Chapter 5
Results and Discussion

5.1 Determination of disease weight

According to the Delphi process which was discussed in Chapter 4, 5 medical experts were invited to give a weighting to different diseases. Here the weight of death is one, compared with death , the weight for each disease was given by the experts. The two-rounds result is shown in Tables 6.1 and 6.2.

Due to the fact that experts had different backgrounds and experience, the variance of the first round results was large. We fed back the first round result to the experts and asked them to give us further information. The standard deviation of the second round was less than the first round. It means that the second round results are better than those from the first round.

Two types of diseases were omitted due to their small weight or lower morbidity rate. They are: polio, rabies, influenza, other injuries or poison, glaucoma and cataract.

The general morbidity rate for communicable disease is

$$Y_c = 0.61A1 + 0.89A2 + 0.6A3 + 0.6A4 + 0.35A5 + 0.32A8 + 0.74A9 + .47A10 + 0.6A11 + 0.6A12 + 0.45A13 + 0.34A14 + 0.38A15 + 0.6A16$$

The general morbidity rate for non-communicable disease is

$$Y_{nc} = 0.78B1 + 0.78B2 + 0.76B3 + 0.77B4 + 0.76B5 + 0.86B6 + 0.75B7 + 0.51B8 + 0.33B9 + 0.62B10 + 0.36B11 + 0.33B12 + 0.36B13 + 0.41B14 + 0.48B15 + 0.31B16 + 0.4B17 + 0.41B18 0.38B19 + 0.32B21 + 0.41B22 + 0.5B23 + 0.32B24 + 0.44B25 + 0.39B26 + 0.47B27 + 0.34B28 + 0.37B29 + 0.38B30 + 0.42B31$$

A1-A17 and B1-B31 are the index of disease, the name of each one is shown in the following table.

Table 5.1 First Round Result of Disease Weighting

Disease Name and ID	Expert A	Expert B	Expert C	Expert D	Expert E	Mean	SD
typhoid fever (A1)	0.85	0.45	0.52	0.77	0.44	0.61	0.190
choler (A2)	0.90	0.90	0.86	0.88	0.85	0.88	0.023
tetanus (A3)	0.75	0.40	0.46	0.68	0.42	0.54	0.161
Arthrop-born encephalitis (A4)	0.80	0.50	0.44	0.71	0.47	0.58	0.161
whooping cough (A5)	0.42	0.30	0.30	0.35	0.45	0.36	0.068
rabies (A6)	0.95	0.89	0.80	0.95	0.89	0.90	0.061
polio (A7)	0.60	0.45	0.42	0.52	0.46	0.49	0.071
syphilis (A8)	0.40	0.30	0.30	0.20	0.40	0.32	0.084
Hemorrhagic fever (A9)	0.90	0.50	0.80	0.88	0.65	0.75	0169
Tuberculosis (A10)	0.55	0.40	0.40	0.51	0.40	0.45	0.073
Septicemia (A11)	0.85	0.50	0.44	0.75	0.47	0.60	0.185
Measles (A12)	0.80	0.40	0.30	0.68	0.35	0.51	0.221
Viral hepatitis (A13)	0.50	0.40	0.45	0.49	0.43	0.45	0.041
Malaria (A14)	0.55	0.30	0.20	0.46	0.25	0.35	0.147
Schistosomiasis (A15)	0.50	0.30	0.30	0.45	0.30	0.37	0.097
Septicemia (A16)	0.85	0.50	0.44	0.75	0.47	0.60	0.019
Malignant neoplasm of nasopharynx (B1)	0.80	0.78	0.77	0.80	0.78	0.79	0.013
Malignant neoplasm of esophagus (B2)	0.80	0.80	0.75	0.78	0.80	0.79	0.021
Malignant neoplasm of stomach (B3)	0.80	0.80	0.75	0.70	0.68	0.75	0.055
Malignant neoplasm of colon (B4)	0.82	0.80	0.75	0.78	0.68	0.77	0.054
Malignant neoplasm of rectum (B5)	0.80	0.80	0.75	0.75	0.69	0.76	0.045
Malignant neoplasm of liver (B6)	0.90	0.95	0.85	0.80	0.80	0.86	0.065
Malignant neoplasm of trachea and lung(B7)	0.80	0.80	0.75	0.70	0.70	0.75	0.050
Malignant neoplasm of breast (B8)	0.60	0.55	0.50	0.45	0.50	0.52	0.057
Malignant neoplasm of cervix uteri (B9)	0.45	0.30	0.20	0.39	0.25	0.32	0.102

Table 5.1: (Continued...)

Disease Name and ID	Expert A	Expert B	Expert C	Expert D	Expert E	Mean	SD
Hodgkin's disease (B10)	0.6	0.75	0.66	0.72	0.45	0.64	0.119
Begign neoplasm (B11)	0.40	0.40	0.30	0.38	0.30	0.36	0.052
Diabetes mellitus (B12)	0.40	0.30	0.30	0.38	0.30	0.34	0.049
Nutritional deficiencies (B13)	0.40	0.30	0.35	0.39	0.33	0.35	0.042
anaemias (B14)	0.50	0.30	0.40	0.48	0.35	0.41	0.085
Dis.of blood and blood-forming organs (B15)	0.60	0.30	0.50	0.58	0.40	0.48	0.126
Mental disorders (B16)	0.40	0.30	0.25	0.36	0.28	0.32	0.061
Dis. of the ear and mastoid process (B17)	0.40	0.30	0.45	0.41	0.46	0.40	0.028
Acute rheumatic fever (B18)	0.45	0.40	0.50	0.46	0.28	0.42	0.084
Chronic rheumatic heart disease (B19)	0.20	0.40	0.50	0.28	0.45	0.37	0.123
Hypertension (B20)	0.30	0.30	0.40	0.33	0.35	0.34	0.042
Pneumonia (B21)	0.20	0.30	0.45	0.26	0.38	0.32	0.098
Ulcer (B22)	0.50	0.40	0.30	0.45	0.30	0.39	0.089
chron.&unspecfied emphysema and asthma B23	0.50	0.40	0.60	0.53	0.50	0.51	0.072
Appendicitis chronic liver Dis.and cirrn B24	0.35	0.25	0.42	0.37	0.34	0.34	0.062
cholelithiasis and cholecystitis (B25)	0.45	0.45	0.56	0.48	0.28	0.44	0.102
Nephrotic syndrome and nephrosis (B26)	0.45	0.35	0.36	0.43	0.36	0.38	0.046
Complication of the puerperium (B27)	0.63	0.36	0.40	0.57	0.38	0.47	0.123
Congenital anomalies of heast and circu.sys.B28	0.30	0.30	0.50	0.35	0.26	0.34	0.094
Birth truma Fractures (B29)	0.40	0.40	0.42	0.41	0.20	0.37	0.093
Dislocation, sprains and strains (B30)	0.40	0.30	0.50	0.43	0.20	0.37	0.117
Burns (B31)	0.60	0.3	0.50	0.58	0.10	0.42	0.212
Other injuries or poison (B32)	0.20	0.30	0.10	0.18	0.05	0.17	0.096
Glaucoma (B33)	0.30	0.30	0.10	0.25	0.05	0.20	0.117
Cataract (B34)	0.35	0.20	0.05	0.28	0.01	0.18	0.145
influenza (A17)	0.50	0.02	0.10	0.40	0.01	0.19	0.226

Table 5.2 Second Round Result of Disease Weighting

Disease ID	Expert A	Expert B	Expert C	Expert D	Expert E	Mean	SD
A1	0.75	0.50	0.55	0.70	0.55	0.61	0.108
A2	0.90	0.90	0.88	0.88	0.88	0.89	0.011
A3	0.75	0.70	0.45	0.50	0.60	0.60	0.127
A4	0.70	0.55	0.50	0.70	0.55	0.60	0.094
A5	0.35	0.35	0.32	0.35	0.40	0.35	0.029
A6 *	0.95	0.89	0.85	0.95	0.90	0.91	0.043
A7 *	0.60	0.50	0.45	0.50	0.46	0.5	0.059
A8	0.40	0.30	0.30	0.25	0.35	0.32	0.057
A9	0.85	0.60	0.75	0.80	0.70	0.74	0.096
A10	0.50	0.45	0.45	0.48	0.45	0.47	0.023
A11	0.70	0.60	0.60	0.60	0.55	0.6	0.055
A12	0.60	0.40	0.40	0.50	0.40	0.6	0.089
A13	0.45	0.45	0.45	0.45	0.43	0.45	0.009
A14	0.40	0.32	0.30	0.40	0.30	0.34	0.052
A15	0.45	0.35	0.35	0.40	0.35	0.38	0.045
A16	0.70	0.60	0.60	0.60	0.50	0.6	0.071
B1	0.78	0.78	0.78	0.80	0.78	0.78	0.009
B2	0.78	0.8	0.75	0.75	0.80	0.78	0.023
B3	0.78	0.80	0.75	0.75	0.72	0.76	0.031
B4	0.80	0.80	0.75	0.78	0.70	0.77	0.042
B5	0.78	0.78	0.76	0.77	0.70	0.76	0.033
B6	0.88	0.92	0.86	0.84	0.82	0.86	0.036
B7	0.78	0.78	0.75	0.72	0.72	0.75	0.030
B8	0.55	0.52	0.50	0.50	0.50	0.51	0.022
B9	0.43	0.30	0.25	0.38	0.29	0.33	0.073
B10	0.58	0.68	0.66	0.70	0.50	0.62	0.083

Table 5.2(Continued...)

DISEASE NAME and ID	Expert A	Expert B	Expert C	Expert D	Expert E	Mean	SD
B11	0.38	0.40	0.35	0.38	0.30	0.36	0.039
B12	0.38	0.30	0.30	0.36	0.32	0.33	0.036
B13	0.38	0.33	0.35	0.37	0.35	0.36	0.019
B14	0.48	0.36	0.40	0.45	0.37	0.41	0.052
B15	0.55	0.40	0.50	0.54	0.42	0.48	0.069
B16	0.35	0.30	0.28	0.34	0.30	0.31	0.030
B17	0.38	0.35	0.42	0.41	0.44	0.4	0.035
B18	0.43	0.40	0.45	0.46	0.32	0.41	0.058
B19	0.30	0.40	0.45	0.32	0.42	0.38	0.065
B20	0.32	0.30	0.35	0.34	0.35	0.28	0.139
B21	0.25	0.32	0.45	0.26	0.30	0.32	0.080
B22	0.48	0.40	0.35	0.45	0.35	0.41	0.059
B23	0.50	0.45	0.55	0.52	0.50	0.50	0.036
B24	0.35	0.29	0.30	0.34	0.34	0.32	0.027
B25	0.45	0.45	0.48	0.46	0.38	0.44	0.038
B26	0.42	0.38	0.36	0.40	0.38	0.39	0.023
B27	0.60	0.40	0.42	0.52	0.40	0.47	0.089
B28	0.32	0.3	0.46	0.34	0.30	0.34	0.067
B29	0.38	0.38	0.42	0.41	0.28	0.37	0.055
B30	0.38	0.33	0.48	0.40	0.32	0.38	0.064
B31	0.56	0.40	0.42	0.50	0.20	0.42	0.137
B32 **	0.20	0.30	0.15	0.25	0.12	0.20	0.073
B33 **	0.28	0.28	0.15	0.20	0.10	0.20	0.079
B34 **	0.33	0.20	0.08	0.20	0.08	0.18	0.104
A17 *	0.40	0.08	0.10	0.30	0.08	0.19	0.149

* omitted due to low morbidity rate.
** omitted due to low weight.

5.2 Predication of Morbidity Rate for 5 Counties in 9 Years

MOH conducted the National Health Service survey in 1992. Totally 90 counties were selected using sample technical. Some indicators in the survey were selected to predicate the morbidity rate of each county in 9 years. There are two models. One is a model for predicating the morbidity rate of communicable disease, the other is for the non-communicable disease. The dependent variables are weighted morbidity rate of communicable and non-communicable disease, respectively. The weights are determined by Delphi Method, 5 medical experts. The independent variables are GCP per capita, urban-population proportion, average number of hospital beds and health staff per 1000 persons and the average health budget.

The model is

$$Y = f(\text{GNP}, \text{urb\_pop}, \text{doc}, \text{beds}, \text{budget})$$

The regression results of two models are shown in Table 5.3 and Table 5.4.

Table 5.3 Regression Result of Communicable Disease Model

Variable	Parameter Estimate	Standard Error	t	Prob > |T|
INTERCEPT	27.6992	1.5226	18.1922	0.0001
GNP	-0.0002	0.0007	-0.2519	0.8016
DOC	-0.7214	2.4934	-0.2893	0.7730
BUDGET	-0.0077	0.1028	-0.7462	0.9407
BED	-2.3000	3.7019	-0.6276	0.5361
URBAN	-0.0575	0.0337	-1.7085	0.0912

Adjusted R^2 = 0.411 Number of observations = 90

Table 5.4 Regression Result of Non-communicable Disease Model

Variable	Parameter Estimate	Standard Error	t	Prob > |T|
INTERCEPT	37.4534	2.1888	17.1114	0.0001
GNP	-0.0002	9.4E-4	-0.2592	0.7962
DOC	-4.5840	3.5844	-1.2788	0.2045
BUDGET	-0.0463	0.1477	-0.3131	0.7550
BED	5.6484	5.3217	1.0614	0.2916
URBAN	-0.0800	0.0484	1.6523	0.1022

Adjusted R^2 = 0.32 Number of observations = 90

The regression results in Tables 5.3 and 5.4 demonstrate that only about 40 % of variation of the dependent variable can be explained by these independent variables. The relatively small R square indicates that some explanatory variables are not accounted in this model, and/or some of selected independent variables may not be good proxies of mentioned aspects for determining the disease. In fact there are many factors which should affect the morbidity , e.g. the education level of local people, medical insurance coverage, immunization coverage, average health expenditure , some natural factors and so on.

If we can improve the model or use another kind of model, maybe we can obtain better predicating results of morbidity in 5 counties for 9 years.

Another problem is the sample size of the national survey was not big enough. If the sample size is bigger, we can obtain better predicated results.

Predicated morbidity rate of communicable and non-communicable disease are obtained from the two models. The results are shown in Tables 5.5 and Table 5.6.

Table 5.5 Predicated Result of Communicable Disease Morbidity Rate (1/1000)

Year	SY	Qi	JR	DY	LP
1985	11.65	13.52	11.19	11.35	17.85
1986	12.05	13.97	11.29	11.96	17.97
1987	11.05	13.15	10.46	10.32	17.46
1988	11.17	12.74	9.96	9.35	16.78
1989	11.00	12.33	9.50	9.27	16.62
1990	10.98	12.35	9.33	8.68	16.56
1991	11.39	12.32	8.75	8.23	16.35
1992	11.04	12.04	7.39	7.64	17.55
1993	10.92	11.16	7.12	7.49	15.06

Table 5.6 Predicated Result of Non-communicable Disease Morbidity Rate (1/1000)

Year	SY	Qi	JR	DY	LP
1985	10.16	11.57	9.40	11.96	14.46
1986	10.96	12.79	9.20	13.01	15.97
1987	9.61	11.96	9.52	12.79	15.67
1988	9.07	12.71	9.82	12.23	15.43
1989	9.09	11.54	9.87	12.23	15.33
1990	8.79	12.76	10.91	13.00	16.05
1991	7.93	12.35	12.91	13.86	16.57
1992	7.37	13.19	14.00	13.24	18.99
1993	6.43	10.53	14.62	12.05	19.23

5.3 Allocative Efficiency of Public Health Budget

According to the empirical model which was discussed in Chapter 4, to obtain the marginal effect of different activities, a group of log-linear regression models was built. A large part of the data comes from a special survey which was conducted by CAPM in 1994. The purpose of the survey was to

describe the health financing status in different regions in different stages of development of China. The indicators collected were: GCP, population number, urban population proportion, curative budget, preventive budget, immunization coverage, and mother and new born health service coverage. Some other indicators were gotten from each province ''Year Book''. They are consumer price index, average doctors and hospital beds number per 1000 person . The time period was from 1985 to 1993. The total includes 5 counties. All the economic indictors were converted into 1985 values using their own consumer price index (consumer price index shown in Appendix I). We should use GCP deflator discount GCP value, but due to limited time, we have not found it in the ''Year Book''.

For controlling communicable disease and non-communicable disease, the functions of curative and preventive approaches are not the same. They can not be combined into a single model. So three types of model were established. They are death, communicable disease and non-communicable disease models, respectively. Economic reform changed the budget allocation style . So each type of model should be divided into at least two parts, before and after reform. A problem is that the health policy reform was not conducted at a certain time point. Actually it was reformed step by step. To make the problem simpler, we assumed that reform was conducted at the end of 1989. Each type of model contains two parts: before and after reform . The parameters which are obtained from the model could be used to evaluate the allocative efficiency during the economic reform.

5.3.1 Regression Result

The log linear regression results of models are presented in Tables 5.7-5.12

Table 5.7 Regression Result of Death Model
(Before Reform)

Variable	Parameter Estimate	Standard Error	t	Prob > |T|
INTERCEPT	2.1069	0.4857	4.337	0.0015
X1	-0.2355	0.0315	-7.458	0.0001
DGNP	-0.0003	6E -05	-5.684	0.0002
U_PROP	-1.1718	0.9963	-1.176	0.2668
DOCTOR	0.0169	0.0088	1.924	0.0832
BED	0.0094	0.0027	3.534	0.0054
CURATIVE	-0.1429	0.0222	-6.428	0.0001
PREV	-0.1213	0.0777	-1.563	0.1492
IMM	0.0006	0.0027	0.259	0.8011
MOTHER	0.0033	0.0019	1.792	0.1035

Adjusted R^2 = 0.61 Number of observations = 20

Table 5.8 Regression Result of Death Model
(After Reform)

Variable	Parameter Estimate	Standard Error	t	Prob > |T|
INTERCEPT	1.6341	0.5091	3.210	0.0093
X1	-0.1676	0.0368	-4.559	0.0010
DGNP	.00008	.00002	-4.292	0.0016
U_PROP	-0.6268	0.5464	-1.147	0.2779
DOCTOR	0.0054	0.0029	1.876	0.0902
BED	0.0030	0.0022	1.396	0.1929
CURATIVE	-0.0687	0.0157	-4.367	0.0014
PREV	-0.1011	0.0917	-1.103	0.2958
IMM	0.0045	0.0031	1.455	0.1763
MOTHER	-0.0010	0.0029	-0.103	0.7469

Adjusted R^2 = 0.58 Number of observations = 20

Table 5.9 Regression Result of Communicable Disease Model (Before reform)

Variable	Parameter Estimate	Standard Error	t	Prob > |T|
INTERCEPT	1.4211	0.4218	3.369	0.0071
X1	-0.0684	0.0144	-4.755	0.0008
DGNP	-0.0003	.00005	-5.595	0.0002
U_PROP	1.6512	0.9466	1.744	0.1117
DOCTOR	-0.0013	0.0087	-0.147	0.8861
BED	-0.0051	0.0022	-2.295	0.0447
CURATIVE	-0.0253	0.0196	-1.289	0.2263
PREV	-0.0376	0.0525	-0.715	0.4908
IMM	0.0030	0.0021	1.423	0.1853
MOTHER	-0.0050	0.0018	-2.768	0.0199

Adjusted R^2 = 0.411 Number of observations = 20

Table 5.10 Regress Result of Communicable Disease Model (After Reform)

Variable	Parameter Estimate	Standard Error	t	Prob > |T|
INTERCEPT	1.6533	0.5444	3.037	0.0125
X1	-0.0499	0.0183	-2.734	0.0211
DGNP	-0.0003	.00003	-8.090	0.0001
U_PROP	3.1255	0.8924	3.502	0.0057
DOCTOR	-0.0116	0.0051	-2.278	0.0460
BED	-0.0141	0.0028	-5.042	0.0005
CURATIVE	-0.0142	0.0187	-0.762	0.4636
PREV	-0.0508	0.1171	-0.434	0.6734
IMM	-0.0014	0.0044	-0.321	0.7547
MOTHER	-0.0038	0.0044	-0.864	0.4078

Adjusted R^2 = 0.92 Number of observations = 20

Table 5.11 Regress Result of Non-communicable Disease Model (Before reform)

Variable	Parameter Estimate	Standard Error	t	Prob > |T|
INTERCEPT	1.4870	0.4261	3.490	0.0051
X1	-0.0921	0.0155	-5.952	0.0001
DGNP	.00009	0.0001	0.722	0.4856
U_PROP	-3.1899	2.5874	-1.233	0.2433
DOCTOR	0.0011	0.0174	0.063	0.9510
BED	0.0202	0.0076	2.653	0.0225
CURATIVE	-0.1077	0.0484	-2.227	0.0478
PREV	-0.0489	0.1308	-0.374	0.7155
MOTHER	0.0008	0.0044	0.185	0.8569

Adjusted R^2 = 0.411 Number of observations = 20

Table 5.12 The Regress Result of Non-communicable Disease Model (After Reform)

Variable	Parameter Estimate	Standard Error	t	Prob > |T|
INTERCEPT	3.3395	2.0802	3.477	0.1524
X1	-0.0877	0.0271	-4.085	0.0142
DGNP	-.00005	.00009	0.711	0.5846
U_PROP	-1.2419	1.8170	0.070	0.5163
DOCTOR	-0.0022	0.0548	0.506	0.9689
BED	0.0007	0.0192	1.410	0.9722
CURATIVE	-0.0238	0.1585	-1.531	0.1773
PREV	-0.0217	0.5911	-0.542	0.7246
MOTHER	-0.0030	0.0164	-1.083	0.8596

Adjusted R^2 = 0.4211 Number of observations = 20

In equations:

x1= lag mortality or morbidity
DGNP = average GCP (1985 value)
U_PROP = urban population proportion
DOCTOR = average hospital beds posses
BED = average hospital beds posses
CURATIVE = average curative budget

PREV = average preventive budget
IMM = immunization coverage
MOTHER = mother and new born health service coverage

5.3.2 Regression Result Discussion

Due to the limited observation, the results were not as good as we expected. Some results were as we expected, such as average GCP, average curative and preventive budget which has negative effect on the mortality or morbidity. But some results were different from we expected, e.g. immunization should also have a negative effect on the results, in the some regressions, the coefficient is positive . The reason was maybe the immunization coverage everywhere was very high after 1985. It can not reflect the real relation between the input and outcome.

5.3.3 Marginal Effect of Different Activities

The marginal effect of curative care and preventive care can be calculated using the coefficient and the mortality or morbidity. The results of different types (death, communicable disease and non-communicable disease) for three years (current year, next year and third year) are shown in Table 5.13a, Table 5.13b and Table 5.13c .The summary results are shown in the following Table 5.13d and Table 5.14. The population of each county was used as a weight to get the weighted means.

Table 5.13a Three Year Marginal Effect of Prevention and Treatment for Death

		Prevention				Treatment			
County	Year	t year	t+1 year	t+2 year	total	t year	t+1 year	t+2 year	total
QI	1985	0.000649	0.000560	0.000559	0.001769	0.000764	0.000659	0.00057	0.00200

Table 5.13a: (Continued)

		Prevention				Treatment			
County	Year	t year	t+1 year	t+2 year	total	t year	t+1 year	t+2 year	total
	1987	0.000560	0.000532	0.000531	0.001625	0.000660	0.000626	0.00055	0.00184
	1988	0.000546	0.000847	0.000846	0.002240	0.000643	0.000997	0.00089	0.00253
	1989	0.000532	0.000825	0.000824	0.002182	0.000627	0.000971	0.00087	0.00246
	1990	0.000706	0.000657	0.000656	0.002020	0.000480	0.000446	0.00039	0.00132
	1991	0.000688	0.000656	0.000655	0.002000	0.000467	0.000446	0.00039	0.00130
	1992	0.000658	0.000656	0.000655	0.001970	0.000447	0.000446	0.00039	0.00129
	1993	0.000657	0.000656	0.000655	0.001969	0.000446	0.000446	0.00039	0.00129
SY	1985	0.000813	0.000741	0.000740	0.002295	0.000957	0.000873	0.00073	0.00256
	1986	0.000800	0.000774	0.000773	0.002348	0.000941	0.000911	0.00077	0.00262
	1987	0.000742	0.000661	0.000660	0.002065	0.000874	0.000779	0.00066	0.00232
	1988	0.000775	0.000977	0.000975	0.002728	0.000913	0.001150	0.00097	0.00304
	1989	0.000662	0.000953	0.000952	0.002568	0.000780	0.001122	0.00097	0.00288
	1990	0.000814	0.000825	0.000824	0.002465	0.000553	0.000561	0.00048	0.00160
	1991	0.000795	0.000747	0.000746	0.002288	0.000540	0.000507	0.00044	0.00148
	1992	0.000826	0.000747	0.000746	0.002320	0.000561	0.000507	0.00043	0.00150
	1993	0.000748	0.000747	0.000746	0.002241	0.000508	0.000507	0.00044	0.00146
DY	1985	0.000437	0.000417	0.000416	0.001271	0.000514	0.000491	0.00044	0.00145
	1986	0.000418	0.000345	0.000345	0.001109	0.000493	0.000406	0.00037	0.00127
	1987	0.000417	0.000339	0.000339	0.001096	0.000491	0.000399	0.00036	0.00125
	1988	0.000345	0.000431	0.000431	0.001209	0.000407	0.000508	0.00047	0.00138
	1989	0.000339	0.000389	0.000389	0.001118	0.000400	0.000458	0.00042	0.00128
	1990	0.000359	0.000263	0.000263	0.000887	0.000244	0.000179	0.00016	0.00059
	1991	0.000324	0.000172	0.000172	0.000670	0.000220	0.000117	0.00011	0.00044
	1992	0.000263	0.000172	0.000172	0.000609	0.000179	0.000117	0.00011	0.00040
	1993	0.000172	0.000172	0.000172	0.000518	0.000117	0.000117	0.00011	0.00034

Table 5.13a: (Continued)

County	Year	Prevention				Treatment			
		t year	t+1 year	t+2 year	total	t year	t+1 year	t+2 year	total
JR	1985	0.000727	0.000647	0.000646	0.002021	0.000855	0.000762	0.00065	0.00227
	1986	0.000717	0.000544	0.000543	0.001805	0.000844	0.000640	0.00055	0.00203
	1987	0.000648	0.000537	0.000536	0.001722	0.000763	0.000632	0.00055	0.00194
	1988	0.000545	0.000922	0.000921	0.002389	0.000641	0.001086	0.00097	0.00269
	1989	0.000537	0.000906	0.000905	0.002349	0.000633	0.001066	0.00095	0.00265
	1990	0.000769	0.000692	0.000691	0.002153	0.000522	0.000470	0.00041	0.00140
	1991	0.000756	0.000717	0.000717	0.002191	0.000513	0.000487	0.00042	0.00142
	1992	0.000693	0.000717	0.000717	0.002128	0.000471	0.000487	0.00043	0.00139
	1993	0.000718	0.000717	0.000717	0.002153	0.000488	0.000487	0.00042	0.00140
LP	1985	0.001078	0.001029	0.001027	0.003135	0.001268	0.001212	0.00095	0.00343
	1986	0.001062	0.000976	0.000974	0.003013	0.001250	0.001149	0.00091	0.00331
	1987	0.001031	0.000962	0.000960	0.002954	0.001214	0.001132	0.00090	0.00325
	1988	0.000978	0.001188	0.001186	0.003353	0.001151	0.001399	0.00113	0.00368
	1989	0.000963	0.001161	0.001159	0.003284	0.001134	0.001367	0.00111	0.00361
	1990	0.000991	0.001044	0.001042	0.003079	0.000673	0.000709	0.00059	0.00197
	1991	0.000969	0.000931	0.000930	0.002831	0.000658	0.000633	0.00053	0.00182
	1992	0.001046	0.000931	0.000930	0.002908	0.000711	0.000633	0.00052	0.00186
	1993	0.000933	0.000931	0.000930	0.002795	0.000634	0.000633	0.00053	0.00180

Table 5.13b Three Year Marginal Effect of Prevention and Treatment for Communicable Disease

County	Year	Prevention				Treatment			
		t year	t+1 year	t+2 year	total	t year	t+1 year	t+2 year	total
QI	1985	0.000438	0.000415	0.000414	0.001267	0.000294	0.000279	0.00025	0.00083
	1986	0.000453	0.000419	0.000419	0.001292	0.000304	0.000282	0.00025	0.00084
	1987	0.000415	0.000413	0.000412	0.001241	0.000279	0.000278	0.00025	0.00081

Table 5.13b: (Continued)

county	Year	Prevention				Treatment			
		t year	t+1 year	t+2 year	total	t year	t+1 year	t+2 year	total
	1988	0.000419	0.000412	0.000412	0.001244	0.000282	0.000277	0.00025	0.00081
	1989	0.000413	0.000427	0.000427	0.001269	0.000278	0.000287	0.00026	0.00083
	1990	0.000557	0.000560	0.000560	0.001678	0.000155	0.000156	0.00014	0.00046
	1991	0.000578	0.000554	0.000554	0.001687	0.000161	0.000154	0.00014	0.00046
	1992	0.000560	0.000554	0.000554	0.001669	0.000156	0.000154	0.00014	0.00045
	1993	0.000554	0.000554	0.000554	0.001663	0.000155	0.000154	0.00014	0.00045
SY	1985	0.000508	0.000493	0.000493	0.001495	0.000342	0.000332	0.00030	0.00097
	1986	0.000525	0.000478	0.000478	0.001482	0.000353	0.000322	0.00029	0.00096
	1987	0.000494	0.000463	0.000462	0.001420	0.000332	0.000311	0.00028	0.00092
	1988	0.000479	0.000463	0.000463	0.001406	0.000322	0.000312	0.00028	0.00091
	1989	0.000463	0.000462	0.000462	0.001388	0.000311	0.000311	0.00028	0.00090
	1990	0.000627	0.000611	0.000610	0.001849	0.000175	0.000170	0.00016	0.00050
	1991	0.000625	0.000566	0.000566	0.001758	0.000174	0.000158	0.00014	0.00048
	1992	0.000611	0.000566	0.000566	0.001744	0.000170	0.000158	0.00014	0.00047
	1993	0.000566	0.000566	0.000566	0.001699	0.000158	0.000158	0.00014	0.00046
DY	1985	0.000420	0.000392	0.000392	0.001206	0.000283	0.000264	0.00024	0.00079
	1986	0.000424	0.000374	0.000373	0.001172	0.000285	0.000251	0.00023	0.00076
	1987	0.000393	0.000356	0.000356	0.001106	0.000264	0.000240	0.00022	0.00072
	1988	0.000374	0.000350	0.000350	0.001075	0.000251	0.000235	0.00021	0.00070
	1989	0.000357	0.000328	0.000328	0.001014	0.000240	0.000221	0.00020	0.00066
	1990	0.000473	0.000375	0.000375	0.001224	0.000132	0.000104	0.00010	0.00033
	1991	0.000444	0.000361	0.000361	0.001167	0.000124	0.000101	9.66539	0.00032
	1992	0.000375	0.000361	0.000361	0.001098	0.000104	0.000101	9.73411	0.00030
	1993	0.000361	0.000361	0.000361	0.001084	0.000101	0.000101	9.74773	0.00029
JR	1985	0.000426	0.000387	0.000387	0.001201	0.000287	0.000260	0.00024	0.00078
	1986	0.000449	0.000351	0.000351	0.001152	0.000302	0.000236	0.00021	0.00075

Table 5.13b: (Continued)

county	year	Prevention				Treatment			
		t year	t+1 year	t+2 year	total	t year	t+1 year	t+2 year	total
	1987	0.000388	0.000348	0.000348	0.001084	0.000261	0.000234	0.00021	0.00071
	1988	0.000351	0.000326	0.000325	0.001003	0.000236	0.000219	0.00020	0.00066
	1989	0.000348	0.000309	0.000309	0.000966	0.000234	0.000208	0.00019	0.00063
	1990	0.000440	0.000387	0.000387	0.001216	0.000123	0.000108	0.00010	0.00033
	1991	0.000418	0.000380	0.000380	0.001178	0.000116	0.000106	0.00010	0.00032
	1992	0.000388	0.000380	0.000380	0.001148	0.000108	0.000106	0.00010	0.00031
	1993	0.000380	0.000380	0.000380	0.001141	0.000106	0.000106	0.00010	0.00031
LP	1985	0.000671	0.000655	0.000654	0.001981	0.000451	0.000441	0.00038	0.00128
	1986	0.000675	0.000630	0.000629	0.001935	0.000454	0.000424	0.00037	0.00125
	1987	0.000656	0.000624	0.000623	0.001904	0.000441	0.000420	0.00036	0.00123
	1988	0.000630	0.000621	0.000621	0.001874	0.000424	0.000418	0.00037	0.00121
	1989	0.000624	0.000614	0.000613	0.001852	0.000420	0.000413	0.00036	0.00119
	1990	0.000841	0.000890	0.000890	0.002622	0.000235	0.000249	0.00022	0.00071
	1991	0.000830	0.000815	0.000814	0.002460	0.000232	0.000227	0.00020	0.00066
	1992	0.000891	0.000886	0.000881	0.002658	0.000249	0.000247	0.00024	0.00074
	1993	0.000815	0.000812	0.000807	0.002434	0.000228	0.000219	0.00021	0.00066

Table 5.13c Three Year Marginal Effect of Prevention and Treatment for Non-communicable Disease

County	Year	Prevention				Treatment			
		t year	t+1 year	t+2 year	total	t year	t+1 year	t+2 year	total
QI	1985	0.000438	0.000415	0.000414	0.001267	0.000294	0.000279	0.00025	0.00083
	1986	0.000453	0.000419	0.000419	0.001292	0.000304	0.000282	0.00025	0.00084
	1987	0.000415	0.000413	0.000412	0.001241	0.000279	0.000278	0.00025	0.00081
	1988	0.000419	0.000412	0.000412	0.001244	0.000282	0.000277	0.00025	0.00081
	1989	0.000413	0.000427	0.000427	0.001269	0.000278	0.000287	0.00026	0.00083

Table 5.13c: (Continued)

		Prevention				Treatment			
County	Year	t year	t+1 year	t+2 year	total	t year	t+1 year	t+2 year	total
	1990	0.000557	0.000560	0.000560	0.001678	0.000155	0.000156	0.00014	0.00046
	1991	0.000578	0.000554	0.000554	0.001687	0.000161	0.000154	0.00014	0.00046
	1992	0.000560	0.000554	0.000554	0.001669	0.000156	0.000154	0.00014	0.00045
	1993	0.000554	0.000554	0.000554	0.001663	0.000155	0.000154	0.00014	0.00045
SY	1985	0.000508	0.000493	0.000493	0.001495	0.000342	0.000332	0.00030	0.00097
	1986	0.000525	0.000478	0.000478	0.001482	0.000353	0.000322	0.00029	0.00096
	1987	0.000494	0.000463	0.000462	0.001420	0.000332	0.000311	0.00028	0.00092
	1988	0.000479	0.000463	0.000463	0.001406	0.000322	0.000312	0.00028	0.00091
	1989	0.000463	0.000462	0.000462	0.001388	0.000311	0.000311	0.00028	0.00090
	1990	0.000627	0.000611	0.000610	0.001849	0.000175	0.000170	0.00016	0.00050
	1991	0.000625	0.000566	0.000566	0.001758	0.000174	0.000158	0.00014	0.00048
	1992	0.000611	0.000566	0.000566	0.001744	0.000170	0.000158	0.00014	0.00047
	1993	0.000566	0.000566	0.000566	0.001699	0.000158	0.000158	0.00014	0.00046
DY	1985	0.000420	0.000392	0.000392	0.001206	0.000283	0.000264	0.00024	0.00079
	1986	0.000424	0.000374	0.000373	0.001172	0.000285	0.000251	0.00023	0.00076
	1987	0.000393	0.000356	0.000356	0.001106	0.000264	0.000240	0.00022	0.00072
	1988	0.000374	0.000350	0.000350	0.001075	0.000251	0.000235	0.00021	0.00070
	1989	0.000357	0.000328	0.000328	0.001014	0.000240	0.000221	0.00020	0.00066
	1990	0.000473	0.000375	0.000375	0.001224	0.000132	0.000104	0.00010	0.00033
	1991	0.000444	0.000361	0.000361	0.001167	0.000124	0.000101	9.66539	0.00032
	1992	0.000375	0.000361	0.000361	0.001098	0.000104	0.000101	9.73411	0.00030
	1993	0.000361	0.000361	0.000361	0.001084	0.000101	0.000101	9.74773	0.00029
JR	1985	0.000426	0.000387	0.000387	0.001201	0.000287	0.000260	0.00024	0.00078
	1986	0.000449	0.000351	0.000351	0.001152	0.000302	0.000236	0.00021	0.00075
	1987	0.000388	0.000348	0.000348	0.001084	0.000261	0.000234	0.00021	0.00071

Table 5.13c: (Continued)

county	year	Prevention				Treatment			
		t year	t+1 year	t+2 year	total	t year	t+1 year	t+2 year	total
	1988	0.000351	0.000326	0.000325	0.001003	0.000236	0.000219	0.00020	0.00066
	1989	0.000348	0.000309	0.000309	0.000966	0.000234	0.000208	0.00019	0.00063
	1990	0.000440	0.000387	0.000387	0.001216	0.000123	0.000108	0.00010	0.00033
	1991	0.000418	0.000380	0.000380	0.001178	0.000116	0.000106	0.00010	0.00032
	1992	0.000388	0.000380	0.000380	0.001148	0.000108	0.000106	0.00010	0.00031
	1993	0.000380	0.000379	0.000376	0.001145	0.000106	0.000254	0.00024	0.00060
LP	1985	0.000671	0.000655	0.000654	0.001981	0.000451	0.000441	0.00038	0.00128
	1986	0.000675	0.000630	0.000629	0.001935	0.000454	0.000424	0.00037	0.00125
	1987	0.000656	0.000624	0.000623	0.001904	0.000441	0.000420	0.00036	0.00123
	1988	0.000630	0.000621	0.000621	0.001874	0.000424	0.000418	0.00037	0.00121
	1989	0.000624	0.000614	0.000613	0.001852	0.000420	0.000413	0.00036	0.00119
	1990	0.000841	0.000890	0.000890	0.002622	0.000235	0.000249	0.00022	0.00071
	1991	0.000830	0.000815	0.000814	0.002460	0.000232	0.000227	0.00020	0.00066
	1992	0.000891	0.000889	0.000886	0.002666	0.000249	0.000247	0.00024	0.00074
	1993	0.000815	0.000809	0.000806	0.002430	0.000228	0.000226	0.00022	0.00067

Table 5.13d Sum of Three Year Marginal Effect of Prevention and Treatment

County	Year	Prevention				Treatment			
		t year	t+1 year	t+2 year	total	t year	t+1 year	t+2 year	total
QI	1985	0.001584	0.001444	0.001443	0.004472	0.002153	0.001972	0.00177	0.00589
	1986	0.001637	0.001408	0.001407	0.004452	0.002248	0.001900	0.00169	0.00584
	1987	0.001446	0.001389	0.001388	0.004224	0.001974	0.001882	0.00170	0.00556
	1988	0.001409	0.001689	0.001688	0.004787	0.001902	0.002221	0.00201	0.00613
	1989	0.001391	0.001640	0.001639	0.004671	0.001884	0.002112	0.00191	0.00591
	1990	0.001454	0.001377	0.001375	0.004207	0.000844	0.000777	0.00070	0.00232
	1991	0.001438	0.001349	0.001348	0.004136	0.000817	0.000753	0.00068	0.00225

Table 5.13d: (Continued)

County	Year	Prevention				Treatment			
		t year	t+1 year	t+2 year	total	t year	t+1 year	t+2 year	total
	1992	0.001378	0.001349	0.001348	0.004076	0.000778	0.000753	0.00068	0.00221
	1993	0.001350	0.001349	0.001348	0.004049	0.000754	0.000753	0.00068	0.00219
SY	1985	0.001887	0.001819	0.001817	0.005525	0.002545	0.002492	0.00218	0.00722
	1986	0.001950	0.001874	0.001871	0.005696	0.002672	0.002601	0.00226	0.00754
	1987	0.001822	0.001688	0.001686	0.005197	0.002495	0.002332	0.00205	0.00688
	1988	0.001876	0.002064	0.002061	0.006002	0.002604	0.002835	0.00247	0.00791
	1989	0.001690	0.002019	0.002017	0.005727	0.002335	0.002762	0.00245	0.00754
	1990	0.001717	0.001721	0.001719	0.005159	0.001031	0.001044	0.00092	0.00299
	1991	0.001688	0.001540	0.001539	0.004768	0.001008	0.000915	0.00081	0.00273
	1992	0.001723	0.001541	0.001539	0.004804	0.001045	0.000915	0.00080	0.00276
	1993	0.001542	0.001541	0.001539	0.004623	0.000916	0.000915	0.00082	0.00265
DY	1985	0.001317	0.001275	0.001274	0.003867	0.001809	0.001780	0.00162	0.00521
	1986	0.001293	0.001199	0.001198	0.003691	0.001769	0.001715	0.00157	0.00505
	1987	0.001276	0.001178	0.001177	0.003633	0.001781	0.001702	0.00155	0.00504
	1988	0.001200	0.001315	0.001314	0.003830	0.001716	0.001918	0.00176	0.00539
	1989	0.001179	0.001348	0.001347	0.003876	0.001703	0.002068	0.00189	0.00566
	1990	0.001069	0.000941	0.000940	0.002950	0.000635	0.000615	0.00056	0.00181
	1991	0.001047	0.000849	0.000849	0.002746	0.000650	0.000564	0.00051	0.00172
	1992	0.000941	0.000849	0.000849	0.002640	0.000616	0.000564	0.00051	0.00169
	1993	0.000850	0.000849	0.000849	0.002549	0.000565	0.000564	0.00051	0.00164
JR	1985	0.001738	0.001659	0.001657	0.005056	0.002431	0.002398	0.00211	0.00694
	1986	0.001803	0.001493	0.001491	0.004787	0.002548	0.002192	0.00192	0.00666
	1987	0.001661	0.001482	0.001481	0.004625	0.002401	0.002182	0.00193	0.00651
	1988	0.001494	0.001884	0.001882	0.005260	0.002195	0.002704	0.00241	0.00731
	1989	0.001484	0.001892	0.001890	0.005267	0.002184	0.002766	0.00247	0.00742

Table 5.13d: (Continued)

county	year	Prevention				Treatment			
		t year	t+1 year	t+2 year	total	t year	t+1 year	t+2 year	total
	1990	0.001491	0.001366	0.001364	0.004222	0.000954	0.000892	0.00079	0.00263
	1991	0.001473	0.001358	0.001356	0.004188	0.000959	0.000879	0.00077	0.00261
	1992	0.001367	0.001358	0.001357	0.004083	0.000893	0.000879	0.00078	0.00255
	1993	0.001359	0.001358	0.001357	0.004074	0.000880	0.000879	0.00078	0.00254
LP	1985	0.002456	0.002450	0.002446	0.007353	0.003277	0.003338	0.00280	0.00942
	1986	0.002518	0.002360	0.002356	0.007235	0.003424	0.003232	0.00269	0.00935
	1987	0.002454	0.002334	0.002331	0.007120	0.003344	0.003201	0.00268	0.00923
	1988	0.002363	0.002594	0.002590	0.007548	0.003238	0.003543	0.00298	0.00976
	1989	0.002338	0.002584	0.002580	0.007503	0.003206	0.003562	0.00300	0.00977
	1990	0.002179	0.002345	0.002342	0.006866	0.001289	0.001408	0.00120	0.00390
	1991	0.002158	0.002161	0.002158	0.006477	0.001283	0.001315	0.00112	0.00372
	1992	0.002348	0.002161	0.002158	0.006668	0.001410	0.001315	0.00111	0.00383
	1993	0.002164	0.002161	0.002158	0.006484	0.001317	0.001315	0.00112	0.00375

Table 5.14 Summary of Three Year Marginal Effect Before and After Reform

	Before Reform		After Reform	
County	prevention	treatment	prevention	treatment
QI	0.00452	0.00587	0.00405	0.00220
SY	0.00563	0.00742	0.00484	0.00279
DY	0.00378	0.00528	0.00272	0.00172
JR	0.00500	0.00698	0.00414	0.00259
LP	0.00735	0.00951	0.00662	0.00387
weighted means	0.00482	0.00657	0.00396	0.00239

From the results, we know that before the economic reform, the marginal effect of prevention was bigger than the marginal effect of treatment, but not by too much . For example, in QI county, the marginal effect of prevention was 0.00452, the marginal effect of treatment was 0.00657. After economic reform, the values were converse: the marginal effect of prevention was 0.00405, and the marginal effect of treatment was 0.00220. For the average level, before reform these two values was 0.00482 and 0.00657, respectively. It means that if we increase one Yuan (1985 NPV) of preventive budget for every person in these counties, a total of 4.8 persons ''death'' (including death, communicable disease and non-communicable) per 1000 persons can be prevented in three years. For the curative approach, it was 6.6. The result is related to the Chinese health policy: '' Giving priority to prevention ''. The government allocates more budget to the preventive sector. Another consequence from this result is that it is very difficult to get enough inpatients, outpatients and surgical services for the local people. After decentralization, the local governments became more responsible for decisions. They moved the limited budget from preventive care to curative service. The result was that the marginal effects for the preventive and curative medicine were 0.00396 and 0.00239. At that point, if we input one Yuan additional budget to curative service for each person, it can only prevent about 60% (0.00239/0.00396) ''deaths'' that can be prevented by the preventive care. The local government over allocate their budget to the curative sector. So we suggest that if the government has additional budget, it should be allocated to the preventive sector for better outcome.

5.4 Result of Analysis of Equity in the Public Health Budget Allocation

Based on the theoretical framework discussed in Chapter 4, the equity measure (Gini coefficient) of public health budget among three provinces and the health resources, health manpower and average hospital beds for the whole of China in 1992 were

among three provinces and the health resources, health manpower and average hospital beds for the whole of China in 1992 were calculated. We evaluate the equity of average preventive budget, curative budget , average number of doctor and average number of hospital beds .

5.4.1 Equity for the Preventive Budget

County's EPS and MCH obtained most of their budget from county government. Another part came from upper level government including prefecture, province and central government. For evaluating the equity among different economic development area, the counties were ranked by their GCP per capita. (The rank during the 9 years is same). The GCP per capita for 5 counties and their rank are shown in Table 5.16. The equity measures (including actual budget, equity level budget, the gap between actual and equity level) among the 5 counties are shown in Table 5.15 . The Gini coefficients are shown in Table 5.17.

5.4.2 Equity for the Curative Budget

The county curative budget is budget for local general county hospitals, Chinese Traditional Medicine county hospitals and township hospitals. Due to the decentralization policy, most of the curative budget came from local government expenditure. If the financial condition of the local government is ''good'', a substantial part of the budget could be allocated to the health sector including curative care. Otherwise the average budget level would be low. Action of budget allocating could affected the equity of curative budget. The equity measures of curative budget among the 5 counties are shown in Table5..16. The Gini coefficients are shown in Table 5.17

Table 5.15 Measures Related to Equity in the Public Budget

Year	County	number of population	Prevention			Treatment		
			Actual Budget (Yuan)	Equity Level (Yuan)	Gap (Yuan)	Actual Budget (Yuan)	Equity Level (Yuan)	Gap (Yuan)
1985	Qi	212321	1.56	1.72	-0.16	6.10	5.08	1.02
	SY	225475	1.28	1.72	-0.44	4.68	5.08	-0.40
	DY	563749	2.89	1.72	1.17	6.98	5.08	1.90
	JR	765338	1.22	1.72	-0.50	4.10	5.08	-0.98
	LP	132800	0.69	1.72	-1.03	1.80	5.08	-3.28
1986	Qi	210042	1.70	1.84	-0.14	6.23	5.43	0.80
	SY	227020	1.30	1.84	-0.54	4.76	5.43	-0.67
	DY	564688	3.20	1.84	1.36	7.66	5.43	2.23
	JR	769162	1.24	1.84	-0.60	4.40	5.43	-1.03
	LP	134700	0.70	1.84	-1.14	1.96	5.43	-3.47
1987	Qi	209985	1.88	1.88	0.00	7.68	5.62	2.06
	SY	228998	1.55	1.88	-0.33	5.28	5.62	-0.34
	DY	568198	3.00	1.88	1.12	7.68	5.62	2.06
	JR	776824	1.36	1.88	-0.52	4.28	5.62	-1.34
	LP	136500	0.77	1.88	-1.11	2.18	5.62	-3.44
1988	Qi	210399	1.92	1.93	-0.01	8.38	6.15	2.23
	SY	230017	1.55	1.93	-0.38	5.44	6.15	-0.71
	DY	577340	3.02	1.93	1.09	8.56	6.15	2.41
	JR	785883	1.45	1.93	-0.48	4.68	6.15	-1.47
	LP	138700	0.80	1.93	-1.13	2.36	6.15	-3.79
1989	Qi	211565	1.86	1.99	-0.13	8.48	6.85	1.63
	SY	233364	1.60	1.99	-0.39	5.62	6.85	-1.23

Table 5.15 (Continued)

Year	County	number of population	Prevention			Treatment		
			Actual Budget (Yuan)	Equity Level (Yuan)	Gap (Yuan)	Actual Budget (Yuan)	Equity Level (Yuan)	Gap (Yuan)
	DY	583320	3.28	1.99	1.29	10.64	6.85	3.79
	JR	794691	1.42	1.99	-0.57	4.75	6.85	-2.10
	LP	140300	0.76	1.99	-1.23	2.58	6.85	-4.27
1990	QI	214609	2.00	2.13	-0.13	8.20	7.48	0.72
	SY	237182	1.60	2.13	-0.53	5.47	7.48	-2.01
	DY	589015	3.40	2.13	1.27	13.20	7.48	5.72
	JR	800774	1.60	2.13	-0.53	4.53	7.48	-2.95
	LP	141600	0.98	2.13	-1.15	2.74	7.48	-4.74
1991	QI	218079	2.11	2.16	-0.05	8.85	8.24	0.61
	SY	239593	1.69	2.16	-0.47	5.68	8.24	-2.56
	DY	590831	3.42	2.16	1.26	14.98	8.24	6.74
	JR	801507	1.60	2.16	-0.56	4.86	8.24	-3.38
	LP	142800	1.08	2.16	-1.08	2.70	8.24	-5.54
1992	QI	219358	2.20	2.25	-0.05	9.41	8.72	0.69
	SY	241766	1.88	2.25	-0.37	5.96	8.72	-2.76
	DY	597866	3.53	2.25	1.28	16.03	8.72	7.31
	JR	800854	1.63	2.25	-0.62	4.99	8.72	-3.73
	LP	144500	1.14	2.25	-1.11	2.74	8.72	-5.98
1993	QI	217278	2.20	2.26	-0.06	9.25	9.34	-0.09
	SY	244342	1.80	2.26	-0.46	6.04	9.34	-3.30
	DY	594670	3.50	2.26	1.24	18.42	9.34	9.08
	JR	805268	1.72	2.26	-0.54	4.86	9.34	-4.48
	LP	145700	1.16	2.26	-1.10	2.74	9.34	-6.60

Table 5.16 GCP Per Capita (Yuan) and Rank

Year	Qi	SY	DY	JR	LP
1985	665.26	745.01	1150.89	847.77	233.43
1986	704.78	903.15	1275.96	952.19	274.68
1987	742.36	1000.07	1603.67	1038.37	344.32
1988	903.05	912.98	2029.06	1229.78	576.78
1989	992.60	1071.29	2074.18	1302.89	634.35
1990	1146.27	1180.53	2412.28	1511.00	656.78
1991	912.51	1168.65	2621.21	1745.00	714.29
1992	1048.51	1240.87	3846.79	2341.66	844.29
1993	1109.18	1637.05	5495.25	3850.88	1066.78
rank	2	3	5	4	1

Source : The survey conducted by CAPM.

Table 5.17 Gini Coefficient of Preventive and Curative Budget Among 5 Counties

Year	Curative Care	Preventive Care
1985	0.1190	-0.1241
1986	0.1159	-0.0507
1987	0.0579	0.0164
1988	0.0387	-0.0421
1989	0.0554	-0.0327
1990	0.0768	-0.0702
1991	0.0923	-0.0763
1992	0.0923	-0.1883
1993	0.1166	-0.1936

Note: Ranking by GCP per capita.

The distribution of preventive and curative budget are shown in Fig. 5.2 and Fig. 5.3.

Fig.5.1 Distribution of Preventive Budget:1985-1993

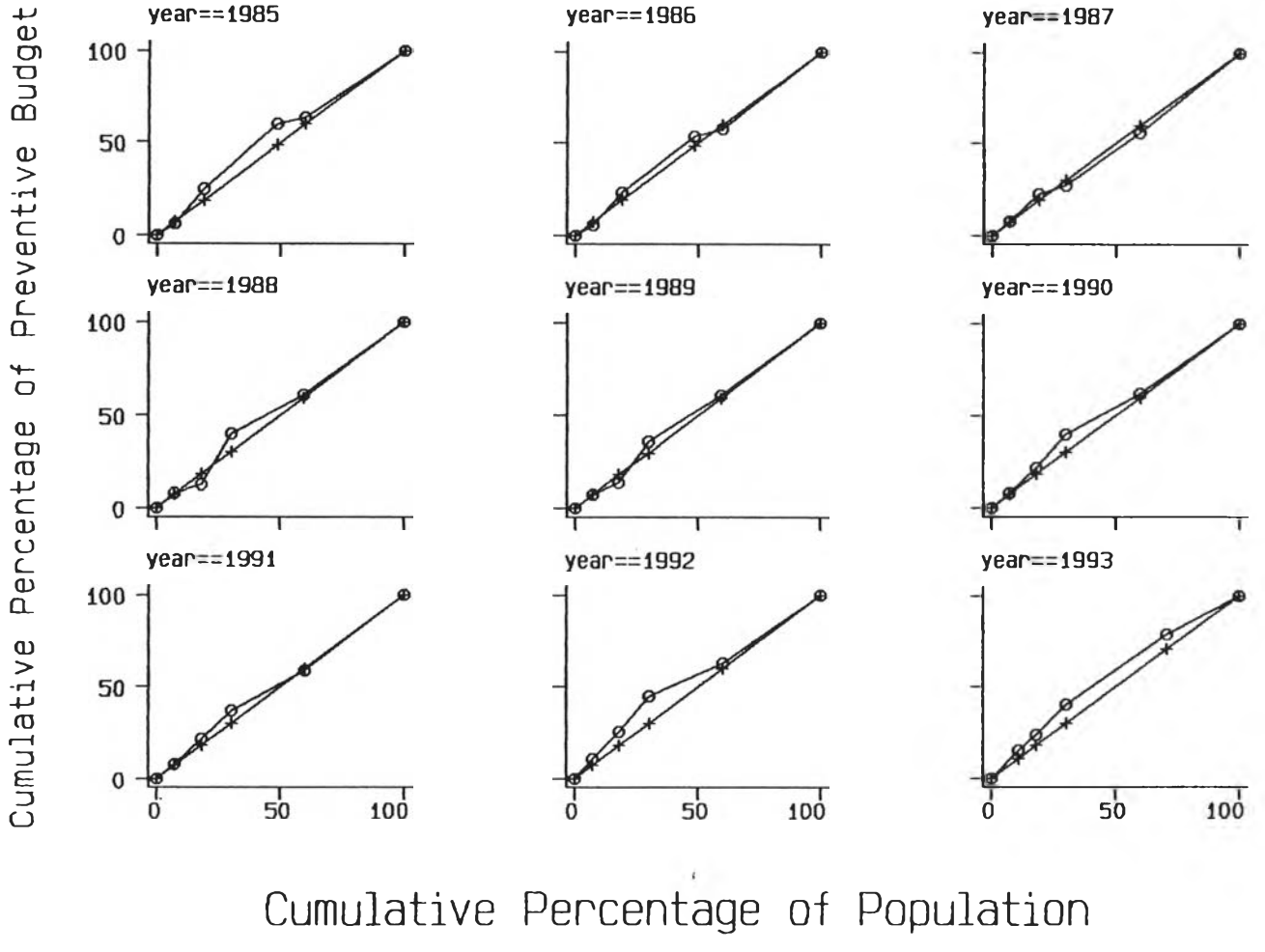
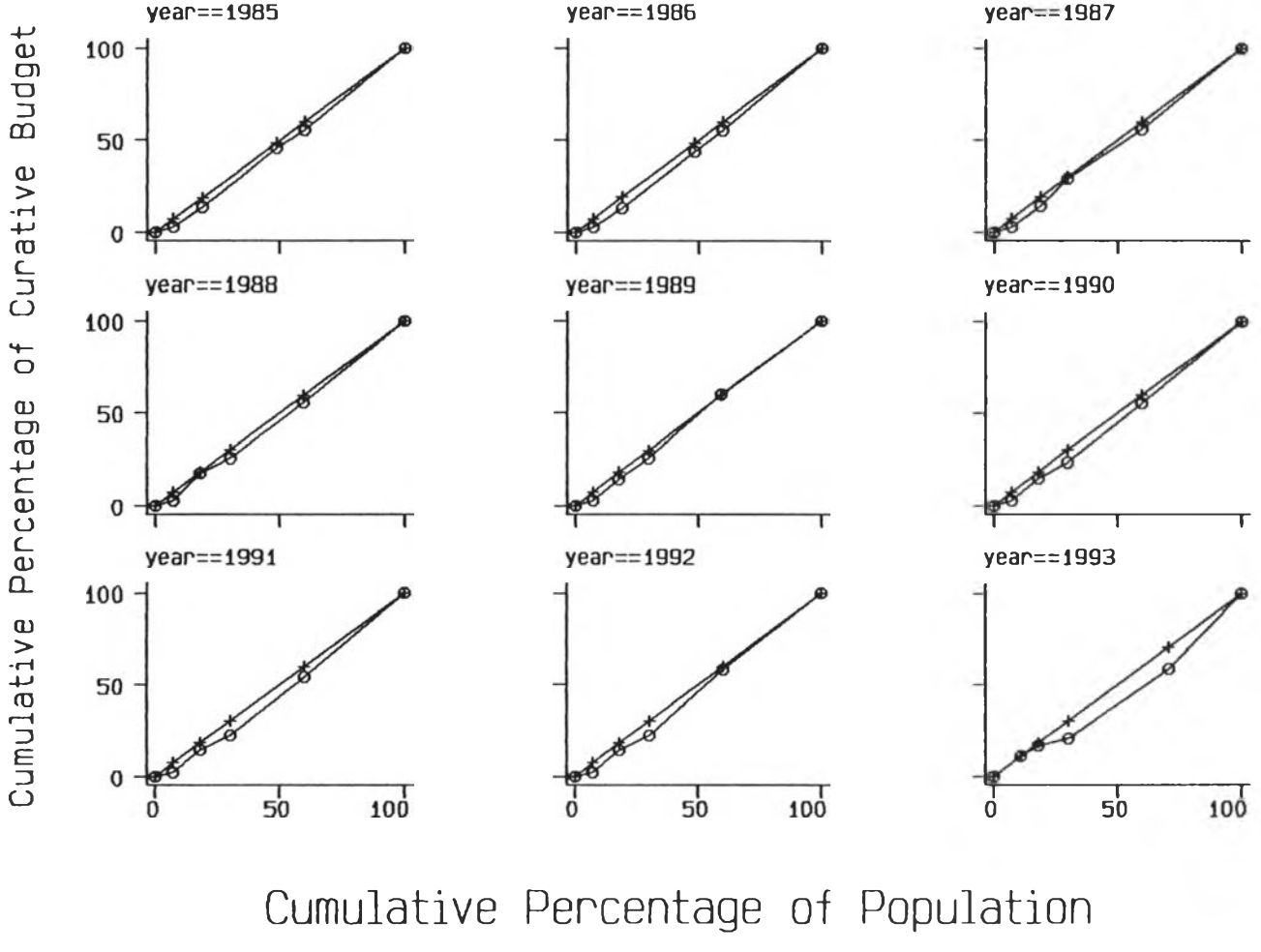


Fig.5.2 Distribution of Curative Budget:1985-1993



5.4.3 Conclusion

The Gini coefficients of per capita preventive budget are negative for 8 years. It means comparing with the richer counties, the poorer counties get more preventive budget . The reason is that the richer county's EPS or MCH have stronger financing ability. They can get additional money from multiple sources. But for the poorer county's EPS or MCH, they can not. So the government allocated more budget to them.

Comparing with poorer county, the richer county can get more curative budget from their local government. All the Gini coefficient for 9 year are positive. The reason is that rich counties has more government income. They could allocate more budget to curative sector depend on their willing. For poorer counties, even they also want to allocate more budget to curative sector, but they can not due to their lower government income.

Before 1989, both equity of curative and preventive budget increased. But after 1989 both of them decreased. The reason is decentralization. The local government can allocate their budget according their situation and financing ability.

5.5 Results of Analysis of Equity in the Public Health Budget, Health Manpower and Average Hospital Bed Allocation in China

The same measurement (Gini coefficient) was used to evaluate the equity level of health budget, health manpower and average hospital beds posses among different provinces of China in 1992. The data was obtained from the Department of Financing, MOH and Health Information Center, MOH. The results are shown in Table 5.17 5.18 and Fig 5.3-5.6. As in Table 5.15, the results include actual level, equity level and the gap between the actual situation and equity situation.

Table 5.18 Measures Related to Equity in Budget of Prevention and Treatment, China, 1992

Province	number of population (10,000)	Preventive			Treatment		
		Actual Budget (Yuan)	Equity Level (Yuan)	Gap (Yuan)	Actual Budget (Yuan)	Equity Level (Yuan)	Gap (Yuan)
Beijing	1048.74	2.26	1.50	0.75	16.03	4.76	11.27
Tianjin	882.72	2.57	1.50	1.06	11.34	4.76	6.58
Hebei	6249.33	1.14	1.50	-0.37	3.27	4.76	-1.49
Shanxi	2919.08	1.63	1.50	0.12	4.91	4.76	0.15
Inner Mongolia	2178.55	2.77	1.50	1.26	5.71	4.76	0.95
Lianning	3957.85	2.12	1.50	0.61	6.59	4.76	1.83
Jilin	2474.02	2.2	1.50	0.69	5.91	4.76	1.15
Heilongjiang	3526.17	1.88	1.50	0.37	5.96	4.76	1.2
Shanghai	1289.37	3.53	1.50	2.02	18.16	4.76	13.4
Jiangsu	6767.49	1.27	1.50	-0.24	4.23	4.76	-0.53
Zhejiang	4285.91	1.63	1.50	0.12	6.14	4.76	1.38
Anhui	5817.48	1.16	1.50	-0.35	3.00	4.76	-1.76
Fujian	3066.85	1.57	1.50	0.06	5.74	4.76	0.98
Jiangxi	3827.03	1.20	1.50	-0.31	2.96	4.76	-1.8
Shandong	8579.78	1.33	1.50	-0.18	4.84	4.76	0.08
Heinan	8811.49	0.82	1.50	-0.69	2.61	4.76	-2.15
Hubei	5513.65	1.57	1.50	0.06	4.03	4.76	-0.73
Hunai	6209.25	1.31	1.50	-0.2	2.74	4.76	-2.02
Guangdong	6463.17	1.49	1.50	-0.02	7.07	4.76	2.31
Guangxi	4359.36	1.30	1.50	-0.21	3.68	4.76	-1.08
Hainan	671.32	2.90	1.50	1.39	7.38	4.76	2.62
Sichuan	10942.9	1.07	1.50	-0.44	3.44	4.76	-1.32

Table 5.18: (continued)

Province	number of population (10,000)	Preventive			Treatment		
		Actual Budget (Yuan)	Equity Level (Yuan)	Gap (Yuan)	Actual Budget (Yuan)	Equity Level (Yuan)	Gap (Yuan)
Guizhou	3300.97	1.27	1.50	-0.24	3.22	4.76	-1.54
Yunnan	3767.15	2.42	1.50	0.91	4.99	4.76	0.23
Tibet	225.27	5.42	1.50	3.91	24.76	4.76	20.00
Shanxii	3340.29	1.27	1.50	-0.24	3.68	4.76	-1.08
Gansu	2288.12	1.54	1.50	0.03	4.96	4.76	0.20
Qinhao	443.06	3.72	1.50	2.21	8.16	4.76	3.40
Ninxia	482.27	2.5	1.50	0.99	7.3	4.76	2.54
Xinjiang	1554.14	3.13	1.50	1.62	9.41	4.76	4.65
Gini coefficient		0.081			0.1866		

Note: Gini coefficient was calculate by ranking GPP per capita

Table 5.19 Measures Related to Equity in Average Number of Doctors and Hospital Bed , China ,1992

Province	number of population (10,000)	Average Doctors			Average Beds		
		Actual Doctors (/1000)	Equity Level (/1000)	Gap (/1000)	Actual Beds (/1000)	Equity Level (/1000)	Gap (/1000)
Beijing	1048.74	111.389	36.43	74.95	63.993	27.19	36.80
Tianjin	4359.36	80.679	36.43	44.24	44.165	27.19	16.97
Hebei	6249.33	31.729	36.43	-4.70	25.452	27.19	-1.739
Shanxi	2919.08	47.929	36.43	11.49	37.9054	27.19	10.71
Inner Mogolia	2178.55	46.921	36.43	10.49	30.9472	27.19	3.75
Liaoning	3957.85	58.823	36.43	22.39	51.5297	27.19	24.33
Jilin	2474.02	53.47	36.43	17.04	38.2871	27.19	11.09

Table 5.19: (Continued)

Province	number of population (10,000)	Average Actual Doctors (/1000)	Doctors Equity Level (/1000)	Gap (/1000)	Average Actual Beds (/1000)	Beds Equity Level (/1000)	Gap (/1000)
Heiljiang	3526.17	50.866	36.43	14.43	36.4106	27.19	9.21
Shanghai	1289.37	86.841	36.43	50.41	55.804	27.19	28.61
Jiangsu	6767.49	35.538	36.43	-0.89	25.7837	27.19	-1.40
Zhejiang	4285.91	33.84	36.43	-2.59	24.6608	27.19	-2.53
Anhui	5817.48	25.409	36.43	-11.02	20.5197	27.19	-6.67
Fujian	3066.85	29.74	36.43	-6.68	23.7455	27.19	-3.44
Jiangxi	3827.03	31.487	36.43	-4.94	24.6593	27.19	-2.53
Shandong	8579.78	30.737	36.43	-5.69	23.1642	27.19	-4.02
Henan	8811.49	28.523	36.43	-7.90	21.7221	27.19	-5.46
Hubei	5513.65	41.422	36.43	4.99	29.257	27.19	2.06
Hunan	6209.25	30.564	36.43	-5.86	23.8747	27.19	-3.31
Guangdong	6463.17	34.065	36.43	-2.36	22.4139	27.19	-4.77
Guangxi	4359.36	26.003	36.43	-10.42	18.9551	27.19	-8.23
Hainan	671.32	46.12	36.43	9.68	33.7514	27.19	6.56
Sichuan	10942.9	29.728	36.43	-6.70	23.6861	27.19	-3.50
Guizhou	3300.97	26.675	36.43	-9.75	18.0698	27.19	-9.12
Yunnan	3767.15	29.439	36.43	-6.99	24.8607	27.19	-2.33
Tibet	225.27	36.294	36.43	-0.13	24.8679	27.19	-2.32
Shanxii	3340.29	37.734	36.43	1.30	29.4588	27.19	2.26
Gansu	2288.12	35.523	36.43	-0.91	24.3042	27.19	-2.88
Qinhao	443.06	45.402	36.43	8.97	38.1348	27.19	10.94
Ninxia	482.27	44.079	36.43	7.65	27.5468	27.19	0.35
Xinjiang	1554.14	58.192	36.43	21.76	46.6329	27.19	19.44
Gini coefficient		0.141			0.171		

From the Table 5.17 and Fig 5.3 , Fig 5.4, we know the budget for curative and preventive care are unequal. In the maps we can see there are three kinds of region. The main reason of inequity are two: one is that for some area, central government give special policy and more financial support; The second one is each province financing ability. For high economic develop area, they can allocate more budget to health sector.

1. High level budget:

Three municipalities cities: They have both powerful financing ability and stronger central government support.
(Beijing, Tianjin and Shanghai)

Richer Province : Comparing with other province, they can allocate more budget to health sector.
(Hainan province)

Some Poorer provinces: central government give some special policy and more financial support, So average budget level is higher than some other provinces.
(Xinjiang Tibet Inner-Mongolia.....)

2. Middle level budget:

They can not get too much budget from central government, but their financing is powerful. They can allocate more health budget from their local government expenditure.
(North east of China and some eastern provinces)

3. Lower level budget:

They also can not get enough money from the central government and the financing ability is poor due to their lower economic development level.
(Some provinces in the middle area of China)

The another result is that the Gini coefficient of curative care is greater than prevention. It means inequity of curative budget is greater than that of the preventive budget. The reason is that some rich provinces allocated more budget to the curative sector. But for the preventive sector, both richer or poorer provinces did not allocate too much budget to it.

For equity distribution of doctor and hospital bed, There is also much room for improvement. The government should have a policy to provide incentives to the doctors, nurses and other health staff to go to places where more health manpower are needed.

Fig. 5.3 Distribution of Average Preventive Budget 1992

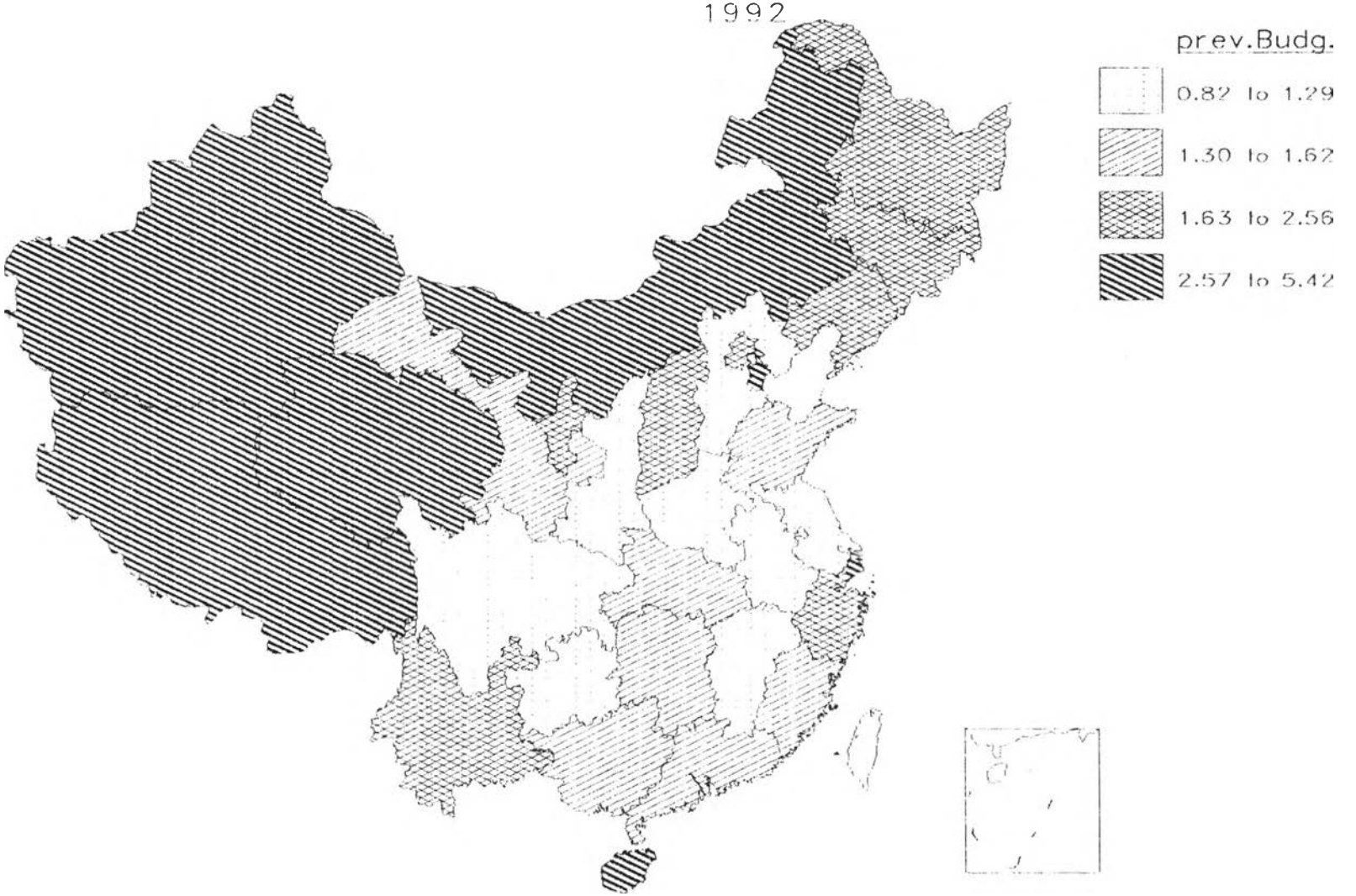


Fig. 5.4 Distribution of Average Curative Budget

1992, China

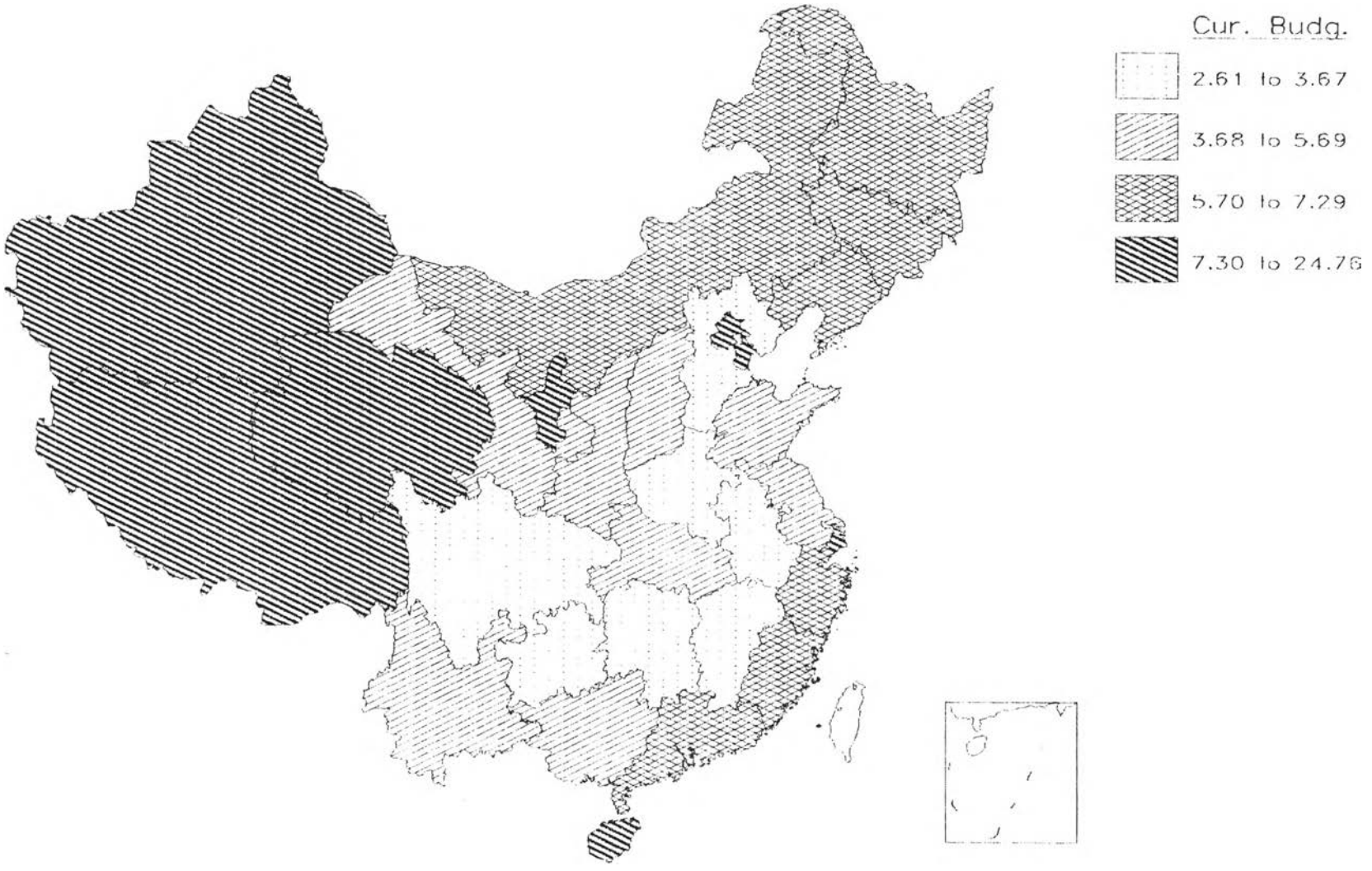


Fig 5.5 Distribution of Average Health Staffs

1992, China

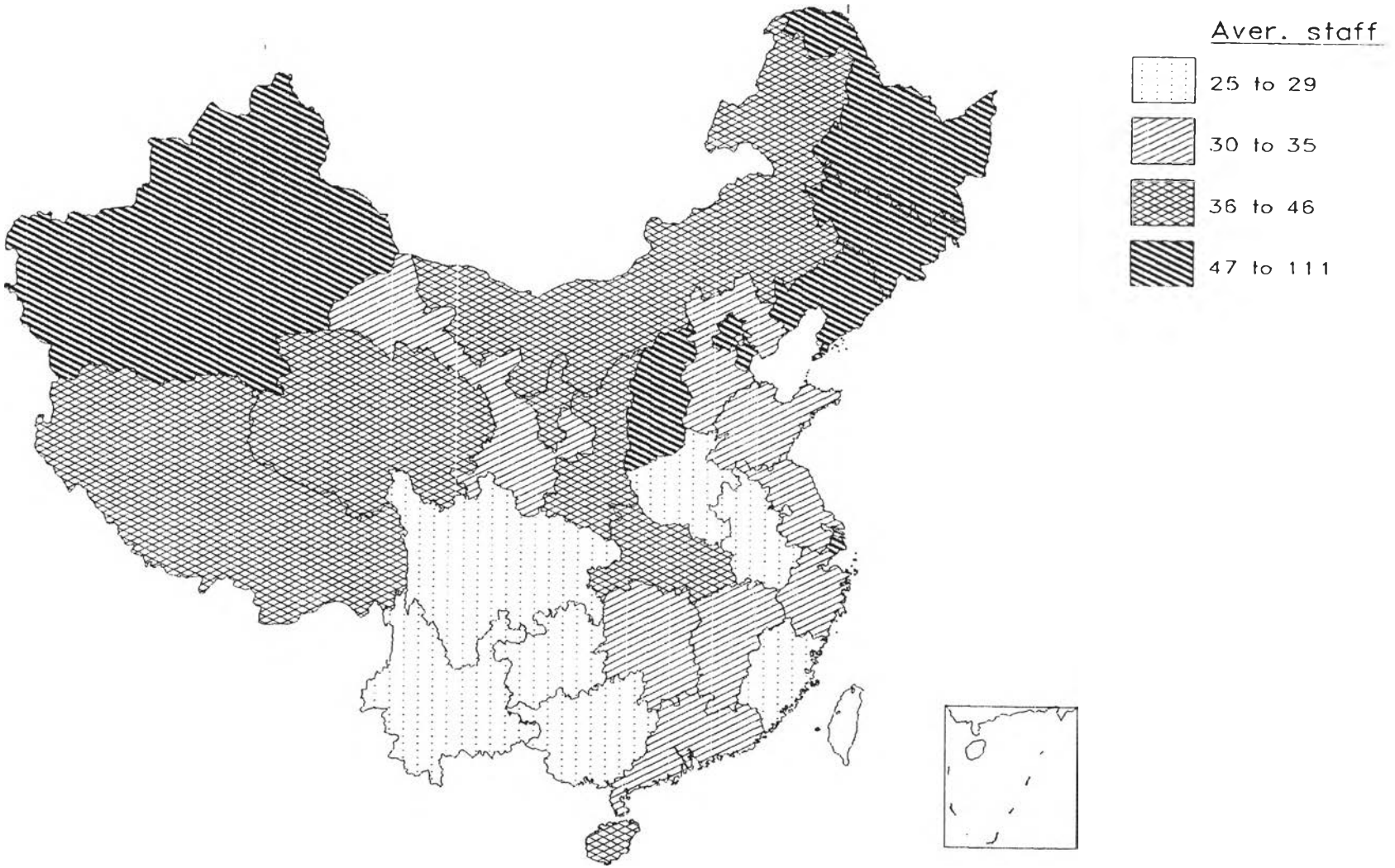


Fig 5.6 Distribution of Average Hospital Beds (#/10, 000

1992, China