

An Economic Analysis of Health Care in China
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Abstract

After describing the institutions for health care in China as they evolved since 1949, this paper presents statistical demand functions for health care. It applies the demand functions to explain the rapid increase in health care demand and the resulting rapid increase in price when supply failed to increase. The failure in increase in supply was traced to the system of public supply of healthcare in China. The reform experience of Suqian city in the privatization of healthcare is reported to demonstrate the positive effect of privatization on supply. The government's health care program for the urban and rural population is described and an evaluation of it is provided.

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1. Introduction

With a population of over 1.3 billion China has received much attention, including its spectacular economic development since 1978 and the accompanied deterioration of health care for a substantial segment of its large rural population. Section 2 of this paper recounts the success of the PRC in improving the health conditions of its population from 1949 to 1980 and describes the changes of the public health care system after 1980.

In section 3, statistical demand equations for health care are estimated. Using only annual time-series data from 1995 to 2003 I have estimated an income elasticity of somewhat above unity and a price elasticity of about 0.7. Using cross-section data on per capita expenditure for health care and per capita total consumption expenditure for urban and rural population separately I have found the total expenditure elasticity of demand for medicine and medical services to be approximately unity with small standard errors for both populations. Taking their average value 1.042 as given I have used time series data to estimate price elasticity, obtaining a value of 0.63 with a small standard error.

In section 4 I document the surprising fact that the per capita supply of healthcare did not increase from 1989 to 2004 when output of almost all other consumer goods increased rapidly in the course of China's rapid economic development. I trace the cause to the public supply of health care, and use the recent reform experience in Suqian city to show that privatization can lead to a rapid increase in supply as it did for that city. Government programs for the health care of urban and rural population will be described in section 5. Section 6 is an evaluation of the government's programs. Section 7 concludes.

2. Changes in Health Care Institutions

Since 1949 the Chinese government has had an extensive program to improve the health conditions of the Chinese people. One indicator of the improvement is the decline in the annual death rate from about 17 per 1000 in 1952 to 6.34 per 1000 in 1980, as shown in Table 12.1 of Chow (2002). As another indicator, life expectancy was 40.8 years in the

early 1950s, 49.5 in the early 1960s and 65.3 in the late 1970s when economic reform began (see *World Population Prospects: The 2004 Revision*: <http://esa.un.org/unpp/p2k0data.asp>). In the mean time many diseases were eliminated or brought under control. Programs for hygiene and health protection were introduced. A large number of health personals were trained and healthcare institutions were established by 1980. See Chow (2002, pp. 212-3) for details.

Before economic reform started in 1978 the Communes in rural China provided health care through a three-tier system that was managed and financed locally. In the first tier, the part-time barefoot doctors in health clinics provided preventive and primary care. For more serious illnesses, they referred patients to the second tier: commune health centers, which might have 10 to 30 beds and an outpatient clinic serving a population of 10,000 to 25,000 and which were staffed by junior doctors. The most seriously ill patients were referred by the commune health centers to the third tier: county hospitals staffed with senior doctors. The “cooperative medical system” (CMS) that organized the barefoot doctors and provided other medical services to the rural population was part of the commune system and was financed by the communes' welfare funds.

Thus the CMS served the dual role of a supplier and a collector of insurance funds for the farmers to pay for the services. Healthcare can be adequately supplied in a planned economy if the planning authority, as represented by the Commune leaders in the present case, controls all resources to produce healthcare including capital facilities, personnel and medical supplies.

After economic reforms in agriculture the above healthcare system collapsed as the system of Communes collapsed. Publicly provided healthcare became the responsibility of the local governments which, in poor regions, did not have the financial resources from taxation to supply adequate healthcare. The facilities and services deteriorated. Barefoot doctors found it more profitable to work full-time in farming or to set up private practices outside the system. As incomes of farmers increased the demand for better-quality medical care increased. With limited supply prices went up. The low-income

farmers cannot afford to pay for healthcare of the same quality as was previously supplied under the collectively financed CMS.

In the language of the World Bank (1997, p. 3): “The shift away from a communal system deprived the rural cooperative medical system of its sources of community-based financing. As communes gradually disappeared, so did the cooperative medical system. Only about 10 percent of the rural population is now covered by some form of community-financed health care, down from a peak of 85 percent in 1975. (There is much variation in coverage among provinces, however, because of differences in interpretation of national policy.) As a result, some 700 million rural Chinese must pay out of pocket for virtually all health services. Without insurance, medical expenses can lead to deferral of care, untreated illness, financial catastrophe, and poverty.”

For the urban population before economic reform health centers and hospitals associated with state-owned enterprises and other government institutions cared for the employees and their family members. With urban economic reform in the 1990s state-owned enterprises were made financially independent and downsized. State enterprises and other government organizations had difficulty in financing the health care of their employees. During this period, along with the restructuring of the state enterprises to become shareholding companies that are to be relieved from their burden to provide welfare support to its employees and their families, the Chinese government was in the process of establishing a medical insurance system to replace the previous system. Under the new insurance system introduced in 1998 in addition to government contribution, the employer contributes 6 percent and the employee contributes 2 percent of his wage. The large number of non-state enterprises can also participate in this insurance system or can afford to pay wages to their employees that are sufficient for them to be self insured. In other words, the government has instituted a new insurance system to pay for health care for the urban population after the gradual reform of the state enterprises but has not provided a similar insurance system for the rural population after the rapid privatization of farming.

Besides government neglect, the second reason for the rural population to receive much less adequate health care is their low income. As the data in Table 1 below show between 50 to 60 percent of health expenditures are individual expenditures. Only about 16 percent are provided by the government. In 2002, per capita consumption expenditures of the middle income group among urban households was 5452.94 yuan, about 3.3 times the corresponding figure 1645.04 yuan for the rural households, as shown in Table 3 below. The ratio of the mean net urban income per capita of 7730.3 yuan to rural income per capita of 2476 yuan in 2002 is 3.11 (see *China Statistical Yearbook 2004*, Table 10-1). Table 3 also shows how much more the urban residents spent on medicine and medical services in 2002 than the urban population. As a result of government neglect and income disparity the rural population receives much less health care than the urban population in China. This is one of the most serious social-economic problems in China.

3. Statistical Demand Functions for Health Care

We will show that the theory of consumer demand is applicable for explaining the aggregate data on the quantity of health care provided, the relative price of health care and real income, and that the estimated statistical demand function can be used to explain the changes in the ratio of health care expenditure to GDP.

There has been a rapid increase in health care expenditures in recent years, at a much higher rate than GDP. The ratio of health expenditure to GDP (data in Table 1 and Table 2 respectively) increased from $2257.8/58478.1 = 3.86$ percent in 1995 to $6584.1/116741.2 = 5.64$ percent in 2003. This fact can be explained by an income elasticity of demand close to unity together with price elasticity less than unity as will be explained at the end of this section. Note in Table 1 that health care expenditure out of government budget is only about 16 to 17 percent of the total whereas individual expenditure accounts for 55 to 60 percent. This fact supports the application of demand theory to explain health expenditures since the consumers have to pay for them.

Table 1 Expenditure for Health Care

Year	Total nominal (100 million)	Government Budgetary	Social Expenditure	Resident Individual	Percent Government	Percent Individual
1995	2257.8	383.1	739.7	1135.0	17.0	50.3
1996	2857.2	461.0	844.4	1551.8	16.1	54.3
1997	3384.9	522.1	937.7	1925.1	16.4	52.8
1998	3776.5	587.2	1006.0	2183.3	16.0	54.8
1999	4178.6	640.9	1064.6	2473.1	15.8	55.9
2000	4586.6	709.5	1171.9	2705.2	15.5	59.0
2001	5025.9	800.6	1211.4	3013.9	15.9	60.0
2002	5790.0	908.5	1539.4	3342.1	15.7	57.7
2003	6584.1	1116.9	1788.5	3678.7	17.0	55.8

Source: *China Statistical Yearbook 2002*, Table 21-469; *China Statistical Yearbook 2005*, Table 22-37.

Demand equations for health care can be estimated by (1) using only aggregate time series data and (2) using cross-section data to estimate income elasticity as a check on the estimate obtained in (1) and to be combined with the time series data to improve our estimate of price elasticity. Note that this demand analysis deals with the quantity of health services demanded and not the health conditions as measured for example by the death rate or life expectancy of the population in relation to income or the distribution of income, a subject discussed in Deaton (2003), among others.

Time series data on quantity of health services Q , GDP, a price index pr of health care, consumer price index and population are given in Table 2.

Table 2 Time-Series Data on Aggregate Demand for Health Care

Year	Consumer Price Index	GDP Nominal (100 million)	Price index of healthcare pr	Quantity of health services $Q = \text{exp}/pr$	Population(10 thousand)
1995	3.028	58478.1	1.000	2257.8	121121
1996	3.279	67884.6	1.124	2542.0	122389
1997	3.371	74462.6	1.381	2451.0	123626
1998	3.344	78345.2	1.619	2085.5	124761
1999	3.297	82067.5	1.808	2311.2	125786
2000	3.310	89468.1	2.009	2283.0	126743
2001	3.333	97314.8	2.220	2263.9	127627
2002	3.306	105172.3	2.402	2410.5	128453
2003	3.346	117390.2	2.616	2516.9	129227

Source: Consumer Price Index (1985=1.00) is from *China Statistical Yearbook 2005*, Table 9-2; GDP from Table 3-1; Price index pr for health care services from the Table “Consumer Price Indices by Category” under “medical and health care services (preceding year = 100)” in *China Statistical Yearbook* from 1997 to 2004. The entry in the 1997 *Yearbook* is 1.124 for 1996 as compared with 1 in 1995)

We define the quantity of health care Q , as exhibited in column 5 of Table 2, as the ratio of total health care expenditure in Table 1 to the price index pr (1995 =100) of health care service in Table 2. It is the amount of health care services measured in 1995 prices. Note the very rapid increase in the price of healthcare in China. We further define the relative price p of health care as the price index of health care pr divided by the consumer price index in Table 2 and real income Y as GDP in current prices divided by the consumer price index. Let q and y denote respectively per capita quantity of health care and per capita income, obtained by dividing Q and Y respectively by population as given in the last column of Table 2. A regression of $\ln q$ on $\ln y$ and $\ln p$ based on the 9 annual observations from 1995 to 2003 yields the following result:

$$\ln q = 1.178(.395) \ln y - 0.707(.222) \ln p - 2.564(.490) \quad R^2/s = 0.635/.0449 \quad (1)$$

Income elasticity of demand for health care is estimated to be 1.178 with a standard error of 0.395 and price elasticity is estimated to be .707 with a standard error of 0.222. These estimates are reasonable. It will be shown below that the income elasticity estimate is close to the estimates for both urban and rural residents from cross-section data.

Table 3 Cross-section data on per capita health expenditure and total expenditure 2002

	Low income households	Lower Middle income households	Middle income households	Upper middle income households	High income households
Urban: Total expenditures	3259.59	4205.97	5452.94	6939.95	8919.94
Medicine and medical services	225.67	286.56	382.83	510.15	657.33
Rural: Total expenditures	1006.35	1310.33	1645.04	2086.61	3500.08
Medicine and medical services	57.57	74.88	90.73	116.49	201.72

Source: *China Statistical Yearbook 2003*, Table 10-7, for urban data in 2002; Table 10-23, for rural data in 2002 (rural data for previous years are not available in *Yearbook*).

Next, cross-section data are used to estimate income elasticity of demand for health care. Table 3 shows cross-section data on per capita expenditures for medicine and medical services for five different income groups among the urban and rural families in 2002. As reported in Table 4, regressing the log of medical expenditure per capita on the log of total expenditure per capita yields a total expenditure elasticity for the urban population equal to 1.080 (with a standard error of 0.023) and for the rural population equal to 1.003 (with a standard error of 0.023). The adjusted R^2 of these two regressions with 5 observations are equal to 0.9981 and 0.9980 respectively. Table 4 also shows that the corresponding estimates based on 2004 data are similar. Since 2004 is outside our sample period we will use the 2002 estimates to combine with time series data to improve our estimate of price elasticity. Given that over 60 percent of China's population is rural but their total expenditure for health services is smaller than that of the urban population I

simply take an average of 1.080 and 1.003 or 1.042 as our estimate of income elasticity of demand (which is the same as total expenditure elasticity if total expenditure is proportional to income). This estimate is quite close to and highly consistent with the estimate based on time series data alone as reported in equation (1) above.

Table 4 Cross-section Estimates of Income Elasticity

Observation Units	Year	Sources of Data	Estimate (Standard error)	R ²
Households	2002	Table 3	Urban 1.080 (0.023)	0.9981
			Rural 1.003 (0.023)	0.9980
	2004	<i>CSYearbook 2005</i> Tables 10-7, 10-24	Urban 1.136 (0.046)	
			Rural 1.056 (0.018)	
Provinces	2002	<i>CSYearbook 2003</i> Tables 10-15, 10-25	Urban 0.869 (0.189)	0.4230
			Rural 1.161 (0.145)	0.6876
	2004	<i>CSYearbook 2005</i> Tables 10-16, 10-26	Urban 0.919 (0.154)	
			Rural 1.162 (0.163)	

Taking the income elasticity of 1.042 as given I use time series data to estimate the price elasticity by regressing (log quantity – 1.042 log real income) on log price to yield

$$[\ln q - 1.042 \ln y] = -0.633 (.047) \ln p - 2.733 (.034) \quad R^2/s = 0.9633/.04198 \quad (2)$$

Given the small standard errors of the cross-section estimates of income elasticity and the small standard error of the estimate of price elasticity in equation (2) which is conditional on the given value of the income elasticity, we can be fairly confident in using these estimates to discuss the trends of health care demand below.

To deal with the problem of simultaneous-equation bias, I regress $\ln p$ on $[\ln q - 1.042 \ln y]$ and obtain a regression coefficient of -1.522 with a standard error of 0.112. The inverse of this coefficient provides an estimate of price elasticity equal to 0.657. Since it is very

close to 0.633 the problem of simultaneous-equation bias is not serious and we can use equation (2) to explain and forecast demand with confidence.

We provide further empirical support for our estimate of income elasticity by using provincial data. If $\ln p$ is added to both sides of our demand equation (1) we have, algebraically,

$$\ln(pq) = c + a \ln y + (1 - b) \ln p + e \quad (3)$$

Provincial data on health care expenditure per capita pq and income per capita y can be used to estimate income elasticity a if $\ln p$ on the right-hand side of (3) is uncorrelated with $\ln y$ and can be combined with e as the residual of the regression. We recognize that residents in provinces with higher per capita income may pay higher prices for health care but p in equation (3) refers to the price paid for health care of the same quality and the higher prices, if observed in richer provinces, are assumed to pay for products or services of higher quality.

The estimates by using provincial data are given in the last two rows of Table 4. These estimates are close to those obtained previously from household data but the estimates for the rural population are somewhat higher than for the urban population, contrary to the previous estimates. Any difference between the provincial estimate and the previous household estimate is explainable by its standard error. For example, for 2002 the larger difference is 0.257 between the estimate 0.869 (0.189) from provincial data and the previous estimate 1.136 (0.046) for the urban population. Its standard error is the square root of 0.189^2 plus 0.046^2 or 0.195, almost as large as the difference itself.

The regressions based on provincial data can be used to study the relation between income inequality and inequality in medical expenditure across provinces for urban and rural residents. Define income inequality by the standard deviation $s(\ln y)$ of log per capita income across provinces and health expenditure inequality by the standard deviation $s(\ln(pq))$ of log per capita medical expenditure. Since the correlation coefficient

R in the regression of $\ln(pq)$ on $\ln y$ equals the ratio of income elasticity a times the ratio $s(\ln y)/s(\ln(pq))$, we have:

$$s(\ln(pq)) = (a/R)s(\ln y)$$

Thus our measure of inequality in medical expenditure $s(\ln(pq))$ is a factor (a/R) times the measure of income inequality $s(\ln y)$. If the factor is greater than one, the former is greater than the latter. The smaller the correlation coefficient R, given the regression coefficient a , the larger is this factor because other factors contribute more to the variation of medical spending. Using data for 2004, the factor a/R equals $0.919/0.742$ or 1.239 for urban residents. For rural residents it is $1.162/0.799$ or 1.454 . Hence inequality in medical expenditure is larger than inequality in income across provinces for both urban and rural residents. The ratio of medical spending inequality to income inequality is higher than for rural residents than for urban residents partly because the former have a higher income elasticity of demand for medical expenditure. This may be the result of the better insurance provided for urban residents.

Our demand equation (3) can explain the rapid increase in per capita expenditure for health care. Taking the derivative of equation (3) with respect to time we have:

$$d\ln(pq)/dt = 1.042 d\ln y/dt + (1 - 0.633) d\ln p/dt \quad (4)$$

Using data on y and p based on Table 2, we find $d\ln y/dt = (\ln 2714.89 - \ln 1594.47)/8 = 0.0665$ and $d\ln p/dt = (\ln 1 - \ln 2.36738)/8 = 0.1077$. The right-hand side of (4) is the sum of the income effect $1.042(0.0665) = 0.06932$ and the price effect $(1 - 0.633)(0.1077) = 0.0395$, yielding a total of 0.1088 for the exponential rate of increase in medical expenditure per capita per year.

As a fraction of GDP health care expenditure increased from 3.86 percent in 1995 to 5.61 percent in 2003. The increase in the ratio of health expenditure to GDP in the course of economic development can also be explained by our demand equation (2). Let us add $\ln p$ to and subtract $\ln y$ from both sides of the equation (2) to yield:

$$\ln(pq/y) = 0.042 \ln y + 0.367 \ln p - 2.733 \quad (5)$$

The first term on the right side of equation (5) indicates that the health expenditure income ratio will increase as per capita increases if income elasticity is larger than unity. The second term implies that the ratio will increase if price elasticity is smaller than unity. In the case of China the income effect on the ratio is small because income elasticity is not much above unity but the price effect is large enough to explain the increase in the ratio from 3.86 percent to 5.61 percent. A similar point about the increase in the ratio of education spending to GDP was made in Chow and Shen (2006) on the demand for education in China, where the demand is also found to be price inelastic.

4. Supply of Health Care: Public or Private?

After almost three decade of economic reform towards a market economy in China, the most striking fact is that the supply of healthcare remains almost entirely public. People in China, whether in government or outside, still believe that healthcare is a part of the social welfare system and that therefore the supply of it is the sole responsibility of the government. Statistics presented in column 5 of Table 2 and later in Table 4 show that the per capita supply of healthcare in China did not increase from 1989 to 2003 while the per capita output of almost all other products and services in China was increasing at a very rapid rate. The only reasonable explanation of this remarkable phenomenon is that healthcare was publicly supplied. Hospitals, health centers and health clinics are almost entirely publicly owned and publicly operated. Healthcare is the responsibility of local governments or state-owned units. These units have limited budget and have no incentive to increase supply. For years they simply maintained the existing level and considered that sufficient in fulfilling their responsibility. Since supply was not market determined, market forces did not operate to increase supply in the face of rapid increase in demand. The result of increasing demand is an increase only in price with no increase in the quantity supplied as the data in Table 2 have shown. The healthcare industry is the outstanding example of failure of China's economic reform towards a market economy.

Evidence for the limited increase in supply of medical services was presented in column 5 of Table 2 which shows that per capita health care expenditures in constant 1995 prices ($q = Q/\text{population}$) did not increase from 1996 to 2003. The almost constant supply of health care per capita is also confirmed by the data given in Table 5.

Table 5 Trends in the Amount of Health Care Supplied

Year	Beds in Health Institutions (10 000 units)		Medical Technical Personnel (10 000 persons)		Doctors		Senior and Junior Nurses	
	City	County	City	County	City	County	City	County
	1957	22.1	7.4	38.2	65.7	13.8	40.8	10.0
1980	76.8	121.4	131.3	148.5	52.7	62.6	30.0	16.6
1981	80.3	121.4	143.5	157.6	58.6	65.8	33.4	19.1
1985	96.2	126.7	167.7	173.4	70.9	70.4	39.2	24.5
1989	133.5	123.3	212.1	168.8	95.0	76.8	59.9	32.2
1990	138.7	123.7	218.5	171.3	97.8	78.5	63.4	34.1
1995	174.0	109.7	265.9	159.8	118.4	73.4	79.0	33.5
2001	195.9	101.7	287.2	163.6	129.5	80.5	91.8	36.9
2004	225.3	101.6	293.4	145.5	126.1	64.4	96.8	34.0

a) Number of beds in health institutions by city and county before 2001 refers to hospital beds.

Source: *China Statistical Yearbook 2005*, Table 22-27.

From 1989 to the early 2000s both the number of beds per capita and the number of technical medical personnel per capita did not increase based on the data in Table 5 and a population of 1127.04 million in 1989 and other population data in Table 2 . In 1989, the number of beds was 2.2785 per 1,000 persons; the number of medical technical personnel was 3.3796 per 1,000 persons and the number of doctors was 1.5243 per 1,000 persons. In 2001 (year selected because of the change in the definition of beds in 2002 by inclusion of beds not in hospitals) the number of beds was 2.3318 per 1,000 persons. In 2004 the number of medical personnel was 3.3765 per 1000, and the number of doctors was 1.4655 per 1,000 persons. Thus the number of beds per thousand persons increased very slightly from 2.28 to 2.33 while the number of medical personnel per thousand

persons remained constant at 3.38 and the number of doctors per thousand persons decreased slightly from 1.52 to 1.47. In other words the supply of medical services per thousand persons as measured by the above statistics remained approximately constant from 1989 to 2004. These data confirm the statistic on per capita expenditure for health care in constant prices exhibited in column 5 of Table 2.

If public ownership and operation of healthcare facilities is the reason for the lack of increase in supply of healthcare we need to present evidence to demonstrate that non-government operation will increase supply. Such evidence can be found in the privatization of the public healthcare system in Suqian City of Jiangsu province in the period 2000-2006, as reported in *Jingji Guancha Bao (Economic Observer News)*, July 8, 2006, *Xianhua Daily News*, April 17, 2006, and *Zhongguo Qingnian Bao (China Youth News)*, March 23, June 22 and June 23, 2006. These news reports are summarized below.

In 1999 Suqian was the poorest city of Jiangsu province with a population of 5.2 million and the lowest healthcare asset per capita in the province, lower than the national average. The reports confirm the fact that healthcare supply was generally recognized to be the responsibility of the government. In 2000 the supply of health care had four major problems: (1) The government faced a debt burden and the hospitals had insufficient funding. Sometimes the wages of about two third of the workers in health institutions could not be paid on time. (2) Capital stock was antiquated and new investment was not forthcoming. (3) There were not enough adequately trained doctors and the barefoot doctors had a poor attitude for service and provided low-quality service. (4) Village health clinics confronted the vicious circle of lacking funds, poor service, less income and more difficulty in raising funds. Under these circumstances the new mayor decided to attract non-government capital by privatization of healthcare while leaving as government responsibility the maintenance of public health as a public good, such as disease prevention, disease control and setting public health standards. The main objective was to eliminate the monopoly of public supply of healthcare as a consumption good.

Such a major institutional change as in the present case always faces resistance and obstacles. When the first public hospital was privatized by auction its workers and staff objected. This problem was solved partly by giving shares to them. After receiving numerous criticisms from the Department of Public Health of the Jiangsu Provincial Government and experimenting with and eventually allowing various forms of privatization, including individual ownership, partnership and share-holding companies with shares held locally or nationally, some held by well-known national corporations that retain control, the privatization process became successful after five years.

The following statistics show evidence of success. Between 1999 and 2004, the average expenditure per visit was reduced from 75.49 to 70.19 yuan, or by 7 percent in hospitals at the city-county level, and from 37.62 to 27.84 yuan, or by 26 percent in hospitals at the village level. The average charge per bed per day was reduced from 182.18 to 175.38 yuan, or by 3.7 percent in city-county level hospitals, and from 62.24 to 51.71 yuan, or by 16.9 percent, in village level hospitals. The average expenditure for a patient leaving a hospital was reduced from 2150.8 to 2124.12 yuan, or by 1.2 percent in city-county level hospitals, and from 554.36 to 484.80 yuan, or by 12.5 percent in village level hospitals. The price of healthcare (term not defined in the news article) at village level hospitals was one-third lower than the national average. If we refer to column 4 of Table 2 the national price index of healthcare increased from 1.808 in 1999 to 2.616 in 2003. This shows that by reducing or just maintaining the price of health care as reported above the privatization experiment of Suqian was a great success.

Not only was price lower and supply greater, but the quality of healthcare has improved. Patients interviewed reported better service, better attitude of doctors and shorter waiting time. Furthermore, the inflow of investment has led to the increase in the number of hospitals from 130 in 1999 to over 400 (some very small) in 2004 and the increase in the city's total healthcare asset value to 1.539 billion yuan, which amounts to over three times the amount in 1999.

In April 2006, Professor Li Ling of the Center for Chinese Economic Research led a group of 10 scholars to study the reform in Suqian, making two visits from April 6 to April 10 and from April 28 to 30, some acting as potential patients. They have written a report, as summarized in *China Youth News* of June 22 and 23, that includes the following four negative comments on the reform experience. Basically they believe that the demand for and supply of healthcare cannot be treated in the same way as an ordinary consumer good and therefore the market mechanism does not work. The following are their negative comments (in quotes) and my responses. I include this discussion in the present paper because there other economists in China and elsewhere who may have similar views as Professor Li and her colleagues.

1. “Average expenditure per visit and per hospital stay were said to have decreased but at the same time the number of hospitals and their incomes also increased rapidly. If these data are correct, the demand for healthcare must have increased rapidly. Under the economic condition of Suqian there was no possibility for demand to have increased so rapidly. One wonders, did health expenditure actually decrease?”

My response is that all the facts cited above are consistent with the basic economic theory of demand and supply. Before healthcare reform the supply curve was vertical, showing no increase in quantity supplied in response to a price increase. After reform the supply curve is positively sloping with a large segment on the right of the previous vertical supply curve, showing the increase in supply. Given the same negatively sloping demand curve as assumed by Professor Li that there was little or no increase in demand (no increase in demand means the same *demand curve* and not the same *amount demanded* which did increase because price decreased), the new equilibrium will have a lower price and larger quantity than before just as the data indicate. The product of price and quantity expenditure also will decline when price declines if demand is price-inelastic (price elasticity being -0.633 as we have estimated in section 3 of this paper). Hospital income which equals revenue minus cost can increase if competition has led to significant reduction in cost. All the cited facts about price, quantity demanded and supplied,

expenditure of consumers, and income of hospitals can be explained by elementary economic theory.

2. “The economics of healthcare has its special laws. The first is the existence of asymmetric information between suppliers and demanders. There is a natural monopoly for the supplier.... If the suppliers are motivated by profits, the hospitals will find ways to obtain more profits by misleading the consumers such as inducing a higher demand. As a result the patients will be harmed.”

While I agree that asymmetric information, monopoly power and profit seeking at the expense of the consumers exist, evidence in Suqian and elsewhere has demonstrated that these are not sufficient to undermine the advantage of private supply of healthcare as compared with public supply. A public hospital in lack of funds provided by the government and doctors working in such a hospital can also use monopoly power to raise more funds or to increase income at the expense of the consumers. Evidence of this will be provided in section 6 where asymmetric information will be further discussed. A private system allows for competition among many hospitals and reduces the monopoly power of government hospitals. Given the available hospitals and doctors, most consumers in Suqian and elsewhere are able to choose the better ones even some may be misled. Doctors and hospitals misleading patients for short-term profits will be discovered by the intelligent ones and words will spread. They will lose out in the long-run and most of them understand this.

3. “Reductions in price and in expenditure are different concepts. In China prices of healthcare and some medicine are controlled by the government. When citizens complain about expensive healthcare they refer to large expenditure, which are the product of price and quantity. Quantity is subject to the prescription of the doctors.”

Except for the first sentence the remaining three are subject to error. First, our study of demand for healthcare has demonstrated that price has been determined by the increase in demand in the face of limited supply. It is market determined. Even if officially the

government has power to set some prices it has to follow market forces in setting the prices. For example if the government had failed to increase price in the face of increasing demand there would have been serious shortages which we have not observed in China. Official statistics in column 4 of Table 2 show the rapid increase in the price of healthcare, which the government would have prevented if it could. Second, there is no evidence to support the assertion that the complaint about expensive medical cost is a complain about total expenditure and not a complain about price. Citizens know the difference between price and expenditure. Third, doctors can manipulate the quantity demanded only to a limited extent, for reason given at the end of the last paragraph.

4. “We have observed ‘competition in healthcare equipment’ to attract patients. Since the patients are not well informed they tend to seek the best known hospitals and doctors and the most up-to-date equipment. Hence there exists competition in providing skilled doctors and best equipment and not in price. Some of the new equipment is superfluous and the cost is ultimately charged to the patients.”

My response is that such “quality competition” is a good thing in offering a better product to the consumers. Again the consumers cannot be assumed to be entirely ignorant of the quality of doctors and equipment being offered. The reputable and best known ones are in general of good quality because many consumers have testified to their quality from experience. It may be easy to fool a few consumers but not a large number of consumers who decide collectively what is well-known and reputable. The accusation of over supply of high-quality doctors and equipment is unjustified because excess supply cuts into the profit of the hospital when other more efficient hospitals having just the right amount of new equipment can offer a lower price and attract customers away from the inefficient one with excess equipment.

Just because there are some special features in the economics of healthcare such as asymmetric information one cannot conclude that the basic law of demand and supply fails to operate. The evidence from the reform in Suqian and my responses above should

suffice to demonstrate that privatization can lead to increase in supply, a lower price, and better quality.

In January 2006 the mayor of Suqian who spearheaded the healthcare reform was promoted to Deputy Governor of Jiangsu Province. He can be expected to push such reform in that Province forward. It is difficult to predict the extent and the speed of his success and of the acceptance of similar reforms by the central government for other parts of China. Without being able to predict the speed of privatization one cannot predict the increase in supply of healthcare in China.

5. Government's Program for Health Care

Important policies on health care were announced on January 15, 1997 in the "Decision on Health Reform and Development by the Central Party Committee and State Council." The basic (long-run) objective of the Decision is to insure that every Chinese will have access to basic health protection. For the rural population the strategy is to develop and improve CMS through education, by mobilizing more farmers to participate and gradually expanding its coverage. For urban employees a basic medical insurance system was established in 1998, financed by 6 percent of the wage bill of employing units and 2 percent of the personal wages. By the end of 2001, 76.29 million employees had participated in basic insurance programs. In addition, free medical services and other forms of health care systems covered over 100 million urban population. The establishment of a health insurance system is concerned with the demand side of health services. It is important to note, as pointed out in the last section, on the supply side the government still maintains the notion that public supply is the main stay although in 2004, possibly influenced by the reform experience of Suqian, it is in the process of allowing some hospitals in urban and rural areas to be run privately to reduce the financial burden to the government.

Further efforts have been made to improve the health care of the rural population, as indicated in the *Work Report of the Premier*, March 14, 2006 which reads in part:

“In health care, we put great effort into improving the public health system and rural health care work. Over the past three years, the central and local governments spent 10.5 billion yuan to basically complete establishment of a disease prevention and control system that operates at the provincial, city and county levels. A total of 16.4 billion yuan was spent on setting up a medical treatment system for public health emergencies, and work is proceeding smoothly. The central government spent 3 billion yuan from the sale of treasury bonds to support the establishment of health clinics in towns and townships in the central and western regions, thus improving public health and medical treatment conditions there. Trials of a new type of rural cooperative medical care [insurance] system were extended to 671 counties with a total of 177 million rural residents. We intensified efforts to prevent and treat major diseases such as AIDS and gave high priority to the prevention and control of highly pathogenic avian influenza, keeping it from spreading and infecting people. Progress was made in population work and family planning.”

Thus the government programs include disease prevention and control, treatment for public health emergencies, the establishment of health clinics and the health insurance under a new CMS. The new CMS is the center piece of rural health care and is still in the process of being improved. It currently covers only 177 million of the almost 800 million rural residents or only 22.5 percent. The No. 1 Policy Document on the three-farm problem issued by the State Council in February 2006 stipulates more financial support for the system from both central and local government revenues in 2006. The system will cover 40 percent of the rural areas in 2006 and almost all rural areas in 2008. Under the plan the government will allocate 40 yuan for every account of farmers who pay ten yuan each, and set up a clinic in every village in the near future. All this is to remedy the current situation that rural residents, who account for some 60 percent of the nation's total population, only have access to 20 percent of the country's medical resources.

6. Evaluation of the Current Health Care System

From my discussion of section 4, it becomes obvious that the main weakness of China's healthcare system is its failure to allow and encourage private supply. Since the government program deals mainly with demand by providing insurance and with public supply these are the topics to be discussed in this section. I will first evaluate the effect of the government's program to improve the healthcare of the rural residents as stated in the

last paragraph of section 5. I will then consider the special characteristics of the economics of healthcare and examine how they affect the healthcare in China.

Before economic reform the cooperative medical care system had adequate funding under the Commune system since the Communes controlled all the farmers' incomes. In 1985, only 5 percent of rural villages had such a cooperative health care system, with private financing becoming the main source of payment for medical care. From 1990 to 2000, the share of total government health care spending that went to rural areas was reduced from 12.5 percent to 6.6 percent (Zeng (2004), p. 309), partly accounted for by the reduction in the proportion of population in rural areas. Government funding has since increased together with an attempt to expand the CMS as described at the end of the last section. How effective will this plan be in improving healthcare for the rural population?

More farmers are expected to be insured. The 40 yuan subsidy to pay for government health insurance is small as compared with the per capita annual income of almost all farmers. Hence total spending on healthcare will not increase substantially through the income effect. However healthcare spending (including both private out-of-pocket spending and spending by government insurance) and the quantity of healthcare demanded will increase through the price effect since the price of healthcare to the insured rural residents will be substantially reduced. Under the government insurance system many rural residents can pay for treatment for illnesses which they otherwise cannot afford. They will take preventive treatment or treatment for an illness in its early stage which they would not otherwise. A government program of social insurance can have an important effect in improving healthcare for the rural population because many rural residents may not voluntarily buy such insurance. In fact many have not voluntarily done so as they are now paying for medical expenses only when they are seriously ill. How much success this insurance program and the program to build a clinic for every village will have depends on how well the government can organize the rural residents to join the insurance program and how well it can increase the quantity of services available through the establishment of additional clinics in rural areas. The provision of healthcare

will increase even faster if the government allows and encourages the establishment of private clinics and hospitals.

We next turn to the special microeconomic characteristics in the market for healthcare. First, there exists asymmetric information between consumers and suppliers as discussed in section 4. Although the consumer can choose the physicians and the hospital to a large extent, the treatment for any particular illness is chosen mainly by the physician. One consequence of this is that expensive and perhaps unnecessary tests and treatment may be recommended by the physician who tries to minimize his risk of having to take responsibility for neglect and to maximize the payment to himself. Second, if the consumer is insured, and if he does not pay for most of the cost of medicine or treatment under some form of co-payment system, he has no incentive to economize the use of the resources. In the mean time hospitals and physicians could also take advantage of the insurance system to extract as much as possible for their services. Asymmetric information and medical insurance are two important sources of wastes in the provision of healthcare. In spite of the above possible sources of waste, we have found that the demand for health care is responsive to price in our estimation of the demand equations and that private supply of health care will be responsive to price and will provide more, cheaper and better healthcare to consumers than public supply.

Wastes in the public health system in China are described in Huang (2004). Some consumers and the physicians have colluded to bill the government insurance system for unnecessary expenses and even for falsified medical expenses. Hospitals and physicians have also billed public insurance for unnecessary or non-existing expenses. Hospitals and medicine producers have cooperated to over charge the insurance system. Pharmaceutical companies collude with doctors to increase the use of their drugs by paying a percentage of sales receipts. The consumers suffer because parts of medical expenses are not covered by insurance under a co-payment system with a fixed annual deductible. The control of costs by the Chinese medical insurance system in the face of such attempts to over charge is a difficult task. Allowing private insurance to compete might help improve the performance of the government insurance monopoly. While some economists have

pointed to the bureaucratic behavior and inefficiency in a monopolistic government insurance system Paul Krugman (2006) points out two advantages of public health insurance that covers all citizens: saving of the administrative costs which private insurance companies incur “to identify and screen out high-cost customers” and “the ability to bargain with suppliers, especially drug companies, for lower prices.” Yet there is no harm to allow private insurance companies to enter because they would not survive unless they can render better services at a profit. They may also have a better incentive to control costs.

Under the system of public supply in China, the urban residents receive much better health care, at least measured by expenditures per capita, than the rural population. The government has assisted the urban working population in the transformation of the former medical service system provided by the employing units to the current system of insurance financed three ways by the government, the employees themselves and the employers. Given its limited budget the local governments have not provided as much health care to a large segment of the rural population as under the former Commune system. The attempt to organize CMS as a collective medical care insurance system is incomplete. Until recently this system has received only limited government financing and is now covering only about 180 million of the 800 million rural population. For the urban population the current medical care is essentially publicly supplied and publicly insured although much of medical expense is paid for privately. For the rural population public supply is limited and demand is limited by the lack of insurance and low income. Inequality between the rural and urban population in the Chinese system of public supply and public insurance of healthcare is a major weakness of that system.

Returning to the need to privatize the supply healthcare services, given the positive experience of private supply in Suqian city as described in section 4 and in all other countries in the world in which private hospitals flourish, China does not need to privatize all public hospitals but only need to allow non-government hospitals to exist and to compete with one another and with public hospitals. Let the better hospitals flourish. In the case of education, the government has encouraged private provision

through the leasing of public schools for “operation by the people” and the establishment of private schools at all three levels of primary, secondary and higher education, and of financially independent branches of public universities. See Chow and Shen (2006) for a discussion. However the government still retains the old notion of the planning period that hospitals should be public and has not encouraged the establishment of private hospitals or the leasing of public hospitals for “operation by the people.” The unfortunate result is the lack of increase in the output and the rapid increase in price of healthcare in a period when China experienced a very rapid growth in national output and a stable price level.

7. Conclusion

After surveying the institutional changes in China’s healthcare system, this paper presents statistical demand functions for health care with income elasticity near unity for both the urban and rural population and a price elasticity of about 0.6. It applies demand analysis to explain the increase in healthcare expenditure and in the relative price of medical services as income increases and as supply is limited. When income increased the demand curve shifted upward. Given an inelastic supply both relative price and total expenditure increased. Our demand equation can also explain the increase in the ratio of healthcare expenditure to GDP in the course of rapid economic development. While Chinese data are consistent with a demand equation based on the theory of consumer demand for health care, the data on the quantity supplied suggest that aggregate supply during the sample period was determined by a government system of public supply of healthcare which did not respond to price increase. A rapid increase in demand led only to a rapid increase in price but not quantity supplied as the data show.

China’s economic reform has been regarded as a great success and the accompanied economic growth has been phenomenal. One important failure of the reform was the failure to allow market forces to operate in the supply of healthcare. As the reform experience in Suqian demonstrates, relying solely on public supply by local governments

and state-owned units could lead to no increase in supply. The Chinese public healthcare system also resulted in serious inequality in the supply of and insurance for healthcare between the urban and rural population. Many poor and uninsured farmers received less health care than under the Commune system because the increase in their incomes was not sufficient to pay for the same amount of health care now at much higher prices.

Most recently the Chinese government has attempted to improve the health care of the rural population through the expansion of the cooperative medical insurance system CMS in the next few years with its own subsidy but the success of this policy remains to be seen. This is one important aspect of the more general problem of rural poverty, called the san-nong problem (or three-farm problem for farming, rural areas and farmers) to which the government is devoting much attention as discussed in Chow (2006) but much of that general problem is yet unresolved.

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