

# The analysis of determinants of individual's provider choice in urban China

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## Abstract

There exists, simultaneously, an unsatisfied demand for hospital specialist services and excessive supply of clinic and district hospital services in urban China's market for hospital care services. Since the 1990s, the government initiated a health insurance system for the population in the urban areas and has made a noticeable progress in expanding the coverage. With rising income and insurance coverage, the question about which type of hospital service to be selected has become an important issue for the urban population. This paper uses multinomial logit model to study the influence of health insurance and other factors on individual's hospital choice in five major cities of China. The objective is to draw some recommendations to mitigate the excess capacity and unsatisfied demand in the market for hospital services.

JEL classification:

**Keywords:** provider choice, insurance, income

## Introduction

The urban medical protection scheme<sup>2</sup> under the central-planned economy collapsed when China implemented market-oriented economic policies in the 1980s. Along with the increasing income and living standards, there is an emerging challenge to meet

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<sup>2</sup> government and labor insurance scheme

this rising demand for hospital specialist service, while there is an excess supply of basic hospital care services.

The unsatisfied demand for specialist medical services means that patients cannot afford medical treatment as the escalating cost of medical service is far greater than their purchasing power. The health statistics shows that while the average medical expenses per inpatient in General Hospitals of Health Sector<sup>3</sup> were 473.3 RMB in 1990 compared to 3597.7 in 2002, the average out-patient medical expenses have increased from 10.9 RMB in 1990 to 99.6 RMB in 2002 (Chinese Health Statistics Year Book, 2003). Further, the proportion of health expenditure to GDP increased from 3.04% in 1978 to 5.42% in 2002 and since 1995 this growth has exceeded the GDP growth, thus further fueling the demand for specialist hospital services. Moreover, the collapse of medical protection scheme established under the central-planned economy has added further pressure on the demand side. The pre-reform medical protection scheme was a free scheme, implemented “according to need” of the patient. The scheme meant that patients only need to visit the assigned medical institutions to acquire health services, with all medical expenses paid by the employers. However, factors such as, the financial difficulties of many state-owned enterprises, promotion of market-oriented economy, and the rapid rise of medical expenses, made the free health care system unsustainable. With the collapse of the pre-reform medical protection scheme, the proportion of out-of-pocket expenses has risen sharply, exerting enormous financial pressure on individuals’ ability to access medical service. According to Health Statistics, private out-of-pocket expenses were 20.43 percent of total health expenditure in 1978, rising rapidly up to 58.34 percent in 2002 (Karen et al, 2006). In addition, the percentage of patients in big cities who cannot access to medical service due to financial pressure increased from 3.21 percent in 1993 to 36.69 percent in 1998. This proportion was much higher in middle and small cities.

On the supply side of the health care market, there are areas of excess capacity in some segments of the market. Table 1 elaborates this point by highlighting the

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<sup>3</sup> Except Ministry of Health, other ministries also own some sort of hospitals.

utilisation patterns of hospital beds and the daily number of consultations and inpatients per doctor across different type of hospitals.

**Table1 Hospital Type and the Utilisation of Health Service in 2002**

	Hospital of Ministry of Health	Province Hospital	Hospital of City at Prefecture	Hospital of City at County Level	County Hospital	Township hospital	Clinics
Utilization rate of beds (%)	95.54	87.73	77.51	65.79	59.65	34.9	50.8
Daily consultations and inpatients per doctor	7.8	6.6	5.5	5.3	4.3	-	-

Source: Chinese Health Statistics Yearly Book 2003, Ministry of health

As Table 1 indicates, the hospital utilisation and consultations rates were much higher in the large hospitals (e.g., ministry and provincial hospitals) than the smaller township or country hospitals. This shows a simultaneous existence of excess demand at large hospitals, when the small hospitals are being underutilize.

In 1998, in order to deal with both demand and supply side challenges, the Chinese central government began to establish and implement a new health insurance scheme as a combination of an individual medical savings account (MSA) and a social pooling fund in urban China. In the meantime, the government also encouraged other insurance schemes in the private sector, such as commercial health insurance to expand health coverage. By the end of 2003, 98 percent of cities in China had implemented the new public health insurance scheme for urban employees and 109 million people were insured under this system. Although the new scheme is still evolving, the establishment of health insurance does enable people to share the risk

of health expenditure due to illness' uncertainty and, therefore, lowering the economic barriers for patients to access medical services in urban China. In addition, individuals have more freedom to choose a medical institution for consultation and treatment. In general, people can choose 3 or 5 medical institutions under a given hospital category (refer to Table 1 for hospital type).

The objective of this paper is to address some key questions in the context of the evolving Chinese healthcare system. In particular, the paper addresses questions, such as: What type of medical institution is preferred by individuals? What are the factors that determine individual hospital choice? Do individual choose high quality hospital, accepting to wait a longer time? Or, is the case simply that individuals prefer a low level hospital consultation due to its relative lower price and convenience.

The paper is organized as follows. Section 2 is a literature review. Section 3 describes the data set and relevant variables used in the paper. Section 4 discusses and analyses the empirical results and draws policy implications based upon these results. Section 5 draws conclusions from the paper.

## **Literature Review**

With regards to hospital provider choice, the relevant literature has two stances. One is to address provider's characteristics such as price, quality, and accessibility and the other is to analyse characteristics of the patients, including the patients' evaluation of providers' characteristics. This paper focuses on the latter.

Mitchell et al. (1997) studied the influence of different types of health insurance schemes (HMOs , other private insurance schemes and Medicaid) on breast cancer patients' treatment and hospital choices. By controlling the disease category variable the paper uses probit econometric method and concludes that patients joining HMO prefer to choose nearest cancer hospitals rather than a distant large hospital. Jowett et al (2001) analyse the impact of being insured, under the voluntary component of Vietnamese Health Insurance, on patterns of treatment seeking behavior (i.e., outpatient or inpatient; self-treatment or public hospital or private providers). They adopt two-stage multinomial logit method and verify the effectiveness of their instrumental variable to control the insurance's endogeneity. Hanson et al. (2001) mainly discuss the impact of public and private hospitals' quality on the demand for outpatient services. Their greatest contribution is the use of ex ante quality measures for all respondents to eliminate possible endogenous biases caused by ex post measures. Their study also analyse the effects of time cost on the patients' choice. By using probit method, the authors conclude that there is a strong correlation between the outpatient demand and hospitals' quality and price. Yip et al. (1998) examine the factors that influence patient choice of medical provider in the three-tier health care system in rural China. The paper uses multinomial logit method to study patients' income and insurance coverage on their choice among self-treatment, village health clinics, township hospital center, and county hospital. According to their results, insurance coverage does not show significant influence on patients' provider choice. Following Yip et al (1998), this paper adopts multinomial logit method to address the determinants affecting individual's provider choice under the new health insurance scheme for urban employees.

## Model

The multinomial logit method is used to study individual's provider choice. Following McFadden (1983), the utility of alternative provider  $j$  to individual  $i$  is

$$U_{ij} = V_{ij}(\text{insur}_{ij}, \text{incom}_{ij}, \text{selfassess}_{ij}, X_{ij}) + \varepsilon_{ij}$$

**insur** is whether or not individual has insurance.

**incom** is individual's income.

**selfassess** is individual's self-assessed health status.

**X** is the individual's other characteristics, such as age, gender, education, etc.

**J** is the provider type.

In this paper we classify providers into four categories, 0=basic health service institution<sup>4</sup>; 1=county hospital; 2=city hospital; and 3=province and ministry hospitals.

We also assume that the individual's utility function  $V(\cdot)$  is linear because non-linear function can be approximated by linear functions in econometric estimation. Then the utility function of individual  $i$  is

$$U_{ij} = X_i \beta_j + \varepsilon_{ij}$$

$X_i$  represents all the factors that could affect individual's provider choice.

If we assume that distribution  $\varepsilon$  is type I extreme value (Gumbel) distribution, that is

$F(\varepsilon_{ij}) = \exp(-e^{-\varepsilon_{ij}})$ , then the probability of individual  $i$  choosing alternative  $j$  is

$$P_j = \frac{\exp(X_i \beta_j)}{\sum_{k=0}^3 \exp(X_i \beta_k)}$$

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<sup>4</sup> Including clinics and health center

In order to use multinomial logit model, we also assume that  $\varepsilon_{ij}$  and  $\varepsilon_{ik}$  are independent (independence of irrelevant alternative (IIA)). This assumption is not satisfied under most circumstances. However, in this paper this assumption is not problematic as; a) while self-treatment is an alternative of individual choice in the existing literature, the paper does not take self-treatment into account. This leads to the reduction of possible correlation across  $\varepsilon$  distributions; b) in this study the independent variables only include the characteristics of individuals, not those of alternatives. Therefore, even if the nested logit model is used, the results would be almost the same; and c) Train (1990) points out that IIA assumption in multinomial logit model is not very restrictive.

## Data and variables

The data used in the paper is from both a household survey and an individual survey undertaken by China Academy of Health Policy at Peking University in five major cities (Shenyang, Beijing, Hangzhou, Shanghai and Shenzhen) in 2003<sup>5</sup>. Table 2 describes the basic situation of these five cities.

**Table 2 Basic Characteristics of the Five Cities**

	Shenyang	Beijing	Hangzhou	Shanghai	Shenzhen
Location	Northeast	North China	East China	East China	South China
Area (km <sup>2</sup> )	12980	16808	16596	6341	1953
Population (millions)	6.89	11.48	6.43	13.42	1.51
GDP per capita (Yuan)	23,271	32,061	32,819	46,718	46,000

In total, the effective sample size is 3385 households and 10177 individuals. The sample looked at individuals who were sick within two weeks and/or had a chronic disease with six months at the time being surveyed and those individuals with age 18

<sup>5</sup> In this survey we choose one county from each city to perform household survey

years or above from the total effective sample<sup>6</sup>. In addition, the study only chooses the individuals who once went to medical institutions for medical treatment. For estimation purposes, a final ample size of 3118 was used for the analysis.

In this sample 16.16 per cent individuals choose basic health service institution, 16.48 per cent choose county hospital, 38.2 per cent choose city hospital and 29.15 per cent choose province or above hospital. Some important variables in the study are described as follows;

### **Insurance status**

In this survey, insurance includes social (public) health insurance and private health insurance. The social health insurance consists of basic health insurance for urban employee, health insurance for catastrophic diseases, government insurance, labor insurance, and Cooperative Medical System for the rural population. According to the survey, the percentage of individuals without social insurance is 21.23. While, 78.77 per cent of those with social insurance are covered by basic health insurance for urban employees, who includes social pooling fund and individual savings account. Individual savings account is funded by employees and employers and pay for outpatient expenses. The social pooling fund is collected by employers and used for inpatient expenses.

As there are only 2.82 percent of urban individuals with the private health insurance in the sample, we do not distinguish private and social insurance and treat them as insurance in the model. In general, the overall insurance coverage rate is 79.31 percent in the sample.

The role of health insurance is to change the relative price of medical services. The real price that individuals pay for medical consultation, after paying their insurance premium, is zero. The medical treatment expense covered by insurance does not cover

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<sup>6</sup> In accordance with Chinese culture, individual whose age is 18 or above is treated as an adult. This means that they have more autonomy in choosing providers. In other words, individual's characteristic may well represent his/her provider choice.

more than 20 percent of the real price paid by the individuals. Therefore, insurance inherently solves the accessibility of medical services due to financial difficulties of urban population. Consequently, individuals with insurance will be mainly concerned with the quality of care and the relative price of a medical institution. The probability of choosing a medical institution with a high quality will be higher if the relative price is approximately the same or similar. This then allows the individuals to extract maximum consumer surplus under given conditions.

### **Income**

In our paper income means average family income per year which is equal to total family income for the family, including children with age less than 18. It represents individual's payment capacity for medical service. Generally speaking, individuals with higher income prefer high-quality hospital. The paper uses income as a continuous variable.

### **Self-assessed health status**

Self-assessed health status<sup>7</sup> is also a very important factor that affects an individual's provider choice. Self-assessed health status represents not only individuals' actual health status, but also level of comfort or discomfort concerning their health wellbeing. An individual with poor self-assessed health status is inclined to choose high-quality providers. Those with good self-assessed health status tend to choose self-treatment or choose a provider with relatively lower level of quality.

### **Other variables**

Besides the above mentioned variables, the study also considers some demographic characteristics of individuals, such as age, gender, marital status, disease diagnostic category, education and etc. Table 3 provides descriptive statistics of all the variables.

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<sup>7</sup> In general, self-assessed health status is classified into five categories (see Table 3).

**Table 3 Definitions and Descriptions of the Variables**

Variable	Definition	Value or range	Mean S.E. or %
		0-basic health service institution	16.16
Hospital	all types of providers	1-county hospital	16.48
		2-city hospital	38.20
		3-province or above hospital	29.15
Female	gender	0-male	46.44
		1-female	53.56
Age	age	Age 15 to100	62.72
			( 14.70)
Married	marital status	0-unmarried	21.74
		1-married	78.26
Incom	average family income per year (yuan)	440—200000	12200.11
			( 12579.38)
Lincom	ln(income)	6.086775 to 12.20607	9.119648
			(.7329958)
Edu_40	education	1-below primary school	34.12
		0-others	65.88
Edu_41	education	1-junior	27.39
		0-others	72.61
Edu_42	education	1-high school	19.28
		0-others	80.72
Edu_43	education	1-college and above	19.21
		0-others	80.79
Insur	insurance status	1-yes	79.31
		0-no	20.69
		1-excellent	8.85
Selfassess	self-assessed health status	2-very	16.07
		3-good	53.56
		4-fair	19.28
		5-poor	2.25
famsize	the number of members in one family	1 to 8	3.01
			(1.20)
Disease	disease diagnostic category	0-acute	6.32
		1-chronic	93.68
City_1	city dummy	1-Shenyang	12.71
		0-others	87.29
City_2	city dummy	1-Hangzhou	23.60
		0-others	76.40
City_3	city dummy	1-Shanghai	32.23
		0-others	67.77
City_4	city dummy	1-Shenzhen	14.43
		0-others	85.70
City_5	city dummy	1-Beijing	17.03
		0-others	82.97

## Result

Table 4 shows the results of multinomial logit regression by taking the county hospital as a reference group. Apart from analysing the coefficients, the study also evaluates the relative risk ratio (RRR). Following the multinomial logit's assumptions, we have

$$\ln \left[ \frac{\Pr(Y_i = j | X)}{\Pr(Y_i = k | X)} \right] = X (\hat{\beta}_j - \hat{\beta}_k) \quad \forall k, k \neq j$$

If we assume  $\beta_k = 0$ , that is k is the reference group, then this translates to the following equation,

$$\ln \left[ \frac{\Pr(Y_i = j | X)}{\Pr(Y_i = k | X)} \right] = X \hat{\beta}_j \quad \forall k, k \neq j$$

Following the definition of  $RRR = \exp(\beta)$ , the economic interpretation of RRR is that, given other things equal, if  $x_k$  increases by one unit what will be the relative probability of choosing institution j by selecting the county hospital as a reference group. If  $x_k$  is a dummy variable, for example insurance, the economic interpretation of choosing basic health service institution is as follows;

$$RRR = \frac{\frac{\Pr(\text{basic health service institution consultation})}{\Pr(\text{county hospital consultation})} \text{with insurance}}{\frac{\Pr(\text{basic health service institution consultation})}{\Pr(\text{county hospital consultation})} \text{without insurance}}$$

Table 4 shows that  $RRR=1.33$ . This implies that the relative probability of choosing basic health service institution for individual with insurance is 1.33 times higher than that of individual without insurance.

**Table 4 Result of Multinomial Logit Regression**

Variable	Basic health service institution		City hospital		Province hospital	
	Coef. (Robust Std. Err.)	RRR	Coef. (Robust Std. Err.)	RRR	Coef. (Robust Std. Err.)	RRR
female	0.0751 (0.1396)	1.0780	-0.0476 (0.1177)	0.9535	0.0386 (0.1306)	1.0394
age	-0.0071 (0.0052)	0.9930	-0.0080* (0.0048)	0.9921	-0.0022 (0.0054)	0.9978
married	-0.1829 (0.1653)	0.8329	-0.0621 (0.1451)	0.9398	0.2392 (0.1645)	1.2703
edu_41	-0.0321 (0.1876)	0.9684	0.2148 (0.1600)	1.2396	0.3170* (0.1796)	1.3730
edu_42	0.0893 (0.2089)	1.0934	0.3076* (0.1842)	1.3602	0.9447*** (0.2009)	2.5720
edu_43	0.0693 (0.2462)	1.0717	0.5412*** (0.1976)	1.7180	1.4068*** (0.2127)	4.0830
insur	0.2837* (0.1735)	1.3281	0.4998*** (0.1589)	1.6484	0.4853*** (0.2026)	1.6247
lincom	-0.6062*** (0.1226)	0.5454	-0.1120 (0.1004)	0.8941	-0.1811 (0.1143)	0.8343
selfassess	0.0426 (0.0749)	1.0435	0.2955*** (0.0660)	1.3437	0.3616*** (0.0750)	1.4356
famsize	-0.0709 (0.0540)	0.9315	-0.1024** (0.0481)	0.9027	-0.1036** (0.0568)	0.9016
chronic	-0.8461*** (0.2594)	0.4291	0.1618 (0.2889)	1.1757	0.7582** (0.3499)	2.1344
city_2	2.0424*** (0.3246)	7.7090	1.2147*** (0.2444)	3.3694	1.6553*** (0.2737)	5.2349
city_3	2.4759*** (0.3057)	11.8923	0.5239** (0.2392)	1.6887	2.1625*** (0.2682)	8.6926
city_4	2.5558*** (0.3197)	12.8817	-0.7174*** (0.2545)	0.4880	-1.8528*** (0.4043)	0.1568
city_5	0.3312 (0.2969)	1.3926	-1.0772*** (0.2116)	0.3405	-0.9482*** (0.2558)	0.3874
_cons	5.0565*** (1.1398)		1.2667 (0.9491)		-0.8995 (1.1133)	

Comparative group is county hospital  
 \*: P<=0.10; \*\*: P<=0.05; \*\*\*: P<=0.01

observation=3188

Wald Chi<sup>2</sup>(45)=1039.10

Table 5 represents the marginal effect of independent variables on possibility of choosing health institution j. The formula is

$$\frac{\partial P_{ij}}{\partial x_i} = P_{ij}(\beta_j - \sum_{k=1}^J P_{ik}\beta_k)$$

It is easy to draw a conclusion that one independent variable's marginal effect depends on not only coefficient itself but also other independent variables. Taking insurance as an example from Table 5, if insurance coverage increases by one additional unit, it is more likely that individuals will choose city hospitals at the expense of country hospitals.

**Table 5 Marginal Effect of Independent Variables**

Variable	Basic health service institution	County hospital	City hospital	Province hospital
	Coef. (Std. Err.)	Coef. (Std. Err.)	Coef. (Std. Err.)	Coef. (Std. Err.)
female	0.0114 -0.0144	0.0001 -0.0134	-0.0214 -0.0200	0.0098 -0.0173
age	-0.0003 -0.0005	0.0008 -0.0006	-0.0012 -0.0008	0.0008 -0.0007
married	-0.0286 (0.0185)	0.0003 (0.0164)	-0.0279 (0.0252)	0.0562*** (0.0203)
edu_41	-0.0299* (0.0175)	-0.0242 (0.0172)	0.0179 (0.0272)	0.0362 (0.0246)
edu_42	-0.0456*** (0.0179)	-0.0536*** (0.0168)	-0.0522* (0.0304)	0.1514*** (0.0309)
edu_43	-0.0771*** (0.0184)	-0.0801*** (0.0159)	-0.0647** (0.0308)	0.2218*** (0.0321)
insur	-0.0152 (0.0191)	-0.0615*** (0.0219)	0.0518* (0.0286)	0.0249 (0.0288)
lincom	-0.0630*** (0.0130)	0.0269** (0.0113)	0.0345* (0.0179)	0.0016 (0.0159)
selfevalu	-0.0284*** (0.0078)	-0.0332*** (0.0074)	0.0292** (0.0116)	0.0324*** (0.0104)
famsize	0.0019 (0.0056)	0.0119** (0.0054)	-0.0087 (0.0085)	-0.0051 (0.0080)
chronic	-0.1941*** (0.0359)	-0.0026 (0.0318)	0.0613 (0.0446)	0.1354*** (0.0295)
city_2	0.1229*** (0.0434)	-0.1421*** (0.0168)	-0.0599 (0.0392)	0.0791** (0.0384)
city_3	0.2068*** (0.0414)	-0.1452*** (0.0189)	-0.2921*** (0.0321)	0.2305*** (0.0406)
city_4	0.6562*** (0.0457)	-0.0526** (0.0208)	-0.3311*** (0.0322)	-0.2725*** (0.0175)
city_5	0.1825*** (0.0515)	0.0961*** (0.0330)	-0.1957*** (0.0379)	-0.0829** (0.0331)

\*: P<=0.10; \*\*: P<=0.05; \*\*\*: P<=0.01

observation=3118

### **Insurance status**

As noted in Table 4, the insured individuals, as compared to uninsured individuals, are 1.33 times as likely to choose basic health service institution; 1.65 times as likely to choose city hospital; 1.62 times as likely to choose provincial hospital, when using the county hospital as reference group. Considering individuals' preference between basic health service institution and city hospital, the study finds that, given other things equal, insurance coverage leads to individuals 1.24 times ( $1.65/1.33$ ) more likely to choose city hospital as to choose basic health service institution. In other words, the insured prefer a city hospital to a basic health service institution. Similarly, it also seems that the insured prefer a provincial hospital to a basic health service institution. It is important to note that the choice difference between a basic health service institution and a county hospital is significant at 10 % level and that between a provincial/city hospital and a county hospital is significant at 1% level.

Generally, individual's determination of provider choice depends on quality and price characteristics of different institutions. Although there is no variable to measure provider's qualities in our survey, we assume that the quality of service provided is gradually increased as we move from basic health service institutions to provincial hospital (CHSYB, 2003).

Prices reflect not only expenses in monetary terms but also time costs involved in the purchase of hospital services. In this paper we use scale 1 to 5 to represent individuals' evaluation about the time they have to spend for medical consultation

(1=very short, 5=very long). Table 6 shows that the higher the quality of a provider, the larger the time cost.

**Table 6 Time Cost of Visiting Providers**

	Basic health service institution	County hospital	City hospital	Province hospital
traveling time	1.8559	2.5641	2.4333	2.1667
		Pearson chi2(12) = 26.7351 Pr = 0.008		
waiting time	2.1610	2.6410	2.8	3.3333
		Pearson chi2(12) = 28.5331 Pr = 0.005		
total	4.0170	5.2051	5.2333	5.5
N=193		Pearson chi2(21) = 40.0271 Pr = 0.007		

There is no doubt that health insurance changes the nominal prices that patients are faced with. In the new health insurance system for urban employees, outpatient expenses are paid by individual savings accounts held by the social insurance scheme, which mean that the nominal price for outpatient consultation for the individuals is almost zero. For inpatient expenses, individual's co-payment does not exceed 20%. Therefore, time costs and quality are the main determinants of individuals' choice regarding the hospital providers. The study finds that individuals with insurance significantly prefer a city/provincial hospital to a county hospital as there is no significant time cost difference. Table 5 shows clearly that having insurance increases the possibility of visiting province and city hospitals and decreases the possibility of visiting county hospitals and basic health service institutions. From the predicted possibility in Table 7, the study finds that 41.41 per cent of the insured individuals choose a city hospital and 38.54 per cent choose a province hospital, which is much higher than for those of the uninsured.

**Table 7 Actual and Predicted Possibility of Provider Choice**

	Basic health service institution		County hospital		City hospital		Province hospital	
	actual	predicted	actual	predicted	actual	predicted	actual	predicted
<b>Insurance status</b>								
no insurance	22.64%	24.81%	25.27%	16.28%	38.45%	54.73%	13.64%	4.19%
having insurance	14.48	9.02	14.19	11.04	38.13	41.41	33.2	38.54
<b>Income</b>								
low-income group	15.96	7.98	15.6	9.45	41.47	54.59	26.97	27.98
middle-income group	15.17	12.5	15.67	11.17	35.25	37	33.92	39.33
high-income group	17.87	17.63	18.84	17.03	38.16	40.82	25.12	24.52
<b>Health status</b>								
excellent	21.74	22.1	32.61	40.94	27.9	21.38	17.75	15.58
very	20.96	23.35	18.16	18.16	38.12	36.33	22.75	22.16
good	16.65	9.16	14.91	8.74	36.77	44.49	31.68	37.6
fair	8.49	7.49	12.65	3.99	46.26	58.4	32.61	30.12
poor	14.29	10	11.43	5.71	44.29	60	30	24.29
<b>Disease</b>								
acute	47.21	65.99	13.2	3.05	27.41	23.35	12.18	7.61
chronic	14.07	8.66	16.71	12.74	38.93	45.57	30.3	33.04

## Income

While using the county hospitals as reference group, Table 4 shows that an individual is 0.55 times as likely to choose a basic health service institution; 0.89 times as likely to choose city hospital over county hospital; and 0.83 times as likely to choose a provincial hospital if the logarithm income increases 1%. A comparison of the probability of visiting a basic health institution with a city and/or a provincial hospital shows that as income increases 1 percent, an individual is 1.64 times more likely to choose a city hospital over a basic health institution and 1.53 times more likely to choose a provincial hospital over a basic health institution. The above results need to be used with caution; the relative possibility of a basic health institution over a county hospital is statistically significant.

When calculating the income's marginal effect approximately at the mean level, the study finds that the increase of income reduces the possibility of visiting a basic health service institution. Furthermore, the increasing of income also increases the possibility of visiting a city/province hospital, although this effect is not significant. These results are plausible. A rise in payment capacity for medical services enables people to select a high-quality provider.

However, the above outcome may not be always true as time cost is not incorporated in this econometric model. Table 5 shows that the change in possibility of visiting province hospital is not large as compared to that of visiting a city and a county hospital. Further, Table 4 shows that the relative risk ratio of county hospitals over city/province hospitals is less than 1. The above result is due to the fact that an individual's time cost of visiting providers is determined by his or her income. The higher an individual's income is, the higher is the time cost. In other words, as an individual's income increases, so does a desire to access better medial services, which in turn leads to a higher time cost. Therefore, the study cannot determine an individual's decision to access medial services by only looking at changes in income; this is being highlighted in Table 8 that shows the marginal impact of income on hospital/quality of service choice. For example, for individuals from the high-income group shows that; as income increases by 1 per cent, their probability of accessing basic health services drop by 4.8 per cent. Table 8 also shows income's marginal effect around the means across different service providers. For instance, for low-income individuals using the basic health services, a 1 per cent rise in income will lead to 8 percent drop in their usage of these services. However, if the individuals

from this group consume country hospital services, a 1 per cent income will lead to 2.6 per cent rise in the usage of country hospital services.

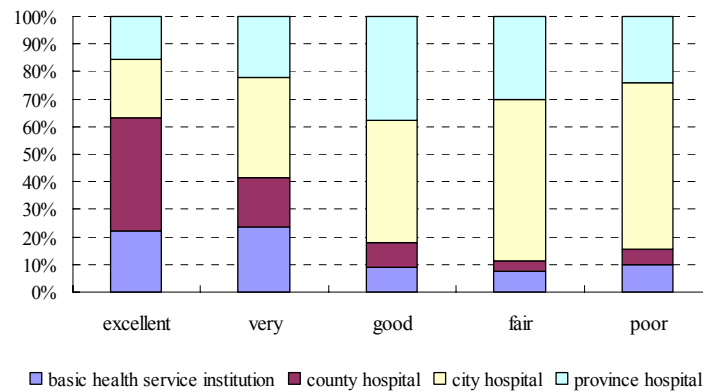
**Table 8 Marginal Effects of Income among Different Groups**

	Basic health service institution	County hospital	City hospital	Province hospital
low-income group	-0.0805***	0.0266***	0.0450**	0.0089
middle-income group	-0.0640***	0.0269**	0.0351**	0.0020
high-income group	-0.0484***	0.0269*	0.0255	-0.0040

### **Self-assessed health status**

The results indicates that as the value of self-assessed health status increases, i.e., , individual's health status declines, the individuals are 1.04 times more likely to choose basic institutions over county; 1.34 times more likely to choose city hospital over county hospital; and 1.29 times more likely to choose province hospital by taking county hospital as a referring group. We can also see that the relative possibility of visiting city hospital over basic institution is 1.29 times as much as before and that of visiting province hospital over city one is 1.07 times as much as before. The relative possibility of visiting city/province hospital over county one is significant at 1% level. The study found that individuals with bad health prefers high-quality providers, which is shown clearly by table 5. The following figure gives us predicted possibility of different providers in different health group and also shows the similar conclusion.

### health status and providers' predicted possibility



Generally speaking, individuals with relative poor self-assessed health status is more concerned about her/his discomfort and, therefore, providers' quality is the important factor that affect individuals' decision.

### Other variables

In our regression, some demographic characteristics, such as gender, age and marital status, do not have significant impact on patients' provider choice. In addition, provider choice is significantly affected by individual's education level. Education acting as a human capital plays an important role for individuals' concern of their health and therefore is a significant factor for individuals choosing high-quality providers. Furthermore, the family size is used as a proxy to reflect the number of children and aged family members who presumably consume more medical care services. Table 4 finds that the increase of family size reduces the relative possibility of visiting a city or province hospital compared with a county one. The type of diseases also affects patients' provider choice. Individuals with acute diseases prefer the basic health institution in their proximity or a province hospital more than those individuals with chronic diseases. Finally, dummy variables of city also significantly

affect provider choice due to different health policy and different health delivery systems.

## **Conclusion**

The paper uses the household data of five cities (Shenyang, Hangzhou, Shanghai, Shenzhen, and Beijing) in China to study the determinants affecting individuals' provider choice. The study uses multinomial logit model and finds insurance coverage, income, self-assessed health status, education and city dummy variables affecting the individuals' provider choice in urban China. The expansion of health insurance coverage for urban individuals reduces the prices they pay for obtaining medical services and, therefore, leads to higher possibility of choosing high-quality hospital. The level of income also increases the possibility of visiting high-quality hospital, but the result should be interpreted with caution as time cost of visiting providers is a rough estimation and may not be true reflection of actual cost incurred. Furthermore, individuals with higher educational level and with poor self-assessed health status are more likely to be concerned about their health status and therefore are more likely to choose high-quality providers.

In the context of the Chinese reform process, governments, local, provisional and national, do not provide sufficient financial support for providers as they previously did under the central-planned economy. The government is now asking the providers to manage their performance on their own in the market place. On the other hand, governments still restrict health service prices to a very low level. In order to compensate providers' losses in health service provision, the government implements

two policies that ensure providers to generate revenues from drug sales and provision of services through the usage of medical equipment. As a result, many basic health service institutions are unsustainable as they cannot get enough revenue as they lack the access to above two sources of revenue generation. The study shows that the improvement of health insurance coverage could increase demand for both basic institutions and high-quality institutions. This is because basic institutions are convenient to access and thus inflict lower time cost for individuals to access these medical services. The new health insurance schemes should provide incentives for individual to choose basic health institution as their first choice. This would reduce the pressure on the large hospitals. But the quality of basic health institutions should also be improved to ensure that they attract patients and are economically viable.

This is an exploratory study to investigate the determinants of urban citizens' provider choice. There are a few shortcomings. Firstly, because of the limitation of data, the study does not consider the medical prices and qualities in the model, especially time cost of visiting a hospital. Secondly, the possible nature of insurance's endogeneity is ignored in this paper. However, we assume that it may not be a problematic as the proportion of commercial insurance is only 2.8%; whereas social insurance coverage is 70%. Therefore, the problem of adverse selection may not be so severe.

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