Chapter 2

Literature Review

This chapter examines the literature in two subjects which seem rather unrelated but which in reality are interdependent. The first subject is the Chinese economic reform and its impact on the health sector. The second subject is allocative efficiency and equity.

2.1   Policy Issues Concerning Government Funding of the Health Sector in China

The decisions on ´´ Issues Pertaining to the Establish of Socialist Market Economic System ´´ ratified on the third plenum of 11th Party congress in November 1978 set the objective to create a new Socialist Market Economic System by the end of this century. The decision proposed a comprehensive package of reforms that would constitute the framework of market socialism.

The health care system of a nation is always closely associated with its social economic system. China's health care system evolved under the planned economy and thereby operated in line with the planned economic system for 40 years. With the introduction of the socialist market economy, the environment for health resources allocation   has undergone fundamental change which will inevitably affect the development of the health sector.

The health sector in China is chiefly funded by government departments and business enterprises. Fund raising is realized through the common efforts of government planning committees for health sector, including the Ministry of Finance, the Ministry of Health , the Traditional Chinese Medicine Administration, the Labor Department, the National Price Control Bureau, the Ministry of Agriculture and other government agencies.

In the past, the Chinese government applied two kinds of subsidies to the health sector when making health care budgets: 1) a full cost budget and 2) a balanced budget.

The full cost budget referred to the practice in which the government covered all the operating expenses of a health organization through government appropriations because such organizations did not have regular revenues. Examples of such organization are EPS ,MCH and drug control institutes.

The balanced budget denoted government subsidies to medical institutions, such as hospitals, township health centers and various kinds of clinic that had a regular income by providing services to customers, to balance the difference between their revenue and expenditure arising from policy considerations (such as the low health care price policy). The government changed its health care subsidy policy in 1960. Two types of the subsidies are concerned in the policy (1) subsidy on certain items, like the basic salary of the health workers and repairmen and purchasing for equipment; (2) subsidy fixed by certain amount, if the hospital provide fixed amount service, they will get fixed amount subside.

The balanced budgeting was replaced by a ''full salary coverage'' policy when subsidizing hospital and state-owned township health centers. The budget followed a formula that appropriated 100% of the basic salary of the entire staff of a hospital. Government subsidies to township health centers of collective townships was at 60% of the total amount of staff salaries. Since 1985, the government has adopted a different subsidy method called '' flat rate contract''. Once a subsidy rate is fixed, the institute which receives the subsidy is in full control in using the fund. The rate of subsidy to township health centers and other collective township health institutions is based on their accomplishment of medical care, epidemic prevention and health care tasks assigned to them.

Health institutes that received full subsidies from the government began to charge fees for services in 1985, under the

guidance of relevant policies proclaimed by the Ministry of Health. Compensatory charge were also made for receiving services of particular kinds in health and epidemic prevention. To date, the government policy still upholds full subsidy to institutes with full cost budgets. However, in practice government offices have great difficulty in realizing full subsidy to health care institutes especially preventive institutes because of financial shortage or other reasons.

According to the new health financing policy. There are some problems now :

1. In the present self-financing budget managing system at local level, there is a contradiction between rights and duties. In some areas, due to inappropriate use of health funds, increases in health and medical expenditure have been impaired. To some extent, the Ministry of Health is losing its capacity to finance its primary health care infrastructure, especially at county level, where the Ministry of Health does not exercise direct control over their administration. To guarantee the implementation of health policies in rural areas, the ministry should empower local government with more responsibilities and power of action.

2. To some extent, a rational choice of health expenditure is more important than fund. Spending some money on developing policy guidelines may bring more benefits than a direct allocation of fund.

3. Primary health protection and prevention organization are beset with crises. Insufficient government funding and expansion of paid services have weakened some area of health protection and prevention.

In this section, we review the change of Chinese health policy and its effect.

2.2 Allocative Efficiency and Equity of Health Resources

There are several studies concerning to resources allocation. They use different ways to evaluate efficiency and equity.

2.2.1 Efficiency

Efficiency is a state where the costs of producing any given output are minimized and the utility of individual's preferences is maximized. Efficiency can sometimes be attained in competitive market.

There is a need to distinguish between technical efficiency and allocative efficiency. Technical efficiency is where the cost of producing a given output are minimized, or where output is maximized for a given cost. Allocative efficiency exits where it is not possible to make any individual better off without making some other individual worse off. The existence of perfect market can be shown to lead to both technical and allocative efficiency.

Allocative efficiency is held many economists to be important because the desirability of moving from allocative inefficient to efficient states would command universal assent. That is, if it is possible to undertake some change so that at least one person is better off without making anyone worse off then this must be a 'good thing' and consequently ought to be undertaken. These change are 'pareto improvements'. It is argued (Mishan, 1974) that the cost-benefit approach should try to identify potential Pareto improvement.

The theorem makes the competitive market solution attractive. If perfect competition can be achieved, then the market forces left to their own working will generate an efficient outcome, an invisible hand solution. Undoubtedly health care market is not a competitive market due to there are some market ' failures'. Hence other procedures must be used for allocating resources, such as the cost-benefit approach.(Alistair,1988)

Brich and Gafni (1992) claimed that the decision rules cost-effectiveness/utility analysis(CEA) fail to achieve their

stated objectives, namely the maximization of health gains for a given amount of resources. The critique includes the following objections to CEA: First, they argue that CEA does not guarantee improvement social welfare in situation where multiple health objectives exist (e.g., survival and functional status). Second, they argue that CEA does not consider the health gains forgone by reallocating resources from existing programs to find new programs. Third, they argue that CEA can lead to inefficient resource allocation when there are alternative levels of programs that compete for budgetary resources. Finally, they argue that the decision rules of CHE are incorrect in the presence of program indivisibility and that integer programming techniques are needed.

Johannesson and Weinstein (1993) stated on the contrary that if the decision rules of cost-effectiveness analysis are used in an appropriate way, they do lead to their state goal, e.g. the maximization of health effects for a given amount of resources. A more workable approach to obtain a useful decision rule for cost-effectiveness analysis is to determine a price per unit of health effects. Once this price is determined, the decision rule for cost-effectiveness analysis reduces to that of comparing the correct cost-effectiveness ratio for a program with this standard. Cost-effectiveness is not without problems. Result are often interpreted incorrectly, e.g. by failing to calculate incremental ratios for mutually exclusive programs, and results are often compared with dominated alternatives. There also several conceptual problems such as the definition of cost. The decision rules of cost-effectiveness analysis, however, are consistent with the objectives of maximizing a specified effective for a given amount resources.

Pornchaiwiseshui (1993) conducted a study how well - from economic efficiency and equity point of view - malaria control resources have been allocated over time, among health districts and between prevention and surveillance measure.

To obtain overall efficiency the malaria control resource must be optimally spent between the preventive measure and

surveillance measure, optimally allocated between districts and optimally distributed over time. According to some basic economic theory, Three groups conditions were developed to achieved the target. In the empirical morbidity model, three leading causes of morbidity and mortality from disease (malaria, acute diarrhea and TB) were considered. The independent variables, including lagged dependent variables and other socioeconomic factors, are considered to determine either the transmission rate of patient recovery rate or both. The estimations are based on ten years annual time series data for selected provinces.

Pornchaiwiseskul developed a model to estimate the morbidity rates of communicable disease.

$$logC_t - logC_{t-1} = h_t - r_t \qquad (2.2.1)$$

C_t : the morbidity rate at year t

h_t : the transmission rate

r_t : the patients recovery rate

The model describes a steady state of communicable disease. Three basic components in determining the disease-specific morbidity and mortality rates are i)the transmission rate ii) the patient recovery rate and iii)the patients death rate. All three rate components can be more or less controlled or influenced by the disease control measures. Based on equation 2.2.1 another model was built :

$$
\begin{aligned}
DlogMORBi_{k,t} = & \ a_{i0} + a_{i1}*MORB1_{k,t-1} + a_{i2}*MORB2_{k,t-1} \\
& + a_{i3}*MORB3_{k,t-1} + a_{i4}*logQ_{k,t-1} + a_{i5}*RVAG_{kt} \\
& + a_{i6}*HC_{k,t} + a_{i7}*FORDEN_{k,t} + a_{i8}*DDT_{k,t} \\
& + a_{i9}*ABER_{k,t} + a_{i10}*ABER_{k,t-1} \qquad (2.2.2)
\end{aligned}
$$

$a_{i8}, a_{i9}, a_{i8} < or = 0$

$a_{i8} = a_{i9} = a_{i10} = 0, \ i = 2,3$

i=1,2,3   1= malaria; 2= acute diahrrea; 3= tbuclosis.

k = subscript index for cross section

t = subscript index for year

MORB = morbidity of i diseases

DDT = amount of DDT use per population per year as a proxy for malaria preventive measures.

ABER = anul blood examination rate

Rvag = ratio of the agricaltureal sector output to total economic output as a proxy for rural population proportion.

HC = number of health centers per population.

FORDEN = forest density or proportion of forest land.

Q = per capita output measured in real terms.

The model presents the morbidity rates and annual blood examination rate which will have a lagged effect on the morbidity rate in the future.

Even through the optimal condition may not be tested for allocative efficiency and health district equity, but can provide a 'shadow' value for disease control measure unit cost ratio, cost of public funds and social welfare weight for each of the health districts, The shadow value can indicate a problem area or district that receive too much or too little resource compared to the national average or compare to a reference value. The shadow value is an information feedback that can be useful in planning for future program or budget re-allocation. The deviation of the shadow value from the referenced value is a signal to the planners to adjust their plan accordingly.

2.2.2 Equity

Health care need is also a central focus on equity. There two kinds of equity. Horizontal and vertical equity. First , vertical equity involves the unequal treatment of unequal, i.e. the idea that if individual have different health conditions (e.g. a common cold and pneumonia) they should be treated differently. Second, horizontal equity is concerned with the equal treatment of equals: two individual both with pneumonia should be treated equally. While in principle there are no difficulties with these concepts, in practice there can be. Horizontal equity is perhaps the simpler to handle because recognizing equality both of conditions and of treatment is easier. Vertical equity entail not only measurement inequality in conditions ,but also determining how unequal the treatment response should be.

Sen (1972) discussed a number of measures of inequality. Their advantages and weaknesses. Two of these measure are:

(1)Range is defined as the gap between highest and lowest income level as a ratio of mean income.

$$E = (Max \ Yi- Min \ Yi) / \mu \qquad (2.2.3)$$

The weakness of this measure is that it ignores the distribution and not merely at the extreme values. It compare the in between extremes.

(2) $$M = \sum_{i=1}^{n} | \mu -Yi| /n \ \mu \qquad (2.2.4)$$

The weakness of this measure is that it is not sensitive to transfer from a poor person to a rich person as long as both lie on the same side of mean income, such as 1$ transferred from the richest to the second rich person or the poorest will get. the same value of M . So it fail to catch the commonly accepted ideas on inequality.

In order to solve the above problems, *Gini* coefficient measure were suggested. A detail explanation of this measure will be presented in Chapter 4.

To advanced understand the equity issues we review the work of Van Doorslaer and Wagstaff (1992).

These authors define inequity by beginning with the following equation:

$$m1 = a_p + b_p \ h_I \qquad \text{if poor} \qquad (2.2.5)$$
$$m1 = a_r + b_p \ h_I \qquad \text{if rich} \qquad (2.2.6)$$

In this equation, m is medical expenditure, a_p and a_r are constant levels of expenditure when healthy for the poor and the rich respectively, b_p b_r are constant coefficients of health status, 'hi' which equals 0 when the person is healthy and 1 when sick (We omit random error terms depicting the minor

characteristics of individuals that affect medical expenditure irrespective of need).

Horizontal equity occurs when $a_p = a_r$ and $b_p = b_r$, that is when the expected average spending of the rich and poor are equal , both when well (hi = 0) and when sick (hi = 1).

To generate a measure of the degree of inequity, the authors then calculate the standardized expenditure shares, based on equations 2.2.5 and 2.2.6 , which are the group's shares of total expenditure reflected by their spending. The final result is described graphically in Figure 2.1 . Here the curve labeled g measures the cumulative standardized shares against the cumulative population arranged by income level . As shown in this hypothetical example, the poorest 20 percent of the population account for about 5 percent of medical expenditure, the poorest 40 percent account for about 11 percent of the expenditure, and so on.

If spending favors the rich, the curve will lie below the diagonal. As in this case, where spending favors the poor, the curve lie above the diagonal. The degree of inequality is measured as the ratio of the area of the ellipsoid A to the total areas under the diagonal.

Fig. 2.1 Standardized Expenditure Concentration Curve