



TI 2006-091 / 1

Tinbergen Institute Discussion Paper

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October 9, 2006

JEL codes: D12, H51, I11, I18, P36

Keywords: health insurance, poverty, China, health care, market failure

Abstract

Does medical insurance affect health care demand and in the end contribute to improvements in the health status? Evidence for China for the year 2004, by means of the China Health and Nutrition Survey (CHNS), shows that health insurance does not affect health care demand in a significant manner. Counterfactuals suggest that full insurance coverage of the Chinese population will not radically change the health care decisions and may even enlarge the perverse effects of today's health care system: insured persons are more likely to fall back on self-care when they are injured or ill than on the care of a local clinic. This effect is particularly strong in urban areas. In case of a severe injury hospital consultation is preferred to local clinic or self-care by most people, but still a substantial percentage (20 percent) resorts to self-care or ignores the illness. The high level of out-of-pocket expenses paid by both insured and uninsured patients lies at the root of this problem. Insurance does not offer real protection against unpredictable high health care expenditures and can lead people into a position of long-term poverty or serious liquidity problems.

* Comments by Frans Willekens are gratefully acknowledged.

1. Introduction

“China is beginning to discover that market forces alone cannot produce good health care.” *The Economist*, August 19, 2004

The Chinese health insurance market is in a state of flux as Chinese government tries to repair the financial and cultural obstacles that may impede the poor in trying to get access to essential health care services. The need for reform is large as the majority of the Chinese households do not have health insurance making them extremely vulnerable in case illness strikes a household member. Recent nationwide health services surveys indicate that excessive costs were the prime reason for not seeking medical care for a substantial part of the population: 38 percent did not seek medical attention while sick, 70 percent refused hospitalization after doctor’s referral and among early hospital discharges against medical advice 67 percent was associated with non-affordability of hospital expenses (WHO, 2005). In 2002 64 percent of total health expenditures in China were financed out-of-pocket and as numerous surveys indicate differences across regions are large. In some rural areas out-of-pocket spending as a portion of total spending was as high as 90 percent of household income. Large medical bills can lead the accumulation of debts, the withdrawal of lifetime savings, the use of family resources or the decision to forego adequate treatment of illnesses or injuries. When medical bills becomes excessive a household is forced to live in poverty and in case out-of-pocket expenditures exceed a certain threshold poverty becomes a long-term affair with all the subsequent negative effects on labor supply, savings and health status. The latest figures suggest that out-of-pocket health care expenditures absorb 4 percent of household consumption and 6 percent of non-food consumption. These averages cover up huge differences: 5 to 20 percent of the households incur catastrophic health care payments (as a percentage of non-food consumption), i.e. they are susceptible to living in long-term poverty (Van Doorslaer *et al.*, 2005). The picture sketched of the Chinese health care system suggests that widespread health insurance coverage is a *sine qua non* for the Chinese health care system to function properly. However, the question remains whether ‘being insured’ solves the access problems of Chinese health care. If the price of health care is excessive, health insurance will not solve the problems of access since the insurance premiums will rise to cover the expected health costs. The price of insurance will in turn prevent access to adequate health care or generate long-term

financial problems. Knowing how the actions of insured persons differ from those who are not insured is of some importance in understanding the problems faced by Chinese health policy makers.

This paper tries to come to grips with the present state of health care insurance in China by focusing on the health care decisions made by Chinese adults (17 years and older) and the role played by commonly used insurance schemes and the level of out-of-pocket expenses made by patients. The present study is therefore primarily a view from the demand side. Needless to say, the inner workings of the supply side (insurance companies, health care providers) should be of equal importance but the Chinese case is so complex and the diversity of experiences across this vast country so wide ranging that almost every study offers a partial view. A piecemeal examination seems to be the only feasible route for outside observers. The research findings suggest that full insurance coverage of the Chinese population will not radically change the health care decisions and may even enlarge the perverse effects of today's health care system. Insured persons are more likely to fall back on self care when they are injured or ill than on the care of a local clinic. Consultation of doctors at hospitals is preferred to self-care, especially in case the illness turns out to be severe. Apparently in urban regions people do not trust the doctors at local health clinics, because most would prefer to go directly to a hospital.

The first question that will be examined is the matter of insurance coverage: who is insured? Subsequently, what are the consequences of being insured, or more specifically how does an insured state affect health care decisions which ultimately impinge on the health status of adults? This question will be answered by first examining how it affects health decisions in preventive (general and prenatal care) and curative health care consumption and subsequently how these decisions affect the self-reported health status. To examine the current state of health care in China the China Health and Nutrition Survey 2004 will be used, a well established database that has proven its worth in tracking the health and nutritional status of Chinese in nine provinces that differ by economic and social development.

2. Demand for Health Care and Insurance

The demand for health insurance stems from the unpredictability of health care spending. Health risks have always been present, and for a long time people have been carrying these risks themselves out of their own pockets. Life insurance or

funeral insurance were well developed financial instruments by the end of the 19th century in the western world, but health insurance played a minor role. Once effective health care became an expensive but also valued commodity, health insurance became a desired and inevitable service. The value of health insurance is to be traced to the unpredictability of medical spending which could have a deep and long-run impact on the welfare of individuals or households through the loss of income or the expenditures on medical care (Gertler and Gruber, 2002). If a risk-neutral consumer faces no saving or borrowing constraints and medical spending in bad health states is affordable within the limits of lifetime income the need for health insurance is not a priori clear. Things change, of course, when people are risk averse, when liquidity constraints at every moment in time are binding, and when the lifetime income is not sufficient to pay the medical care bill. The natural solution for guarding against the risks of illness is to pool risks with others in the population. Under conditions of full information the fair insurance premium would be the average cost of care. The prime dilemma faced in practice by health care insurers is that they must face the tradeoff between the benefits from spreading risks against the increase of moral hazard. Once an insurer offers an insurance package that offers more protection against high medical spending during periods of illness it also induces people to make more use of health care as the price of health care is lowered. Moral hazard revolves around hidden action or an action with a hidden motivation and curtailing this is almost impossible as medical needs are not fully monitorable. Insurance companies solve the moral hazard problem by demanding some form of coinsurance. In other words, the insured are required to partially self-insure as they pay out of their own pockets for medical care received. Most insurance companies try to find a compromise between two extreme coinsurance solutions in which all risks are carried by the insured party and the other in which all risks are carried by the insurer, engendering greater moral hazard. With perfect knowledge an insurer could fully insure and thereby fully reimburse all spending on a specific treatment. However, in practice the severity of illness is not fully monitorable and thereby insurance leads to overconsumption of medical care when sick and in the end insured parties pay more for health insurance than is optimal (Cutler and Zeckhauser, 2000).

In this paper we will examine two types of health care consumption to see how insurance affects health care demand: preventive health care (in general and applied to prenatal health care) and curative health care. Preventive health care entails forward

looking decisions set in a lifetime framework. It varies from checking regularly for blood pressure, diabetes to taking medicine which prevents an event (like a stroke or a heart attack) occurring. Preventive action is akin to an investment in human capital and the level of time preference, initial health status and age all play a role in preventive health care demand (Kenkel, 2000).

The consumption for curative health care differs from preventive health care as an event has actually taken place – an illness or an injury – and the decision at this junction in time is to seek advice about a cure or ignore the illness. Uncertainty and information are the keywords to understanding this element of health care demand. When struck by illness the patient has to diagnose whether or not the illness is serious enough to be treated by a medical professional. Each decision depends, of course, on the severity of the injury or illness and the risk one is willing to take that some injuries will heal by time or by self medication. The central issue in the present paper is, of course, whether health insurance and additional out-of-pocket health expenditures affect health care decisions and in turn the health status of people.

The production of health may look simple in theory, in practice it is filled with a myriad of effects. Figure 1 presents the interrelationships that may exist between insurance, health care demand and health status.

HERE FIGURE 1

As noted by Levy and Meltzer (2001) “identifying the causal impact of health insurance on health is complicated by the fact that health insurance is not usually assigned randomly to individuals.” Both observed and unobserved characteristics of individuals affect every link of the chain of decisions or health states. The factors that affect health insurance status are also the same underlying factors which affect health investment, health status and the use of medical care. Furthermore, the theory of moral hazard predicts that health insurance has a negative effect on health behavior which prevents the appearance of a health risk. Therefore, a simple comparison of outcomes of insured versus uninsured may reflect either a causal effect of health insurance or simply differences between insured and uninsured individuals. This endogeneity problem makes it difficult to pinpoint causal influences in observational studies which according to Levy and Meltzer (2001) are “hopelessly confounded” by methodological problems of (1) identifying the direction of causation between health

insurance and health; and (2) controlling for unobserved factors that might simultaneously determine both health insurance and health status. Insurance coverage may be a function of health status, leading to endogeneity bias in estimates of effects of insurance on health and the use of medical care. The direction of the bias is not clear a priori as an anticipation of relatively high use of medical services might lead an individual to seek insurance, which yields an upward bias to the estimated effect of insurance on health care demand. The bias may also move in the opposite direction as insurers may be able to identify or screen people who will be intensive users and either decline to offer insurance or use price discrimination to separate the different risk groups. Levy and Meltzer suggest that the only true and informative test would be an experimental setting. Unfortunately such a setting is not within reach for most researchers and they have to correct for the problem of endogeneity in a more pragmatic fashion. In the current setting one can deal with the endogeneity problem by using an instrumental variables estimation (IV) strategy (cf. Hadley, 2003; Meer and Rosen, 2004).

3. Data

The analysis of the demand for health care and health insurance is based on the 2004 wave of the China Health and Nutrition Survey (CHNS). The CHNS is a collaborative effort involving the National Institute of Nutrition and Food Safety, the Chinese Center for Disease Control and Prevention, and the University of North Carolina at Chapel Hill. The 2004 survey covers nine provinces (see Figure 2) that vary substantially in geography, economic development, public resources, and health indicators. A multistage, random cluster process was used to draw the sample surveyed in each of the provinces (Liaoning, Heilongjiang, Jiangsu, Shandong, Henan, Hubei, Hunan, Guangxi, Guizhou). In 2004 the sample for each of the provinces is approximately 1,000 respondents, totalling 9,856 respondents for the year 2004. Counties in the nine provinces were stratified by income (low, middle, and high) and a weighted sampling scheme was used to randomly select four counties in each province. The importance of taking account of regional differences is very important for the case of China. Studies by Ravallion and Chen (2006) and Zhang and Kanbur (2005) show how much progress China has made over the past decades but that economic and social inequalities have also substantially increased over the years.

HERE FIGURE 2

The first round of the CHNS, including household, community, and health/family planning facility data, was collected in 1989. Five additional panels were collected in 1991, 1993, 1997, 2000, and 2004.¹ In the present study we will use just one year to gain an insight into Chinese health system and two sections from the CHNS, viz. the health services section and the individual adult survey section. To gain an insight in the Chinese demand for health insurance over time by means of the CHNS one can consult studies by Henderson *et al.* (1995), Akin *et al.* (2004) and Lindelow and Wagstaff (2005). The health services section contains detailed data on insurance coverage, medical providers, and health facilities that the household might use under selected circumstances. Questions about accessibility, and time and travel costs are asked at the household level. Information on illnesses and on all uses of the health system during the previous month is collected from all household members in the survey year.

4. Insurance coverage

Before examining the effect of health insurance on medical consumption we first explore the issue of health insurance demand, in other words: who is insured? To gain insight in the distribution of health insurance coverage we exploit the CHNS data for the year 2004. Similar exercises for early waves of the CHNS can be found in Akin *et al.* (2004). Of course, insurance contracts differ with respect to the level of out-of-pocket expenditures and coverage of services insured, but at this stage we make no distinction with respect to those specifics. In examining who is insured we will use a number of explanatory variables, which are summarized in Table 1. An important variable which is not summarized in the table refers to the wealth class to which household members belong. A wealth variable is constructed by a linear index from asset ownership indicators², using principal components analysis to derive weights as demonstrated by Filmer and Pritchett (2001). For the econometric analysis of wealth

¹ For more information on the data and the set-up of the survey consult the CHNS website: www.cpc.unc.edu/china.

² The indicators used are binary variables indicating ownership of: radio/tape recorder, VCR, color television, washing machine, refrigerator, air conditioner, sewing machine, electric fan, computer, camera, microwave oven, electric rice cooker, pressure cooker, telephone, cell phone, VCD or DVD, bicycle, motorcycle, car, in-house tap water, safe water source, in-house flush toilet, main cooking fuel biomass (wood/dung/coal),

effects a dummy variable is constructed which divides households into three classes: the poorest 40 percent of the population, the richest 20 percent and the middle wealth class (40 percent) is used as base category.

HERE TABLE 1

A number of observations can be made on the basis of this table. First of all, the low level of insurance coverage: 27 percent of the population is covered by some form of health care insurance. Another fact which reflects the Chinese economy is the relatively high level of people working in farming and residing in rural areas. The health status is relatively low if we compare this to earlier measured health evaluations (Lindelow and Wagstaff, 2005). In 1991 27 percent of the heads of households regarded their health as fair or poor, in 2001 this has increased to 37 percent and in 2004 (see Table 1) this percentage has reached the level of 41 percent.

At this point we are interested in who has health insurance and Table 2 gives some clues which factors are important in health insurance demand.

HERE TABLE 2

Insurance coverage is linked primarily to employment status. Employees of state enterprise or civil servants are generally known to have wide insurance coverage, whereas farmers or employees of small private firms have little or no coverage. Furthermore within the group of government employees education plays a significant role: a state employee with a university degree is 4.8 times more likely to have health insurance than a state employee with only a primary school education. It seems that wealth constraints are less important within the public sector than within the private sector: there are no significant differences between public sector employees of the three wealth classes. The role of education plays a far smaller role in the group of private sector workers: only among university trained workers can one detect a significant higher share of health insurance contracts. Among the group of private sector workers it is especially the farmers and people working in low-skilled services who are by and large uninsured. Another noteworthy element to be highlighted is the fact that there may be some form of positive self-selection in the demand for health

insurance. Those who are in favor of healthier lifestyles are also the ones who are more likely to have health insurance.

Last but not least, the regional diversity of health insurance coverage is large. The chance of being insured of those living in rural areas is 65 percent smaller than those living in urban areas. Furthermore, the higher level of insurance coverage in a province like Jiangsu, and to a lesser extent in Shandong and Hunan, show that the regional diversity is a factor to be taken account with in sketching a picture of the Chinese health care sector. Jiangsu deserves some special mention as this is a province that has implemented a health insurance reform in 1997 which seems to have proven quite effective in controlling hospital charges and expenditures (Meng *et al.*, 2004). However, as shown by Akin *et al.* (2004) the province of Jiangsu has always been an outlier in terms of insurance coverage: in 1989 the insurance rate was 49 percent, after which it showed some fluctuations but throughout that time Jiangsu has remained outstanding and again in 1997 the insurance coverage was 49 percent. Poor provinces like Guizhou, Guangxi and Hunan have always lagged behind in insurance coverage and still do. It remains an open question whether people residing in this province behave differently in matters of health care demand. In the remainder of the paper we will shed light on this issue.

5. Does insurance coverage affect health care demand?

In principle we would expect the presence of insurance coverage to affect medical consumption because insurance lowers the price of health care. The null hypothesis of testing the effect of insurance can therefore be formalized as follows: insured persons use more medical care than uninsured persons. In testing this hypothesis we make use of two types of medical consumption: preventive health care (section 5.1) and curative health care (section 5.2). The reason for making this distinction is to be traced to the fact that both services may differ in terms of characteristics valued by people. An illness or an injury represents a health shock which calls for immediate action. Preventive health care is quite different as there is no immediate shock which needs to be dealt with. The demand for preventive health care is a forward looking decision which may also be affected by the current health status (as approximated by the Body Mass Index) and health attitude.

5.1 Preventive health care

To examine this type of health care demand we will focus on two types: general preventive health care and prenatal health care.

General preventive health care

The results are presented in Table 3 for two different models. The first (column 1) assumes that insurance is an exogenous variable and hence the conventional probit analysis of the choice of preventive health care consumption will suffice. However, Gruber (2000) and Meer and Rosen (1998) argue that in cases of insurance one should treat the status of being insured as an endogenous variable. Treating it as an exogenous variable would seriously underestimate the true effect of insurance coverage on health care demand. Column (2) presents the marginal effects derived from instrumental variables (IV) probit estimation.

HERE TABLE 3

Two conclusions can be derived from Table 3. First of all, the estimation results do not lend support to the presence of large moral hazard effects in health insurance. In case insurance is considered an exogenous variable (column 1) it appears that the probability of making use of preventive health care services by insured persons is 3 per cent higher than of uninsured persons. Re-estimating this model by means of IV probit estimation increases this marginal effect to 4 per cent but it turns out to be statistically insignificant and a small percentage compared to the induced insurance effects found by Meer and Rosen (1998). Furthermore, the other variables also show small effects for both models in the range of marginal effects of 1 to 3 percent.

The second conclusion is that the endogenous model is not an appropriate approximation of the Chinese preventive health care market. In other words, being insured is too a large extent an exogenous event. Of course, this should not surprise us too much as the health insurance status is closely linked to employment status. The insurance status is instrumented in column (2) on the level of education of the respondent and the (Wald) exogeneity tests show that there is not sufficient information in the sample to reject the null hypothesis that there is no endogeneity. Of course, much depends on the suitability of the instrument(s) chosen. We experimented with alternative instruments but these did not overturn the conclusion that the

endogeneity of insurance status is not a problem and the regular probit estimates are sufficient to distill a picture of preventive health care demand.

Prenatal health care demand

The previous (survey) question referred to preventive health care in general, which covered services like a general physical examination, a blood pressure screening or a prenatal or postnatal examination. It would be of interest to see whether previous conclusion is robust when we focus on a specified preventive health care service. To attain this goal we have focused on prenatal care which is approximated by two specific questions (which apply only to women): (1) on the *use* of prenatal care during the most recent pregnancy; and (2) the *number* of prenatal examinations during this pregnancy. The estimation results (see Table 4) give rise to mixed conclusions. First of all, the effect of being insured on the probability of using prenatal care is certainly larger: having insurance increases the probability of prenatal care use by 14 percentage points.

HERE TABLE 4

The endogenous model produces an effect that is twice as large as the probit model (28 percentage points), but again the ordinary probit model would have sufficed as the exogeneity test do not suggest that IV probit estimation is not an appropriate model. This is also the case when one considers the *number* of prenatal examinations. The marginal effect based on ordinary least squares suggests that women with insurance are liable to make 1.4 more visits than uninsured women. The instrumental variables estimate of the insurance effect suggests that this difference is in the range of five more visits for insured persons. This is a considerable difference. However, statistical tests (see Hausman test) show that the evidence of endogeneity is very weak in this case.

An observation that needs to be mentioned is the result that wealth constraints are of no importance in prenatal health care, whereas such constraints clearly have an effect on general preventive health care services, albeit a small effect. These effects are to some extent expected as family planning ranks high on the list of policy priorities of Chinese government.

5.2 Curative health care

The consumption of the curative health care boils down to the choice of health care provider in case respondents become ill or injured. In the CHNS-survey respondents were asked to reveal their choice of health care provider in case they became ill or injured in the month preceding the interview. Persons can choose between four alternatives: (1) ignore the illness or injury; (2) self care; (3) consult a doctor at a local clinic or local health worker; (4) consult a doctor at a hospital.³ There are two ways of modeling this choice, each with different implicit assumptions. The options can be ordered by costs, thereby suggesting to use ordered probit or logit estimation. However, the options need not be superior to one another and therefore ordered probit estimation may not offer the best estimation technique. For instance, self care may be a better choice in case people trust their own judgement more than that of a local health worker or doctor. And visiting a local clinic in case of the flu may offer quicker service than visiting a hospital with a few hours drive. The alternative modeling option is to frame the choice between the four health care options as being independent, and this is formalized in the multinomial logit model (see Verbeek, 2004). The implicit assumption is that each individual chooses the option which generates the highest level of utility. The error terms tied to specific options must be independent, in other words, conditional upon observed characteristics the utility levels of any two alternatives are independent. If two or more options are very similar the multinomial logit model is not well suited to shedding light on the actual choice process. Estimated coefficients should not change very much for any subset of alternatives, as formalized in the Hausman and McFadden (1984) test for the so-called independence of irrelevant alternatives (IIA). A priori, we assume that the IIA applies and health care choices can be modeled according to the properties of a multinomial logit model. The base category against which the choices are evaluated is the option to ignore the illness or injury and in Table 5 the estimation results are presented of a simple model in which the demand for a particular health providers depends on a set of demographic variables (sex, marital status, age), regional variables and variables

³ In the CHNS questionnaire the options may seem clear but a substantial number of persons who claimed to choose for self care (eventually) went to see a doctor at a clinic or hospital, so for the present study we have used their eventual choices of health care provider.

describing the health background of the respondent.⁴ Note that the demand for health care in Table 5 applies to a special subset of the total sample because it refers only to those who have had an illness or injury in the past month.

HERE TABLE 5

The variable which is of central interest is the presence of health care insurance and at this point the perverse effects of health insurance become clear in the China of today. In the face of an illness insured persons are more likely than uninsured persons to consult a doctor at a hospital rather than ignoring the illness. To get a better grip on the quantitative impact of insurance coverage Table 6 presents the predicted probabilities of how Chinese would choose in case they are struck by an illness under three scenarios: scenario one represents the status quo of 2004, the second scenario is a counterfactual in which it is assumed that everyone has health insurance, and the third scenario shows the additional effects (on top of the mandatory insurance scenario) of equal access of all wealth classes. Naturally, the simulation results of Table 6 reveal the same pattern that one can derive from Table 5, but the predicted probabilities give a better view of how a representative person reacts and chooses among the four health care actions. To make the comparison more transparent we have disaggregated the choices by the severity of the illness. One can imagine that for illnesses that do not appear severe or life-threatening people will deliberate over ignoring the illness, taking care of it themselves or consulting a clinic, but certainly not consult a doctor at a hospital. In case the illness becomes more serious, the prominent options will be self-care and consulting a clinic. And for severe illnesses the logical choice would be to consult doctors at either clinics or hospitals. In that respect the calculations in Table 6 are revealing in that they suggest that hospitals are overused for illnesses or injuries that could have been dealt with at a lower level in the hierarchy of the health system and hospitals are underused for serious injuries. Of course this conclusion is also reflected in the other choices, where neglect or self-care rank high where the consultation of an expert would have been a wise step. The fact under present conditions that 17 percent of the severely ill or injured persons decide to

⁴ The possibility that IIA applies was tested by running a Hausman test. The independence of irrelevant alternatives applies and this corroborated the assumption that the multinomial logit model is an appropriate model for the question at hand.

resort to self care and 3 percent tends to ignore the disease can be a devastating element in case a country is struck by highly communicable diseases like SARS or HIV/AIDS.

HERE TABLE 6

The counterfactual of mandatory insurance for the entire Chinese population suggests that the effects of this exercise are extremely small. The biggest increases are to be noted with respect to hospital use, especially for severe illnesses, and self care in case of illnesses of lesser importance. Apparently being uninsured is not the root cause of the Chinese health care system. The variable ‘wealth class’ in Table 3 offers a better clue what might be a major reason: the high price of health care. The steep increase in health care costs has made curative health care a good that is beyond the financial means of the poorest citizens. The likelihood that poorest citizens use self care and hospital care is 50 percent and 44 percent, respectively of what the middle wealth class uses. Neglecting illnesses or injuries is thereby significantly higher among the poor vis-à-vis the rest of society. The fact that the poor do not differ with respect to clinic use compared to the middle or top wealth classes suggests that the quality of health care at clinics is questionable, a fact which seems to be in line with the findings of Meng *et al.* (2000). This impression is reinforced by the fact that people with a healthy lifestyle are indifferent between visiting a clinic or ignoring the illness, and they are firmly set on resorting to self-care or a doctor at a hospital. Especially people residing in urban areas are apparently more accustomed to using self-care. People in rural areas are far more set on visiting a clinic and self-care is far lower, although the effects of mandatory insurance and equal access generate the largest effects in rural areas (see Table 6), where people switch more to self care and hospital care and they will decrease their use of local clinics.

5.3 A reality check on the results

The previous results are to some extent puzzling as they suggest that health insurance yields counterintuitive or even perverse effects: in case of an illness or an injury people with insurance and a positive health style would rather turn to self-care than to consulting a doctor at a clinic. For most Chinese the (local) clinic is the first place to visit in case of illness (see Liu, 2004a, 2004b) and foregoing medical advice does not

seem rational when you have health insurance, unless of course, the insurance contract covers very little and most the expenses have to be financed out-of-pocket. The estimated health care demand effects of insurance are also not in line with expectations. The endogeneity of health care demand - which seems widespread in, e.g., the US health care system - is virtually absent in the Chinese case and insurance effects are small or negligible. Of course, absence of a strong health insurance effect could mean two things: either human nature of Chinese citizens is riddled of moral hazard, or health care is so expensive that being insured may perhaps soften the blow of high medical bills but one can still run into a situation of liquidity problems or long-term poverty. Although there is no direct evidence on the first argument it would seem that Chinese are just as liable as US or European citizens to fall prone to hidden actions that lead to extra health care consumption. The first argument therefore does not seem a plausible factor in explaining the weak insurance effect. The expensive health care argument, however, does have a ring of truth. Reports of a faltering Chinese health care system are ample (cf. WHO, 2005, Meng *et al.*, 2000, Liu *et al.*, 2000) and to stay close to the year of observation the following anecdote illustrates what may lie at the heart of the problem. China's health care system made the headlines in an incident that came to light in April 2004. The incident revolved around a baby Rongrong, who was seriously malnourished by substandard milk powder and who was misdiagnosed by the village clinic and a rural hospital, even though they charged the father of the baby the equivalent of two and a half months salary. Only at a city hospital the correct diagnose was made but by then the baby was in a critical condition. After seven days and another three months salary-worth of hospital bills the baby was dead (*The Economist*, August 19, 2004).

The Rongrong case comprises all of the drama of China's health care crisis. Rural people often have to make do with local clinics or rural hospitals, which are not endowed with the most talented or qualified doctors or with sufficient means to provide services at a satisfactory level. Meng *et al.* (2000) show for clinics situated in rural villages that the quality of services was poor and that a large proportion of patient expenditure was due to over-treatment and, last but not least, quality differences between privately and publicly owned clinics are virtually absent. As one can deduce from Table 3 visiting a clinic is a more likely choice among people living in rural areas and resorting to self-care is a less likely choice. The largest rural-urban

differences in health care choices are with respect to use of clinics and self-care, as Table 4 demonstrates.

The story of the perverse effects of health insurance does not seem to be related to health insurance as such but more generally to the (high) price and (low) quality of Chinese health care. The element of quality is known to play a significant role in health care consumption, especially with respect to aspects of family planning. The one-child policy in urban China makes couples place a higher priority on quality and not so much cost. A report (cited in Meng *et al.*, 2004) notes that in wealthy areas child birth has increased at tertiary hospitals, thereby bypassing township or county hospitals.

To see what the costs of health care are Table 7 reports the out-of-pocket expenditure incurred by the respondents underlying the results of Table 3. The concept of out-of-pocket is here defined as all net payments made by individuals for medical services. For those who have not insurance the concept is clear: all medical expenses are paid by the individual. In case of an insured person, the out-of-pocket expenses are 292 yuan, which constitutes 2 percent of annual personal income of the respondents concerned. Things are quite different when people consult and get treated at a hospital or a clinic. The percentage health expenditures which people paid for the full 100 percent out of their own pockets varies between 50 and 80 percent and according to definitions of financially catastrophic out-of-pocket spending – more than 10 percent of annual income - we can calculate that 10 percent of the respondents is in this danger zone and 50 percent of the respondents are running into short-term liquidity problems when ‘catastrophic’ is meant to mean that more than 10 percent of monthly income is spent on health care. This percentage is bound to be an underestimate because most health insurance contracts reimburse part of the costs and the out-of-pocket percentages in Table 7 refer only to expenditures which health insurance contracts exclude. Of course, these are self-reported figures but they accord well with the figures derived from National Health Accounts (cf. Van Doorslaer *et al.* 2005).

HERE TABLE 7

Estimating the effect of out-of-pocket expenditure on health care decisions is best done by focusing on a particular treatment.⁵ The categories of illnesses surveyed in the CHNS are generally too broad to be of use in testing this effect rigorously and where categories might offer some ground for testing the number of observations per category are too small. Nevertheless estimations which take account of interaction effects between insurance coverage and wealth class⁶ seem to suggest that the question of affordability is of crucial importance: it are primarily the poorest people who react most strongly to being insured.⁷

The most troubling aspect of the Chinese health care system may well be the under-provision of socially desirable services and the over-provision of unnecessary services generating a low quality health care system (Liu and Mills, 2002) which sets in motion a pattern of health care decisions which increase the costs of health care even further. The fact that mandatory insurance decreases use of clinics and increases the use of hospitals is a suboptimal shift when care is offered at a lower price at a clinic than a hospital. To see how prices of health care treatment differ by health care provider we have run a regression explaining the treatment costs for a cold or the flu (see Table A1) and it appears that seeking advice at hospitals is significantly more expensive than a (village) clinic, in the range of 26 to 46 yuan extra. If people do not trust the expert advice of clinics for whatever reason and move to hospitals the Chinese health care system is burdened by inefficient health care behavior.

With such high medical bills it is of some interest to whether the health care insurance premiums are equally high. If insurance does not help in preventing liquidity problems and long-term poverty it is quite understandable why 75 percent of the respondents are not covered by health insurance. The institutional setting of health care insurance has changed quite dramatically over the years and tracking this

⁵ The results of Table 3 have been re-estimated by replacing the insurance variable by level of coinsurance for outpatient hospital care (estimation results are available on request). The general insight from this test is that the level of coinsurance does not affect health decisions in a discernable manner. Insured persons whose hospital bills are completely covered do not differ in a significant manner from those who have to pay a large share of the bill or who don't know the coinsurance rate of their contract. The latter group can be quite large as 20-30 percent of the insured apparently do not know which part of their hospital expenses they had to pay out of their own pocket. This counterintuitive result can in part perhaps be explained by the fact that respondents are asked *ex post* about their decisions and it could very well indicate that decisions are made without full knowledge of contractual coinsurance rates. After the fact (injury, illness) some remember the share they had to pay and others do not. In short, the experiment cannot offer a clear testing ground and would have to be complemented with an *ex ante* question to see how out-of-pocket payments affect health care decisions.

⁶ Estimation results are available on request.

consistently over time with CHNS data will prove to be difficult. In Table 8 the most prominent insurance contract types are shown. In the past the government insurance (GLS) and labor insurance (LIS) were the two most dominant insurance forms for urban areas. The cooperative medical insurance played a large role in rural areas and still does but it has undergone significant change (WHO, 2005). The New Rural Cooperative Medical Scheme (RCMS) was the result of a reform initiated by the Chinese Communist Party Central Committee (CCPCC) and the State Council in 2002. The scheme is not expected to have a major impact on health decisions of the poor, since its scope is limited to catastrophic illnesses and it excludes basic health services. The insurance contract stipulates full up-front payment of medical bills and reimbursement rates are in the range of 20-30 percent of medical bills.

Today insurance types such as GLS and LIS do not have the same dominant position as they used to have a few years ago, since government employees have predominantly free medical service and unified planning service contracts. Commercial insurance is a novel type of contract but judging from Table 7 its market share is still small; a fact which seems to be inspired by the high commercial insurance premium. Other types are also used by state employees, save the cooperative insurance which is almost exclusively used by agricultural workers and farmers. Across the various regions there are no big differences in annual insurance premiums. There are, however, substantial differences across age groups, with old aged people paying considerably less than the young.⁸

HERE TABLE 8

To test for robustness of conclusions of Table 3 the results are re-estimated but this time replacing the insurance state by the type of insurance contract (see Table A3 in the appendix). The results point in the direction that only those insured persons with free medical service are the ones who make more use of hospital care than other insured persons. It should not raise surprise that the persons with a cooperative

⁷ In the sample only 11 percent of the poor have a health insurance contract, which in most cases boils down to the cooperative health insurance, as most of the poor - 85 percent - reside in rural areas.

⁸ See for details the appendix to this paper: Table A2.

insurance contract use clinics slightly more often than persons with other insurance contract types as the cooperative insurance mainly covers the rural areas.⁹

6. Do health decisions affect the health of people?

A final exercise in evaluating the state of Chinese health care system is limited to examining how health care decisions affect the self-reported health status. Most of the attention in the economics literature seems to go exclusively to the issue of poverty induced by soaring out-of-pocket expenditures (cf. Lindelow and Wagstaff, 2005). However, what interests us at this point is the question whether the health status of people is adversely affected by incentive structures of the Chinese health care system. The health status of the Chinese has decreased substantially over the past fifteen years and examining this decline longitudinally is unfortunately impossible as attrition the health care section of the CHNS has become too large to perform a meaningful analysis if one wants to cover the current situation in China. At this point the focus of attention is therefore on the present state of the Chinese health care system. The question which was put to the respondents was: “How would you describe your health compared to that of other people of your age?” with four possible evaluation states (i.e. poor, fair, good and excellent). As the question is stated, age should not matter that much in the evaluation, unless of course, evaluations become more skewed when people age or if people neglect the proviso and simply evaluate their health in comparison with earlier ages. Table 9 presents the ordered probit estimation of the health status, the second column presents the estimated coefficients and the subsequent columns present the marginal effects derived from the estimated parameters and evaluated at means of the explanatory variables.

HERE TABLE 9

The biggest factors influencing the self-reported health status of Chinese are: having a history of apoplexy (a stroke) and a severe illness in the past month. For instance, someone with an apoplexy history will increase the probability that this person will rate himself or herself as being in poor health with 35 percent, compared to someone with no history of the listed diseases. Of lesser importance are age, having a history of

⁹ The ascribed effect is however not significantly different from 1 if one invokes very strict levels of statistical significance, thereby making the effect not very robust.

diabetes and the occurrence of an illness that is somewhat severe. The probability that someone who has experienced an illness of moderate severity will rate his or her health as poor will increase by 12 percent, compared to the situation where this illness did not occur. If the illness turned out to be severe the corresponding marginal effect would have been 27 percent.

Of course, the effects that are of central interest refer to health decisions taken and use of the Chinese health care system. The use of preventive health care and adhering to a health lifestyle are decisions that can both be interpreted as investments in health capital. According to the two top rows of Table 9 these investments certainly have an effect, but as one would expect, these effects are small. An effect that raises some surprise is the fact that the action taken in case of a health care shock is negative or absent, whereas one would expect that consultation of an expert or self-care would always be superior to ignoring the illness or injury, certainly when an injury becomes a severe one. However, self-care or treatment at a clinic offer no compensating effect compared to the option of ignorance. And consultation and care received at a hospital yields the counterintuitive or perverse result that such a visit increases (decreases) the probability of being in poor (good) health. The effect is small, but nonetheless it remains a puzzle why expert care worsens health status. Closer inspection of this negative effect of hospital care on health status shows that it is absent for rural areas and present in full force in urban areas. What drives this result remains a puzzle if one uses the survey as the only source of information. But with market oriented finance reforms Chinese hospitals, especially state-owned hospitals, had to drastically cut back on the level of care. Health care facilities had to rely on their own revenues to cover 70 percent of their costs by the mid 1990s. In 2003 state subsidies fell even further and covered only 10 percent of total costs of state-owned hospitals (Liu and Mills, 2002; WHO, 2005). Reactions from the supply side to these finance reforms were under-provision of cheaper public health services, concentration on wealthy patients (Liu and Xu, 1998) and concentration on curative services and medicines with high profit margins, services that are not necessarily the most appropriate (Liu *et al.*, 2000).

7. Conclusions and Discussion

China has witnessed a tremendous change in its institutional structure of health care. From a centrally planned economy under Mao Zedong, it has moved starting to a

market based health care sector. The health care regime switch has not been without repercussions: the majority of Chinese are not insured, out-of-pocket health care spending makes health care unaffordable driving citizens into long-term poverty (Russell, 2004; Van Doorslaer *et al.*, 2005), medical personnel in hospitals are working under perverse incentive structures thereby raising the price of health care and exacerbating the access problems of health care. This picture is in marked contrast with the era of Mao Zedong, when nine out of ten country people had access to subsidized health clinics run by the so-called 'barefoot doctors'. As Diamond stated "economists from those countries [dropping central planning] embraced capitalism, or more specifically laissez-faire competition with an enthusiasm which exceeds that of western economists. Yet laissez faire capitalism has received little serious support in the West for a very long time." (2002: 1233) The reason why it has received so little support can perhaps be found in lessons learned from the Chinese experience, which seems to make the case clear that the market for health care is fraught with all the imaginable textbook cases of market failure *and* government failure. Learning from these failures may be the way forward for Chinese policy makers.

However, the attention for the Chinese case is not restricted to national interests but it touches clearly on international interests as communicable diseases - such as SARS and HIV/AIDS - can spread faster when the health care organization is in disarray and when the price of health care has become so high that people forgo specialized care and are tempted or forced to ignore serious illnesses or injuries.

The present study has tried to sketch a picture of the current state of Chinese health care. A survey among (potential) users of health care can only scratch at the surface of the problems that the Chinese face, but nevertheless this side of the story generates enough worries. The fact that even insured people prefer self-care to (expert) care at a clinic or a hospital is a tell tale sign that something has gone wrong in designing the Chinese health care system and that simply making health insurance accessible or mandatory will not solve the problem. The real problems of the health care system are apparently the supply side and the demand side only reveals in an indirect manner that 'something' is wrong. The supply side is to some extent a black box but the reports on the soaring health care costs, counterproductive financial incentives at clinics and hospital, the use of 'red packets'(bribes) in exchange for health care are all signs that jeopardize the health care system and with it the human capital of Chinese citizens. The ramifications of these problems may also affect other

initiatives of national and international concern. For instance, the International Conference of Population and Development of 1994 was focused on strengthening reproductive health care and making widespread access to such care possible. In China contraceptives are freely available as it fits in with the official ‘one child’ policy, but in a broader context the high insurance premiums and health care costs, the exclusion of prenatal care and delivery from insurance contracts, the deteriorating health status of Chinese are developments which are not conducive to attaining the goal of sound reproductive health care. And when one turns to the Millennium Development Goals of substantially reducing poverty by the year 2015, China’s health care system will only make things worse (Lindelov and Wagstaff, 2005). At the root of the problem of soaring health costs lies unsustainable fiscal decentralization, shifting the budget problems to local authorities who do not have the funds to maintain a sound health care system and inadequate governance of the supply side. The difficult task for the Chinese government is that a silver bullet solution does not exist. The problem is multifaceted and tackling problem with one solution – e.g. mandatory health insurance for all - will not suffice and may even may make matters worse in the short run for the demands on the hospital capacity. The same logic could apply to fighting HIV/AIDS. After ignoring the HIV/AIDS disease up and till the summer of 2002 the Chinese government is starting to recognize the seriousness of the problem and it designed a policy known as the ‘four frees and one care’ policy. Government has committed to (1) providing farmers and poor people free antiretroviral drugs, (2) free voluntary HIV testing and counseling, (3) free prevention of mother-to-child transmission, (4) free schooling for AIDS orphans and care for AIDS patients and their families (Thompson, 2005). Provinces and their counties are required to raise funds to support the implementation of these policies. Recently the government has doubled the budget (to more than 1.5 billion yuan) on prevention and control of HIV/AIDS in the years 2006-2007 (*the Lancet*, February, 2006). Again the government shifts the financial responsibility to lower levels of government thereby repeating history of health care in general.

8. Appendix

In this appendix three additional regressions are shown as background information for the reader. First of all, the diversity in treatment costs are explained per health care provider (Table A1). The analysis is based on household survey data of the CHNS.

Secondly, the diversity in insurance premiums are explained (Table A2) based on adult survey data of the CHNS. To check on the robustness of the conclusions reached in the paper on the basis of Table 3, health consumption decisions are rerun by using multinomial logit estimation to checking on the type of insurance contract (Table A3).

HERE TABLE A1-A3

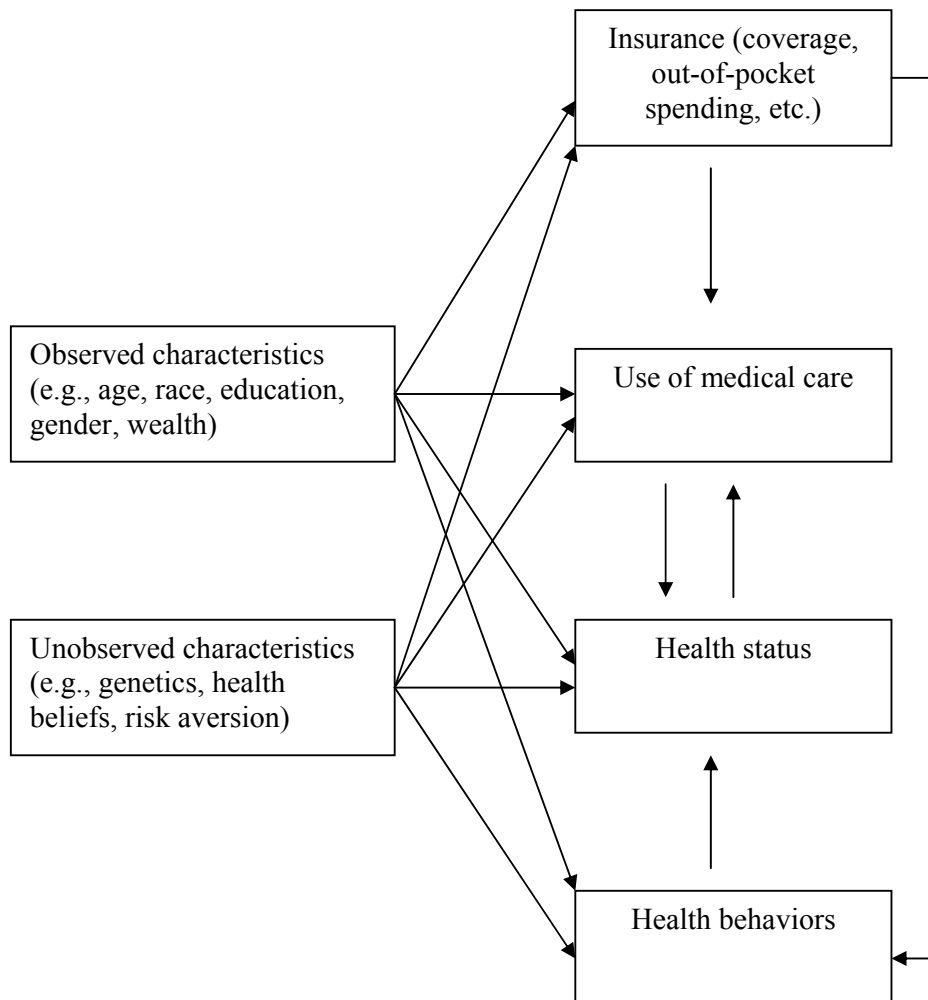
9. References

- Akin, J.S., Dow, W.H., Lance, P.M., 2004. Did the Distribution of Health Insurance in China Continue to Grow Less Equitable in the Nineties? Results from a Longitudinal Survey. *Social Science & Medicine* 58, 293-304.
- Cutler, D.M., Zeckhauser, R.J., 2000. The Anatomy of Health Insurance. In: Culyer, A.J., Newhouse, J.P. (eds.), *Handbook of Health Economics*, vol. 1B, North Holland: Amsterdam, pp. 563-643.
- Diamond, P., 2002. Organizing the Health Insurance Market. *Econometrica* 60, 1233-1254.
- Filmer, D., Pritchett, L.H., 2001. Estimating Wealth Effects Without Expenditure Data - or Tears: An Application to Educational Enrollments in States of India. *Demography* 38, 115-132.
- Gertler, P., Gruber, J., 2002. Insuring Consumption Against Illness. *American Economic Review* 92, 51-70.
- Gruber, J., 2000. Medicaid. NBER working paper, Cambridge MA.
- Hadley, J., 2003. Sicker or Poorer – The Consequences of Being Uninsured: A Review of the Research on the Relationship between Health Insurance, Medical Care Use, Health, Work and Income. *Medical Care Research and Review* 60, 3S-75S.
- Hausman, J.A., McFadden, D.F., 1984. A Specification Test for the Multinomial Logit Model. *Econometrica*, 52, 1219-1240.
- Henderson G.E., Akin, J.S, Hutchinson, P.M., Jin, S.G., Wang, J.M., Dietrich, J., Wao, L.M., 1998. Trends in Health Services Utilization in Eight Provinces in China, 1989-1993. *Social Science & Medicine* 47, 1957-1971.

- Hu, T.W., Ong, M., Lin, Z.H., Li, E., 1999. The Effects of Economic Reform on Health Insurance and the Financial Burden for Urban Workers in China. *Health Economics* 8, 309-321.
- Kenkel, D.S., 2000. Prevention. In: A.J. Culyer, Newhouse, J.P. (eds.), *Handbook of Health Economics*, vol. 1B, North Holland: Amsterdam, pp. 1675-1720.
- Levy, H., Meltzer, D., 2001. What Do We Really Know About Whether Health Insurance Affects Health? Working paper, University of Chicago Harris School of Public Policy, Chicago.
- Lindelow, M., Wagstaff, A., 2005. Health Shocks in China: Are the Poor and Uninsured Less Protected? World Bank Policy Research Working Paper, no. 3740, Washington DC.
- Liu, X., Liu, Y., Chen, N., 2000. The Chinese Experience of Hospital Price Regulation. *Health Policy and Planning* 15, 157-163.
- Liu, X., Mills, A., 2002. Financing Reforms of Public Health Services in China: Lessons for Other Nations. *Social Science and Medicine* 54, 1691-1698.
- Liu, X.Z., Xu, L.Z., 1998. Evaluation of the Reform of the Public Health Financing in China. *China Health Resource* 1, 151-154.
- Liu, Y., 2004a. China's Public Health Care System: Facing the Challenges. *Bulletin of the World Health Organization* 82, 532-538.
- Liu, Y., 2004b. Development of the Rural Health Insurance System in China. *Health Policy and Planning* 19, 159-165.
- Meer, J., Rosen, H.S., 2004. Insurance and the Utilization of Medical Services. *Social Science & Medicine* 58, 1623-1632.
- Meng, Q., Rehnberg, C., Zhuang, N., Bian, Y., Tomson, G., Tang, S., 2004. The Impact of Urban Health Insurance Reform on Hospital Charges – A Case Study from Two Cities in China. *Health Policy* 68, 197-209.
- Meng, Q., Liu, X., Shi, J., 2000. Comparing the Services and Quality of Private and Public Clinics in Rural China. *Health Policy and Planning* 15, 349-356.
- Ravallion, M., Chen, S., 2006. China's (Uneven) Progress Against Poverty. *Journal of Development Economics*, forthcoming.
- Russell, S., 2004. The Economic Burden of Illness for Households in Developing Countries: A Review of Studies Focusing on Malaria, Tuberculosis and HIV/AIDS. *American Journal of Tropical and Medical Hygiene* 71, 147-155.

- Thompson, D., 2005. *China Confronts HIV/AIDS*. Population Reference Bureau: Washington DC.
- Van Doorslaer, E. *et al.*, 2005. Paying Out-of-Pocket for Health Care in Asia: Catastrophic and Poverty Impact. EQUITAP Project working paper, no. 2, http://www.proadess.cict.fiocruz.br/artigos/EquitapWP2_2005.05.30.pdf, Erasmus University Rotterdam.
- Verbeek, M., 2004. *A Guide to Modern Econometrics*. 2nd edition, Wiley & Sons: Chichester.
- Wagstaff, A., Lindelow, M., 2005. Can Insurance Increase Financial Risk? The Curious Case of Health Insurance in China. World Bank Policy Research Working Paper No. 3741.
- WHO, 2005. China: Health, Poverty and Economic Development. Beijing, WHO representative in China. http://www.who.int/macrohealth/action/CMH_China.pdf
- Zhang, X., Kanbur, R., 2005. Spatial Inequality in Education and Health Care in China. *China Economic Review* 16, 189-204.

Figure 1: Interrelationships between insurance, medical care and health



Source: adapted from Levy and Meltzer (2001)

Figure 2: Participating Chinese provinces in survey



Source: CHNS, <http://www.cpc.unc.edu/china>

Table 1: Descriptive Statistics

Variable	Description	Mean
Insurance state	Percentage with medical insurance	26.7%
Sex	Percentage female	51.9%
Educational level	What is the highest level of education you have attained?	
Primary school	Graduated from primary school	27.3%
Lower middle school	Lower middle school degree	41.7%
Upper middle school	Upper middle school degree	14.5%
Technical degree	Technical or vocational degree	8.4%
University or higher	University/college degree or master's degree or higher	8.1%
Profession	What is your primary occupation?	
Senior professional	Doctor, professor, lawyer, architect, engineer	4.4%
Junior professional	Midwife, nurse, teacher, editor, photographer	3.8%
Administrator/manager	Working proprietor, government official, section chief, department director, administrative cadre, village leader	4.9%
Office staff	Secretary, office helper	4.4%
Farmer	Farmer, fisherman, hunter	48.4%
Skilled worker	Foreman, group leader, craftsman	6.4%
Non-skilled worker	Ordinary laborer, logger	9.4%
Driver	Driver	3.0%
Service worker	Housekeeper, cook, waiter, doorkeeper, hairdresser, counter, salesperson, launderer, child care worker	10.5%
Other	E.g. soldier, army or police officer, actor, musician.	4.8%
Employment	What type of work unit is this?	
State	Government department, state service/institute or state owned enterprise	19.0%
Small collective	Small collective enterprise (such as township-owned)	3.2%
Large collective	Large collective enterprise (such as owned by county, city, province)	2.0%
Family farm	Family contract farming	46.1%
Individual enterprise	Private, individual enterprise	25.7%
Other organization types		4.0%
History of:	Has a doctor:	
High blood pressure	- ever told you that you suffer from high blood pressure?	8.9%
Diabetes	- ever told you that you suffer from diabetes?	1.5%
Myocardial infarction	- ever given you the diagnosis of myocardial infarction?	0.5%
Apoplexy	- ever given you the diagnosis of apoplexy?	1.2%
Bone fracture	Do you have a history of bone fracture?	4.7%
Rural/urban site	Urban = 0, rural = 1	65.3%
Severity of the illness	How severe was the illness or injury? (with reference to a sickness or injury incurred during the past 4 weeks)	
Not severe	Not severe	39.6%
Somewhat severe	Somewhat severe	48.2%
Quite severe	Quite severe	12.2%
Health action	What did you do when you felt ill?	
Ignore	Did not pay any attention	12.7%
Self care	Self care	31.2%
Doctor at clinic	Saw local health worker or a doctor at clinic (village, private, work unit clinic, town family planning service)	26.3%
Doctor at hospital	Saw a doctor at a hospital (town, county or city hospital)	29.9%
Child died	Have you ever given birth to a child who was born alive but later died? No = 0, yes = 1	3.4%
Use of prenatal care	Did you have prenatal care during this [the most recent, and in case pregnant not the present] pregnancy? No = 0, yes = 1	78.3%
Number of prenatal checkups	How many prenatal examinations did you have altogether?	4.9
Health preventive action past month	During the past 4 weeks did you receive any preventive health service, such as health examination, eye examination, blood test, blood pressure screening, tumor screening? (no = 0, yes =1)	3.5%

Weight	Body Mass Index constructed on the basis of questions on weight and height (mean = 23.3, standard deviation = 4.4)	
	Underweight	7.0%
	Normal	65.8%
	Overweight	22.7%
	Obese	4.5%
Health status	Right now, how would you describe your health compared to that of other people of your age? (1) poor, (2) fair, (3) good, (4) excellent	
	Poor	7.3%
	Fair	33.3%
	Good	45.4%
	Excellent	14.0%
Health lifestyle	Scale based on two items: How important in your life is (1) being physically active; and (2) eating a healthy diet? With answers ranging from value 1 (not important at all) to value 5 (the most important). [NB: calculated scale reliability is 0.81]	3.11

Source: CHNS questionnaire

Table 2: Who has health insurance? Logit analysis of the probability of being insured (no insurance = base category)^a

	Being insured (not = 0)					
	Total sample		By employment sector:			
			Private sector		Public sector	
	(1)		(2)		(3)	
	Odds r.	z-value	Odds r.	z-value	Odds r.	z-value
Age group (17-35 = 0)						
36-45	1.61**	3.46	1.47*	2.18	1.96**	3.09
46-64	1.73**	3.94	1.69**	2.98	1.73*	2.47
65+	1.20	0.66	1.25	0.76	0.76	0.44
Sex (male=0)	0.88	1.52	0.83	1.72	0.87	0.87
Health lifestyle	1.30**	3.64	1.29**	2.88	1.39**	2.39
Wealth (middle = 0)						
Lowest 40%	0.75*	1.97	0.70*	2.14	1.00	0.00
Top 20%	1.38*	2.31	1.36	1.39	1.42	1.92
Educational level (primary school = 0)						
Lower middle school	1.01	0.06	0.97	0.20	1.53	1.05
Upper middle school	1.39	1.95	1.36	1.55	2.38*	2.03
Technical or vocational degree	1.92**	3.06	1.36	0.92	4.02**	3.15
University or higher	2.62**	4.10	2.32*	2.13	4.79**	3.45
Profession (senior prof. = 0)						
Junior professional	1.11	0.38	0.96	0.05	1.08	0.26
Administrator	0.58*	2.23	0.41	1.83	0.78	0.82
Office staff	1.02	0.07	0.83	0.33	1.16	0.51
Farmer	0.24**	4.06	0.22**	3.06	1.11	0.32
Skilled worker	1.34	1.13	1.27	0.52	0.99	0.03
Non-skilled worker	0.82	0.76	0.65	0.96	1.16	0.25
Driver	0.60	1.56	0.44	1.60	0.31**	2.69
Service worker	0.36**	3.82	0.33*	2.45	-	-
Other	0.66	1.60	0.50	1.45	0.88	0.35
Employer status (state = 0)						
Small collective	0.37**	4.29	(= 0)	-	-	-
Large collective	0.32**	3.90	0.99	0.04	-	-
Family contract farming	0.40**	3.00	0.87	0.33	-	-
Private, individual enterprise	0.14**	11.94	0.36**	3.40	-	-
Other	0.32**	4.93	0.97	0.10	-	-
Province (Liaoning = 0)						
Heilongjiang	1.87*	2.53	3.11**	3.08	1.19	0.59
Jiangsu	20.93**	14.36	26.63**	13.92	2.98**	2.82
Shandong	2.69**	4.57	3.62**	4.94	1.30	0.77
Henan	0.78	1.29	0.44*	2.41	1.22	0.59
Hubei	1.32	1.37	1.16	0.56	1.98	1.74
Hunan	2.74**	4.82	2.93**	4.02	2.60**	2.66
Guangxi	0.79	1.22	0.66	1.50	1.28	0.66
Guizhou	0.86	0.68	0.90	0.31	0.79	0.76
Rural state (urban = 0)	0.73*	2.36	0.75	1.43	0.67*	2.24
Pseudo R ²	0.38		0.34		0.12	
N =	4,193		3,215		976	

(a) Hubert-White correction is used to account for heteroskedasticity in estimation. Statistical significance at levels: * < 5%, ** < 1%.

Table 3: Do insured people choose consume different amounts of preventive health care services? Estimated marginal effects^a

	Use of preventive health care services			
	Probit-estimation		IV probit-estimation	
	(1)	(2)	(1)	(2)
	Effect	z-value	Effect	z-value
Insurance (not insured = 0)	0.03**	4.65	0.04	1.53
Age group (17-35 = 0)				
36-45	-0.02**	3.78	-0.02**	3.79
46-64	-0.00	0.27	-0.00	0.37
65+	-0.00	0.95	-0.01	1.07
Sex (male=0)	0.01**	2.61	0.01**	2.63
Wealth (middle = 0)				
Lowest 40%	-0.01**	3.03	-0.01**	2.79
Top 20%	0.00	0.85	0.00	0.43
Weight (normal = 0)				
Underweight	-0.00	0.56	0.00	0.52
Overweight	0.01	1.26	0.01	1.22
Obese	-0.00	0.15	0.00	0.10
Health attitude	0.00	1.45	0.00	1.26
Province (Liaoning = 0)				
Heilongjiang	-0.01	1.00	-0.01	1.05
Jiangsu	0.01	0.64	0.00	0.21
Shandong	0.03**	2.88	0.03**	2.79
Henan	-0.01	1.72	-0.01	1.59
Hubei	0.02	1.93	0.02	1.92
Hunan	-0.00	0.72	-0.01	0.77
Guangxi	-0.00	0.34	-0.00	0.23
Guizhou	-0.02**	3.14	-0.02**	3.07
Rural state	-0.01**	3.51	-0.01**	3.22
Ln σ	-	-	-0.96**	110.22
Atanh ρ	-	-	-0.05	0.49
Wald test of exogeneity (p-value)		-	0.24 (0.626)	
Pseudo R ²		0.10	-	
N =		6,527		6,527

(a) The marginal effects represent the effect of a discrete change of a dummy variable from 0 to 1. Statistical significance at levels: * < 5%, ** < 1%. Method of estimation is instrumental variables probit estimation. The binary variable 'insurance state' is instrumented on the level of education.

Table 4: Do insured people choose consume different amounts of prenatal health care services? Estimated effects^a

	Use of prenatal health care services			
	Use of prenatal care		Number of check-ups	
	probit	IV-probit	OLS	2SLS
	(1)	(2)	(3)	(4)
	Effect	Effect	Coef.	Coef.
Insurance (not insured = 0)	0.14**	0.28**	1.41*	5.25
Age	-0.01**	-0.02**	0.01	-0.01
Child died	-0.27	-0.24	0.39	0.60
Wealth (middle = 0)				
Lowest 40%	-0.09	-0.07	-0.61	-0.41
Top 20%	0.01	-0.00	0.85	0.50
Weight (normal = 0)				
Underweight	0.24*	0.21	0.96	1.23
Overweight	0.16**	0.17**	1.32	1.66
Obese	0.16**	0.16**	0.60	0.72
Health attitude	-0.05	-0.06	-0.17	-0.43
Province (Liaoning = 0)				
Heilongjiang	0.11	0.12	-2.56*	-2.44
Jiangsu	0.11	0.02	-0.52	-1.96
Shandong	0.05	0.06	-1.81	-1.11
Henan	0.17**	0.19**	-2.56*	-2.21
Hubei	0.12*	0.15*	-0.50	0.11
Hunan	0.06	0.01	-1.09	-1.87
Guangxi	0.21**	0.24**	0.27	1.03
Guizhou	0.14*	0.15**	-1.50	-0.80
Rural state (urban = 0)	0.02	0.03	-2.41**	-2.24**
Constant	-	-	9.32**	9.12**
Ln σ	-	-1.11**	-	-
Atanh ρ	-	-0.44	-	-
Wald test of exogeneity (p-value)		1.75 (0.186)	-	-
Hausman test χ^2 (prob > χ^2)	-	-	-	2.46 (0.117)
Pseudo R ²	0.19	-	0.22 ^b	0.08 ^b
N	241	241	192	192

(a) The marginal effects represent the effect of a discrete change of a dummy variable from 0 to 1. Statistical significance at levels: * < 5%, ** < 1%. In case of instrumental variables estimation, the binary variable 'insurance state' is instrumented on the level of education.

(b) Adjusted R² for OLS/TSLS.

Table 5: Does insurance type matter in choosing health care providers compared to the option of ignoring the illness or injury (Relative risk ratios of multinomial logit estimation) ^a

	Self care		Doctor at clinic		Doctor at hospital	
	RRR	z-value	RRR	z-value	RRR	z-value
Insurance (not insured = 0)	1.38	1.61	1.09	0.40	1.50*	1.97
Wealth (middle = 0)						
Lowest 40%	0.50**	3.62	0.73	1.65	0.44**	4.19
Top 20%	1.27	1.04	0.71	1.34	1.30	1.11
Age group (17-35 = 0)						
36-45	0.61	1.65	0.51*	2.13	0.74	0.94
46-64	0.63	1.65	0.54*	2.11	0.77	0.88
65+	0.66	1.41	0.63	1.50	1.13	0.39
Sex (male=0)	0.89	0.76	1.02	0.12	0.94	0.39
Marital status (never married = 0)						
Married	2.20*	2.30	2.03*	2.04	1.74	1.56
Separated/widowed	1.94	1.60	1.98	1.65	1.42	0.83
Health attitude	1.31*	2.17	1.13	0.93	1.41**	2.69
Severity of the illness (not severe = 0)						
Somewhat severe	1.25	1.39	1.49*	2.40	2.53**	5.51
Quite severe	2.44*	2.19	4.18**	3.59	15.42**	7.04
Province (Liaoning = 0)						
Heilongjiang	1.16	0.39	1.99	1.61	2.17	1.91
Jiangsu	0.38**	3.33	1.42	1.05	0.87	0.44
Shandong	0.38**	2.79	2.34*	2.42	1.60	1.38
Henan	0.33**	3.29	3.72**	4.04	1.77	1.77
Hubei	0.77	0.83	2.73**	2.90	1.67	1.50
Hunan	0.94	0.20	1.64	1.37	1.45	1.10
Guangxi	0.84	0.53	2.58**	2.74	2.03*	2.11
Guizhou	0.89	0.37	2.47**	2.65	1.30	0.77
Rural state (urban = 0)	0.87	0.75	2.06**	3.85	1.62**	2.58
Pseudo R ²				0.09		
N				2,052		

(a) Statistical significance levels are denoted by * < 5%, ** < 1%.

Table 6: How economy-wide insurance affects health decisions – predicted probabilities^a

Probability that health action will be taken:												
Severity of illness	Ignore			Self care			Clinic			Hospital		
	Rural	Urban	Total	Rural	Urban	Total	Rural	Urban	Total	Rural	Urban	Total
Percentages												
<i>Not severe</i>												
Status quo	16.2	15.1	15.7	29.0	49.2	38.0	35.7	16.5	27.1	19.0	19.2	19.2
+ All insured	13.9	13.2	13.6	31.3	50.9	40.2	32.8	15.1	24.8	21.9	20.7	21.5
+ Equal access	10.7	12.9	11.7	33.8	49.3	40.6	30.5	17.7	24.8	25.1	20.0	22.8
Total change	-5.5	-2.2	-4.0	+4.8	+0.1	+2.6	-5.2	+1.2	-2.3	+6.1	+0.8	+3.6
<i>Somewhat severe</i>												
Status quo	10.5	10.6	10.5	23.8	40.1	30.8	34.2	17.3	26.9	31.5	31.9	31.7
+ All insured	8.8	9.2	8.9	25.2	41.1	32.0	30.5	15.6	24.1	35.5	34.1	35.0
+ Equal access	6.5	8.7	7.5	26.4	40.2	32.3	27.7	17.4	23.3	39.4	33.6	36.9
Total change	-4.0	-1.9	-3.0	+2.6	+0.1	+1.5	-6.5	+0.1	-3.6	+7.9	+1.7	+5.2
<i>Quite severe</i>												
Status quo	3.5	3.3	3.4	13.4	21.8	17.1	29.6	16.5	23.9	53.4	58.3	55.6
+ All insured	2.8	2.8	2.8	13.7	21.9	17.2	25.1	14.5	20.5	58.3	60.8	59.5
+ Equal access	1.8	2.6	2.2	14.0	21.6	17.1	20.6	15.2	18.4	63.6	60.6	62.4
Total change	-1.7	-0.7	-1.2	+0.6	-0.2	0.0	-9.0	-1.3	-5.5	+10.2	+2.3	+6.8

(a) The scenarios ‘all insured’ and ‘equal access’ are constructed by respectively assuming that everyone is insured and that wealth class effects in making health decisions are absent.

Table 7: Out-of-pocket expenses (in yuan) in health care insurance contracts

	Self care	Clinic	Hospital		Preventive health care
			Inpatient ^a	Outpatient	
Average total cost	292.2	233.6	514.6	700.7	60.9
% completely self paid expenses	100	80.3	51.9	66.8	87.7
OOPE as % of annual personal income	1.7		6.3		0.4
% who spends >10% of wage income (monthly)	19.5		50.9		16.0
> 10% of total annual income	3.7		10.2		10.0

(a) The cost per day hospitalized. For the sample examined the average total cost of the inpatient treatment was 7495.2 yuan.

Source: CHNS, wave 2004

Table 8: Insurance contracts and some characteristics, 2004

Insurance type	Market share	Annual insurance premium (in yuan)	% of insured who are:		Prenatal care and delivery services: covered by insurance?	
			Situated in rural areas	State employees	No	Does not know
Commercial insurance	6.8	903.4	38.2	32.4	70.7	20.7
Free medical service	28.3	215.6	37.1	86.5	45.5	23.6
Worker's compensation	17.1	502.6	37.5	47.3	46.7	34.1
Cooperative insurance	27.9	56.2	81.4	1.9	73.1	23.5
Unified Planning Service	16.7	256.3	29.1	77.2	60.4	26.0
Other	3.2	387.2	30.6	53.7	66.7	22.9
Average		292.2	48.0	46.6	60.0	25.2

Source: CHNS, wave 2004

Table 9: Explaining the relative health status (ordered probit analysis) and marginal effects of changes in explanatory variables^a

	Ordered probit coefficients	Self reported relative health status:			
		Poor	Fair	Good	Excellent
<i>Health investment</i>					
Used preventive health care past month (no = 0)	0.33**	-0.07**	-0.05*	0.09**	0.02**
Health lifestyle	0.12**	-0.03**	-0.01**	0.03**	0.01**
<i>Health shock</i>					
Severity of the illness (not severe = 0)					
Somewhat severe	-0.46**	0.12**	0.04**	-0.13**	-0.03**
Quite severe	-0.84**	0.27**	-0.05*	-0.20**	-0.03**
Health care used in case of illness (ignore = 0)					
Self care	0.15	-0.04	-0.01	0.05*	0.01
Clinic	-0.00	-0.01	0.00	0.01	0.00
Hospital	-0.21*	0.05*	0.01**	-0.05*	-0.01**
<i>Health capital</i>					
Age group (17-35 = 0)					
36-45	-0.25**	0.07**	0.01**	-0.07**	-0.01**
46-64	-0.48**	0.13**	0.03**	-0.13**	-0.03**
65+	-0.52**	0.14**	0.03*	-0.14**	-0.03**
Sex (male=0)	-0.19**	0.05**	0.01**	-0.05**	-0.01**
Weight (normal = 0)					
Underweight	-0.26**	0.07*	0.01**	-0.07**	-0.01**
Overweight	0.11	-0.03	-0.01	0.03	0.01
Obese	0.11	-0.03	-0.01	0.03	0.01
Presence of disease history of: ^b (none = 0)					
High blood pressure	-0.16*	0.04*	0.01**	-0.04*	-0.01*
Diabetes	-0.42**	0.13**	-0.00	-0.11**	-0.02**
Myocardial infarction	-0.33	0.10	0.01	-0.09	-0.01
Apoplexy	-1.00**	0.35**	-0.11*	-0.21**	-0.02**
Bone fracture	-0.19*	0.05*	0.01**	-0.05*	-0.01*
<i>Control variables</i>					
Province (Liaoning = 0)					
Heilongjiang	-0.12	0.03	0.01**	-0.03	-0.01
Jiangsu	0.25**	-0.06**	-0.03*	0.07**	0.02*
Shandong	0.08	-0.02	-0.01	0.02	0.01
Henan	0.10	-0.02	-0.01	0.03	0.01
Hubei	0.02	-0.00	-0.00	0.00	0.00
Hunan	-0.02	0.00	0.00	-0.00	-0.00
Guangxi	-0.21*	0.06	0.01	-0.06**	-0.01**
Guizhou	-0.19	0.05	0.01**	-0.05*	-0.01*
Rural state (urban = 0)	-0.14*	0.04**	0.01*	-0.04**	-0.01**
Pseudo R ²	0.09				
N =	1,960				

(a) Statistical significance at levels: * < 5%, ** < 1% For matters of convenience, cut-off points have been removed from the table.

(b) The disease history is set at one year or longer, i.e. people have experienced designated problems for at least one year or longer.

Table A1: Understanding diversity in treatment costs per health provider^a

	Explaining treatment costs	
	OLS-coefficient	t-value
Health care provider (village clinic = 0)		
Private clinic	4.07	1.5
Work unit clinic	8.48	1.2
Other clinic	4.11	0.4
Town family planning service	13.22	0.5
Town hospital	5.10*	2.2
County maternal and child hospital	6.46	0.5
County hospital	25.80**	10.8
City maternal and child hospital	44.58**	3.1
City hospital	34.66**	12.8
Worker's hospital	27.01**	5.6
Other hospital	38.20**	5.3
Drugstore	-3.98	0.7
Other	14.02*	2.4
Contract with village or work unit (no contract = 0)	2.43	1.2
Province (Liaoning = 0)		
Heilongjiang	-7.30*	2.2
Jiangsu	27.16**	9.0
Shandong	-10.96**	3.4
Henan	-11.13**	3.4
Hubei	4.02	1.3
Hunan	-8.32*	2.5
Guangxi	-26.35**	8.4
Guizhou	-15.59**	4.9
Rural state (urban = 0)	-13.90**	6.9
Constant	42.19**	9.2
Adjusted R ²	0.14	
N =	5,941	

(a) The compare the price of a treatment across health care facilities we have used the money a person self pays for the treatment of cold or flu (in yuan). Significance levels denoted as * < 5%, ** < 1%

Table A2: ...and of insurance premiums^a

	Explaining health insurance premiums	
	OLS- coefficient	t-value
Insurance type (commercial insurance = 0)		
Free medical service	-606.2**	10.5
Worker's compensation	-349.6**	5.6
Cooperative insurance	-795.7**	14.0
Unified Planning Service	-587.5**	9.6
Other	-528.6**	6.2
Age group (17-35 = 0)		
36-45	158.1**	3.9
46-64	31.5	0.9
65+	-184.6**	4.3
Province (Liaoning = 0)		
Heilongjiang	-122.4*	2.1
Jiangsu	32.3	0.6
Shandong	79.3	1.3
Henan	-48.3	0.6
Hubei	-97.7	1.4
Hunan	7.5	0.1
Guangxi	-14.6	0.2
Guizhou	-147.5	1.9
Rural state (urban = 0)	-74.7*	2.3
Constant	968.3**	12.0
Adjusted R ²		0.20
N =		1,616

(a) Significance levels denoted as * < 5%, ** < 1%

Table A3: Does insurance type matter in choosing health care providers? ^a

	Self care		Doctor at clinic		Doctor at hospital	
	RRR	z-value	RRR	z-value	RRR	z-value
Insurance type (no insurance = 0)						
Commercial insurance	5.45	1.61	1.79	0.49	3.01	1.00
Free medical service	1.32	0.90	0.79	0.67	1.89*	2.03
Worker's compensation	1.04	0.12	0.57	1.47	1.41	1.06
Cooperative insurance	1.16	0.43	1.83	1.85	1.58	1.37
Unified planning medical service	1.40	0.95	0.74	0.71	0.72	0.83
Wealth (middle = 0)						
Lowest 40%	0.51**	3.50	0.71	1.82	0.44**	4.26
Top 20%	1.25	0.94	0.80	0.82	1.29	1.01
Age group (17-35 = 0)						
36-45	0.59	1.74	0.50*	2.18	0.75	0.88
46-64	0.63	1.63	0.54*	2.10	0.80	0.75
65+	0.66	1.41	0.67	1.30	1.16	0.46
Sex (male=0)	0.88	0.77	0.97	0.16	0.94	0.37
Marital status (never married = 0)						
Married	2.26*	2.37	2.00*	1.99	1.71	1.49
Separated/widowed	2.00	1.67	1.96	1.62	1.41	0.80
Health attitude	1.29*	2.07	1.16	1.14	1.42**	2.75
Severity of the illness (not severe = 0)						
Somewhat severe	1.25	1.37	1.51*	2.49	2.51**	5.43
Quite severe	2.41*	2.15	4.14**	3.56	15.83**	7.10
Province (Liaoning = 0)						
Heilongjiang	1.16	0.39	1.87	1.46	2.31*	2.07
Jiangsu	0.41**	2.87	1.19	0.50	0.87	0.41
Shandong	0.42**	2.52	1.97	1.91	1.60	1.37
Henan	0.29**	3.60	3.71**	4.03	1.88	1.94
Hubei	0.76	0.85	2.64**	2.78	1.85	1.79
Hunan	0.91	0.30	1.58	1.26	1.64	1.44
Guangxi	0.83	0.57	2.50**	2.65	2.10*	2.20
Guizhou	0.89	0.38	2.34**	2.49	1.35	0.87
Rural state (urban = 0)	0.88	0.73	1.97**	3.58	1.59**	2.45
Pseudo R ²				0.10		
N				2,035		

(a) Significance levels denoted as * < 5%, ** < 1%