



CHAPTER 6

ASSESSMENT OF THE EFFECTS OF ELEMENTS

As mentioned in Chapter 3, Multi Criteria Analysis (MCA) is a decision support tool which allows choices to be made among alternatives given multiple objectives and constraints.

The expected effects of alternatives (projects, insurance schemes, insurance elements) on a set of objectives and a set of constraints are compared with the decision maker assigning priorities, through relative weights, to the objectives and constraints.

Before starting the Multi Criteria Analysis, it is necessary to inspect possibly existing mathematical relations among alternatives of each element, objective and constraint.

Based on the definitions of the objectives identified in Chapter 4, in the analysis objectives (O_i , $i = 1, 2, \dots, 6$) are symbolized as follows:

- O_1 : Improvement of health
- O_2 : Improvement of equity
- O_3 : Improvement of resource utilization efficiency
- O_4 : Improvement of effectiveness of health service delivery
- O_5 : Increasing risk-sharing or solidarity
- O_6 : Improvement of health service quality

Similarly, based on the definitions of the constraints identified in Chapter 4, constraints (C_j , $j = 1, 2, \dots, 11$) are symbolized as follows:

- C_1 : Ability to pay
- C_2 : People's awareness about health and health care and willingness to join health insurance
- C_3 : Resources available
- C_4 : Price of health services
- C_5 : Accessibility and availability of health services
- C_6 : Operational efficiency

- C₁ : Managerial capacity
- C₂ : Government (or authorities concerned) attitude to health insurance
- C₃ : Politic and economic system and policy of the State
- C₄ : Health system and health policies of the State
- C₁₁ : State health legislation

In fact, based on the principles of the MCA, we can construct a MCA effect table as presented in Table 6.1. The objective O_i will get various values vs every alternative of each element E_k in an insurance scheme. The situation is the same for the constrains C_j. This relationship can be seen in the MCA effect table.

Table 6.1: MCA Effect Table

Element k (m = 1,2...m)	Objectives					Constraints				
	O ₁	O ₂	.....	O _i		C ₁	C ₂	.....	C _j	
	(i = 1,2,... 6)					(j = 1,2,... 11)				
1	a ₁₁	a ₁₂	.....	a _{1i}		b ₁₁	b ₁₂	.....	b _{1j}	
2	a ₂₁	a ₂₂	.....	a _{2i}		b ₂₁	b ₂₂	.....	b _{2j}	
.	
.	
.	
m	a _{m1}	a _{m2}	.....	a _{mi}		b _{m1}	b _{m2}	.....	b _{mj}	

A very important procedure is, for any alternative or value of each element E_k in any health insurance scheme which is possibly selected, how to determine the extent to which the element may satisfy a set of objectives O_i when those alternatives or values of the element are specially given. In other words, how a_{ki} is bestowed is one of the key procedures. On the other hand, for any alternative or value of each element, there must be a number of factors and conditions, which are defined as constraints C_j, affecting or constraining the achievements of the objectives. But to what extent those constraints will exert negative roles in operating a health insurance scheme, that is, how to determine b_{kj} when the alternatives or values of each element are given? This is a separate research problem.

From the view of mathematics, all possible alternatives or values of each element, i.e. E_k(m), are variables. O_i is the function of E_k(m), i.e.

$$O_i = f_i (E_k(m)) \dots\dots\dots (6.1)$$

And also C_j is the function of $E_k(m)$, i.e.

$$C_j = b_{kj} = f_c (E_k(m)) \dots\dots\dots (6.2)$$

Consider the relation of O_i and C_j , because constraints can affect achievement of objectives to a considerable extent we can find there is another function between them, i.e.

$$O_i = f_s (C_j) \dots\dots\dots (6.3)$$

However, O_i depends on not only $E_k(m)$ but also C_j , so we have

$$\begin{aligned} O_i &= a_{ki} = f [f_s (E_k(m)), f_c (C_j)] \\ &= f \{ f_s [E_k(m)], f_c [f_s (E_k(m))] \} \dots\dots (6.4) \end{aligned}$$

Clearly, it is ideal if those mathematic relationships are found out and established. Unfortunately, it is impossible to find such relationships without a massive research, but sometimes it is not necessary and realistic to do so. Nevertheless, in actual practice, we have to subjectively assess the interactions among them. Based upon the reasoning assessments, we may be able to determine a_{ki} and b_{kj} . Very often, these three approaches can be used to assess the effects:

- 1) Assessing the effects of elements on objectives under possible existence of constraints, i.e. giving a scaling value for a_{ki} and b_{kj} , based completely on insurance theories and logical judgments and past experiences practiced in China and abroad.
- 2) Assessing the effects of elements on objectives under possible existence of possible constraints by means of questionnaire methods, e.g. Delphi's Method, then bestowing scaling values for a_{ki} and b_{kj} based upon analysis and adjustment of the questionnaire results.
- 3) Assessing the effects of elements on objectives under possible existence of constraints, by carrying out an experimental trial in some sampling regions, then bestowing scaling values for a_{ki} and b_{kj} . Such a trial, of course, has many limitations, e.g. long period of time, factors and conditions affecting control, human interference, and so forth.

It is ideal if those approaches are combined. But in this case, it seems at present that only the first option can be applied in the research, although the other two are certainly important and necessary, and they may be able to be used in the future activities when implementing insurance programme.

The general principle of the grade scaling method is that all objectives or constraints are able to be given possible grades with respect to the effects of elements, then, based on the given grades, corresponding scaling values are obtained for them. The grades and scales to which objectives (or constraints) can be achieved (or

influence) are shown in Table 6.2.

Table 6.2: Grades and Scales of Objectives and Constraints

Grade	A	B	C	D	E
Scale	5	4	3	2	1

Assume when a conceived health insurance scheme is carried out in a period of time e.g. 3 years or 5 years, if all objectives can be achieved to the extent of 100 % and all constraining factors can exert their influences to the extent of 100 %, then we define that their grade of possible achievements of objectives and influences of constraints is A. So, the corresponding scale value is 5. Similarly for grades B, C, D, and E. In other words, we take the objectives to be pursued as 1, then according to the percentages which are achievable, the grades are able to be given. The same situation exists for the constraints.

Now, we try to assess the effects of the elements which have been identified in Chapter 5 in relation to each objective and constraint.

6.1 Element 1: sources of contributions

By virtue of the principle of solidarity or risk-sharing, in the case of Guangxi the sources of health insurance (compulsory or voluntary) funds are possibly:

- * contributions by insured persons;
- * contributions by collective economic funds;
- * State subsidies.

As an important element of a health insurance scheme, the sources of contributions are directly related to both consumption and provision of health care services, i.e. they can affect health demand and supply. It is very complicated to elucidate this relationship. However, it may be more obviously observed in consideration of compensation rate of medical care expenses. If other things are given, the size of insurance contributions collected will rely on the proportion of reimbursement. More important is that usually the nature of the sources of contributions decides the forms of insurance schemes, i.e. compulsory or voluntary.

Under the condition of 100 % compensation, the insurance premium to be collected must be expected to be as high as possible to cover the costs. In this case, if contributions are mainly from state subsidies or collective economic funds, the effects of contribution sources on consumption and provision of health care services will not be much feathered. It means that people, as consumers, will probably be

indifferent to consumption of health care services in relation to behavior, but hospitals, as providers, may possibly be active in inducing people's health consumption to make a favorable profit (assume making profit is one of goals of hospitals in operating health services) while there are no strict regulations to limit their professional behavior. Then this kind of insurance most probably is a compulsory scheme. Under such a scheme, the population covered may be big; overutilization of health services, i.e. moral hazard, will arise. If most of insurance premiums are derived from individuals, people who might wish participate the insurance scheme will give up their idea because of high premium; particularly it is true for the poor, even though most of their medical expenses incurred by diseases may be compensated. But the number of people who may be willing to join the scheme will be less than expected.

If insurance premiums are from not only the insured population (major source), but also from the government subsidies or collective economic funds, and the premium rate is acceptable and compensation rate is reasonable, such a scheme may achieve objectives to the ideal extent and the impacts of constraints on the scheme may also be limited.

Concerning the effects of the sources of contributions in relation to objectives as well as constraints, the assessments are made, based upon above analysis.

6.1.1 Objectives to be related:

- 1 Improvement of health: If the sources of insurance contributions can lead to properer consumption of health care services for people, within a period of some years the health status of people will be improved.
- 2 Improvement of equity: The principle of equity in the social security context means that all members are entitled to the same benefits. In this sense, the bigger the coverage by insurance, the more equity in health care consumption will be improved. Evidently, only when government subsidy and collective economic funds are involved in the sources of insurance contributions, is the coverage of population able to be increased. Then, equity improvement will be significant.
- 3 Improvement of resource utilization efficiency: If the sources of contributions are able to result in improvements in health service delivery, management and quality of health care, then efficiency of resource utilization will be improved.
- 4 Improvement of effectiveness of health service delivery: If the sources of insurance contributions give rise to people's overconsumption of health services, as a result, such overconsumption is almost of no use to improve health status of population, but resources have been used, we say effectiveness is problematic.



5. Increasing risk-sharing or solidarity: As analyzed above, the sources of contributions can influence people's choices whether to join a health insurance scheme. The greater the population to be insured in a scheme, the bigger capacity of risk-sharing.
6. Improvement of health service quality: Strictly, the effects of the sources of insurance contributions on the provider-side are not significant. The quality of health services is more likely to depend upon the terms of payments to supplier. However, if more people participate in an insurance scheme, which means more demand on quantity and quality of services, then improving health service quality and management should be required.

From above analysis, we are able to assess the extent to which objectives of an insurance scheme may be achieved in relation to the element of sources of contribution under the possible constraints. The Table 6.3 gives scaling values assessed.

Table 6.3: Scaling Values of Objectives in Element 1

El(m) m = 1,2...6	Objectives ($O_i, i = 1,2...6$)					
	O_1	O_2	O_3	O_4	O_5	O_6
El(1)	3	3	2	3	4	2
El(2)	3	3	3	3	3	3
El(3)	2	2	4	3	2	4
El(4)	5	5	4	5	5	5
El(5)	4	4	4	4	4	4
El(6)	4	4	4	4	4	3

6.1.2 Constraints to be related:

1. Ability to pay: People's choice in participation of in an insurance scheme is being constrained by an ability to pay. If people have a higher ability to pay for health care, in general the source of insurance contributions may be broad.
2. People's awareness about health and health care and willingness to join health insurance: In the element of sources of contributions, the impact of this factor is on people's decision making whether it is worthwhile spending a sum of money on participating in an insurance scheme.
3. Resources available: The element of sources of contributions actually indicates the resource in monetary terms, which is available to be used to operate an insurance scheme. In the case of Guangxi, because of the local economy, either peasants or government and collective economic enterprises can not contribute much to health insurance.

- 4 Price of health services: Related to the element of sources of contributions, the price of health services influences the size of the insurance premium. High price must be disadvantageous in attracting sources of contributions.
- 5 Accessibility and availability of health services: Related to the element of sources of contributions, similarly, this factor mainly affects people's investment behavior in relation to participation of health insurance.
- 6 Operational efficiency: Relatively to governments and collective enterprises, those people who paid insurance premium will be more concerned with operational efficiency of the scheme. This impact can't be neglected in practice.
- 7 Managerial capacity: The impact of this constraint is similar to operational efficiency.
- 8 Government (or authorities concerned) attitude to health insurance: For the contribution sources from governments or collective economic funds, this is a significant constraint.
- 9 Politic and economic systems and policies of the State: This constraint usually has effects on the sources of government subsidies and collective economic funds.
- 10 Health system and health policies of the state: The effect of this constraint on the element of sources of contribution is quite broad, which is reflected in people's confidence when they decide whether to invest in health insurance.
- 11 State health legislation: Appropriate health legislation is helpful for insurance premium collection. Surely it affects the element of contribution sources to some extent.

Based upon the above assessment and logical reasoning, we bestow scaling values for each constraint in terms of the alternatives of the element of contribution sources (Table 6.4).

Table 6.4: Scaling Values of Constraints in Element 1

El(m)	Constraints (C _j , j = 1,2,...,11)										
	C ₁	C ₂	C ₃	C ₄	C ₅	C ₆	C ₇	C ₈	C ₉	C ₁₀	C ₁₁
El(1)	3	2	2	2	3	2	2	5	5	4	5
El(2)	4	3	3	4	3	2	2	4	4	4	4
El(3)	5	5	4	5	5	3	3	1	2	2	1
El(4)	2	2	1	4	4	5	4	4	5	5	5
El(5)	4	3	4	4	4	4	3	3	5	5	4
El(6)	3	3	4	4	4	4	3	5	4	3	3

6.2 Element 2: Basis of premium charged

The basis of premium charged is a very important element in the scheme. The method of charging premium reflects the rationality of the insurance mechanism, which directly influences people's choice to join the insurance scheme. The effects of the element on the consumption and provision of health services are also complicated. It is considered that it is not reasonable to charge a fixed rate for each insured, or to charge a changing rate for each insured in terms of age or income. If the insurance premium is charged at a fixed rate for every insured despite his age and sex, most probably the so-called adverse selection in insurance will occur, when the scheme is voluntary. Even though the premium is charged in terms of age or income, still there are many problems to be solved. In general, it is considered that it is acceptable that the premium is charged in terms of the probability of utilizing health services.

6.2.1 Objectives to be related:

- 1 Improvement of health: Reasonable and scientific methods to charge premium may possibly increase the number of population to join an insurance scheme, which is helpful to improve health status of population as a whole.
- 2 Improvement of equity: Improper methods of charging premium may probably hinder improvement in the equity in health care.
- 3 Improvement of resource utilization efficiency: Generally speaking, the methods of charging premium have no direct association with this objective.
- 4 Improvement of effectiveness of health services delivery: The situation should be similar to the objective above.
- 5 Increasing risk-sharing or solidarity: The methods of charging premium have significant effects on risk-sharing. Some can increase risk-sharing capacity of an insurance scheme, e.g. the charging method in terms of income.
- 6 Improvement of health service quality: It may be said that the contribution of the element of basis of charging premium to this objective is quite limited.

Based upon the analysis above, the objectives are able to be scaled as in the Table 6.5.

Table 6.5: Scaling Values of Objectives in Element 2

E2(m) m = 1,2...4	Objectives (O_i , $i = 1,2...6$)					
	O_1	O_2	O_3	O_4	O_5	O_6
E2(1)	3	1	3	2	3	2
E2(2)	3	2	4	2	4	3
E2(3)	3	2	3	2	5	2
E2(4)	4	5	5	3	4	3

6.2.2 Constraints to be related:

- 1 Ability to pay: A reasonable and acceptable premium rate is based on the economic paying ability of people. Vice versa, people's economic paying ability provides possibilities for choosing charging methods. That is, people's paying ability has effects on selection of charging methods and premium rates.
- 2 People's awareness about health and health care and willingness to join health insurance: The people with different backgrounds in economy, education, culture, and social class will have different reactions to premium charging methods and rates. Nevertheless, a reasonable premium rate and charging method is easily accepted by all people.
- 3 Resources available: This constraint seems not much related to the premium charging methods, but a high premium rate means resources available are increased if compensation is not considered.
- 4 Price of health services: High price of health services needs a high premium rate in spite of whatever charging methods are used. Too high a premium rate inevitably results in a decrease in the number of people who may be willing to join an insurance scheme.
- 5 Accessibility and availability of health services: Strictly to say, there is not a direct or obvious relation between this constraint and the element of basis of premium charged. But favorable accessibility and availability of health services makes it possible to charge a relatively high premium.
- 6 Operational efficiency: Certainly, the element of premium charging methods is directly related to the operational efficiency of the insurance scheme. Different ways to collect the premium will have different operational efficiencies.
- 7 Managerial capacity: The situation to a great extent is similar to the constraint above.

- 8 Government (or authorities concerned) attitude to health insurance: There is not a direct relation between the premium charging methods and this constraint. But governments can impose their influence on some methods which they think necessary.
- 9 Politic and economic systems and policies of the State: In principle there is not either a direct relation between the premium charging methods and this constraint. But when political and economical systems and policies of the State are suddenly or greatly changed, the premium charging methods, as well as rates, must be adjusted respondingly.
- 10 Health system and health policies of the State: This constraint has direct effects on the premium charging methods because it influences the supply of health care services. As we know, in supply-side, the characteristics and items of health services, the ways of health service delivery, and so on are able to have effects on selecting premium charging methods and rates.
- 11 State health legislation: The same as above, health legislation has an obvious influence on premium charging methods.

Based upon the above analysis, the constraints are able to be scaled as in the Table 6.6.

Table 6.6: Scaling Values of Constraints in Element 2

E2(m)	Constraints (C _j , j = 1, 2, ..., 11)										
	C ₁	C ₂	C ₃	C ₄	C ₅	C ₆	C ₇	C ₈	C ₉	C ₁₀	C ₁₁
E2(1)	5	4	3	4	5	1	1	1	4	4	3
E2(2)	4	3	3	4	4	2	2	2	4	4	4
E2(3)	2	3	2	3	4	4	2	2	5	4	4
E2(4)	3	4	1	3	3	3	3	1	4	4	3

6.3 Element 3: Ownership of insurer

According to the previous experiences and current situation of China, ownership of the insurance agents is a key to successful operation of a health insurance scheme. The element of the ownership of the insurers may be exerted in both consumption and provision of health services, and operational efficiency as well. If an insurance scheme is run by State-owned insurance companies, in general, people may be more confident of the scheme, so that people may be more attracted by it. On the other hand, because the insurers and health service institutes are owned by the State, there are a few conflicts between them, but they are easy to be resolved. However, very commonly, State-owned companies usually do not pay much attention to supervision of

activities of health services of hospitals, to control of escalation of medical expenses (costs) due to unreasonable medical activities. For this reason, they often have a low operational efficiency and managerial disorder. For private insurance agents, the situations may be opposite.

6.3.1 Objectives to be related:

- 1 Improvement of health: If an insurance scheme, because of its ownership of insurer, can increase more people to join the scheme, and result in improvement of quality of health services and operational efficiency, it will make much contribution to health status of people.
- 2 Improvement of equity: In general, the element of ownership of insurers contributes very less to improving equity in health care. But an insurance scheme run by a State-owned company may be better than one run by private company.
- 3 Improvement of resource utilization efficiency: As mentioned above, a scheme run by a private company may be more advantageous to improve resource utilization efficiency than one run by state-owned company.
- 4 Improvement of effectiveness of health services delivery: The effects of the element of ownership of insurers on this objective is similar to the objective above.
- 5 Increasing risk-sharing or solidarity: The ownership of insurers is strongly related to the objective of increasing risk-sharing or solidarity. The capacity of an insurance scheme in risk-sharing will depend on the number of the insured. If the coverage of a scheme is bigger, the capacity of risk-sharing will be bigger, and vice versa.
- 6 Improvement of health service quality: The effect of the ownership of insurers on health service quality is very significant. Generally speaking, an insurance scheme run by private company may be more helpful to improve quality of health services.

Based on above analysis, objectives are able to be scaled as in the Table 6.7 under Element 3.

Table 6.7: Scaling Values of Objectives in Element 3

E3(m) m = 1,2,3	Objectives ($O_i, i = 1,2...6$)					
	O_1	O_2	O_3	O_4	O_5	O_6
E3(1)	3	4	2	2	4	2
E3(2)	4	3	5	3	2	4
E3(3)	4	3	4	3	3	3

6.3.2 Constraints to be related:

- 1 Ability to pay: It may be said that the effect of the constraint of economic paying ability on the selection of the ownership of insurers is almost not existant when a scheme is going to be carried out. But a suitable form of insurer's ownership may be acceptable to poor peasants.
- 2 People's awareness about health and health care and willingness to join health insurance: Theoretically, this constraint is not related to the ownership of insurers. The possible influence is in constraining alternatives of the element.
- 3 Resources available: This constraint may be disadvantageous to implement a scheme run by a private company.
- 4 Price of health services: In general, when the price of health services is too high, private insurance companies are possibly not willing to compete in the health market because the number of people who may wish to participate insurance may become less.
- 5 Accessibility and availability of health services: This constraint is certainly affecting the selection of insurers with respect to their ownership. But their relation is not easy to determine.
- 6 Operational efficiency: Any form of ownership of insurers is influenced by this constraint. But private companies may pay much attention to it because of their commercial goal.
- 7 Managerial capacity: If an insurance scheme to be implemented is less difficult to manage due to its ownership, this kind of insurance scheme should be selected.
- 8 Government (or authorities concerned) attitude to health insurance: Government attitude is a very important factor in deciding what kind of ownership insurer to run the insurance scheme. Usually they will make decisions according to their favorite.
- 9 Political and economic systems and policies of the State: This is another important factor affecting the selection of insurance scheme with respect to its insurer's ownership. Free political and economic systems and policies make it possible for different ownership insurers to compete in the health market.
- 10 Health system and health policies of the State. This constraint can play a role in considering what kind of ownership insurers can run an insurance scheme because the interests of health service providers are related to the ownership of insurers.
- 11 State health legislation: In general, the effect of this constraint on choosing insurers in terms of their ownership is quite limited.

Based on above analysis, we attempt to assess the possible scaling values of the constraints in the circumstances of the element of ownership of insurer (Table 6.8).

Table 6.8: Scaling Values of Constraints in Element 3

E3(m)	Constraints ($C_j, j = 1, 2, \dots, 11$)										
	C_1	C_2	C_3	C_4	C_5	C_6	C_7	C_8	C_9	C_{10}	C_{11}
E3(1)	2	2	3	4	4	4	4	5	4	4	3
E3(2)	4	3	2	3	3	3	3	3	5	4	4
E3(3)	3	3	2	3	3	3	3	5	5	4	5

6.4 Element 4: Insurance type

Insurance type, i.e. compulsory or voluntary scheme, is a problem faced by the decision makers when they are going to introduce health insurance into some areas. Insurance type is closely associated with the consumption and provision of health services in the health market. A compulsory scheme maybe means a high coverage of the insured. In theory, it can make much contribution to improving health status of people and equity in health care. But on the other hand, such a scheme will bear heavier constraints, such as resources available, accessibility and availability of health services, operational efficiency and managerial capacity. A voluntary scheme may possibly be helpful to improve the efficiency of resource utilization and quality of health services. But its role in achieving other objectives such as health improvement, equity improvement, risk-sharing capacity, may be most likely to be relatively limited by the constraints.

6.4.1 Objectives to be related:

- 1 Improvement of health: As mentioned above, a compulsory scheme means a high coverage of the insured. Generally speaking, a high insured coverage is able to lead to health improvement in people.
- 2 Equity improvement: Insurance type can play a role in improving equity in health care. It is said that a compulsory scheme is useful to improve equity in health care, and vice versa for a voluntary scheme.
- 3 Improvement of resource utilization efficiency: Relatively, a compulsory scheme may have a lower efficiency of resource utilization than a voluntary scheme because the compulsory scheme may have more problems in management and operation.
- 4 Improvement of effectiveness of health services delivery: The

situation may be similar to the objective above.

- 5 Increasing risk-sharing or solidarity: Obviously, a compulsory scheme means a high coverage of insured, that is, the capacity of risk-sharing in the scheme is high.
- 6 Improvement of health service quality: It is difficult to judge which type of insurance can improve quality of health services more. But a voluntary scheme may be more closely related the objective.

After the above analysis, we are able to assess the extent to which objectives of an insurance scheme may be achieved in relation to the element of insurance type under the possible constraints. The Table 6.9 is scaling values assessed.

Table 6.9: Scaling Values of Objectives in Element 4

E4(m) m = 1,2	Objectives (O _i , i = 1,2...6)					
	O ₁	O ₂	O ₃	O ₄	O ₅	O ₆
E4(1)	4	5	2	4	5	3
E4(2)	3	3	4	3	2	4

6.4.2 Constraints to be related:

- 1 Ability to pay: If insurance funds are from governments and collective economic funds and the insurance scheme to be implemented is a compulsory one, the economic paying ability of people is not much related. But if insurance premium is mostly from individual payment, the economic paying ability of people will play a role in deciding insurance type.
- 2 People's awareness about health and health care and willingness to join health insurance: In general, when people have high awareness about health and health care and high willingness to join health insurance, it is better to implement a voluntary scheme, and vice versa when knowledge is poor it is better to implement a compulsory scheme in order to broadly improve people's health.
- 3 Resources available: If there are more resources available, a compulsory insurance scheme should be implemented, and vice versa for a voluntary insurance scheme. This is because a compulsory scheme may achieve the objectives to the greater extent than a voluntary scheme. In the case of less resources available, a voluntary scheme means more choices are given to people to select.
- 4 Price of health services: Too high a price of health services may be disadvantageous to implement a compulsory scheme, but it may be feasible to carried out a voluntary scheme. The reason is that high price of health services means to collect a high insurance premium

which a compulsory scheme is not able to bear. But a voluntary scheme allows people to have choices.

- 5 Accessibility and availability of health services: Usually, a voluntary insurance scheme is based upon a better accessibility and availability of health services. Otherwise, people who intend to join the scheme will be less. In a word, this constraint has effects on both compulsory and voluntary schemes, but more obviously on the former.
- 6 Operational efficiency: This constraint can affect both compulsory and voluntary schemes, but it is difficult to distinguish which one is more affected by them .
- 7 Managerial capacity: In general, a compulsory insurance scheme needs higher capacity in management than a voluntary one. That is to say a compulsory scheme is more constrained by the managerial capacity.
- 8 Government (or authorities concerned) attitude to health insurance. Governments have a right to select insurance type based upon their interests and value view, and political commitments on people's health. This is a real constraint.
- 9 Politic and economic systems and policies of the State: The effect of this factor on selection of insurance type is very similar to the element of ownership of insurers. In the situation of China, because of the current reform of economic system, a voluntary insurance scheme may be more suitable at this time.
- 10 Health system and health policies of the State: This is an important factor in selecting insurance type. It seems that a compulsory scheme is more related to it.
- 11 State health legislation: Health legislation has an obvious effect on compulsory insurance. If there is not specific legislation on health in the State, voluntary insurance is commonly still carried out.

Based on the above analysis, we attempt to assess the possible scaling values of the constraints in the circumstances of the element of insurance type (Table 6.10).

Table 6.10: Scaling Values of Constraints in Element 4

E4(m)	Constraints ($C_j, j = 1, 2, \dots, 11$)										
	C_1	C_2	C_3	C_4	C_5	C_6	C_7	C_8	C_9	C_{10}	C_{11}
E4(1)	4	2	4	3	2	3	3	4	4	4	4
E4(2)	5	4	3	4	3	2	2	2	2	3	2

6.5 Element 5: Insurer's goal

In practice, as an industry, some insurance schemes are operated for making profits, some are operated for not making profits. Very clearly, with different commercial operational goal, health insurance will create different results under the current constraints in terms of the objectives identified. An insurance scheme with a goal of making profits inevitably manages to impose influence on supplier-side of health services in order to reduce medical costs, improve efficiency and quality of health services. But because of its goal of making a profit, it may obstruct people's consumption of health services to the some extent, so that some objectives can not reach an ideal level. Oppositely, not-for-profit schemes may achieve the some objectives to the high extent, but be constrained by the conditions and factors.

6.5.1 Objectives to be related:

- 1 Improvement of health: If the scheme is not for making profits, people to join it will be greater in number and the ability to consume health services may be increased. In this sense, a scheme of not-for-profit can contribute much to the objective to improve people's health.
- 2 Improvement of equity: Theoretically, if the scheme is for making profits, the number of insured will be small. In this sense, the equity improvement is quite limited. If the scheme is not for making profits, then the objective of equity improvement can reach a higher level because a relatively low premium makes it possible for more people to be covered by the scheme.
- 3 Improvement of resource utilization efficiency: Based upon the experiences, the scheme of making profits usually have a higher efficiency of resource utilization than one not making profits. Because of seeking high profits, when the scheme is run, the cost control and quality improvement are paid much attention.
- 4 Improvement of effectiveness of health services delivery: Similarly, the effect of the insurer's goal on this objective is the same as above.
- 5 Increasing risk-sharing or solidarity: Generally speaking, the capacity of risk-sharing in an insurance scheme is dependent on the insured coverage. So, the contribution to the objective will determine the insured coverage which is related to insurer's goal.
- 6 Improvement of health service quality: As analyzed above, a scheme with a goal of making profits may often pay attention to quality of health services in order to satisfy consumers in the health market. The effect of the element of insurer's goal on quality of health services may be not significant.

After the above analysis, we are able to assess the extent to which objectives of an insurance scheme may be achieved in relation to the element of insurer's goal under the possible constraints (Table 6.11).

Table 6.11: Scaling Values of Objectives in Element 5

E5(m) m = 1,2	Objectives (O _i , i = 1,2...6)					
	O ₁	O ₂	O ₃	O ₄	O ₅	O ₆
E5(1)	3	3	5	3	4	5
E5(2)	3	4	2	2	5	3

6.5.2 Constraints to be related:

- 1 Ability to pay: It should be said that the insurer's goal is related to people's economic paying ability. Low level of economic paying ability in the population is not suitable to implement an insurance scheme with a goal of making profits.
- 2 People's awareness about health and health care and willingness to join health insurance: In general, there is not a direct relation between this constraint and the element of insurer's goal. But similarly, when people's awareness about health and health care, and willingness to join health insurance are limited, they probably consume less health services. In this case, the insurer which takes making profit as a commercial goal will not operate a scheme which possibly produces less profits.
- 3 Resources available: Generally speaking, an insurance scheme operating not-for-profit needs more resources available to support it. That is to say there is a direct relation between this constraint and the element of insurer's goal.
- 4 Price of health services: If insurers with a goal of making profit can benefit from high price of health services, they would like this situation, but high price is harmful for implementation of health insurance. The relation of this constraint to the element of insurer's goal is difficult to determine.
- 5 Accessibility and availability of health services: If accessibility and availability of health services is high this is useful for insurers to make profits, and vice versa.
- 6 Operational efficiency: High operational efficiency means lower costs or a high output. That is, if making profit is possible, then a scheme with a goal of making profit can be considered.
- 7 Managerial capacity: The situation is similar to the constraint above.

- 8 Government (or authorities concerned) attitude to health insurance: Very similar to the element of insurance type mentioned above, this constraint may determine whether an insurance scheme can be implemented in terms of insurer's goal.
- 9 Politic and economic systems and policies of the State: The situation is very similar to the element of insurance type mentioned above. That is, the current reform of economic system and policy of the State is suitable to implement an insurance scheme with a goal of making profits.
- 10 Health system and health policies of the state: This constraint can affect the suppliers of health services in influencing insurer's goal. In fact, insurer's profits are to a great extent dependent on this constraint.
- 11 State health legislation: If relevant health legislation of the State is useful to protect consumer's interests from inappropriate activities of those insurers making profits, this constraint can play a role in operating health insurance.

Based upon the above assessment, we bestow scaling values for each constraint in terms of the alternatives of the element of insurer's goal (Table 6.12).

Table 6.12: Scaling Values of Constraints in Element 5

E5(m)	Constraints ($C_j, j = 1, 2, \dots, 11$)										
	C_1	C_2	C_3	C_4	C_5	C_6	C_7	C_8	C_9	C_{10}	C_{11}
E5(1)	4	3	3	4	3	2	3	3	3	2	2
E5(2)	3	2	4	2	4	3	2	4	5	4	3

6.6 Element 6: Population to be insured

The population to be insured is a most essential element in an insurance scheme. The larger the population to be insured, the more there will be to consume health services. But when the resources available and efficiency are considered, the population to be insured shall be selected in terms of some characteristics such as age and sex. Concerning this element, different alternatives have different contribution to the objectives and are constrained by the conditions.

6.6.1 Objectives to be related:

- 1 Improvement of health: In theory, if there are more people to join health insurance, it is useful to improve their health, and vice versa.

- 2 Improvement of equity: If all people are insured by the scheme, it should be said that equity in health care is more likely to approach the ideal. But there are a number of constraints, based upon the principle of equity, i.e. equity must be related to need and demand, the population to be insured are provided for according to their needs for health care. Then equity improvement is of significance.
- 3 Improvement of resource utilization efficiency: If people are insured in terms of some characteristics of the population, perhaps the objective of improvement of resource utilization efficiency may be able to reach a high level. However, as consumers, the population to be insured do not determine the efficiency of resource utilization. It seems suppliers of health services play a dominant role in this objective.
- 4 Improvement of effectiveness of health services delivery: For populations with different characteristics, the effectiveness of health services will be different. In general, it is not cost-effective for all population to be insured without consideration of their differences in need and demands for health care.
- 5 Increasing risk-sharing or solidarity: According to the principle of risk-sharing or solidarity, if more population are insured, risk-sharing or solidarity of an insurance scheme will be higher. From this viewpoint, it may be useful to achieve this objective if all the population can be insured no matter what age and sex they are.
- 6 Improvement of health service quality: As analyzed above, it is helpful for improvement of health service quality if the population are insured in terms of their characteristics.

Based on the above analysis, objectives are able to be scaled as in the Table 6.13 under Element 6.

Table 6.13: Scaling Values of Objectives in Element 6

E6(m) m = 1,2...4	Objectives (O_i , $i = 1,2...6$)					
	O_1	O_2	O_3	O_4	O_5	O_6
E6(1)	4	3	3	3	4	3
E6(2)	3	4	4	4	3	4
E6(3)	2	3	3	3	2	3
E6(4)	4	4	5	5	3	5

6.6.2 Constraints to be related:

- 1 Ability to pay: If the economic paying ability of people is low, it is better to insure people according to their characteristics such as age and sex.

- 2 People's awareness about health and health care and willingness to join health insurance: In general, there is not an obvious relation between this constraint and the element of population to be insured. Of course, it is always advantageous if people have high awareness about health and health care and willingness to join health insurance.
- 3 Resources available; This constraint is strongly related to the element of population to be insured. If all of the population are insured in the scheme without considering their characteristics, that means more resources are needed. In the current situation, it seems better to insure the population in terms of their ages and sexes.
- 4 Price of health services: There is no inevitable relation between the price of health services and the element of population to be insured. It seems that a low price of health services is suitable to take all population into the scheme.
- 5 Accessibility and availability of health services: The effects of this constraint on the element of population to be insured are complicated to judge. But if all the population are going to be insured, high accessibility and availability of health services are necessary.
- 6 Operational efficiency: If all the population are insured, it is likely to give rise to difficulty of operation, i.e. a high operational efficiency is necessary. However, it is harnot possible to argue that an insurance scheme regarding the population to be insured in terms of age and sex does not need high operational efficiency.
- 7 Managerial capacity: The situation is simiilar to the constraint above.
- 8 Government (or authorities concerned) attitude to health insurance: Most probably, governments will not pay much attention to the element of population to be insured. That is to say there is no obvious relation between this constraint and the element of population to be insured.
- 9 Politic and economic systems and policies of the State: In some sense, political commitments of the State on people's health is directly related to the element of the population to be insured, but this may not always be true.
- 10 Health system and health policies of the State: It is not clear how this constraint affects the element of population to be insured.
- 11 State health legislation: There is not a direct relation between the constraint and the element of population to be insured.

Based upon the above assessment, we bestow scaling values for each constraint in terms of the alternatives of the element of population to be insured (Table 6.14)

Table 6.14: Scaling Values of Constraints in Element 6

E6(m)	Constraints (C _j , j = 1, 2, ..., 11)										
	C ₁	C ₂	C ₃	C ₄	C ₅	C ₆	C ₇	C ₈	C ₉	C ₁₀	C ₁₁
E6(1)	4	4	5	3	4	4	3	4	5	3	3
E6(2)	3	3	2	3	3	2	2	2	3	3	4
E6(3)	2	3	2	2	2	2	2	2	3	3	4
E6(4)	3	3	3	3	3	3	3	3	4	4	4

6.7 Element 7: Type of services covered by insurance

This element is directly associated with the objectives of insurance scheme. For consumers, the health services they need and demand differ from person to person. For providers, the health services they want to provide are also different. Insurance schemes with different types of health services contribute variously to the achievement of the objectives.

6.7.1 Objectives to be related:

1. Improvement of health: If all health services are covered by the insurance scheme, the achievement of the objective of health improvement may be great, but need to overcome more constraints. For a single individual, maybe curative services are helpful for his health, but for a population the situation may be the opposite to the same extent.
2. Improvement of equity: In general, the objective of equity improvement is relatively better achieved in preventive services than in curative services.
3. Improvement of resource utilization efficiency: It is evident that preventive services have a high resource utilization efficiency because of their nature.
4. Improvement of effectiveness of health services delivery: The situation is similar to the objective above.
5. Increasing risk-sharing or solidarity: It should be said that risk-sharing or solidarity is reflected in curative services. The reason is that the risk is the possibility of incurring the expenses due to treatment after ill. So an insurance scheme which covers curative

services is becoming necessary.

- 6 Improvement of health service quality: It is hard to make a judgement on the relation of the element of type of services covered by insurance and the objective of improvement of health service quality.

Based on the above analysis, objectives are able to be scaled in the Table 6.15 under Element 7.

Table 6.15: Scaling Values of Objectives in Element 7

E7(m) m = 1, 2...4	Objectives ($O_i, i = 1, 2...6$)					
	O_1	O_2	O_3	O_4	O_5	O_6
E7(1)	3	3	4	4	2	3
E7(2)	4	4	2	3	4	4
E7(3)	2	2	3	2	2	2
E7(4)	5	5	3	5	5	4

6.7.2 Constraints to be related:

- 1 Ability to pay: The ability of people to pay has a significant effect on the selection of service types covered by insurance. In general, if the insurance scheme to be implemented covers curative services, then a relatively high economic paying ability of people is required. For preventive services, the situation may be opposite.
- 2 People's awareness about health and health care and willingness to join health insurance: This constraint may play an important role in selecting service type to be insured. Under the circumstances of low people's awareness about health and health care and willingness to join health insurance, it is essential that the services to be covered include curative services.
- 3 Resources available: The resources available are strongly related to the element of service type to be insured. Generally speaking, if the insurance scheme to be implemented is concerned with curative services the requirements on resources available are higher than for preventive services. This is because their characteristics are different.
- 4 Price of health services: Relatively, the price of curative services is higher than preventive services, so it is possible that on this basis alone people would prefer to select preventive services to be insured. But such an effect must be considered in relation to people's needs and demands for health care. That is to say that even though the price of preventive services is low, people would not select them to be insured if they do not recognize a need for them.

- 5 Accessibility and availability of health services: This is directly related to the service types to be covered by insurance. In general, if the services are more accessible and available, they are more likely to be considered for coverage.
- 6 Operational efficiency: Both curative services and preventive services require high operational efficiency, but these have different emphases in each case.
- 7 Managerial capacity: The situation is similar to the constraint above.
- 8 Government (or authorities concerned) attitude to health insurance: In general, there is not a direct relation between this constraint and the element of service types to be insured, but there may sometimes be a preference for resource allocation to one or the other.
- 9 Politic and economic systems and policies of the State: Similarly, this constraint does not directly affect the element of service types to be insured, but again there may be a preference shown.
- 10 Health system and health policies of the State: There is a direct relation between this constraint and the element of service types to be insured. In the current situation, to implement an insurance scheme in which curative services are covered may be suitable.
- 11 State health legislation: Strictly to say, there is no relation between this constraint and the element of service types to be covered.

Based on the above analysis, we attempt to assess the possible scaling values of the constraints in the circumstances of the element of service types to be covered by insurance (Table 6.16).

Table 6.16: Scaling Values of Constraints in Element 7

E7(m)	Constraints ($C_j, j = 1, 2, \dots, 11$)										
	C_1	C_2	C_3	C_4	C_5	C_6	C_7	C_8	C_9	C_{10}	C_{11}
E7(1)	2	4	2	2	2	2	1	4	4	4	4
E7(2)	4	2	5	4	4	4	3	2	2	2	2
E7(3)	2	4	2	1	2	1	1	4	2	3	4
E7(4)	5	5	5	4	4	5	4	4	4	4	4

6.8 Element 8: health care institution providing services

This element is concerned with what levels (village, township, or county) the health care institutions (hospitals) contracted with the insurer should be in. It is strongly related to the consumption and provision of health care services. But the effects of the element on the objectives are also very complicated. If the contracted hospitals are set at low level, e.g. village clinic, the accessibility of health services is high, but the availability of effective health services is not too good, and vice versa for higher level hospital e.g. county hospital. That makes it difficult to judge the extent to which objectives are achieved. In a word, this element relates to many factor and conditions.

6.8.1 Objectives to be related:

- 1 Improvement of health: For a population who have got a relatively high level of health status, if the contracted institutions are set at a low level the objective of health improvement may be limited. Comparatively, for a population who have a relatively low level of health status and of paying ability, if the contracted hospitals are set at a low level the objective of health improvement may be greatly achieved.
- 2 Improvement of equity: If the contracted hospitals are set at a low level, it means health services are more accessible for all insured, then the objective of equity improvement in health care may be achieved to a satisfactory extent. But considering the implication of equity in availability, it is more appropriate that the contracted hospitals are set at a high level.
- 3 Improvement of resource utilization efficiency: In the case of Guangxi, if the contracted hospitals are set at a low levels, a high efficiency of resource utilization may be easily achieved. However, such judgement is often difficult to make.
- 4 Improvement of effectiveness of health services delivery. The situation may be similar to the objective above, but high level's hospitals usually have high effectiveness in terms of quality of service.
- 5 Increasing risk-sharing or solidarity: Commonly, the element of levels of health care institutions providing services is not obviously related to this objective. But when the economic burden incurred by some serious diseases is considered, it is useful to increase risk-sharing or solidarity if the contracted hospitals are set at high levels.
- 6 Improvement of health service quality: According to the current situation, if the contracted hospitals are set at low levels, pressures are put on them to improve health service quality.



Based on the above analysis, objectives are able to be scaled in the Table 6.17 under Element 8.

Table 6.17: Scaling Values of Objectives in Element 8

E8(m) m = 1,2...8	Objectives (O _i , i = 1,2...6)					
	O ₁	O ₂	O ₃	O ₄	O ₅	O ₆
E8(1)	1	2	3	2	1	4
E8(2)	2	3	4	3	3	4
E8(3)	2	3	4	3	3	3
E8(4)	1	1	2	1	2	1
E8(5)	5	4	3	4	5	3
E8(6)	4	5	5	5	4	3
E8(7)	3	4	4	4	4	4
E8(8)	3	4	4	4	4	4

6.8.2 Constraints to be related:

- 1 Ability to pay: If the contracted institutions are set at high levels, that means a high premium is, usually, required. In the case of low economic paying ability, it seems that the contracted hospitals should be set at lower levels.
- 2 People's awareness about health and health care and willingness to join health insurance: From the view of common people, they are always willing to be covered in higher level hospitals. However, such selection of the level of health care institutions providing services is not dependent on this constraint, but is dependent on other factors such as ability to pay. That is to say this constraint is not directly related to the element of level of health care institutions providing services.
- 3 Resources available: If the contracted hospitals are set at high levels, there may have to be high requirements for resources.
- 4 Price of health services: Because of higher prices of health services in higher level hospitals, it is disadvantageous to set the contracted hospitals at that level. That is, the contracted hospitals should be selected at the level where the price of health service is not too high.
- 5 Accessibility and availability of health services: Low level hospitals may often be accessible but not available, and vice versa for high level hospitals. In the effects of this constraint, the contracted hospitals had better be at all levels except those higher than county hospitals.
- 6 Operational efficiency: Under the current circumstances, because of low operational efficiency, it is not appropriate to set the

contracted hospitals at low levels.

- 7 Managerial capacity: The situation is similar to the constraint above.
- 8 Government (or authorities concerned) attitude to health insurance: It is hard to judge the effects of this constraint on the element of level of health care institution providing services. It is really a factor affecting decision making.
- 9 Politic and economic systems and policies of the State. In general, there is not a direct relation between this constraint and the element of health care institutions providing services.
- 10 Health system and health policies of the State: This constraint is not strongly related to the element, but it can affect the activities of instituteion at all levels.
- 11 State health legislation: There is not an obvious relation between this constraint and the element of health care institution providing services.

Based upon the above assessment, we bestow scaling values for each constraint in terms of the alternatives of the element of health care institute providing services (Table 6.18).

Table 6.18: Scaling Values of Constraints in Element 8

E8(m)	Constraints										
	(C _j , j = 1,2,...,11)										
m=1,...8	C ₁	C ₂	C ₃	C ₄	C ₅	C ₆	C ₇	C ₈	C ₉	C ₁₀	C ₁₁
E8(1)	1	1	4	1	1	2	2	3	3	3	2
E8(2)	2	1	3	2	2	3	2	3	3	3	2
E8(3)	3	2	2	3	3	3	2	2	4	3	2
E8(4)	4	3	4	2	5	4	3	1	4	4	3
E8(5)	5	4	1	5	3	5	4	3	5	5	3
E8(6)	4	3	1	4	2	4	3	3	4	3	2
E8(7)	3	2	2	3	2	3	2	3	3	3	2
E8(8)	3	2	2	3	2	3	2	3	3	3	2