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A Gendered View of Reforming Health Care Access for Farmers in China

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Abstract

This paper analyzes the access to health care of the Chinese farmers under the New Rural Cooperative Medical System (NRCMS) from a gendered view. Using the national rural socio-economic survey data collected by the Center for Chinese Agricultural Policy, Chinese Academy of Sciences in 2005, we find: Women were in poorer health status than men. More women than men had chronic disease. Both men and women with good health had lower rates of NRCMS participation than those with bad health. Farmers with very bad health had the lowest participation rate, but this only held for men. Gender had significant effects on both NRCMS participation and health care use. Age, education, deductible level and ceiling limits of reimbursement had positive effects on both NRCMS participation and health care use. The level of family wealth had a significant positive effect on NRCMS participation. Staying in rural areas and doing farming work, and the distance to health care providers had no direct effects on NRCMS participation, but had significant positive association with health care use. To some extent, the narrow coverage with high co-payment compensation system of the ongoing NRCMS pilot programs asserted significant deterrence effects on participation and health care service use for the lower income farmers with poor health. Overall, however, rural women's slightly more than equal participation in NRCMS and use of health care services illustrated in the sample group are significant accomplishments, but this is only a first step toward building an adequate health safety net for all rural residents.

Key words: New Rural Cooperative Medical System (NRCMS); Access to health care; Gender, Health care system reform; China

1. Introduction

Most of the rural population in China has been uninsured since the 1980s because the pre-reform system could no longer function, and despite a number of experiments, no viable alternative had been implemented for widespread coverage by the early 2000s. The urban health care system is separate and not easily converted to meet the needs in farming areas. As a step toward creating a health safety net for rural residents, the Chinese Ministry of Health launched a pilot experiment, the New Rural Cooperative Medical Scheme (NRCMS), in selected counties in 1996. In 2002, the Central Government expanded the NRCMS pilot programs to all provinces.

NRCMS is designed to relieve the excessive financial burden of health care on farmers by pooling funds for catastrophic illness and in-patient medical services. Participation is voluntary and based on the household. Although the annual premium is low (10 *yuan* per capita), co-payments are high. County, prefecture and provincial governments (and in western regions, the central Government) contribute to the local NRCMS based on the actual number of their participants. The very poor are helped with the costs of participation. Local areas have experimented with aspects of the programs such as the types of benefits participants receive. By mid-2004, 310 counties had established NRCMS pilot programs, covering 95 million farmers. By the end of 2007, 2451 counties had established NRCMS pilot programs. About 730 million farmers have participated, representing 86.2% of the total farmer population in the rural areas where NRCMS have been implemented (China Ministry of Health, 2008). By 2010, NRCMS is expected to cover most of the country's rural households.

Policy-makers and researchers have given much attention to the various NRCMS pilot programs, exploring differences in financing methods, the package of benefits, and the system of remuneration (Shen, et al., 2004; Du, et al., 2004; Yang, et al., 2004; Wu, et al., 2006; Zhu, et al., 2006; Mao, 2007; Deng, et al., 2007; Zhao, et al., 2007). Other studies examine the health care demand of farmers, the probability of farmer participation in NRCMS, and government contributions (Hai, et al., 2002; Hu, 2002; Xu, et al., 2004; Gao, et al., 2006; Yan, et al., 2006;

Tang, et al., 2007). Empirical studies assess aspects of the performance of NRCMS (Li, et al., 2004; Yan, et al., 2006; Du, et al., 2007; Shao, 2007). Despite these useful contributions to research, empirical studies of key determinants of participation and utilization of health care services are lacking. Few studies examine how the access to health care differs between men and women under NRCMS, although a common premise of health research is that gender operates as an independent influence on virtually any population-based outcome of interest (DrPH, 2000). Men and women typically differ with respect to health and use of health care services; thus, they have a different relationship to the health care system.

The objective of this study is to investigate how NRCMS affects equity goals in access to health care from a gendered view and to explore the gender-specific determinants of participating in NRCMS and using health care services. Understanding the interplay between gender and the distinct determinants of access to health care in the pilot stage of NRCMS has important implications for further policy design and promotion of equitable access to health care.

Using the national rural socio-economic survey data collected by the Center for Chinese Agricultural Policy of the Chinese Academy of Sciences in 2005, this paper examines the following specific questions: What is the health status of male and female farmers? Is there any gender differential in health insurance coverage (NRCMS coverage)? What are the gender-specific determinants of participating in NRCMS? What are the gender-specific determinants of using health care services under NRCMS? The remainder of the paper is organized as follows: Section 2 provides a brief background on health care in rural China. Section 3 outlines the analytical framework and the specification for the econometric model. Section 4 describes the dataset and descriptive statistics. Section 5 presents the empirical results and discussion, and Section 6 concludes the paper.

2. Background on the Rural Health Care in China

Prior to the 1980s, over 90% of the rural residents in China had been covered by the

Cooperative Medical Scheme (CMS), which was an integrated part of the overall system of collective agriculture production and social services. CMS organized rural health care into a three-tier structure. The first tier was comprised of “barefoot doctors” who provided both preventive and primary-care services, including prescription drugs. For more serious illnesses, barefoot doctors referred patients to the second tier: township health centers. Finally, the most seriously ill patients were referred to the third tier: county hospitals. Under CMS, the financing of health care relied on a pre-payment plan, which included farmers’ premium contributions (0.5-2% of a farmer family’s annual income), village Collective Welfare Fund, and subsidies from higher level governments (Liu et al., 1995). China's outstanding health achievements and equity in health care access before the 1980s are well documented (Sidel, 1972; Newell, 1975; World Health Organization and UNICEF, 1975; Sidel and Sidel, 1982; Harland-Thunberg, 1989; World Bank, 1997; Liu et al. 1999).

In the mid-1980s, socio-economic reforms pressed the Chinese health care systems in both city and countryside to make market-oriented changes. In rural areas, the once successful CMS collapsed. Insurance coverage dropped to only 6.1% in 1990 from 92.6% of the total rural population in 1976 (Feng and Tang, 1995). Nearly all health care had to be paid for out-of-pocket. As a result, many people faced difficulties in obtaining health care services (Li, et al., 2003; Liu, et al., 1995). In 1996, the Chinese Ministry of Health set up pilot programs for the NRCMS in some counties, and the Central Government extended the experiments throughout the country following a national decree in 2002 [discussed above].

The National Health Service Survey in 2003 substantiated the need for the NRCMS or some other insurance arrangement. The Survey shows that 38% of farmers who had been sick did not obtain out-patient services, and 70% of farmers who should have been hospitalized did not obtain in-patient treatment because of financial difficulty (Statistic Center of China Ministry of Health, 2004). The Development Research Center of the State Council conducted a national survey on health services in 118 villages in 2003. It shows that illness was one of the leading causes of poverty. Poor health brings poverty, and poverty is closely linked to poor health.

3. Theoretical Model and Specification for Empirical Model

The major concern of this study is to examine factors associated with gender differences in both health insurance coverage and utilization of health services under the New Rural Medical Cooperative Scheme (NRCMS) in China. Many definitions and criteria with respect to health care equity have been formulated, and gender has been seen as a key factor, especially as it interacts with other social factors such as age, education, and poverty (Andersen, 1995; Whitehead, 1990). This paper draws on this broad view of health care equity and the World Health Organization's specification of three goals in relation to equity: equity in access, utilization, and treatment, given equal needs (Whitehead, 1990). Andersen's health utilization model (1995, 1968) provides a framework for this focus. According to Andersen's model, health insurance is an enabling factor influencing health service use, but it is also a factor subject to the influence of predisposing components (environment, population characteristics, health behavior, and outcomes).¹ Thus, our study focuses on health care access that includes both NRCMS participation and utilization of health care services.

Following the key elements of the Andersen's theoretical model, we set up a two-equation model for participation and utilization, distinguishing the dependent and independent variables as follows:

Dependent variables

Because we are interested in gender equity in access to and utilization of health care, our dependent variables include two categories of predicting components: NRCMS participation and health care service utilization.

Independent variables

For analyses of examining determinants and differentials of using health care services under NRCMS from a gendered view, our independent variables consist of three main categories as follows: (1) *Predisposing factors* reflect the propensity and need to participate in NRCMS and

use health care services. They are measured by such demographic factors as gender, age, education, education squared, and chronic diseases. (2) *Enabling factors* reflect the resources or conditions that make it possible to participate in NRCMS or use health care services. They are necessary but not sufficient conditions, including family factors and community factors. The family factors are expressed with four variables: *dadhome*, *homefarming*, *burden*, and *rich*. *Dadhome* indicates whether or not the father stays in the village; patriarchal traditions can be expected to lead to greater participation in NRCMS when the father is present and makes the decision to participate. *Homefarming* indicates whether or not working-age family members stay in their hometown to do farming work. *Burden* represents the proportion of family members who are aged 60 and over, and the children who are in school. *Rich* stands for the level of family wealth, which is measured by per capita family housing value. The community factors include the sources of health care providers. They are expressed by the distance from the farmers' home to village clinics, the distance from the farmers' home to township hospitals, and the distance from the farmers' home to county hospitals; *designated* means whether or not the village clinics are designated as NRCMS health care providers. (3) *Environmental factors* reflect the health care system and external environment. They are measured by the benefit package of NRCMS. One indicator is the deductible level, also called the bottom line, that is the amount of medical costs paid out-of-pocket by the patients; the other is the ceiling of NRCMS, that is the upper limit of reimbursement.

Based on the theoretical model presented above, the model to be estimated can be written as:

$$\text{Access to health care} = f(\text{Predisposing factors}; \text{Enabling factors}; \text{Environmental factors}; \text{other factors})$$

(1)

Our dependent variables (presented above) are dummy variables. We denote participation of NRCMS as P and health care service utilization as U . If a farmer has participated in NRCMS,

$P=1$, and 0 otherwise. If a farmer has visited a doctor for an illness, $U=1$, and 0 otherwise.

Therefore, we use probit for the regression. Our functions are as the following:

$$\begin{aligned} \text{probit}P = & \beta_0 + \beta_1 \text{gender}_i + \beta_2 \text{age}_i + \beta_3 \text{edu}_i + \beta_4 \text{edu}_i^2 + \beta_5 \text{chronic}_i + \beta_6 \text{dad}_i \\ & + \beta_7 \text{hfarm}_i + \beta_8 \text{burden}_i + \beta_9 \text{rich}_i + \beta_{10} \text{disvc}_i + \beta_{11} \text{disth}_i + \\ & \beta_{12} \text{disch}_i + \beta_{13} \text{designate}_i + \beta_{14} \text{deductible}_i + \beta_{15} \text{ceiling}_i + \varepsilon_i \end{aligned} \quad (2)$$

$$\begin{aligned} \text{probit}U = & \beta_0 + \beta_1 \text{NRCMS}_i + \beta_2 \text{gender}_i + \beta_3 \text{age}_i + \beta_4 \text{edu}_i + \beta_5 \text{edu}_i^2 + \beta_6 \text{chronic}_i \\ & + \beta_7 \text{dad}_i + \beta_8 \text{hfarm}_i + \beta_9 \text{burden}_i + \beta_{10} \text{rich}_i + \beta_{11} \text{disvc}_i + \beta_{12} \text{disth}_i + \\ & \beta_{13} \text{disch}_i + \beta_{14} \text{designate}_i + \beta_{15} \text{deductible}_i + \beta_{16} \text{ceiling}_i + \varepsilon_i \end{aligned} \quad (3)$$

When predicting access to health insurance, P represents the probability of participation in NRCMS. When predicting access to health care, U represents the probability of using health care services. Among the dependent variables, *gender* is a dummy variable (male=1, female=0); *edu* is education level; *edu squared* is included because, drawing on health care literature, we expect that the impact of much higher education will not be the same as at lower levels; *chronic* is a dummy variable for chronic illnesses (*chronic* =1 if any family member has a chronic illness, and 0 otherwise). *Dadh* is whether or not the father, considered the family head, stays in the village where he is likely to make the decision to participate in NRCMS (*dadh* =1 if the father remains home, and 0 otherwise); *burden* is the financial burden of having family members older than 60 or school age children (it equals 1 if there is such a dependent and 0 otherwise). *Rich* is the level of wealth measured by per capita family housing value. *Disvc* is the nearest distance from a farmer' home to a village clinic (within one kilometer=1, longer than one kilometer=0); *Disth* is the nearest distance from a farmer's home to township hospital (within three kilometers=1, longer than three kilometers=0); *Disch* is the nearest distance from a farmer's home to the county hospital (within thirty kilometers=1, longer than thirty kilometers=0); *designated* is whether or not the village clinics are designated as health care providers by NRCMS (*designated*=1, and 0 otherwise). *Deductible* is the deductible level, that is, the amount of medical costs paid out-of-pocket by

the patients (*deductible*=1 if deductible >200, and 0 otherwise)ⁱⁱ; *ceiling limit* is the upper limit of reimbursement (*ceiling limit*=1 if ceiling limit >10,000, and 0 otherwise)ⁱⁱⁱ. Both the patient and NRCMS pooling fund make co-payments for health care costs at the signed pro rata. ε_i is included to control for all unobserved effects.

4. Dataset and Descriptive Statistics

4.1 Dataset

The data used in this paper come from a national rural socio-economic survey executed by Center for Chinese Agricultural Policy, Chinese Academy of Sciences in April 2005. The data were collected from 5 provinces, 25 counties, 50 townships and 101 villages for a total of 808 households. The sample was drawn using multi-stage, clustering design with random selection procedures. In the first stage five provinces were selected. In the second stage the survey team randomly selected 5 counties in each province. Two townships were chosen from a list of all townships in the county that were ranked according to per capita income. One township was chosen from the townships that were relatively wealthy and the other from the townships that were relatively poor. In stage three two villages were chosen from the two selected townships in each county. In stage four eight households were chosen from each selected village. The final dataset can be considered a nationally representative sample.^{iv} At the village level, data were collected on items such as basic social economic conditions and the number of village clinics, as well as per capita income and whether an established NRCMS exists. The village clinic survey covers information such as medical equipment, medical personnel, and the operation of NRCMS. At the household level, information was collected concerning demography, health status, participation in NRCMS, utilization of medical facilities, and health expenses.

4.2 Descriptive Statistics

Sample population's health status

The total sample population is 3272. Among these, 1716 (52.44%) are male, and 1556 (47.56%) are female. 662 people(20.23%) are 16 years old or younger, 55.89% are male, and 44.11% are female. 2239 people(68.43%) are between 17 and 59 years old, 51.09% are male, and 48.91% are female. 371 people (11.34%) are 60 years or older, 54.45% are male, and 45.55 are female. According to the self-reported health status, 2098 respondents (about 64.12%) reported they are in very good or good health; 458 (about 14.00%) reported they are in poor or very poor health. More men (67.02%) than women (60.92%) reported they are in good or very good health. Correspondently, fewer men (11.13%) than women (17.16%) reported they are in bad or very bad health (Figure 1). Based on the self-reported health status, women's health care needs are likely to be greater than men because women's health status was poorer than that of men.

The data shows that among the sample population, 2411 (73.69%) respondents had become ill during the previous year (2004). Among the people who reported being ill, 812 (33.68%) had chronic diseases. About 31.05% of the men, and 36.39% of the women had chronic diseases (Figure 2). Consistent with the reports of overall health, more women than men in the total sample population reported chronic disease. Our data also shows, in 2004, 316 of the respondents had become seriously ill and were referred for hospitalization, but they failed to go. About 56% of them reported the key reason was inability to pay the high medical expenses.

NRCMS participation

Following the Chinese Central Government and State Council Act of 2002 that broadened participation in NRCMS pilot programs, six of the 25 counties in the five surveyed provinces had established pilot programs. One county was in Shaanxi, and the other five were in Jiangsu. In total, there were 24 villages with total population of 1040 implementing NRCMS pilot programs at the time of the survey in 2005. 825 people participated in NRCMS. The total coverage was 79.33%. When looking at the NRCMS participation from farmers' self-reported health status, we find that the participation rates varied (Table 1). About 90.09% of the people with bad health

participated in NRCMS. It was the highest rate. The second highest was people with fair health; people with very good health had a lower participation rate. Only thirteen people reported having very bad health, and notably, they had the lowest rate of participation overall.

Taking a gendered view of the data, we see that women were 47.6% of the residents in the six counties with NRCMS pilot programs in the survey but about 48.61% of those participating in NRCMS. Men covering 52.4% of the total residents in the six sample counties had a little lower participation rate (51.39% of the participating people). Thus, bias against rural women in access to health care insurance was not manifested in participation in NRCMS. As discussed further below, this is probably because NRCMS is set up on a household level rather than for individuals. Men's participation rates by self-reported health status correspond with the overall ranking of sample participation rates; thus, for example, men with bad health had the highest participation rate but those with very bad health had the lowest participation rate. Women with bad health also had the highest participation rate, but women with very poor health had a participation rate that was still quite high (five of the six women who reported very bad health participated). Women with very good health had the lowest participation rate, about 78.14% (Table 1). When comparing the NRMCS participation rate of the people with chronic disease to that of non-chronic diseases, we note that people with chronic diseases had a higher rate of NRCMS participation than those with no chronic disease (Table 2). Both men and women with no chronic diseases had lower participation rates.

Our data also shows the difference in percentage points of participation among the groups of people at different ages. Among the residents in the six counties with NRCMS pilot programs, the 16-year-old and younger covered 19.91%, the 17-to-59-year-olds covered 71.44%, and the 60-year and older covered 8.65%. The percentage of NRCMS participation of the three groups was 72.95%, 80.22%, 86.67% respectively. The older people were more likely to participate in NRCMS programs. It is more obvious among the men.

Analysis of the descriptive statistics shows the following: First, men and women had similar

overall participation rates in NRCMS with women slightly higher (81.01% of women participated compared to 77.80% of men). Second, both men and women with good health had lower NRCMS participation rates than those with bad health. The older people, especially the older men were more likely to participate in NRCMS programs. The result matches health insurance theory of “adverse selection”, namely those at lower risk are less interested in buying health insurance. Third, people with very bad health (self-reported) had the lowest participation rate overall; this was a small group and the results were determined by male non-participation because only four of the seven men who reported very bad health participated while five of the six women in this group participated. The higher non-participation rate of men in very bad health (and thus the overall category) is somewhat contrary to the above-mentioned points. Moreover, it is not consistent with the key conclusion of most health insurance research that people in poor health are more likely to buy insurance. When taking a further look at the benefit package of NRCMS pilot programs, however, we note that NRCMS provides limited basic coverage of in-patient medical expenses from catastrophic illness. The policy contains both a high deductible and co-insurance provisions that require the insured patients to make co-payments out-of-pocket. The farmers in very bad health were more likely to get high medical bills. Even participating in NRCMS, they had to pay not only a deductible (200-300Yuan *per treatment*) but also a certain percentage (about 50%) of eligible medical expenses in excess of the deductible, which are unaffordable to the poor farmers. At the initial stage, NRCMS with high copayment, narrow coverage played little roles in relieving the farmers’ financial burden of disease (Wang, et al., 2005; Yan, et al., 2006; Li, et al. 2007).

5. Regression Results and Discussion

As presented above, we denote participation of NRCMS as P and health care service utilization as U . If a farmer has participated in NRCMS, $P=1$, and 0 otherwise. If a farmer has visited a doctor for an illness, $U=1$, and 0 otherwise. Thus, our multivariate analysis is based on

probit regression because of the binary nature of the outcome variables. Most independent variables are dummy-coded, while a few variables are treated as continuous variables. One set of regressions is conducted on the full sample and includes interaction terms for the joint effects of gender and other key variables. All analyses are conducted with Stata 9.0 software.

We use three different approaches to examine the determinants of NRCMS participation and utilization of health services. First, in Regression 1 (column 2 in table 3 and 4), we specify a dummy variable (gender) that is one if an individual is male and zero if female. When we include all observations of the dataset, we interact the gender indicator variable with other indicator variables as predisposing factors (individual factors), enabling factors (household factors and community factors), environmental factors (benefit package of NRCMS). Second, based in part on our observations in the previous section, and in part by health care access literature, we hypothesize that environmental as economic level and social cultural components will affect both health insurance participation and health service utilization. In our case, the sample population came from the six counties located in Jiangsu Province and Shaanxi Province. As well known, Jiangsu was economically developed, while Shaanxi was less developed. There were great differentials in terms of per capita GDP and local cultures. So, we add a fixed-effect estimator “*Shaanxi*” (denoted as a dummy variable) to the equation to control the regional differentials (Regression 2, column 3 in table 3 and 4). Third, we further hypothesize that income will affect participation rates and health care service use. Based on the previous observation, we include another fixed-effect estimator “*income*” (denoted as a continuous variable) into the equation to control the individual’s income differentials (Regression 3, column 4 in table 3 and 4). In all of our regression models, we use cluster to observe whether or not the estimated coefficients are robust to the estimation technique. This helps confirm whether or not a relationship exists.

One of the most important findings is that gender had statistically significant effects on both NRCMS participation and utilization of health care services (Tables 3 and 4). The negative coefficients mean that women are more likely to participate in NRCMS and use health care

services. There are two explanations. One is that although participation in NRCMS is voluntary, the entire household is required to join. If participating, all the members in the family, men or women, young or old, healthy or unhealthy, are covered by NRCMS. The other explanation is that the health literature suggests that women are more likely to use health services because of their worse health status, higher incidence of chronic health problems, and lifetime need for reproductive and related services (Haynes,1991; Trypuc, 1994; Rosenberg and Hanlon, 1996; Rosenberg and Wilson, 2000; Doyal, 2000). In most regions, NRCMS covers part of reproductive medical costs and reimburses a fixed sum for a birth (200-300 *yuan*). Therefore, households with more women are more likely to participate in NRCMS.

Another finding is that age has a positive effect on both NRCMS participation and health care use. Generally, the older people are more willing to buy health insurance due to higher health risks. We also find education and education squared have statistically significant effects on NRCMS participation. The difference is that the coefficient for education is positive, but education squared has a negative effect. This shows that farmers with higher education levels are more likely to buy health insurance, but at a certain level, the participation rate begins to go down. This type of result is supported by the literature as well as our data. Among our sample population, NRCMS participation rate of the people with elementary school education is 88.33%, while for people with technical and higher education, the participation rate is 14.29%. In general, farmers' education levels are relatively low, and this result may due to farmers with higher education levels migrating to work in urban areas.

In examining participation of people with chronic diseases, we find that after controlling for villagers' income, people with chronic diseases have higher NRCMS participation rate (Table 3). This corresponds with the adverse selection theory for health insurance discussed in the section on descriptive statistic results above. Whether the family head stays at home has no significant effect on participation. Staying in rural areas and doing farming work has no direct impact on NRCMS participation but has significant positive association with health care use. Another

important finding is that the level of family wealth has a significant positive effect on NRCMS participation but no significant association with health care use. It shows the richer people are more likely to be covered by NRCMS program.

The following two findings are rather complicated to explain. One is the distance from farmers' home to health care providers; the other is NRCMS compensation level (Tables 3 and 4). The nearest distance to village clinics has no direct effect on NRCMS participation but has significant statistic effect on health care services use. It is easy to understand when we examine health resource allocation in rural areas. After the agricultural sector reforms since the early 1980s, the CMS collapsed in most of the rural areas. Without adequate compensation and organization, many village clinics closed. Both the number of village clinics and primary health care providers decreased. Nowadays, in most remote poor rural areas, health care providers are in great shortage. There are no clinics or doctors in some mountainous villages. Farmers have no other choice but to travel a long distance to visit the clinics in the neighboring villages or go to the township hospital. There are serious physical barriers to accessing basic health care in the poor rural areas. Also, our regression results show that the deductible level of NRCMS has a significant positive effect on both participation NRCMS and use of health care services. It is contrary to health insurance theory but has a reasonable explanation in practice. In most rural areas, the NRCMS programs in the initial stage only cover in-patient services. Only the medical expenses resulting from catastrophic illness and in-patient health care services could be partially compensated with higher co-payments. As shown in most health literature as well as our descriptive analysis, minor diseases are more common and in higher frequency in the rural areas; catastrophic illness and the need for hospitalization strike relatively few. Preventive and out-patient health care services are more necessary for farmers. Preventive and out-patient services, however, are not covered by NRCMS. Wealthy farmers have the ability to pay the deductibles and co-payments, so they are more likely to participate in NRCMS and get access to health care services. The poor farmers, however, are unable to afford the deductibles and

co-payments of large medical bills, so they have to give up treatment. A similar explanation is suitable to the question of why the ceiling limit has a statistically significant effect on both NRCMS participation and health care service use. Overall, a high co-payment asserts significant deterrence effects on the lower income farmers with poor health from participating in the program and using health care services (Wang, et al., 2005; Liu, 2006; Ren and Jin, 2007).

6. Conclusion

Based on Andersen's access to medical care model, we study the access to health care of the Chinese farmers under the NRCMS from a gendered view. NRCMS pilot programs had been set up in two provinces of the survey (which covered five provinces): one county in Shaanxi and five counties in Jiangsu. We find that: (1) Women are in poorer health than men in general, and women have more chronic illnesses than men. (2) Both men and women with good health had lower rates of NRCMS participation than those with bad health. The farmers with chronic diseases also had a higher rate of NRCMS participation than those with no chronic diseases. Thus, both women and men illustrate some degree of adverse selection. (3) Farmers with very bad health had the lowest participation rate overall; this held for men but not for women in the sample. Participation in NRCMS had no significant effects on utilization of health care services in general. The narrow coverage with high co-payment compensation system of the ongoing NRCMS pilot programs deters participation and health care service use for the lower income farmers with the poorest health. Farmers with higher incomes were more likely to participate in NRCMS and get access to health care services. (4) Gender had significant effects on both NRCMS participation and health care use. Women were more likely to participate in NRCMS and use health care services. (5) Age, education, and ceiling limits of reimbursement had positive effects on both NRCMS participation and health care use. Staying in rural areas and doing farming work and the distance to health care provider had no direct effects on NRCMS participation but had significant positive association with health care use. Deductible level of NRCMS had a significant positive

effect on both participation NRCMS and use of health care services.

The social safety net of health care insurance is rapidly expanding in rural China. NRCMS programs proliferated between the national decree of 2002 and 2008, moving from a situation where less than 10% of the rural population had access to health insurance to one where over 80% had the opportunity to participate in these programs. Concerns that women would not have equal access to health care in a voluntary program with an annual fee have turned out to be unfounded. The coverage, however, is minimal, and use issues are not as clear. Women in the sample are using the NRCMS supported health care slightly more than men. This is a significant accomplishment, but NRCMS has a long way to go. Many women and men, for example, cannot afford to go to the hospital when referred because of the high co-payments required. The NRCMS pilot programs have been expanding, but there are still numerous questions calling for attention of both policy-makers and researchers: how to promote equitable access to health insurance and the basic health care services. Specifically, How to design multileveled health care financing schemes to expand the access of the farmers and other vulnerable groups to basic health services? How to manage the contribution funds to motivate the health service providers to raise quality and efficiency in health service? How to integrate rural NRCMS and urban health insurance schemes so that the rural migrants can find health care in the city? How the Government formulates and adjusts its health policies to ensure the health service delivery and public health goods in rural areas, and reduce health disparities across gender, age and economic groups as well as geographical localities?

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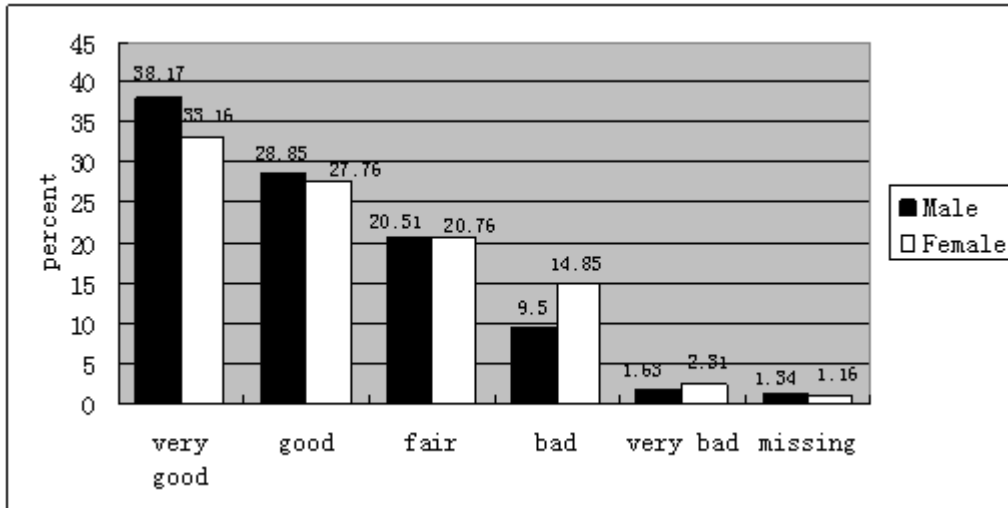


Figure 1 Self-reported health of the sample population

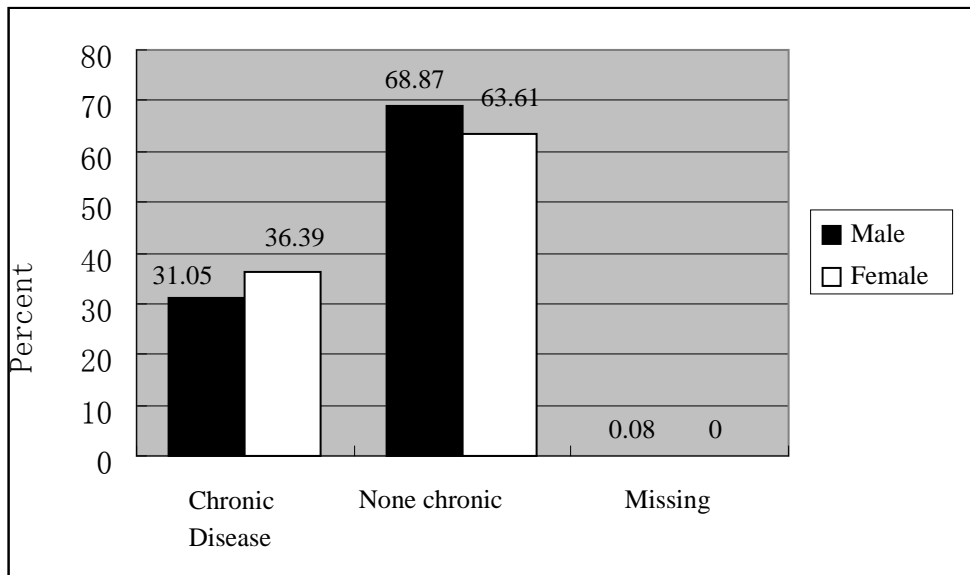


Figure 2 People with chronic diseases among the sample population

Table 1 Self-reported health and NRCMS participation in 6 counties implementing NRCMS, by gender

	Total sample population			Percentage of NRCMS participation		
	male	female	total	male	female	total
Very good	250	215	465	188	168	356
	45.87%	43.43%	44.71%	75.20%	78.14%	76.56%
Good	121	108	229	92	93	185
	22.20%	21.82%	22.02%	76.03%	86.11%	80.79%
Fair	113	103	216	93	82	175
	20.73%	20.81%	20.77%	82.30%	79.61%	81.02%
Bad	51	60	111	47	53	100
	9.36%	12.12%	10.67%	92.16%	88.33%	90.09%
Very bad	7	6	13	4	5	9
	1.28%	1.21%	1.25%	57.14%	83.33%	69.23%
Missing	3	3	6	0	0	0
	0.56%	0.61%	0.58%	0	0	0
Total	545	495	1,040	424	401	825
	100%	100%	100%	100%		

Table 2 Chronic diseases and NRCMS participation in 6 counties implementing NRCMS, by gender

	Total sample population			Percentage of NRCMS participation		
	male	female	total	male	female	total
Chronic Disease	116	120	236	102	104	206
	29.74%	31.17%	30.45%	87.93%	86.67%	87.29%
Non-chronic	274	265	539	212	212	424
	70.26%	68.83%	69.55%	77.37%	80%	78.66%
Total	390	385	775	314	316	630
	100%	100%	100%			

Table 3 Probit Regression Analysis of the Determinants of Participation of NRCMS

	(1)	(2)	(3)
Dependent variable: participation of NRCMS			
Independent variables			
<i>Gender (1=male)</i>	-0.243 (1.99)**	-0.255 (1.95)*	-0.222 (1.73)*
<i>Age</i>	0.025 (3.50)***	0.029 (3.83)***	0.025 (3.28)***
<i>Edu</i>	0.149 (2.94)***	0.157 (3.00)***	0.141 (2.72)***
<i>Edu²</i>	-0.012 (3.22)***	-0.012 (3.13)***	-0.013 (3.41)***
<i>Chronic disease</i>	0.335 (1.59)	0.330 (1.55)	0.506 (2.29)**
<i>Dadhome</i>	0.276 (1.47)	0.277 (1.44)	0.277 (1.39)
<i>Homefarming</i>	-0.002 (0.01)	-0.001 (0.01)	0.026 (0.12)
<i>Burden</i>	-0.005 (1.25)	-0.005 (1.39)	-0.005 (1.40)
<i>Rich</i>	0.403 (2.60)***	0.414 (2.55)**	0.391 (2.39)**
<i>Dis VC</i>	0.142 (0.68)	0.151 (0.73)	-0.124 (0.55)
<i>Dis TH</i>	-0.148 (0.67)	-0.129 (0.59)	-0.156 (0.70)
<i>Dis CH</i>	-0.420 (1.64)	-0.388 (1.52)	-0.768 (2.67)***
<i>Designate</i>	-0.937 (3.41)***	-0.494 (1.57)	-0.484 (1.42)
<i>Deductible >200 RMB Yuan</i>	0.834 (2.91)***	0.854 (2.96)***	1.703 (4.99)***
<i>Ceiling limit >10,000RMB Yuan</i>	0.482 (1.58)	0.529 (1.71)*	1.338 (3.36)***
<i>Shaanxi</i>		1.123 (2.93)***	
<i>inc==2</i>			-2.151 (4.45)***
<i>inc==3</i>			-0.462 (1.24)
<i>Constant</i>	-0.780 (1.38)	-1.496 (2.36)**	-1.213 (1.88)*
<i>Observations</i>	604	604	604
<i>R square</i>	0.1845	0.2057	0.2844

* significant at 10%; ** significant at 5%; *** significant at 1%

Table 4 Probit Regression Analysis of the Determinants of Utilization of Health Care Services

	(1)	(2)	(3)
Dependent variable: Utilization of Health Care Services			
Independent variables			
<i>NRCMS</i>	-0.166 (1.20)	-0.200 (1.42)	-0.192 (1.31)
<i>Gender(1=male)</i>	-0.276 (1.91)*	-0.278 (1.92)*	-0.277 (1.91)*
<i>Age</i>	0.013 (2.21)**	0.015 (2.42)**	0.015 (2.51)**
<i>Edu</i>	0.021 (0.45)	0.025 (0.54)	0.027 (0.58)
<i>Edu²</i>	-0.002 (0.57)	-0.002 (0.62)	-0.002 (0.62)
<i>Chronic disease</i>	0.168 (1.48)	0.162 (1.42)	0.162 (1.41)
<i>Dadhome</i>	0.243 (1.33)	0.246 (1.34)	0.239 (1.30)
<i>Homefarming</i>	0.751 (4.87)***	0.751 (4.87)***	0.745 (4.83)***
<i>burden</i>	-0.002 (1.02)	-0.003 (1.06)	-0.003 (1.09)
<i>Rich</i>	0.038 (0.98)	0.037 (0.94)	0.037 (0.95)
<i>Dis VC</i>	-0.294 (2.33)**	-0.284 (2.25)**	-0.281 (2.17)**
<i>Dis TH</i>	0.088 (0.73)	0.093 (0.77)	0.089 (0.74)
<i>Dis CH</i>	0.377 (2.18)**	0.389 (2.26)**	0.383 (2.17)**
<i>Designate</i>	-0.161 (1.03)	-0.001 (0.00)	0.020 (0.11)
<i>Deductible >200RMB Yuan</i>	0.384 (2.43)**	0.395 (2.50)**	0.403 (2.26)**
<i>Ceiling limit>10,000RMB Yuan</i>	0.511 (2.59)***	0.532 (2.69)***	0.521 (2.42)**
<i>Shaanxi</i>		0.330 (1.59)	
<i>inc==2</i>			-0.379 (1.40)
<i>inc==3</i>			-0.396 (1.99)**
<i>Constant</i>	-1.159 (2.81)***	-1.394 (3.18)***	-1.058 (2.54)**
<i>Observations</i>	611	611	611
<i>R square</i>	0.1363	0.1394	0.1412

* significant at 10%; ** significant at 5%; *** significant at 1%

Notes

ⁱ Anderson's components are specified as the following: (1) The environment includes health care system and external environment. External environment includes physical, political, and economic components. Health care system factors include health policies and health care reforms. (2) The population characteristics are classified into three levels of main determinants including predisposing characteristics, enabling resources, and need. Predisposing characteristics are measured by demographic, social structure, and belief factors. a. Demographic factors include age, gender, marital status, and past illness. Social structure refers to individual's social status. It is measured through an individual's education, occupation, ethnicity, and other factors. Health beliefs are attitudes, values, and knowledge that people have about health and health services that might influence their subsequent perceptions of need and use of health services. b. The enabling component represents the resources facilitating or limiting individuals' use of health services. It covers two aspects: the one is the family enabling factors including income, health insurance, regular health source and access to regular health source. The other is community enabling factors, including status of health facilities, health service price, and region characteristics. c. The need component includes self-perceived illness and evaluated illness. (3) Health behavior includes personal health practices and use of health services. (4) Outcomes are represented by perceived health status, evaluated health status, and consumer satisfaction.

ⁱⁱ Based on local economic development, each county government set its deductibles of NRCMS. The deductibles were classified into four levels based on the designated hospital levels, namely township, county, prefecture and provincial hospitals. The higher level of a hospital, the higher amount of the deductible. Here in our empirical analysis, we only select the deductible of a county hospital. The main reason is that NRCMS programs in the six sample counties only provided reimbursement for the in-patient medical expenses at the county-level or higher hospitals in 2004. Four of the six sample counties set their deductibles as 200 Yuan. The other two counties were 300 Yuan. We denote the variable as: *deductible* =0 if reimbursement=200, *deductible*=1 if reimbursement=300.

ⁱⁱⁱ Each county government set its ceiling limit of NRCMS based on local economic development. The ceiling limit is the upper limit of the total reimbursement for the medical expenses during the whole year. In our study, the ceiling limits of the six sample counties are various. Three counties set their ceiling limit as 20,000 Yuan, another two counties were 1,5000 Yuan, and one was 10,000 Yuan. Usually, the higher the ceiling limit, the more likely that people to buy insurance and use health care services. To be simple, we denote the variable as: *ceiling limit* =1 if the upper limit level >10,000 and 0 otherwise.

^{iv} Five provinces are selected randomly, including Jiangsu, Sichuan, Shaanxi, Hebei, and Jilin. Among the sampling provinces, Jiangsu Province is located in the eastern coastal areas (including Jiangsu, Zhejiang, Shandong, Shanghai, Fujian and Guangdong), representing economically developed areas in China; Sichuan represents southwestern provinces (including Sichuan, Guizhou, Yunnan and Guangxi); Shaanxi represents the provinces in northwestern area (including Shaanxi, Shanxi, Inner Mongolia, Ningxia, Gansu, Qinghai and Xinjiang); Hebei represents the north and central provinces (including Hebei, Henan, Anhui, Hubei, Hunan and Jiangxi); and Jilin represents the northeastern provinces (including Jilin, Liaoning and Heilongjiang).