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ABSTRACT

Health Determinants in Urban China*

This paper identifies health determinants in urban China applying Grossman model. Using wave of China Health and Nutrition Survey in 2000, we find that education has important positive effect on health, and cost of health care services has significantly negative impact. However, effects of wage rate and household income are insignificant. We also find that region is an important determinant of health. The body weight is also important, but unlike finding in developed countries, under-weight instead of over-weight is a better predictor for poor health. Our results suggest that male has better health than female does, and married couple has better health in urban China.

JEL Classification: I12, J24, D12

Keywords: self-reported health status, Grossman model, ordered probit, China

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Health Determinants in Urban China

1. Introduction

Health is widely considered as an important component of human capital. Since the seminal work of Grossman (1972), Grossman model has become standard model to study health demand and health determinants. Applying Grossman model, economists have carried out numerous empirical studies, for examples: Wagstaff (1986, 1993), Erbsland et al. (1995), Sickles and Yazbeck (1998), and Dustmann and Windmeiher (2000) among others. However, few studies on health issues in China are based on human capital theory.[1]

In this paper, we use China Health and Nutrition Survey (CHNS) data set to study the health demand in urban China. We focus on two issues: one is using Chinese data to test Grossman model, and the other is identifying main determinants of health in urban China.

We find that education has important positive effect on health, cost of health care services has significantly robust negative impact, but effects of wage rate and household income are insignificant.

The relationship between age and health is nonlinear. At young age, health increases with age, but is peaked around age 40. This implies that people should pay more attention to their health starting from a relatively young age.

Region, gender, marriage status and body weight are also important factors. Region is an import determinant of health. People in western provinces have worst health; people in coastal and northeastern provinces have best health. Gender and marriage status are also important. Male has better health than female has; married couple has better health. Unlike finding in developed countries, e.g. Gerdtham and

[1] Liu et al (2004) is one of few exceptions. They study the relationship between economic growth and health capital.

Johannesson (1999), under-weight instead of over-weight is a better predictor for poor health.

The remaining paper is organized as follows: Section 2 outlines the analytical framework and specifies the econometric models, Section 3 describes the data set and the health status variable, Section 4 presents descriptive statistics and empirical results, and Section 5 concludes the paper.

2. Analytical Framework

2.1 Grossman Model

Economists consider health as human capital for a long time, e.g. Mushkin (1962), Becker (1964) and Fuchs (1966). Building on the human capital theory, Grossman (1972) provides a formal model to analyze health capital. According to the approach of Grossman, the main distinction between health and education is that health increases income through adding healthy working days while education through improving productivity.

Following the standard model of Grossman (1972, 2000), we assume that the utility function of a representative consumer is as follows:

$$U = U(\phi_t H_t, Z_t), t = 0,1,...,n \qquad (1)$$

where H_t is the stock of health capital at time *t*, ϕ_t is benefit produced by one unit of health capital, $h_t = \phi_t H_t$ is the health consumed at time *t*, and Z_t is consumption for other goods at time *t*.

The initial stock of health capital H_0 is exogenous. H_t at other time and the length of life *n* are endogenous. The following equation describes the change of health capital.

$$H_{t+1} - H_t = I_t - \delta_t H_t \qquad (2)$$

where I_t is the investment in health and δ_t is the rate of depreciation of health capital at time *t*. δ_t is changing with age.

I_t and Z_t are produced by the following equations:

$$I_t = I_t(M_t, TH_t; E) \tag{3}$$

$$Z_t = Z_t(X_t, T_t; E) \tag{4}$$

where M_t are market goods, such as health care services, which are used to produce I_t. TH_t is the time allocated to improve health. E is other exogenous component of human capital besides health, such as education. Equation (4) is home-production function for other consumption items Z_t. Z_t are produced by market goods X_t, time T_t and other human capital E.

Furthermore, the consumer faces the following budget constraint:

$$\sum_{t=0}^{n} \frac{P_t M_t + Q_t X_t}{(1+r)^t} = \sum_{t=0}^{n} \frac{W_t TW_t}{(1+r)^t} + A_0 \tag{5}$$

where P_t and Q_t are prices, W_t is wage rate, TW_t is hours of work, and A_0 is initial wealth.

Beside budget constraint, the consumer also needs to meet the time constraint Ω. Ω must be used up at each period as following:

$$TW_t + TH_t + T_t + TL_t = \Omega \tag{6}$$

where TW_t is time for working, and TL_t is time loss due to illness.

Equations (1) to (6) constitute the Grossman model and they jointly determine the demand for health.

2.2 Static Analysis and Econometric Specifications

Based on the above model, we can study the demand for health through two approaches: Pure Investment Model and Pure Consumption Model. Grossman(2000) has stressed “the estimation of the investment model rather than the consumption model because the former model generates powerful predictions from simple analysis and less innocuous assumptions.” This paper is based on pure invest model. The optimal condition of this model is:

$$\frac{G_t W_t}{\pi_{t-1}} + \frac{G_t[\left(\frac{U_{ht}}{m}\right)(1+r)^t]}{\pi_{t-1}} = r + \delta_t \qquad (7)$$

where $G_t = \partial TL_t / \partial H_t$ is the marginal product of health capital, $U_{ht} = \partial U / \partial H_t$ is marginal utility directly produced by health, m is marginal utility produced by monetary income, and π_{t-1} is the shadow price of health, which is determined by the cost of health care services, wage rate, etc.

Condition (7) is similar to other optimal conditions in economics. Namely, it means that marginal benefit equals marginal cost. The benefit of health includes two aspects: one is monetary benefit, i.e. $G_t W_t / \pi_{t-1}$, and the other is utility gain from health, i.e. ($G_t[(U_{ht} / m)(1+r)^t] / \pi_{t-1}$). Cost is the same as cost incurred on other standard investment, including interest and depreciation.

Equation (7) provides a series of testable hypotheses. As in Figure 1, the crossing point of health benefit curve ($G_t W_t / \pi_{t-1} + G_t[(U_{ht} / m)(1+r)^j] / \pi_{t-1}$) and cost curve ($r + \delta_t$) determines the optimal demand for health H_t^*. If the cost increases, the demand for health will decrease.

In the literature, the change of the rate of depreciation δ_t is one focal point. It is usually assumed that δ_t is increasing with age. If δ_t increases to δ_t^*, the demand for health will reduce from H_t^* to H_t^{*a}.

Education is another key variable. Health and education are two types of complementary human capital. Increase of education will improve the health since more educated consumer will produce health less costly, and hence will lower the shadow price of health, which in turn will increase the health demand from H_t^* to H_t^{*b}.

Health care service is one of the main inputs of health. If its price increases, the cost of health will inevitably increase, and will decrease the demand for health.

Wage rate reflects the value of time. On the one hand, if wage rate increases, the earning from healthy working days will also increase. On the other hand, production of health need time, increase of the wage rate makes the production of health more costly. Therefore, the impact of wage rate on the health demand is ambiguous. However, people generally believe that the former effect dominates the later effect, and that wage rate should have a positive effect.

The time constraint also has testable implication. If the consumer works more, he will end up with less time to improve his health, so his health will decrease.

Our empirical study will test above theoretical implications. The basic specification is as following:[2]

$$\begin{aligned} health &= \beta_0 + \beta_1 age + \beta_2 wage + \beta_3 worktime + \\ &\quad \beta_4 healthprice + \beta_5 education + \varepsilon \end{aligned} \qquad (8)$$

Age is used as a proxy for rate of depreciation. Wage rate and price of health care services reflect the shadow price of health. We estimate different variations of equation (8) in our study. We also control other factors such as gender, marriage status and region in Section 4.

[2] There are two reasons we adopting a linear model instead of a double logarithm model derived from Grossman model. One is that the study of Wagstaff (1993) finds that the assumption ($\widetilde{H}_t / \delta_{t-1} = 0$) is unconvincing and that linear model is more consistent with data. The other is that we use ordered probit model to analyze ordered categorical health status variable.

3. Data Set and Measurement of Health

3.1 CHNS Data Set

The data set is the China Health and Nutrition Survey (CHNS). CHNS is a longitudinal survey, which includes five waves in 1989, 1991, 1993, 1997 and 2000. The survey covers coastal, middle, northeastern and western provinces in China.[3]

CHNS utilizes a multistage, random cluster-sampling scheme. In each province, both big cities and small cities are sampled. CHNS also includes cities from different income levels, and surveys both rural and urban residents. CHNS has very rich information on health and nutrition. It provides a valuable national sample for researchers in health and nutrition fields.

Our econometric approach in this paper is reduced form cross-sectional analysis. We focus our study on the latest wave of the data, 2000 survey, which includes 15,648 observations. There is significant difference between urban area and rural area in China, so we restrict our attention on the urban residents. Since Grossman model is based on working adults, our final sample only includes urban residents with age from 18 to 55. The final sample used in this paper has 1,977 observations. Among them 1,043 are female, and 1,356 are working adults.

3.2 Self-Reported Health Status

One of the major difficulties to study health determinants is how to measure the health. In the literature, there are many methods, like Quality-adjusted Life Years (see Cutler and Richardson, 1997), Disability-adjusted Life Years (see World Bank, 1993) and Quality of Well-being Scale (see Kaplan and Anderson, 1988). Field and Gold (1998) provide an excellent survey.

In the CHNS data set, the people are asked to self-report their health status in four categories: poor, fair, good and excellent. In this paper, instead of using continuous

[3] The surveys of 1989, 1991 and 1993 include Guangxi, Guizhou, Henan, Hubei, Hunan, Jiangshu, Liaoning and Shangdong 8 provinces. In 1997, Heilongjiang replaces Lianing. In 2000, both Liaoning and Heilongjiang are included in the survey along with other provinces.

measurement, we use discrete measurement, self-reported status as our health measurement, as in Gerdtham and Johannesson (1999). Of course, this measurement is not perfect, but compared with continuous measurement, one advantage of categorical measurement is that in some degree it can mitigate measurement error problem.[4] Since we are dealing with ordered discrete variable, we choose ordered probit model for our empirical analysis.

4. Empirical Results

4.1 Descriptive Statistics

Table 1 is descriptive statistics on self-reported health status. 21.0% of urban adult residents report to have excellent health, but for female population, only 16.8% report to have excellent health. People in Guangxi and Guizhou (western provinces) have lowest percentage of excellent health status. They are 6.0% and 5.7%, respectively. People in Heilongjiang, Liaoning (northeastern provinces), Jiangsu and Shangdong (coastal provinces) have highest percentage of excellent health (around 30%). The difference is striking. However, if we combine excellent health and good health two categories, the gap between western provinces and other provinces is becoming smaller. In all provinces, less than 5% people report to have poor health. From Table 1, we also can see except Liaoning, all other provinces report higher percentages of excellent health status in small cities.

4.2 Econometric Results

Table 2 summarizes the variables used in the ordered probit analysis. Table 3 and Table 4 are estimates from ordered probit models for the whole sample.

[4] Studies, such as Kaplan and Camacho (1983), find this categorical health variable contains important information on individual’s health.

Table 3 reports results from basic models. The basic models include key variables in Grossman model, such as age (proxy for rate of depreciation), education, marriage status, health insurance dummy and cost of a flu treatment (proxy for the cost of health care services).[5] The last two variables reflect the shadow price of health. In order to accommodate the nonlinearity of age, we adopt two approaches. One is using age, age squared and age cubed, and the other is using age group dummies. From Table 3, it is clear that the effect of age is highly nonlinear, and age group dummies can capture the nonlinear relationship between age and health better.

As shown in Table 3, compared to age group of 18 to 22, age groups of 23 to 30, 31 to 35 and 36 to 40 have better health. After 40, the health is deteriorating with age. The effect of age on health comes from two sources: increasing of depreciation rate of health capital and decreasing of benefit period from investing in health. Both sources negatively affect the demand for health.

In the basic model, the effect of education is significantly positive for the whole population, as well as for male and for female.

The cost of health care services (using cost of a flu treatment as proxy) has negative but insignificant effect on health for the whole population, as well as for male and for female separately.

We also find that female's health is significantly worse than male's. Both married male and female have better health than their single counterparts do. The effect of household size is also positive but only significant for male.

In Table 4, we control for additional factors, such as region, city size, income level of the cities, and province dummies. The findings on age and education from basic models remain unchanged. However, the effect of household size becomes

[5] We use the community cost instead of individual cost to avoid the problem that individual cost is only observed for the people who have a cold.

significantly positive. The effect of cost of a flu treatment becomes significantly negative for the whole population as well as for male. This is consistent with the prediction from Grossman model.

Region is an important determinant of health. Compared to Henan province (located in the middle part of China), western provinces (Guangxi and Guizhou) have worse health, but coastal provinces (Shangdong and Jiangsu) and northeastern provinces (Liaoning and Heilongjiang) have better health. Provinces (Hubei and Hunan) in the same region as Henan have similar health status as Henna has.

We also consider city characteristics. Big city is not an important factor to determinate the health for male. We divide the city into three groups according to income level: high-income city, middle-income city and low-income city, and include high-income city dummy and middle-income city dummy in our estimation. For the whole population as well as for male and for female separately, the coefficients of middle-income city dummy are significantly positive. Nonetheless, the coefficients of high-income city dummy are all insignificant. One interpretation is that the health care services are inadequate in low-income cities. So compared to residents in the low-income city, the residents in the middle-income cities have better health. Meanwhile, the working pressure is very high in high-income cities, and the residents in high-income cities focus more on working, and less on health and leisure.[6,7]

In Table 5, we restrict our analysis on the working sample only. For the working sample, we also control for wage rate, hours of work, and type of work. We find wage rate, hours of work and working in the formal sector are all insignificant, albeit all of

[6] Another explanation in the literature is that urbanization increases the depreciation rate of health.

[7] In this specification, we do not include body mass index (MBI) since BMI is an endogenous variable. Nonetheless, in order to compare our results with findings in the literature (e.g. Gerdtham and Johannesson, 1999), we also run model with over-weight and under-weight dummies defined by BMI. Unlike findings in developed countries, we find under-weight instead of over-weight is a better predictor for poor health in urban China. The coefficient of over-weight dummy is insignificantly positive. This is not surprising since China is a developing country. Ill nutrition is still a major cause for poor health. These estimates are not reported here and are available from the author upon request.

them are positive. The inconsistency between our findings on wage rate with common wisdom is not surprising given that the primary health care in urban China is part of government welfare program. Non-market forces mainly drive the health investment decisions of urban residents. Further more the effect of wage rate goes to two directions, and from theory the effect of wage rate is ambiguous.

We also run separate regressions for people in the formal sector and in the informal sector. Results for these two groups are similar (see Table 6).

5. Conclusion Remarks

Applying Grossman model, we study the health determinants for Chinese urban adult population based on self-reported categorical health status.

We find cost of health care services has significantly negative impact on health. This finding is very robust across different model specifications investigated in this paper.

Effect of education on health is significantly positive. The positive relationship between health and education is also robust. This positive relationship means that it is possible to use education as a practical tool to improve the health of the population. Investing in education level not only increase productivity and increases income, but also improves the health status; meanwhile health is found positively correlated with income (Liu, et al. 2004). When formulating human capital policy, it will be fruitful to consider health and education together.

To interpret the result on education, it is necessary to point out that in our analysis we cannot model unobservable factors such as ability. If the correlations between ability and education and between ability and health are both positive, our result on education will be bias upward due to omitted variable bias (see Grossman, 2000).

Our study shows that health is deteriorating with age starting from around age 40. This finding is striking in the sense that even if we are still "young", our health is starting deteriorating. An important policy implication is that after certain age, we should have regular physical examination. On the one hand, examination can find the illness at earlier stage, so it helps to slow down the health deteriorating speed; on the other hand, it can save the money from future treatment.

Our empirical findings on education, age and cost of health services are consistent with the predictions from Grossman model.

Wage rate or income on the health is also positive but insignificant. Our findings are not surprising given that the primary health care in urban China is part of government welfare program. Non-market forces mainly drive the health investment decisions of urban residents. Further more the effect of wage rate goes to two directions, and from theory the effect of wage rate is ambiguous.

Contrary to finding in developed countries, under-weight instead of over-weight is a better predictor for poor health. We also find Region is an import determinant of health. Western provinces have worst health; coastal and northeastern provinces have best health. Male has better health than female has, and married couple has better health.

The econometric approach adopted here is reduced form cross-sectional analysis. This is our first attempt to estimate and to test Grossman model using Chinese data. In the future studies, we will explore structural model approach and consider the role of life-cycle behavior.

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Figure 1. Static Analysis for Health Demand

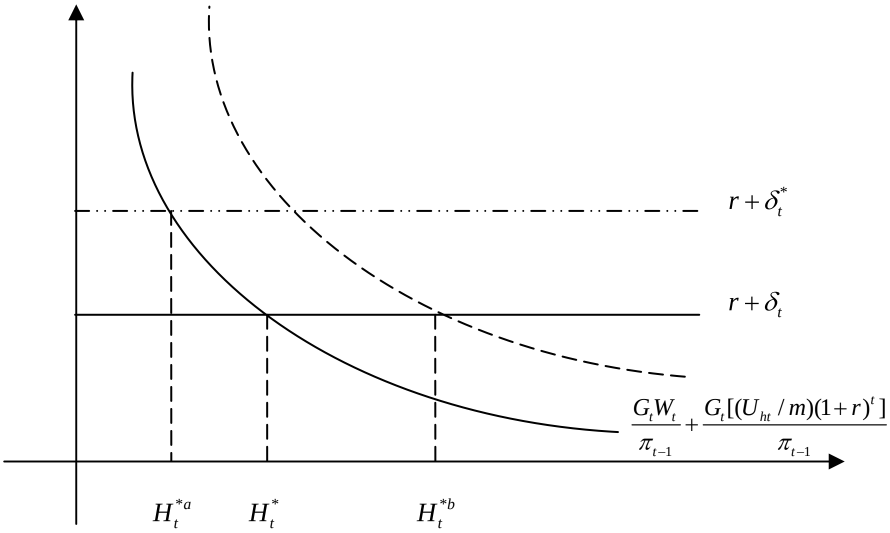

Table 1. Self-Reported Health Status in 2000 by Province, Gender, and City Size

			Whole Sample	Guang-xi	Gui-Zhou	He-Nan	Hu-Bei	Hu-nan	Heilong-jiang	Jiang-Su	Liao-ning	Shan-dong
Whole Sample	Excel	Freq.	415	12	13	32	40	27	82	65	78	66
		%	21.0%	6.0%	5.7%	15.0%	18.1%	10.7%	34.5%	29.3%	38.2%	33.7%
	Good	Freq.	1036	120	144	117	104	158	124	109	70	90
		%	52.4%	60.0%	62.6%	54.7%	47.1%	62.7%	52.1%	49.1%	34.3%	45.9%
	Fair	Freq.	468	61	63	59	64	63	30	45	48	35
		%	23.7%	30.5%	27.4%	27.6%	29.0%	25.0%	12.6%	20.3%	23.5%	17.9%
	Poor	Freq.	58	7	10	6	13	4	2	3	8	5
		%	2.9%	3.5%	4.3%	2.7%	5.8%	1.6%	0.8%	1.3%	4.0%	2.5%
	Total	Freq.	1977	200	230	214	221	252	238	222	204	196
		%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Female	Excel	Freq.	175	2	4	16	16	8	37	28	34	30
		%	16.8%	1.9%	3.3%	14.0%	13.7%	6.2%	31.1%	23.1%	29.8%	29.1%
	Good	Freq.	551	61	77	63	47	84	66	63	43	47
		%	52.8%	59.2%	63.1%	55.3%	40.2%	64.6%	55.5%	52.1%	37.7%	45.6%
	Fair	Freq.	284	36	36	33	45	36	15	28	33	22
		%	27.2%	35.0%	29.5%	29.0%	38.5%	27.7%	12.6%	23.1%	29.0%	21.4%
	Poor	Freq.	33	4	5	2	9	2	1	2	4	4
		%	3.2%	3.9%	4.1%	1.7%	7.6%	1.5%	0.8%	1.7%	3.5%	3.9%
	Total	Freq.	1043	103	122	114	117	130	119	121	114	103
		%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Male	Excel	Freq.	240	10	9	16	24	19	45	37	44	36
		%	25.7%	10.3%	8.3%	16.0%	23.1%	15.6%	37.8%	36.6%	48.9%	38.7%
	Good	Freq.	485	59	67	54	57	74	58	46	27	43
		%	51.9%	60.8%	62.0%	54.0%	54.8%	60.7%	48.7%	45.5%	30.0%	46.2%
	Fair	Freq.	184	25	27	26	19	27	15	17	15	13
		%	19.7%	25.8%	25.0%	26.0%	18.3%	22.1%	12.6%	16.9%	16.7%	14.0%
	Poor	Freq.	25	3	5	4	4	2	1	1	4	1
		%	2.7%	3.1%	4.7%	4.0%	3.8%	1.6%	0.9%	1.0%	4.4%	1.1%
	Total	Freq.	934	97	108	100	104	122	119	101	90	93
		%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Big City	Excel	Freq.	162	5	6	4	13	11	32	13	53	25
		%	18.2%	6.0%	5.0%	4.0%	11.7%	9.7%	34.4%	12.9%	61.6%	29.4%
	Good	Freq.	461	41	70	66	46	71	46	57	14	50
		%	51.7%	49.4%	58.3%	66.0%	41.4%	62.8%	49.5%	56.4%	16.3%	58.8%
	Fair	Freq.	245	33	41	29	44	29	13	29	17	10
		%	27.5%	39.8%	34.2%	29.0%	39.6%	25.7%	14.0%	28.7%	19.8%	11.8%
	Poor	Freq.	24	4	3	1	8	2	2	2	2	0
		%	2.6%	4.8%	2.5%	1.0%	7.3%	1.8%	2.1%	2.0%	2.3%	0.0%
	Total	Freq.	892	83	120	100	111	113	93	101	86	85
		%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Small City	Excel	Freq.	253	7	7	28	27	16	50	52	25	41
		%	23.3%	6.0%	6.4%	24.6%	24.6%	11.5%	34.5%	43.0%	21.2%	36.9%
	Good	Freq.	575	79	74	51	58	87	78	52	56	40
		%	53.0%	67.5%	67.3%	44.7%	52.7%	62.6%	53.8%	43.0%	47.5%	36.0%
	Fair	Freq.	223	28	22	30	20	34	17	16	31	25
		%	20.6%	23.9%	20.0%	26.3%	18.2%	24.5%	11.7%	13.2%	26.3%	22.5%
	Poor	Freq.	34	3	7	5	5	2	0	1	6	5
		%	3.1%	2.6%	6.3%	4.4%	4.5%	1.4%	0.0%	0.8%	5.0%	4.4%
	Total	Freq.	1,085	117	110	114	110	139	145	121	118	111
		%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

Source: Calculated from CHNS 2000 by the author.

Table 2. Variables Used in the Models

Variable	Label	Whole		Female		Male	
		Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
FEMALE	Female	0.5287	0.4993	1	0	0	0
AGE1	18-22	0.0668	0.2497	0.0604	0.2383	0.0668	0.2497
AGE2	23-30	0.1497	0.3569	0.1486	0.3558	0.1497	0.3569
AGE3	31-35	0.1129	0.3166	0.1151	0.3193	0.1129	0.3166
AGE4	36-40	0.1605	0.3672	0.1588	0.3657	0.1605	0.3672
AGE5	41-45	0.1281	0.3343	0.1281	0.3344	0.1281	0.3343
AGE6	46-50	0.1345	0.3413	0.1411	0.3483	0.1345	0.3413
AGE7	51-55	0.0820	0.2744	0.0826	0.2755	0.0820	0.2744
EDU1	Elementary school	0.1547	0.3617	0.1851	0.3885	0.1547	0.3617
EDU2	Junior high school	0.3249	0.4684	0.3381	0.4733	0.3249	0.4684
EDU3	Senior high school	0.3668	0.4820	0.3579	0.4796	0.3668	0.4820
EDU4	College and above	0.1472	0.3544	0.1114	0.3148	0.1472	0.3544
TW3	Working time	23.7688	22.9707	20.7150	22.9576	23.7688	22.9707
WAGE	Wage	357.4281	684.6482	275.3835	557.0478	357.4281	684.6482
HHSIZE	Household size	3.6942	1.1964	3.7019	1.2010	3.6855	1.1918
M1	Insured	0.3808	0.4857	0.3537	0.4784	0.4108	0.4922
M21	Cost of treat a cold	42.9050	42.8810	42.7202	42.7190	43.1123	43.0838
HHINCOME	Household income	6475.716	4556.657	6459.234	4540.838	6494.203	4576.646
UNDER	Under weight	0.0633	0.2436	0.0724	0.2593	0.0531	0.2244
OVER	Over weight	0.0349	0.1835	0.0306	0.1724	0.0396	0.1951
WORK	Working?	0.7295	0.4443	0.6546	0.4757	0.8135	0.3897
FORMAL	Informal sector	0.4742	0.4995	0.4150	0.4930	0.5406	0.4986
BIG	Big city	0.4600	0.4985	0.4587	0.4985	0.4615	0.4988
HIGH	High income city	0.3697	0.4828	0.3686	0.4827	0.3708	0.4833
MIDDLE	Mid income city	0.2528	0.4347	0.2526	0.4347	0.2531	0.4350
Liaoning	North-Eastern	0.1006	0.3009	0.1059	0.3078	0.0948	0.2931
Heilongjiang	North-Eastern	0.1340	0.3408	0.1263	0.3323	0.1427	0.3500
Jiangsu	Coastal	0.1095	0.3123	0.1133	0.3171	0.1052	0.3070
Shandong	Coastal	0.1001	0.3003	0.1003	0.3005	0.1	0.3002
Henan	Middle	0.1055	0.3073	0.1068	0.3090	0.1042	0.3056
Hubei	Middle	0.1109	0.3141	0.1114	0.3148	0.1104	0.3136
Hunan	Middle	0.1267	0.3327	0.1263	0.3323	0.1271	0.3332
Guangxi	Western	0.0987	0.2983	0.0966	0.2955	0.1010	0.3015
Guizhou	Western	0.1139	0.3178	0.1133	0.3171	0.1146	0.3187
MS	Married	0.1586	0.3654	0.1326	0.3393	0.1878	0.3907
N	Sample Size	2037		1077		960	

Table 3. Estimates from Basic Ordered Probit Models
(Whole Sample)

A．Specification I							
Dependent variable：Self-reporting Health Status							
Ind. Variable	Label	Whole		Female		Male	
		Coefficients	P-value	Coefficients	P-value	Coefficients	P-value
FEMALE	Female	-0.2580	0.000				
AGE	Age in 2000	0.2487	0.040	0.2735	0.110	0.2349	0.177
AGESQ	Age squared	-0.0074	0.026	-0.0082	0.080	-0.0070	0.148
AGECU	Age cubed	0.000066	0.027	0.000074	0.077	0.000060	0.165
EDU1	Elementary school	Reference Group					
EDU2	Junior high school	0.2035	0.014	0.1953	0.072	0.2425	0.062
EDU3	Senior high school	0.3167	0.000	0.3461	0.003	0.3281	0.011
EDU4	College and above	0.4506	0.000	0.6323	0.000	0.3530	0.018
HHSIZE	Household size	0.0316	0.160	0.0509	0.103	0.0160	0.624
M1	Insured	-0.0932	0.113	-0.1757	0.034	-0.0189	0.822
M21	Cost of treat a cold	-0.0007	0.268	-0.0007	0.419	-0.0007	0.425
MS	Married	0.0721	0.490	0.0349	0.812	0.1024	0.501
Pseudo R-sq		0.0371		0.0314		0.0319	
N	Sample size	1842		969		873	

B．Specification II							
Ind. Variable	Label	Whole		Female		Male	
		Coefficients	P-value	Coefficients	P-value	Coefficients	P-value
FEMALE	Female	-0.2478	0.000	-	-	-	-
AGE1	18-22	Reference group					
AGE2	23-30	0.2231	0.010	0.1780	0.136	0.2823	0.028
AGE3	31-35	0.1145	0.237	0.0673	0.614	0.1826	0.198
AGE4	36-40	0.0254	0.769	-0.0342	0.774	0.0955	0.449
AGE5	41-45	-0.1403	0.125	-0.0129	0.919	-0.2641	0.046
AGE6	46-50	-0.2662	0.004	-0.2548	0.044	-0.2739	0.040
AGE7	51-55	-0.2558	0.019	-0.1547	0.308	-0.3596	0.021
EDU1	Elementary school	Reference Group					
EDU2	Junior high school	0.2348	0.004	0.2377	0.027	0.2531	0.050
EDU3	Senior high school	0.3423	0.000	0.3784	0.001	0.3369	0.009
EDU4	College and above	0.4738	0.000	0.6897	0.000	0.3341	0.027
HHSIZE	Household size	0.0398	0.076	0.0611	0.050	0.0195	0.551
M1	Insured	-0.1028	0.080	-0.1884	0.022	-0.0264	0.753
M21	Cost of treat a cold	-0.0007	0.257	-0.0007	0.412	-0.0007	0.450
MS	Married	0.1984	0.013	0.1426	0.216	0.2272	0.046
Pseudo R-sq		0.0341		0.0277		0.0326	
N	Sample size	1842		969		873	

Table 4. Estimates from More Complicated Ordered Probit Models
(Whole Sample)

Dependent variable：Self-reporting Health Status							
Ind. Variable	Label	Whole		Female		Male	
		Coefficients	P-value	Coefficients	P-value	Coefficients	P-value
FEMALE	Female	-0.2683	0.000	-	-	-	-
AGE1	18-22	Reference Group					
AGE2	23-30	0.2162	0.015	0.1532	0.210	0.2701	0.040
AGE3	31-35	0.1144	0.243	0.0679	0.615	0.1647	0.256
AGE4	36-40	0.0117	0.894	-0.0468	0.700	0.0571	0.658
AGE5	41-45	-0.0999	0.282	0.0189	0.884	-0.2282	0.090
AGE6	46-50	-0.2715	0.004	-0.3326	0.010	-0.2050	0.132
AGE7	51-55	-0.2639	0.017	-0.2497	0.107	-0.2868	0.073
EDU1	Elementary school	Reference Group					
EDU2	Junior high school	0.1713	0.042	0.1250	0.259	0.2064	0.119
EDU3	Senior high school	0.2425	0.006	0.2259	0.057	0.2516	0.060
EDU4	College and above	0.3053	0.007	0.4778	0.004	0.1921	0.238
HHSIZE	Household size	0.0751	0.002	0.0995	0.003	0.0601	0.093
M1	Insured	-0.0557	0.375	-0.1545	0.079	0.0451	0.621
M21	Cost of treat a cold	-0.0018	0.014	-0.0015	0.133	-0.0022	0.045
HHINCOME	Household income	0.0000053	0.404	0.0000043	0.625	0.0000048	0.603
BIG	Big city	0.1141	0.126	0.1816	0.079	0.0398	0.717
HIGH	High income city	-0.0385	0.548	-0.1111	0.210	0.0393	0.674
MIDDLE	Mid income city	0.3329	0.000	0.2326	0.035	0.4552	0.000
Liaoning	North-Eastern	0.3992	0.001	0.2382	0.124	0.5921	0.001
Heilongjiang	North-Eastern	0.5766	0.000	0.6210	0.000	0.5648	0.001
Jiangsu	Coastal	0.4086	0.000	0.3293	0.037	0.5163	0.003
Shandong	Coastal	0.5395	0.000	0.4558	0.005	0.6493	0.000
Henan	Middle	Reference Group					
Hubei	Middle	-0.0162	0.889	-0.2463	0.121	0.2256	0.192
Hunan	Middle	0.0842	0.466	0.0089	0.955	0.1553	0.356
Guangxi	Western	-0.2324	0.040	-0.2944	0.060	-0.1583	0.336
Guizhou	Western	-0.2352	0.032	-0.2605	0.083	-0.2374	0.143
MS	Married	0.2611	0.001	0.2051	0.080	0.2992	0.010
Pseudo R-sq		0.0696		0.0647		0.0749	
N	Sample size	1842		969		873	

Table 5. Estimates from More Complicated Ordered Probit Models
(Working Sample)

Dependent variable：Self-reporting Health Status							
Ind. Variable	Label	Whole		Female		Male	
		Coefficients	P-value	Coefficients	P-value	Coefficients	P-value
FEMALE	Female	-0.2985	0.000	-	-	-	-
AGE1	18-22	Reference Group					
AGE2	23-30	0.2012	0.056	0.1587	0.294	0.2509	0.098
AGE3	31-35	0.1270	0.260	0.0977	0.547	0.1644	0.309
AGE4	36-40	0.0106	0.915	0.0436	0.762	-0.0167	0.905
AGE5	41-45	-0.1579	0.137	-0.0185	0.908	-0.2648	0.068
AGE6	46-50	-0.2726	0.015	-0.2148	0.209	-0.2987	0.049
AGE7	51-55	-0.3475	0.016	-0.1250	0.596	-0.4461	0.017
EDU1	Elementary school	Reference Group					
EDU2	Junior high school	0.1978	0.072	0.0904	0.572	0.2509	0.104
EDU3	Senior high school	0.3568	0.001	0.3273	0.048	0.3596	0.021
EDU4	College and above	0.3712	0.006	0.6182	0.003	0.1937	0.288
TW3	Working time	0.0008	0.646	0.0038	0.114	-0.0026	0.277
WAGE	Wage	0.000036	0.453	0.000102	0.227	0.000011	0.862
HHSIZE	Household size	0.0667	0.024	0.0974	0.030	0.0503	0.212
M1	Insured	-0.1469	0.063	-0.3389	0.004	-0.0114	0.917
M21	Cost of treat a cold	-0.0026	0.005	-0.0026	0.070	-0.0027	0.027
HHINCOME	Household income	0.0000021	0.804	-0.0000052	0.665	0.0000063	0.586
FORMAL	In formal sector	0.0702	0.384	0.0616	0.598	0.0916	0.423
BIG	Big city	0.0972	0.281	0.0505	0.707	0.0865	0.490
HIGH	High income city	-0.0377	0.618	-0.1253	0.262	0.0233	0.825
MIDDLE	Mid income city	0.2253	0.019	-0.0385	0.789	0.4005	0.002
Liaoning	North-Eastern	0.3037	0.030	0.1047	0.608	0.5274	0.008
Heilongjiang	North-Eastern	0.5036	0.000	0.5587	0.006	0.5181	0.006
Jiangsu	Coastal	0.4081	0.004	0.3894	0.066	0.4913	0.011
Shandong	Coastal	0.5435	0.000	0.4731	0.041	0.6462	0.002
Henan	Middle	Reference Group					
Hubei	Middle	-0.1551	0.279	-0.4602	0.031	0.1100	0.580
Hunan	Middle	0.0858	0.544	-0.0059	0.979	0.1504	0.421
Guangxi	Western	-0.2569	0.065	-0.2487	0.227	-0.2535	0.187
Guizhou	Western	-0.2649	0.044	-0.2166	0.268	-0.3317	0.067
MS	Married	0.1869	0.069	0.0233	0.878	0.2756	0.055
Pseudo R-sq		0.0734		0.0773		0.0819	
N	Sample size	1356		638		718	

Table 6. Estimates from More Complicated Ordered Probit Models by Sector (Working Sample)

Dependent variable：Self-reporting Health Status							
Ind. Variable	Label	Whole		Formal Sector		Informal Sector	
		Coefficients	P-value	Coefficients	P-value	Coefficients	P-value
FEMALE	Female	-0.2985	0.000	-0.2879	0.000	-0.2694	0.010
AGE1	18-22	Reference Group					
AGE2	23-30	0.2012	0.056	0.2523	0.078	0.0558	0.732
AGE3	31-35	0.1270	0.260	0.1971	0.151	-0.0310	0.884
AGE4	36-40	0.0106	0.915	0.1109	0.382	-0.1372	0.406
AGE5	41-45	-0.1579	0.137	-0.1603	0.245	-0.1588	0.354
AGE6	46-50	-0.2726	0.015	-0.3042	0.029	-0.1478	0.453
AGE7	51-55	-0.3475	0.016	-0.1915	0.303	-0.6322	0.009
EDU1	Elementary school	Reference Group					
EDU2	Junior high school	0.1978	0.072	0.1834	0.327	0.2498	0.075
EDU3	Senior high school	0.3568	0.001	0.3648	0.042	0.3890	0.015
EDU4	College and above	0.3712	0.006	0.4101	0.037	0.4219	0.118
TW3	Working time	0.0008	0.646	-0.0002	0.944	-0.0005	0.812
WAGE	Wage	0.000036	0.453	0.000025	0.684	0.000050	0.531
HHSIZE	Household size	0.0667	0.024	0.0735	0.068	0.0466	0.313
M1	Insured	-0.1469	0.063	-0.1272	0.179	-0.1507	0.364
M21	Cost of treat a cold	-0.0026	0.005	-0.0026	0.016	-0.0036	0.069
HHINCOME	Household income	0.0000021	0.804	-0.0000093	0.387	0.000024	0.075
FORMAL	In formal sector	0.0702	0.384	-	-	-	-
BIG	Big city	0.0972	0.281	0.1034	0.384	0.1212	0.426
HIGH	High income city	-0.0377	0.618	-0.0990	0.305	0.0189	0.898
MIDDLE	Mid income city	0.2253	0.019	0.1986	0.145	0.2357	0.116
Liaoning	North-Eastern	0.3037	0.030	0.6355	0.000	-0.3754	0.151
Heilongjiang	North-Eastern	0.5036	0.000	0.6144	0.000	0.8302	0.013
Jiangsu	Coastal	0.4081	0.004	0.5283	0.004	0.3536	0.158
Shandong	Coastal	0.5435	0.000	0.7979	0.000	0.2913	0.248
Henan	Middle	Reference Group					
Hubei	Middle	-0.1551	0.279	0.0409	0.825	-0.4342	0.078
Hunan	Middle	0.0858	0.544	0.2136	0.269	-0.1676	0.446
Guangxi	Western	-0.2569	0.065	-0.1983	0.318	-0.4427	0.038
Guizhou	Western	-0.2649	0.044	-0.0823	0.624	-0.4980	0.025
MS	Married	0.1869	0.069	0.3824	0.009	-0.0253	0.866
Pseudo R-sq		0.0734		0.0773		0.0855	
N	Sample size	1356		638		865	