CHAPTER V
CONCLUSION AND RECOMMENDATION

5.1 Conclusion

The objectives of this study are to measure hospital efficiency using DEA technique and identify the determinants of efficiency using regression analysis. Data of all level of hospitals were used. The output data consisted of outpatient, inpatient and teaching data. The input data comprised the numbers of beds and personnel.

The results presented here suggest that significant numbers of the hospitals included in this study operate at technical efficiency levels well below the efficient frontiers. Only 4.3% of sampled public hospitals operate efficiently as compared to their peers with average efficiency score of 59%. When decomposing into pure technical and scale efficiency, 83.6 % of sampled public hospitals are pure technically inefficient with average score of 67.3%, while 93% of those operate at non-optimal scale with average score of 88.6%.

In cost efficiency analysis, all hospitals have score of 53.1%. When decomposing into technical and allocative efficiency, they have scores of 56.9% or more and 90% or more respectively.

After universal coverage policy implementation, all hospitals have productivity decline of 17.2%. When decomposing into technical and technical efficiency changes, they have technical regress of 37.2% while their technical efficiency increases 31.9%. In addition, their pure technical efficiency changes increase by only 1.8% while scale efficiency changes increase by 29.5%.

The results of regression analysis showed that the numbers of bed, occupancy rate, geographic location and service complexity are associated with technical efficiency.

Regional hospitals

In regional hospital group, mean CRS technical efficiency score is highest among all hospital levels of 75.8%. When decomposing into pure technical and scale

efficiency, they have scores of 90.5 and 83.7% respectively. All scale inefficient regional hospitals (88%) operate under decreasing returns to scale.

In cost efficiency analysis, regional hospitals have mean highest score of 86.7%. When decomposing into technical and allocative efficiency, they have scores of 89.9 and 96.3% respectively.

After universal coverage policy implementation, they have productivity growth of 15.4%. When decomposing into technical and technical efficiency changes, they have technical regress of 7.3% while their technical efficiency increases 26.5%. In addition, their pure technical efficiency changes increase by only 5.9% while scale efficiency changes increase by 19.6%.

For regression analysis, regional hospitals having highest complexity of services are negatively associated with technical efficiency when compared with other levels.

General hospitals (Small and large general hospitals)

In general hospital group, mean CRS technical efficiency scores of both subgroups are in middle level among all hospital levels of 67.5-72.7%. When decomposing into pure technical and scale efficiency, they have scores of 69.6-81.3 and 89-96.8% respectively. Large general hospitals are more pure technically efficient than small general ones, but small general hospitals are more scale inefficient. All large general and most (80%) of small general hospitals operate under decreasing returns to scale.

In cost efficiency analysis, general hospitals have mean medium score of 55-67.1%. When decomposing into technical and allocative efficiency, they have scores of 59.9-71.1 and 91.7-94.6% respectively. Large general hospitals have higher cost, technical and allocative efficiency scores than small general ones.

After universal coverage policy implementation, large general hospitals have productivity growth by 0.4% while small general ones have productivity decline by 19.7%. When decomposing into technical and technical efficiency changes, both subgroups have technical regress of 20.2-22.5% while technical efficiency change of large general hospitals increase by 30%, but that of small general hospitals increase only by 1%. In addition, pure technical efficiency change of both subgroups are a little bit (large general hospitals increase by 8.1%, small general ones decrease by

0.4%). For scale inefficiency changes, those of both groups increase (large general hospitals increase by 21.8%, small general ones increase by 1.6%).

For regression analysis, general hospitals having medium complexity of services are not associated with technical efficiency when compared with other levels.

Community hospitals (Small and large community hospitals)

In community hospital group, mean CRS technical efficiency scores of both subgroups are lowest among all hospital levels of 55.5-60.3%. When decomposing into pure technical and scale efficiency, they have scores of 62.6-67% and 84-96.5% respectively. Small community hospitals are more pure technically efficient than large ones, but large community hospitals are more scale inefficient. Most scale inefficient community hospitals (94%) operate under increasing returns to scale.

In cost efficiency analysis, community hospitals have mean lowest scores of 47.8-55.7%. When decomposing into technical and allocative efficiency, they have scores of 51.6-59.3 and 92.7-94.2% respectively. Large community hospitals have higher cost, technical and allocative efficiency scores than small community ones.

After universal coverage policy implementation, both subgroups have productivity decline by 11.4-15.3%. When decomposing into technical and technical efficiency changes, they have technical regress of 35.6-42.6% while their technical efficiency increases 40.6-49.2%. In addition, pure technical efficiency change of large community hospitals increases by 22.3% while that of small community ones decreases by 0.8%. For scale efficiency changes, those of both groups increase (large community hospitals increase by 27%, small community ones increase by 46.9%).

For regression analysis, community hospitals having lowest complexity of services are not associated with technical efficiency when compared with other levels.

5.1.1 Analysis of hospital efficiency

Technical inefficiency in health facilities is present in varying degrees in both developed and developing countries including Thailand (Ferrier and Valdmanis 1996, Ozcan et al. 1996). When decomposing into pure technical and scale efficiency, 83.6 % of sampled public hospitals are pure technically inefficient with average score of 67.3%, implying that on average, they could reduce their utilization of all inputs by

about 32.7% without reducing output. Meanwhile, 93% of those operate at non-optimal scale with average score of 88.6%, implying that there is room to increase total outputs about 11.4%. It also indicates that technical efficiency is largely due to pure technical inefficiency except regional hospitals that scale inefficiency has higher level than pure technical efficiency. Pure technical inefficiency is predominant in small general and community hospitals. They might be that large hospitals have more high potential inputs like specialized doctor and high technology medical equipment.

Possible causes of pure technical inefficiency are varying among all levels of hospital, they might be problems of hospital management or health care system, for example, there are oversupply in some areas; there are no specialists in community hospitals; rule and regulation are not supported like no empowerment and authority in human resource management, financial management and capital investment. So, the solution for each group would be varying as well.

Scale inefficiency is the problem of large and small hospitals rather than medium-sized hospitals. Decreasing returns to scale is predominant in regional and large general hospitals, it might be due to over-utilization of outpatient and inpatient services after universal coverage policy implementation. Meanwhile, increasing returns to scale is predominant in small community hospitals. This finding is in line with the study of Ferrier and Valdmanis (1996) that increasing returns are substantially exhausted by the time a hospital reaches 100 beds in size.

For scale inefficient hospitals, regional and large general hospitals that experience decreasing return to scale should reduce the quantity of outputs produced, decrease unit costs and increase scale efficiency. In the presence of increasing returns to scale in small community hospitals, expansion of outputs and inputs reduces unit costs and increase efficiency, these hospitals will benefit by augmenting their scale of operations. Although increasing the level of outputs requires an increase in the demand for health care, which is beyond the control of the hospital management but the results of this study indicate that there is reduction of inpatient in the community hospitals. Therefore, these potential problems may to some extent be minimized by strengthening the community hospital and increasing the potential and scope of services to provide more complex health care and improve the quality of health care in order to redistribute the patient from regional and general hospital to community hospitals for expansion of output. In the same time, it would be solution to alleviate the congestion of patient in the large hospitals and reduce the outputs or scale of

operation. In addition, enforcement of existing referral system and correcting the problems in order to reduce referred case from community hospitals to large hospitals should be done. Redistribution of input resources, especially health manpower to community hospitals is needed.

For cost efficiency analysis, average cost efficiency score of sampled hospitals is 53.1%. Similar to technical efficiency analysis, small hospitals are more cost inefficient than large hospitals. All levels of those hospitals have average allocative efficiency scores more than 90%, thus it could be concluded that such cost inefficiency is largely due to technical inefficiency that average score is 56.9. It implies that increase in technical efficiency would increase cost efficiency.

5.1.2 Impact of universal coverage implementation on changing in hospital productivity

For measuring productivity growth before and after universal coverage policy, the results reveal that overall total factor productivity decline by 17.2 that is totally due to technical regress of 37.2% while overall technical efficiency increase of 31.9%. And overall technical efficiency increase is largely due to scale efficiency increase of 29.5%. It also reveals that no productivity decline is found in regional and large general hospital because effects of technical efficiency increase exceed those of technical regress.

According to the results of TFP index analysis, it seems to be that universal coverage scheme has positive effects on technical efficiency. However, it cannot be concluded that because the hospitals have cross-subsidize health care services for insured patient from existing revenue of hospital, civil servant medical benefit scheme, social security scheme. It might be due to overcapitalization and underutilization of capital in the past and after universal coverage scheme implementation, it induces increase in demand and utilization rates, resulting in technical efficiency increase. Meanwhile, decreasing in capital investment results in technical regress and then productivity decline comes up. If the implementation of universal coverage scheme continues, scale and pure technical inefficiency might happen in the future. This is due to decreasing in capital investment while demand and utilization are increasing and reaching to the point of diminishing return to scale. Therefore, health manager should monitor these possible effects.

5.1.3 Analysis of determinants of hospital efficiency

The results of regression analysis for determinants of hospital efficiency reveal that the numbers of bed and occupancy rate are positively associated with technical efficiency. It also is found that difference in geographic location is associated with technical efficiency. These indicate that northeastern region is more efficient than others while southern region that are least efficient. In addition, the regional hospitals reflecting the most complex scope of services are negatively associated with technical efficiency. The results also revealed that involvement in drug auction, hospital accreditation, competition with private hospital and proportions of universal coverage and civil servant patients are not associated with technical efficiency as expected.

As a result of regression analysis of determinants of hospital efficiency, it is recommended that size of hospitals in terms of the number of beds should correspond to the demand of services especially community hospitals under decreasing return to scale should be considered. From the results, these confirm that occupancy rate could be used to evaluate hospital efficiency. It also suggests that geographic location should be taken into consideration and closely monitored in resources allocation or reallocation. The association of service complexity with technical efficiency implies that making an effort and resource allocation to enhance internal management is needed.

5.2 Limitation of the study

Generally, there are many types of different health services defined as outputs and inputs in several levels of service provision and different complexity of technology among community, general and regional hospitals. Some outputs and inputs are not available in this study such as X-ray, Lab test. So, efficiency performance comparison with available outputs and inputs might not be perfect. With assumptions of the study, quality adjustment in outputs was not performed. We assumed that the quality of care was constant across the entire hospitals. In real situation it might not be the case.

5.3 Recommendation

1. Evidence regarding differences in technical and cost efficiency of public hospitals should be taken into consideration in policy formulation process for health resource management of health care organization.

2. For resource allocation or reallocation process, information of pattern of scale inefficiency as increasing or decreasing returns to scale should be used as a tool and guideline. In addition, hospital manager could use these informations as a guideline for resource management.

3. Total factor productivity index should be monitored to identify the impact of universal coverage policy on health service system.

4. Efficiency measurement and benchmarking should be established to monitor resource utilization of health care organization.

Recommendation for further study

Although the results of the study indicate that technical inefficiency is predominant in the current health care system and in technically, inputs could be reduced without decreasing outputs, or outputs and utilization rates could be increased without reducing inputs. But they are relative measures reflecting the overall picture, so it does not mean that reducing input would increase hospital efficiency. In order to increase hospital efficiency, further studies to find out the causes and hidden mechanisms of inefficiency should be done.