who live in non-CMS village (we call them Farmer N) and ones who live in village with CMS (we call them Farmer C), and between willingness and behavior of farmers who live in villages with CMS from the estimated results.

4.8.1 Comparing willingness between farmer "N" and farmer "C"

Obviously the biggest difference between Farmer N and Farmer C is that they face different real scenes. When they are asked the question "are you willing or are not willing to pay for CMS? ", Farmer N do not have to take account of "consequences" and give freely their answers which generally are their own truth willingness, or follow a prevalent idea. After they give a "yes" or "no" answer they will not face any social pressure to push them to join or not join CMS. But in contrast to this situation Farmer C

have to take account of credit of their oral express because they have been placed in a real environment: the willingness will be considered as their own decision by their community. Therefore they would take account of their specific conditions more carefully or follow prevalent ideas when they give an answer.

Some results can be inferred from table 12.

Age, race, gender, education, marriage status, income, health care expenditure and judgement on health services quality appear to have the same impact on two subgroups for their willingness although some factors have different significance.

Generally speaking majority and the younger have stronger oral willingness to pay for CMS.

The results also show that higher education people are less willing than the illiteracy. The reason may be that higher education makes people have more information and capacity to judge, and based on the passed experiences about CMS's establishing and bankrupting they trend to not be willing to pay for CMS.

The quality of health services, including satisfying with services and treatment technique, is an important factor to influence farmers' willingness. It seems truth that for the satisfaction with services farmers focus on services in village clinics, and on the other hand, to treatment technique they emphasize on technical level in township clinics.

Totally speaking marriage status does not affect significantly farmers' willingness.

In our models we do not introduce health status variable. However we use the health care expenditure to represent it. The variable shows that the more a farmer spends on health, the stronger he/she is willing to pay for CMS, and it is significant.

The income shows the same trend significantly too, that is, the higher a farmer's income is, the stronger he/she is willing to pay foe CMS.

Furthermore these two-group farmers also show the same pattern on the willingness for three variables: trust or do not trust the CMS's organizer; evaluate township officials' attitude toward CMS; and judge benefit and cost. Chinese farmers often refer to somebody else when they express some attitude publicly. It is a public social issue to be willing to pay for CMS, so that they would like to follow officials' opinion. If these officials are concerned with and willing to pay actively, they will do. Generally local government is in charge of CMS, especially fund. This is also reason why farmers would evaluate officials' attitude before they express their own attitude. So

far there have not existed complete regulation on CMS. It does depend mainly on personal character, especially moral characters, to run CMS successfully. Therefore how farmers judge possible organizers (trust or not) becomes an important factor to affect farmers' willingness. Of course, the more trust, the more willing.

But on the other hand these two subgroups show differences on some key variables.

The variable, number of family members, has significant impact on two groups. For Farmer N bigger family trends to be less willing, in contrast to this for Farmer C bigger family trends to be more willing. In order to avoiding adverse selection all CMS plans require that all members of a family have to join CMS if anyone is willing to join. It makes families with bigger size to anticipate they would spend "a lot of money" on joining CMS and it may be a pretty big share of their budget. This is a possible reason why bigger size families are less willing to join CMS.

The variable INSU, to describe that a farmer buys or does not buy other insurance, also has very significant impact. These farmers might percept risk more sensitive than others did. But they express to be less willing to pay. It is happened because they anticipate that CMS may not share or shift health risk based on their passed experiences about CMS. Although for the farmer C group the insured seem to be more willing to pay than the rest, their real selection is opposite (see result of the sixth model).

The estimated result of variable UNDE, to measure farmers' understanding what is CMS, do reflect difference of real situation that two subgroups face, and then difference between their attitude. For the farmer C their oral express means they have made a decision whether or not to join CMS. At the same time they should make a judgement where or not the existing CMS works like a CMS which they understand, that is, it can share or shift health risk. If it does not (unfortunately a lot of CMS do not) farmers who can correctly understand CMS's function are certainly less willing to join it. But in the village without CMS farmers N who can correctly understand CMS naturally have a reasonable anticipation, that is, CMS will share or shift risk. They would like to join the CMS, which can work as they understand and anticipate. And farmer N who does not know that CMS can share risk should be less willing to pay. It is rational.

4.8.2 Comparison between attitude and behavior in the farmer c group

The main factors that affect farmers' choice behavior are race, income, expenditure on health, understanding to CMS, buying or not buying other insurance, education and judgement on officials' attitude toward CMS.

The more farmers spent on health, the more eagerly they participate in. This means that there exists very strong adverse selection.

The higher farmers' education is, the less they join CMS. These farmers can recognize clearly flaw of the existing CMS. This might be reason why they do not want to join.

When farmers choose to take part in or not in reality they also show a strong trend to refer to officials' attitude. If officials are concerned with and support CMS eagerly and actively, more farmers join CMS.

These factors impact farmers' behavior as same as they impact willingness. But some factors have different impacts.

Majority (Han) joins CMS less than minority. In contrast to this, majority express to be stronger willing to join CMS.

On comparison with the non-insured the insured join in CMS significantly less in reality. This is opposite to oral expressing. These insured can percept risks more correctly and sensitively than the non-insured. However they do join CMS , which is considered as pool to share risk, much less . It could be said that in reality CMS could not share risk truly.

Farmers who express to trust CMS's organizers join CMS significantly less than others. This tells us that generally oral express is not reliable. The variable BENE, to measure farmers' judging of benefit from and expenditure on CMS, also shows a big gap between oral express and behavior. Farmers who believe the benefit is worthy to expenditure join CMS significantly less than the rest. Indeed sometimes their oral express is a treatment strategy to follow a prevalent or fashionable idea. Only their behavior reveals their true preference.

5. Main findings and policy suggestions

From previous analysis it is easy to get some conclusions and then results in policy suggestions.

5.1 Main findings

(1) In poor rural areas farmers face big health risk. They have to pay more for their health service than general rural areas, and about 10%~15% of them encounter catastrophic diseases every year. One-third ~ one-fifth of patients did not seek medical services because they could not afford to pay.

(2) The farmers with low income and low education lack in correct cognition to CMS. There are 68% of households who completely do not understand CMS's function to set up a pool, share risks they are facing, and prevent them from falling in poverty at least partially. The bias of cognizing CMS (lack of knowledge about CMS) will result in distorted attitude toward CMS. Although almost all of them have to pay for health care from their pockets, after village leaders and township officials arouse farmers to join one household by one there still are 43% of them who express to not want to join CMS directly or in directly (say "I don't know"). In villages with CMS there also are the one-third of farmers to express to not be willing.

(3) Farmers who can perceive risks are less willing to pay than ones who do not perceive risks generally are.

From our models controlling other factors the insured who bough other insurance are less willing than the non-insured significantly. And comparing with the non-insured the insured significantly less choose to join CMS too in villages with CMS.

For the higher education farmers there is a similar situation. They are significantly less willing and choose to join.

These phenomenon shows that existing CMS can not share or shift risk enough so that it has not gained farmers' trust and attracted them to join.

(4) There is an obvious difference between attitude (oral express) toward and behavior of joining in CMS.

From three groups' attitude and behavior (all farmers, the insured, and village leaders and township officials in villages with CMS) we find out that there appears a large difference between these two respects. Most of the group of all farmers in the village with CMS (1551 persons, about 57.2%) are willing to pay for CMS, but about one-second of them do not join CMS in reality. In the insured group 86.2% would like to join CMS, but only 46.9% of them do join CMS indeed. And in the village leaders and township officials group 64.2% are willing to join, but most of them (56.9%) do not join

in reality.

(5) Economic factors are important determinants to impact farmers' willingness.

All multi-variables analysis models show that main economic variables (income and expenditure on health) have significant impact on both willingness and behavior. The more a farmer's income is, the stronger his/her willingness is, and the more eager he/she joins CMS.

On the other hand the "last year" expenditure drives strongly and very significantly farmers to be willing to pay for and join CMS. This suggests that there exist obvious adverse selection in these areas.

(6) There is a big gap between willingness to pay and real needs.

The willingness to pay for CMS is about 12 Yuan on the average. As contrast with this the average spending on medical care is 114 Yuan. The latter is as same ten times as the former. Furthermore we calculate the income elasticity is only 0.27, therefore farmers would not like to increase their spending on health care sharply as their income increases.

5.2 Policy suggestions

These interesting findings based on scientific field survey and analysis provide a basis to shape policy about CMS.

(1) It is absolutely necessary to keep campaigning for spur to CMS before implementing to set up CMS in poor areas. If ones start hurriedly to set up CMS before campaigning enough and then farmers' understanding it sufficiently they will certainly encounter resistance or be left out in the cold. It is a necessary condition to make farmers to recognize the CMS's function to pool risk and prevent them from fall in poverty so that they are willing to pay from the bottom of their hearts. We saw that in some regions some officials wanted to set up CMS quickly when government called for doing it. It was not understood that it would take long time to make CMS sense. Therefore in these regions CMS was forced to establish quickly, and then next year it bankrupted quickly. In order to avoid the situation to occur again we should always keep campaign to prepare feasible conditions until it must be sure that most farmers perceive correctly " what is CMS, which will be established". The unreasonable

stipulation, that is, to set up CMS in the limited time, should be abolished.

(2) “Voluntary” policy should be changed into “mandatory” policy.

So far it has been a free choice to join or not join CMS in any community. And in terms of central government’s document it is prohibited to run a mandatory CMS. However this will make it impossible to keep CMS developing sustainablely because there is obvious adverse selection. We believe that it is certainly a necessary requirement in order to set up and develop sustainablely CMS to change voluntary policy into mandatory policy so that adverse selection can be avoided.

(3) It is necessary that governments subsidize CMS in poor rural areas.

Farmers with low income and low education lack willingness and capacity to pay for CMS. And we have not found any other financing source in interior of poor communities. It appears to be a universally agreeable conclusion that it seems impossible to set up and develop sustianably CMS if there is no any financial aid coming from outside. Even farmers are willing to pay for CMS, the volume is not enough to reimburse their basic medical care. CMS in poor areas requests a stable subsidy mechanism. Only do while we set up the subsidy mechanism it is can be said that CMS steps on a way to develop sustianably.

(4) It is a very urgent task to regulate CMS.

There have not been powerful and detail regulations for CMS’s setting up and its running. The success or failure depends mainly on personality. It often occurs in some regions that organizers deal with issues of CMS as they will. Farmers are not sure if they can benefit from CMS after they join in CMS, because there are no any mechanism or legal regulations to provide them with guarantee for it. This is why their willingness depends on trust or distrust to organizers. If legislative body passes act and governments regulate rule of CMS in detail, it will increases credit of CMS and more farmers become willing to join.

(5) It is also an important issue to improve medical services quality in the levels of village and township.

We have shown that the satisfaction with village clinic services and technical level of treatment in township clinics affect significantly farmers’ willingness. Although farmers’ judgement to medical technical quality is not very exact, their feeling about quality certainly impacts their attitude and choice. On the one hand governments can regulate quality when they regulate CMS. And on the other hand governments can

increase investment in training rural primary doctors and equipping instruments and drugs. These might be as a part of governments' subsidy. This can make farmers to believe that they could gain basic health security if they join CMS.

It is a very difficult issue and will take pretty long time to set up CMS and make it stable in poor rural areas. It should be put in a whole framework of social development and be as a part of reducing poverty. We are sure that farseeing policy and strategies will promote CMS to develop healthily.

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