CHAPTER 3

RESEARCH METHODOLOGY

This study is concerned with the macro level using process indicators of budget allocation for general and regional hospitals in Thailand to access the equity regarding population health needs in terms of budget allocation to hospital needs

The study use the Resource Allocation Working Party (RAWP) as the model to manage England's resource supply in order to equitably allocate to every region, according to health needs. By considering how to separate the resources related to population, number of population, social factors and the Standardized Mortality Ratio (SMR) are needed to weight population. To manage the budget for the public health the weighted population can be :

$$WP = POP(1+a)(1+n)(1+c)$$

In 1981 Maynard and Ludbrook adapted the method of RAWP in order to compare between England, France and The Netherlands. They found that there were inequitable in giving the budget as these fewer regions in England than in France or The Netherlands. And study from Linda by uses the method of RAWP to make the budget for the provincial public health department in each region using the number of population , mortality rate, average income, non-budget, the revenue of social security funds, number of out patient visits, number of day admissions, and number of beds. This study shows that the number of beds is the most significant variable for managing of the budget of the region and the number of day admission and out patient visits come second .

From the concept of the budget allocation formula in England, a budget allocation formula for general and regional hospitals in Thailand can be determined. So these studies apply the weighted population of England, but omit the relative cost because there is not much information and some variable for suitable budget allocation of general and regional hospital in Thailand from Linda's study should be added and then referral rate should be adjusted in the equation of weight population. Because general hospitals are limited in taking care of the patient and this should be taken into consideration when

managing the budget as well. In this study it is assumed that regional and general hospitals have equal efficiency. The equity is defined as an equity of input and output for equal need.

3.1. Conceptual framework for budget allocation

The objective of this study is to compare budget allocation between the expected and actual budget allocation by analyzing the pattern of budget allocation in 1997 from MOPH to regional and general hospitals (Actual budget). The expected budget allocation has factors that hospitals need (Input and output), social factors, non-government budget and social security schemes which calculate weight population according to four factors (Figure 3.1). This is shown in equation 3.1 to 3.8 of this study.

Factor 1. Hospital Needs Factor :

- Hospital Needs in terms of input variables that the variable are mortality rate adjustment and bed rate.

- Hospital Needs in terms of output variable that the variable are out patient visit rate, day admission rate and referral rate.

Factor 2. Social Structure Factor : This consists of the variable that age group 0-12 years rate, age group more than 60 years rate and income gap rate.

Factor 3. Non-government Budget Factor
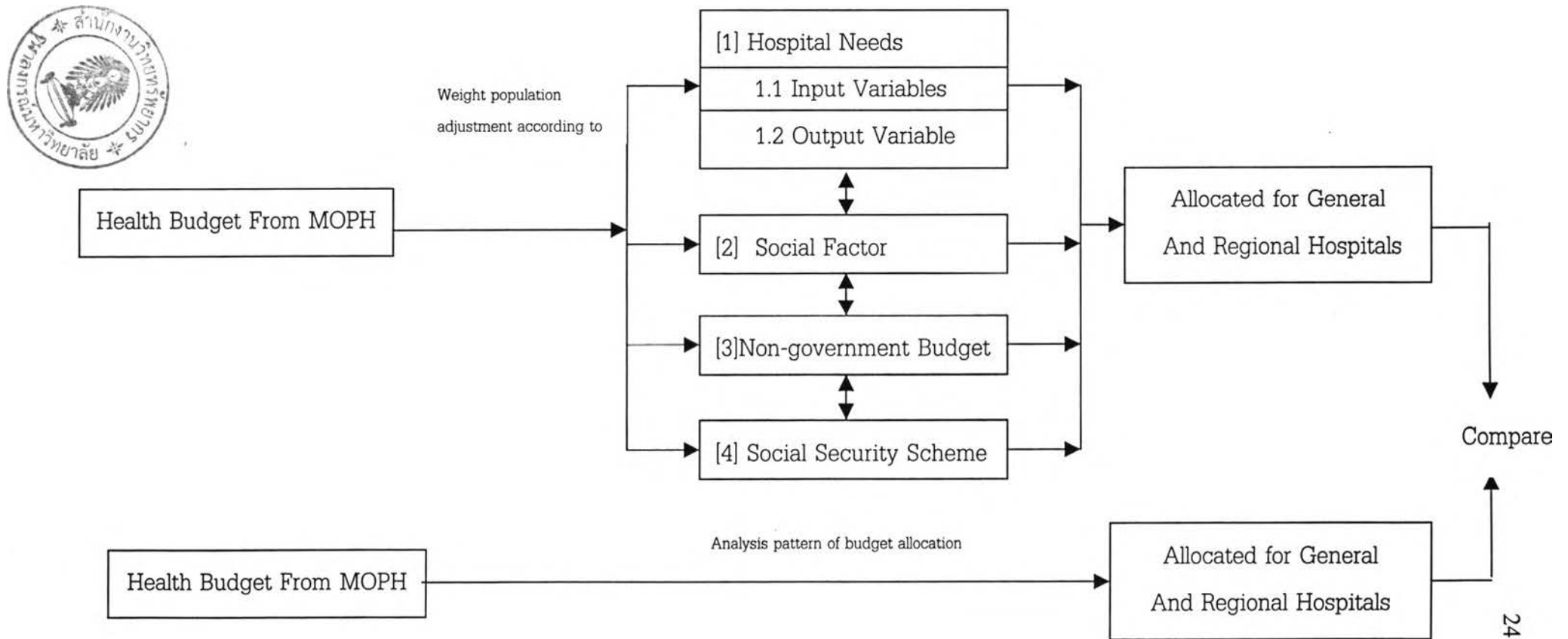
Factor 4. Social Security Scheme Factor

Comparison between expected and actual budget allocation of each hospital. It show in equation 3.8.

If the budget ratio value equals 1 unit, this means that the actual budget allocation has equity budget allocation for the hospital.

On the other hand, If the budget ratio value is more or lower than 1 unit , it means that actual budget allocation has inequity for the hospital. If the budget ratio value is less than 1 unit, actual budget allocation is more than expected budget allocation. If the

provide budget ratio value more than 1 unit, it show that the government should more subsidy for this hospital as expected budget allocation more than actual budget allocation.

Figure 3.1 Conceptual Framework For Budget Allocation in 1997

Weight population
adjustment according to

Health Budget From MOPH	

[1] Hospital Needs

1.1 Input Variables

1.2 Output Variable

[2] Social Factor

[3] Non-government Budget

[4] Social Security Scheme

Allocated for General And Regional Hospitals

Analysis pattern of budget allocation

Health Budget From MOPH

Allocated for General And Regional Hospitals

Compare

3.2. The variables reflected in budget allocation

The variables reflected in budget allocation for general and regional hospitals in Thailand in this study are made up of four factors as shown in table 3.1 (It shows the name of the variables and explains each variable).

This part explains the rationale of each variable in equation 3.1 to 3.6

3.2.1 Hospital needs

<u>Input variable</u>

- Mortality rate adjustment (MTR) : Mortality rate was the indicator used to compare health status of each region and shows severity of disease. The more severe diseases consume more resources. If hospitals have higher mortality rates they should be allocated more resources. This study calculates mortality rate and mortality rate adjustment as follows :

$$\text{Mortality rate} = \frac{\text{number of deaths in each province, in 1997}}{\text{number of deaths in Thailand in 1997}}$$

$$\text{Mortality rate adjustment} = \frac{\text{mortality rate for each province}}{\text{mortality rate in Thailand}}$$

- Bed rate (BR)_:The hospitals have a different number of beds. If a hospital has many beds, it means this hospital's manager need more resources to serve the customers. For example, they need more physicians, nurses, other health officials and more equipment .

<u>Output variable</u>

- Out patient visit rate (OVR) : The public hospital serve the people but most patients are low income, welfare scheme, health card, aged 0-12 years or more than 60 years. If the public hospital has more of these typed of

patient and these patients often visit the hospital, the hospital will have to risk to using their own resources to serve these patients. So these hospitals need more resources from MOPH.

- Admission day rate (AR) : The hospital use the resource to treat patients every day. If the patients are admitted to the hospital for a long time, the hospital has to spend more resources. In this case, the hospital needs more resources to help patients. This variable relates to the budget allocation for hospitals. And that 's the reason MOPH should allocate more budget to the hospital.

- Referral rate (RR) : Some hospitals lack equipment , technology and medical specialists, so they have to refer patients who have more severe disease to a hospital where there is more equipment, technology, and more specialised personnel.

3.2.2. Social structure

- Age: The age 0-12 years rate (A1R) and more than 60 years rate (A2R) take into account the higher risk factors these age-groups face and thei greater for need health services. These groups have free medical card. It means that cards. This means that holders of the free medical card are entitled to free medical care at government hospitals. The card is issued to a individuals. So if these hospitals have more patients in these groups, the government should give more subsidy for these groups.

- Income gap rate (IGR) : This adjusts for differences between average income poverty lines in each province. Patients's income refects their ability to pay as it is a means to obtain food and shelter to maintain health. In the health care system, income is also important to purchase health care when in need. If they get more income and the income gap rate is higher, they should have more ability to pay for their health care service and the hospital will need less subsidy. On the other hand ,the lower income groups and a lower income gap rate means low ability to pay for health care services and

need hospitals in such provinces   more subsidy from   the government to achieve equity.

3.2.3. Non-government budget (NBR)   : This is   the revenue which the hospital   receives from   the   patient, donations or the other revenue outside government budget. A hospital may   get more   revenue because it is located in a high income area or it receive large donations. So these hospital need less subsidy from the MOPH.

3.2.4. Social security scheme rate (SSR) : Workers at an establishment with more than 10 workers are required by the Social Security Act to contribute a monthly income to the Social Security Fund to cover free medical services at contracted health institutions. And most of the people on social security schemes are healthy. A few of them get minor injuries at work . The hospital don' t have to spend anything on their health care. but the social security office has to pay for them. If the hospital has a lot of patients covered by social security, it receives more revenue than it has to expended on social security. So the government should allocate less budget to such hospitals than to others.

Table 3.1 List of Variables (Annual year 1997)

name of variable	variable	definition	observation basis	sources	weighted sign (+ or -)
1 . Hospital Needs 1.1 Input Variables 1. Mortality rate adjustment	MTR	$$\frac{\text{mortality rate for each province}}{\text{mortality rate in Thailand}}$$	province	national statistical office	+
2. Bed rate	BR	$$\frac{\text{number of beds in each hospital}}{\text{total number of beds in general and regional hospitals}}$$	hospital	The provincial hospital division (MOPH)	+
1.2 Output Variables 3. Out patient visit rate	OVR	$$\frac{\text{number of out patient visits for each hospital}}{\text{total number of out patient visits for general and regional hospitals}}$$	hospital	The provincial hospital division (MOPH)	+
4. Admission day rate	AR	$$\frac{\text{number of day admissions for each hospital}}{\text{total number of day admissions for general and regional hospitals}}$$	hospital	The provincial hospital division (MOPH)	+
5 .Referral rate	RR	$$\frac{\text{number of referals for each hospital}}{\text{total number of referais for general and regional hospitals}}$$	hospital	The provincial hospital division (MOPH)	+

(CONTINUED)

name of variable	variable	definition	observation basis	sources	weighted sign (+ or -)
2 Social Factor					
6. Age 0-12 years rate	A1R	$$\frac{\text{number of people aged 0-12 years in each province}}{\text{total number of people age 0-12 years in Thailand}}$$	province	National statistical office	+
7. Age more than 60 years rate	A2R	$$\frac{\text{number of people year age more than 60 years for each province}}{\text{total number of people year age more than 60 years in Thailand}}$$	province	National statistical office	+
8. Income gap rate	IGR	$$\frac{\text{(Average income for each province) - (Poverty line for each province)}}{\text{GDP per head in Thailand}}$$	province	National statistical office	-
3. Non-Budget					
9. Non-budget rate	NBR	$$\frac{\text{non-budget for each hospital}}{\text{total non-budget for general and regional hospitals}}$$	hospital	The provincial hospital division (MOPH)	-
4. Social Security Scheme					
10.Social security Scheme rate	SSR	$$\frac{\text{number of insured people in social security schemes for each hospital}}{\text{total number of insured people in social security schemes for general and regional hospitals}}$$	hospital	Social security office	-

3.3. Methodology for this study

This study used the Resource Allocation Working Party (RAWP) model which weights population according to four factors. The four factors are hospital needs (Input and output), social factors, non-government budget ,social security schemes and the set pattern for suitable budget allocation from MOPH to regional and general hospital. The study used 5 steps as follow :

(1) The variable of social factors and non-budget was a fixed variable in every equation (equation 3.1 to 3.6).

(2) The IGR,NBR and SSR variables are in equation 3.1 to 3.6 but are treated differently to other variables due to their negative weighting. So we use :

$\{1/(1+IGR)\}$, $\{1/(1+NBR)\}$ and $\{1/(1+SSR)\}$ respectively.

(3) The calculated weight population of hospital need in terms of input variable (equation 3.1) was adjusted using referral rate (equation 3.3) and social security scheme rate (equation 3.5).

(4) The calculated weight population of hospital need in terms of output variable (equation 3.2) was adjusted using referral rate (equation 3.4) and social security scheme rate (equation 3.6).

(5) Budget allocation to each of the hospitals in 1997 was calculated using weight population of equation 3.1 to equation 3.6 (equation 3.7).

(6) Expected budget allocation of equation 3.1 to equation 3.6 and actual budget allocation were compared (equation 3.8).

Finally, The pattern can be specified as follows :

3.3.1. Consideration of variable of hospital needs in terms of input (MTR, BR), of social factors (A1R, A2R,IGR) and non-budget(NBR)

$$WP=POP(1+MTR)(1+BR)(1+A1R)(1+A2R)\{1/(1+IGR)\}\{1/(1+NBR)\}$$

$$\dots\dots\dots\dots\dots\dots(3.1)$$

3.3.2. Consideration of variable of hospital needs in terms of output (OVR, AR), of social factors (A1R, A2R,IGR) and non-budget(NBR)

$$WP = POP(1+OVR)(1+AR)(1+A1R)(1+A2R)\{1/(1+IGR)\}\{1/(1+NBR)\}$$

$$\dots\dots\dots\dots\dots\dots\dots\dots\dots(3.2)$$

3.3.3. Consideration of equation 3.1 adjusting for referral rate (RR)

$$WP = POP(1+MTR)(1+BR)(1+A1R)(1+A2R)\{1/(1+IGR)\}\{1/(1+NBR)\}$$
$$(1+RR) \dots\dots\dots\dots\dots\dots\dots(3.3)$$

3.3.4. Consideration of equation 3.2 and adjusting for referral rate (RR)
$$WP = POP(1+OVR)(1+AR)(1+A1R)(1+A2R)\{1/(1+IGR)\}\{1/(1+NBR)\}$$
$$(1+RR) \dots\dots\dots\dots\dots\dots\dots(3.4)$$

3.3.5. Consideration of equation 3.1 adjusting social security scheme rate (SSR)

$$WP = POP(1+MTR)(1+BR)(1+A1R(1+A2R)\{1/(1+IGR)\}\{1/(1+NBR)\}$$
$$\{1/(1+SSR)\} \dots\dots\dots\dots\dots\dots(3.5)$$

3.3.6. Consideration of equation 3.2 and adjusting for social security scheme rate (SSR)

$$WP = POP(1+OVR)(1+AR)(1+A1R)(1+A2R)\{1/(1+IGR)\}\{1/(1+NBR)\}$$
$$\{1/(1+SSR)\} \dots\dots\dots\dots\dots\dots(3.6)$$

3.3.7. Calculation of budget allocation to each of the hospitals in 1997 using weight population of equation 3.1 to equation 3.6

$$EBi = \left[\frac{wp_i}{\sum\limits_{i=1}^{n=92} WPi}\right]\left[\sum\limits_{i=1}^{n=92} ABi\right]$$

.............................(3.7)

WP = weight population of equation 3.1 to equation 3.6

EB = expected budget allocation of each hospital, in 1997

AB = Actual budget allocation of each hospital, in 1997

i = 1,2,3,4,5,6,..............,92

3.3.8. Comparison between expected budget allocation of equation 3.1 to equation 3.6 and actual budget allocation

$$RR_i = \frac{EB_i}{AB_i}$$

..............................(3.8)

RR = ratio of expected budget allocation and actual budget allocation

EB = expected budget allocation of each hospital.

AB = Actual budget allocation of each hospital.

i = 1,2,3,4,5,6,..............,92

If RR = 1, The hospital receives an actual budget equal to the expected budget.

If RR > 1, The hospital receives an actual budget less than the expected budget.

If RR < 1, The hospital receives an actual budget more than the expected budget.

3.4. Population and sample

The population of this study consists of all the general and regional hospitals in Thailand

- 67 general hospitals

- 25 regional hospitals

3.5.Data processing

This study collected secondary data from these source :

- The data of budget allocation to general and regional hospitals and finance in hospitals by Provincial Hospital Division and The Health Insurance Office , Ministry of Public Health (budget allocation report,1997 and the criteria of budget allocation, 1997)

- The data of number of population and structure of population in Thailand, National of Statistical office, 1997

- The data of number of social security scheme for each hospital from the Social Security Office.