



The Analysis of Individual Hospital Choice in Urban China: Microevidence from Five Cities

Jian Wang, School of Economics, Politics, and
Tourism, The University of Newcastle

Amir Mahmood, Newcastle Graduate School
of Business, The University of Newcastle



Motivation

- If individual chooses specialist hospital (large hospital) basing on quality of care or relative level of hospital, say, clinics basing on convenient travel distance and relative cheaper price
- What factors affecting individual hospital choice

Background

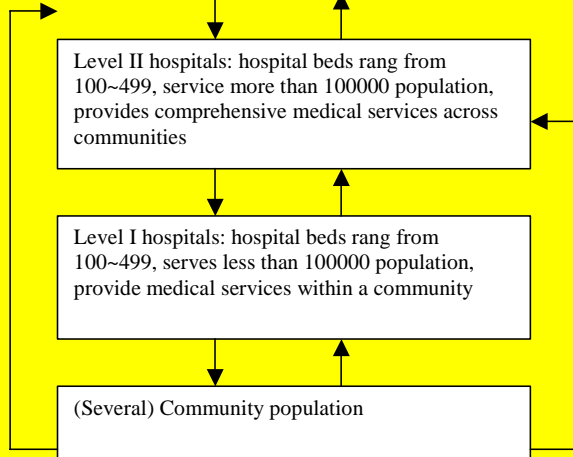
Overview of Chinese public hospitals

Level III hospitals: hospital beds >500, provides high level of specialist services across cities and provinces

Level II hospitals: hospital beds rang from 100~499, service more than 100000 population, provides comprehensive medical services across communities

Level I hospitals: hospital beds rang from 100~499, serves less than 100000 population, provide medical services within a community

(Several) Community population



Method

Following McFadden (1983), individual utility function is as follows;

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

where *insur* represents insurance status;

income represents income status;

selfeval means self-assessed health status;

X means individual other characteristics, e.g., age, gender, education.

J represents individual choice of hospital level. In this paper, hospital levels include 1=county hospital; 2=city metropolitan hospital; 3=provincial hospital.

Data

- The household survey in five major cities (Shenyang, Beijing, Hangzhou, Shanghai and Shenzhen) in 2003.
- The study chooses one county from each city (two counties from Shenzhen).
- This sample totally includes 3385 households and 10177 individuals, whose age is above 18.
- we only choose the individuals who once went to health service institutions for medical consultation/treatments as the observations. The total number of the observations is 3118.

Descriptive Results

- ***Type of hospital***
 - The hospitals are defined four categories according to their sizes and qualities (basic health service institution, county hospital, city hospital, and province hospital).
 - In this sample 16.16% of total individuals choose basic health service institutions, 16.48% choose county hospitals, 38.2% choose city hospitals and 29.15% choose province hospitals.

Descriptive Results

■ *Insurance status.*

- health insurances include the social insurance and the commercial one.
- the social health insurance comprises the basic health insurance for urban employee, the health insurance for catastrophic diseases, the government insurance, the labor insurance and the Cooperative Medical System (only in rural China).
- In our sample 78.77% of observations have social insurances, and 72.68% of these insured are covered by the basic health insurance for urban employees.
- The basic health insurance for urban employees combines two parts—the social pooling fund and the individual saving account.
- We do not distinguish social and commercial insurances.

Descriptive Results

■ *Income*

- In our paper income means average family income per year. This income represents individual's payment capacity for medical service. Generally speaking, one with higher income prefers high-quality hospital. In this paper we use continuously variable of income.



Descriptive Results

- ***Self-assessed health status.***
 - Individual with poor self-assessed health status is inclined to choose to high-quality providers.

Regression Results

- ***Insurance status***
 - The insured more likely choose a basic health service institution, a city and province hospitals than a county hospital.
 - Comparing with uninsured individuals with similar characteristics, the insured are 1.3281 times as likely to choose a basic health service institution, 1.6484 times as likely to choose a city hospital, 1.6247 times as likely to choose a province hospital if a county hospital is taken as a referable group.
 - Considering individuals' preference between a basic health service institution and a city hospital, the study shows that insured are 1.2412 ($1.6484/1.3281$) times as likely to choose a city hospital compared with a basic institution consultation.
 - The insured prefer a province hospital to a basic institution.

Regression Results

- Medical expenses are paid by individual saving account, which means that the outpatient expense for the insured are almost zero. And individual's co-payment of inpatient expense does not exceed 20%.
- Therefore, the time cost and quality are the main factors of patients' provider choice.
- we cannot identify insurance effects. But for county, city and province hospitals, the study shows that being insured significantly enables patients to visit higher quality providers.

Regression Results

- Table 3 shows clearly that having insurance increase the possibilities of visiting a province and a city hospital (0.0518 & $0.0249 > 0$) and decrease the possibilities of visiting a county hospital and a basic institution (-0.0152 & $-0.0615 < 0$).
- Table 4 illustrates that 41.41% of the insured choose city hospitals and 38.54% choose province hospitals, which are much higher than those of the uninsured.

Regression Results

Income

- If income increases 1%, an individual is 0.5454 times as likely to choose a basic health service institution over a county hospital, 0.8941 times as likely to choose a city hospital over a county hospital, and 0.8343 times as likely to choose a province hospital over a county hospital.
- Considering basic institutions and city/province hospitals, as income increases 1%, an individual is 1.6392 ($0.8941/0.5454$) times as likely to choose a city hospital over a basic institution and 1.5297 ($0.8343/0.5454$) times as likely to choose a province hospital over a basic institution. But only the relative possibility of a basic institution over a county hospital is significant.

Regression Results

- Marginal effects of incomes are calculated at the mean value of income.
- The growth of income reduces the possibility of visiting a basic health service institution ($-0.0630 < 0$) and this effect is significant at 1% level.
- The growth of income also increases the possibility of visiting a city/province hospital, while this effect is not so significant.



Regression Results

■ *Self-assessed health status*

- If self-assessed health status increases, an individual is 1.0435 times as likely to choose a basic institution over a county hospital, and 1.3437 times as likely to choose a city hospital over a county one, and 1.2877 times as likely to choose a province hospital over a county one.
- The relative possibility of visiting a city hospital over a basic institution is 1.2877 $(1.3437/1.0435)$ times as much as before and that of visiting a province hospital over a city one is 1.0684 $(1.4356/1.3437)$ times as much as before.
- Individual with poor health status prefers high-quality providers (Table 3). Figure 1, which gives us predicted possibilities of different providers in different health groups, shows the similar conclusions.



Regression Results

■ *Other variables*

- Some demographic characteristics, such as gender, age and marital status, do not have significant effects on patients' hospital choices.
- Educational level is significant.
- The increase of family size reduces the relative possibilities of visiting a province and a city hospital over a county one (Table 3).
- Individual with acute diseases prefers a near basic institution and a province hospital with high quality more than one with chronic diseases.
- Dummy variables of city also affect significantly patients' choices due to different health policies and different health delivery systems.

Conclusion

- Individual with insurance prefers to choose high level hospital, therefore, this leads to the increasing expenses under the collapsed hospital referred system.
- Income growth also increases the possibility of visiting high quality hospitals.
- Individual with higher education and poor self-assessed health status is more concerned about his diseases and prefers to visit high quality providers.

Conclusion

- Regarding county hospitals, maybe governments can consider to reduce their numbers.
- Insurance's endogeneity is ignored in this paper as the proportion of commercial insurance is only 2.8% and that of social insurance is 70%. Then, adverse selection may not be so severe as in other literatures.
- Finally, income is not a sole factor affecting individual choice, other variables also play an important role.

Table1 Utilisation of hospital services							
	Hospital of Ministry of Health	Province Hospital	Hospital of City at Prefecture	Hospital of City at County Hospital Level	County Hospital	Health center	Outpatient Department
Utilization rate of beds (%)	95.54	87.73	77.51	65.79	59.65	34.9	50.8
Daily visits and inpatients per doctor	7.8	6.6	5.5	5.3	4.3		

	Shenyang	Beijing	Hangzhou	Shanghai	Shenzhen
Location	Northeast	North China	East China	East China	South China
Area (km ²)	12980	16808	16596	6341	1953
Population (million)	6.89	11.48	6.43	13.42	1.51
GDP per capita (yuan)	23271	32,061	32819	46718	189525

Table 3 Multiple Logit regression results						
variable	County hospital		Metropolitan hospital		Provincial or above hospital	
	Coef. (Robust Std. Err.)	RRR	Coef. (Robust Std. Err.)	RRR	Coef. (Robust Std. Err.)	RRR
female	0.075078 (0.139569)	1.077968	-0.04758 (0.117694)	0.953534	0.038604 (0.130635)	1.039359
age	-0.00706 (0.005202)	0.992968	-0.00796* (0.004845)	0.992069	-0.00217 (0.005443)	0.997837
married	-0.18289 (0.165264)	0.832858	-0.06209 (0.145076)	0.939799	0.239248 (0.164478)	1.270294
edu_41	-0.03208 (0.187585)	0.968425	0.214757 (0.160005)	1.23956	0.316996* (0.179619)	1.372996
edu_42	0.089329 (0.208863)	1.093441	0.307619* (0.184152)	1.360182	0.944677*** (0.200857)	2.571983
edu_43	0.069276 (0.246231)	1.071732	0.541161*** (0.19764)	1.718	1.406841*** (0.212679)	4.083038
insur	0.283746* (0.173462)	1.328096	0.499823*** (0.158861)	1.64843	0.485333*** (0.202562)	1.624716
lincom	-0.60616*** (0.12259)	0.54544	-0.11197 (0.100376)	0.894075	-0.18111 (0.114253)	0.834341
selfvalu	0.042607 (0.074859)	1.043527	0.295462*** (0.065964)	1.343747	0.361609*** (0.075022)	1.435637
famsize	-0.07091 (0.053987)	0.931547	-0.10239** (0.048087)	0.902681	-0.10359** (0.05677)	0.901599
chronic	-0.8461*** (0.259447)	0.429087	0.161835 (0.288929)	1.175666	0.758183** (0.349895)	2.134393
city_2	2.042384*** (0.324589)	7.708963	1.214727*** (0.244411)	3.369375	1.655348*** (0.273666)	5.2349
city_3	2.475893*** (0.305747)	11.89232	0.523942** (0.239241)	1.688671	2.162475*** (0.268228)	8.692624
city_4	2.555804*** (0.319679)	12.88166	-0.71736*** (0.254458)	0.488041	-1.85276*** (0.404276)	0.156805
city_5	0.331159 (0.296898)	1.392581	-1.07723*** (0.211588)	0.340538	-0.94818*** (0.255839)	0.387445
_cons	5.056539*** (1.139834)		1.266733 (0.949085)		-0.89945 (1.113335)	

Country hospital is a reference group
*: P<=0.10; **: P<=0.05; ***: P<=0.01, Samep observation=3188, Wald Chi2(45)=1039.10
Prob > chi2 = 0.0000

Table 4 Marginal effects of dependent variables				
Variable	Clincs	County hospital	Metropolitan hospital	Provincial hospital
	Coef. (Std. Err.)	Coef. (Std. Err.)	Coef. (Std. Err.)	Coef. (Std. Err.)
female	0.0114051 (0.01438)	0.0001307 (0.01343)	-0.0213645 (0.02003)	0.0098287 (0.01726)
age	-0.0002732 (0.00052)	0.0007508 (0.00055)	-0.0012439 (0.00081)	0.0007663 (0.00072)
married	-0.0286286 (0.01846)	0.0002959 (0.01642)	-0.0278612 (0.02521)	0.056194*** (0.02028)
edu_41	-0.0298793* (0.01745)	-0.0242158 (0.01724)	0.0178548 (0.02715)	0.0362403 (0.02462)
edu_42	-0.0456202*** (0.0179)	-0.0535667*** (0.01681)	-0.0522209* (0.03039)	0.1514078*** (0.03086)
edu_43	-0.0770498*** (0.01841)	-0.0800684*** (0.01591)	-0.0647142** (0.03082)	0.2218324*** (0.03213)
insur	-0.0152238 (0.01913)	-0.0614536*** (0.02188)	0.0518167* (0.02861)	0.0248607 (0.0288)
lincom	-0.0630034*** (0.01298)	0.026862** (0.01133)	0.034543* (0.01786)	0.0015984 (0.01594)
selfvalu	-0.0284378*** (0.00775)	-0.0331695*** (0.00741)	0.0292098** (0.01163)	0.0323975*** (0.01041)
fam size	0.0018622 (0.00559)	0.0119294** (0.00547)	-0.0087333 (0.0085)	-0.0050583 (0.00797)
chronic	-0.1941242*** (0.03591)	-0.0025914 (0.03176)	0.0612781 (0.0446)	0.1354375*** (0.02948)
city_2	0.122926*** (0.04343)	-0.1421026*** (0.01676)	-0.0598957 (0.03921)	0.0790723** (0.03837)
city_3	0.2067543*** (0.04144)	-0.1451645*** (0.01888)	-0.2920562*** (0.03209)	0.2304664*** (0.04057)
city_4	0.6561512*** (0.04568)	-0.05258** (0.02078)	-0.3310996*** (0.03216)	-0.2724717*** (0.01745)
city_5	0.182487*** (0.05146)	0.0961435*** (0.03304)	-0.1956975*** (0.03793)	-0.082933** (0.03307)

*: P<=0.10; **: P<=0.05; ***: P<=0.01
Sample observation = 3118

Time cost of visiting different 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	

Income marginal effects across income 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

Figure 1 Health status and the predicted probability

