



CHAPTER 5

ANALYSIS AND RESULTS

Analysis of Cost of production of a medical student at Chulalongkorn University in the fiscal year 2000, was analyzed to the total cost, unit cost, Baht/SCH, labor cost, material cost, capital cost, hospital cost, economic loss, opportunity cost, and the sensitivity analysis for the change in labor cost, in case of the autonomous university in the near future.

The Cost analysis

Cost analysis, we summarized it to be labor, material and capital cost, the cost from the administration unit, education supporting unit were all allocated to the education unit (the Departments) with the simultaneous equation method. The labor cost of the Faculty of Medicine was increased by 70%, as if the university was autonomous, the change in total cost and unit cost are shown in table 5.8.

5.1 The total cost, unit cost and Baht/SCH

The total cost in producing medical doctors is 326,329,723 Baht the unit cost is 2,161,124 Baht and Baht/ Student Credit Hour is 8,217 as in table 5.1 when adjusted with the repeat and drop out students the total cost is 328,287,701 Baht, the unit cost is 2,174,091 Baht and Baht/Student Credit Hour is 8,267 as in table 5.2 .

Table 5.1 The total cost, unit cost and Baht per Student Credit Hour (SCH) of producing medical doctor. (not adjusted with drop out and repeat student)

Total Cost	Unit Cost	Baht/SCH
326,329,723	2,161,124	8,217

Table 5.2 The total cost, unit cost and Baht per Student Credit Hour (SCH) of producing medical doctor. (adjusted with drop out and repeat student)

TOTAL COST	Unit cost	Baht/SCH
328,287,701	2,174,091	8,267

5.2 The labor cost, material cost and capital cost

Labor cost is the largest portion of the total cost that is 69.8%. the material cost is 4.1% and the capital cost is 26.4% as in table 5.3

Table 5.3 The cost and percentage of the total cost labor cost, material cost and capital cost of producing medical doctors (not adjusted with drop out and repeat student)

	Baht	Percent
Labor cost	226,678,855	69.4
Material cost	13,447,664	4.1
Capital cost	86,203,173	26.4
Total	326,329,722	100.0

5.3 The cost of producing Medical Student year 1 to year 6

The cost of producing Medical Student year 1 is 6,628,608 Baht, unit cost is 46,032 Baht and 1,096 Baht /SCH.

Year 2 the total cost is 44,443,761 Baht, unit cost 290,482 Baht and 7,448 Baht /SCH.

Year 3 the total cost is 59,215,030 Baht, the unit cost is 367,795 Baht and 9,679 Baht /SCH.

Year 4 the total cost is 65,131,670 Baht, the unit cost is 425,697 Baht and 9,900 Baht /SCH

Year 5 the total cost is Bath 87,402,437, the unit cost 598,647 Baht and 11,512 Baht /SCH .

Year 6 the total cost is 57,291,153 Baht, the unit cost 381,941 Baht and 7,639 Baht /SCH as shown in table 5.4

Table 5.4 The total cost, unit cost and Baht/SCH of producing Medical Student year 1 to year 6

Student year	Total cost(Baht)	Unit Cost(Baht)	Baht/SCH
1	6,628,608	46,032	1,096
2	44,443,761	290,482	7,448
3	59,215,030	367,795	9,679
4	65,131,630	425,697	9,900
5	87,402,437	598,647	11,512
6	57,291,153	381,941	7,639

5.4 The cost of producing Medical Students year 2 to year 6 by Departments

The Department of Medicine is the largest cost center for the student (13.2 %), whereas the Department of Obstetrics and Gynecology is the second large cost center (11.7 %) and the Department of Paediatrics is the third (9.9 %) as in table 5.5. The Department of Medicine was to be the biggest cost (13.24%) this was because of the number of credits this department taught.

The percentage of labor, material and capital cost of each department (Table 5.5), the labor cost more than average were Department of Psychiatry (85.1%), Laboratory Medicine (84.5%), Medicine (81.7%), Surgery (80.5%), Rehabilitation (79.7%), Orthopedics (78.5%), Anesthesiology (77.2%), Ophthalmology (77.1%), Otolaryngology (74.1%), Parasitology (71.4%) and Preventive Medicine (71.1%).

On the cost of producing Medical Student year 2,3,4,5, and 6 by Department were shown in table 5.6 – 5.10

The table 5.5 The cost of producing one medical doctor per year from year 2 to year 6.

	MC (%)	LC (%)	CC (%)	Total Cost (Baht)	%of Total Cost (y2-y6)
Medicine	6.8	81.7	11.5	42,325,797	13.2
Obstetrics&Gynecology	4.8	62.7	32.6	37,496,693	11.7
Paediatrics	1.7	63.7	34.6	31,561,896	9.9
Surgery	4.1	80.5	15.4	25,839,553	8.1
Pathology	9.6	55.5	34.9	20,235,788	6.3
Microbiology	6.0	64.0	29.9	18,199,775	5.7
Radiology	2.7	80.1	17.3	15,385,012	4.8
Anatomy	4.1	53.4	42.5	14,230,229	4.5
Forensic Medicine	4.5	64.8	30.8	11,114,855	3.5
Biochemistry	1.3	43.5	55.2	11,221,025	3.5
Anesthesiology	0.5	77.2	22.2	10,218,098	3.2
Physiology	2.2	50.7	47.1	10,167,842	3.2
Orthopaedic Surgery	2.0	78.5	19.5	9,654,264	3.0
Preventive Medicine	2.1	71.1	26.8	9,564,870	3.0
Ophthalmology	5.6	77.1	17.4	9,095,200	2.8
Pharmacology	2.0	51.4	46.6	8,585,374	2.7
Psychiatry	2.1	85.2	12.8	8,080,680	2.5
Rehabilitation Medicine	2.2	79.7	18.0	7,761,473	2.4
Otolaryngology	6.1	74.1	19.9	7,561,633	2.4
Parasitology	3.0	71.4	25.6	7,600,666	2.4
Laboratory Medicine	4.2	84.5	11.3	3,800,394	1.2
Total	4.21	68.8	27.0	319,701,115	100.0

Year 2, Pathology cost 18,894/ Baht SCH, Biochemistry cost 14,668 Baht / SCH and Microbiology Cost 13,217 Baht /SCH these were the three most costly. The unit cost was 290,482 Baht and average cost was 7,448 Baht / SCH as in table 5.6.

Table 5.6 Total cost, material cost, capital cost and unit cost of medical student year2

Department	MC(%)	LC(%)	CC(%)	Total cost	Unit cost	Baht/SCH
Pathology	9.6	55.5	34.9	5,781,654	37,789	18,894
Biochemistry	1.3	43.5	55.2	11,221,025	73,340	14,668
Microbiology	6.0	64.0	29.9	4,044,394	26,434	13,217
Pharmacology	2.0	51.4	46.6	1,430,896	9,352	9,352
Physiology	2.2	50.7	47.1	10,167,842	66,456	6,646
Anatomy	4.1	53.4	42.5	10,672,671	69,756	4,650
Preventive Medicine	2.1	71.1	26.8	1,125,279	7,355	3,677
Total	3.7	51.9	44.4	44,443,761	290,482	7,448

Year 3 Pathology, Forensic Medicine and Microbiology cost 17,955 Baht / SCH, 17,259 Baht /SCH and 12,560 Baht / SCH respectively for the three most costly. The unit cost and average 367,795 Baht and 9,679 Baht as in table 5.7. The Department of Forensic Medicine costly could because of number credit it taught (1 credit).

Table 5.7 Total cost, material cost, capital cost and unit cost of medical student Year3

Department	MC(%)	LC(%)	CC(%)	Total cost	Unit cost	Baht/SCH
Pathology	9.6	55.5	34.9	14,454,134	89,777	17,955
Forensic Medicine	4.5	64.8	30.8	2,778,714	17,259	17,259
Microbiology	6.0	64.0	29.9	14,155,380	87,922	12,560
Parasitology	3.0	71.4	25.6	7,600,666	47,209	11,802
Pharmacology	2.0	51.4	46.6	7,154,479	44,438	8,888
Laboratory Medicine	4.2	84.5	11.3	3,800,394	23,605	7,868
Psychiatry	2.1	85.2	12.8	3,463,148	21,510	7,170
Anatomy	4.1	53.4	42.5	3,557,557	22,097	4,419
Preventive Medicine	2.1	71.1	26.8	2,250,558	13,979	3,495
Total	5.32	63.6	31.1	59,215,030	367,795	9,679

Year 4, Forensic Medicine, Ophthalmology and Obstetrics and Gynecology cost. Baht/SCH at 18,162, 14,861 and 13,615 respectively. The unit cost was 425,697 Baht and 9,900 Baht / SCH (table 5.8). This was the same reason as year 3 that Forensic Medicine, Ophthalmology costly.

Table 5.8 Total cost, material cost, capital cost and unit cost of medical student year 4

Department	MC(%)	LC(%)	CC(%)	Total cost	Unit cost	Baht/SCH
Forensic Medicine	4.5	64.8	30.8	2,778,714	18,162	18,162
Ophthalmology	5.6	77.1	17.4	2,273,800	14,861	14,861
Obstetrics&Gynecology	4.8	62.7	32.6	24,997,795	163,384	13,615
Oto-Laryngology	6.1	74.1	19.9	1,890,408	12,356	12,356
Medicine	6.8	81.7	11.5	19,534,983	127,680	10,640
Orthopaedic Surgery	2.0	78.5	19.5	1,609,044	10,517	10,517
Surgery	4.1	80.5	15.4	11,484,246	75,060	6,255
Preventive Medicine	2.1	71.1	26.8	562,639	3,677	3,677
Total	5.2	72.9	21.9	65,131,630	425,697	9,900

Year 5 was the costliest in the whole 6 years, Rehabilitation, Radiology and Anesthesiology were three most costly at 26,580 Baht / SCH, 26,344 Baht / SCH and 17,497 Baht / SCH. Unit cost was 598,647 Baht and average Baht/SCH was 11,512 (table 5.9). These three departments could be that they taught only 2, 4 and 4 credits respectively for the whole six years of medical student curriculum.

Table 5.9 Total cost, material cost, capital cost and unit cost of medical student year5

Department	MC(%)	LC(%)	CC(%)	Total cost	Unit cost	Baht/SCH
Rehabilitation	2.2	79.7	18.0	7,761,473	53,161	26,580
Radiology	2.7	80.1	17.3	15,385,012	105,377	26,344
Anesthesiology	0.5	77.2	22.2	10,218,098	69,987	17,497
Ophthalmology	5.6	77.1	17.4	6,821,400	46,722	15,574
Otolaryngology	6.1	74.1	19.9	5,671,224	38,844	12,948
Paediatrics	1.7	63.7	34.6	21,041,264	144,118	12,010
Orthopaedic Surgery	2.0	78.5	19.5	3,218,088	22,042	11,021
Psychiatry	2.1	85.2	12.8	4,617,531	31,627	7,907
Surgery	4.1	80.5	15.4	5,742,123	39,330	6,555
Medicine	2.7	80.1	17.3	3,550,387	24,318	4,053
Preventive Medicine	2.1	71.1	26.8	3,375,836	23,122	3,854
Total	2.6	75.0	22.3	87,402,437	598,647	11,512

Year 6, the three most costly were Medicine, Obstetrics&Gynecology and Forensic Medicine at 14,470 Baht / SCH, 13,888 Baht / SCH and 12,350 Baht / SCH respectively.

The unit cost and average Baht/SCH were 381,941 and 7,639 (table 5.10).

Table 5.10 Total cost, material cost, capital cost and unit cost of Medical student year 6

Department	MC(%)	LC(%)	CC(%)	Total cost	Unit cost	Baht/SCH
Medicine	6.8	81.7	11.5	13,023,322	86,822	14,470
Obstetrics&Gynecology	4.8	62.7	32.6	12,498,898	83,326	13,888
Forensic Medicine	4.5	64.8	30.8	5,557,427	37,050	12,350
Paediatrics	1.7	63.7	34.6	10,520,632	70,138	11,690
Orthopaedic Surgery	2.0	78.5	19.5	4,827,132	32,181	10,727
Surgery	4.1	80.5	15.4	8,613,184	57,421	6,380
Preventive Medicine	2.1	71.1	26.8	2,250,558	15,004	3,751
Total	4.2	71.7	24.1	57,291,153	381,941	7,639

5.5 Hospital Cost

On considering the hospital cost, revealed that the hospital labor cost ranking the first(5.18% of total cost) while hospital material cost was 0.97% and hospital capital cost was 0.02% (capital cost here we exclude the building cost for most buildings are depreciated to cost zero). The hospital total cost was 6.17% of the total cost. Department of Medicine accounted for 5,950,630 Baht (1.83%), Obstetrics and Gynecology for 4,992,345 Baht (1.53%) and Surgery for 4,329,744 Baht (1.33%) of the total cost of producing Medical Student as shows in table 5.11.

Table 5.11 Hospital cost in material cost, labor cost, capital cost, percentage and total cost of producing medical student by Department

	MC	%	LC	%	CC	%	Total Hospital cost
Medicine	673,500	(11.32)	5,269,901	(88.56)	7,229	(0.12)	5,950,630
Obstetrics&Gynecology	530,857	(10.63)	4,451,068	(89.16)	10,420	(0.21)	4,992,345
Surgery	790,931	(18.27)	3,511,466	(81.10)	27,347	(0.63)	4,329,743
Orthopaedic Surgery	110,874	(11.33)	865,027	(88.39)	2,731	(0.28)	978,632
Rehabilitation Medicine	110,874	(11.33)	865,027	(88.39)	2,731	(0.28)	978,632
Paediatrics	30,444	(3.41)	857,945	(96.13)	4,063	(0.46)	892,452
Ophthalmology	397,196	(48.93)	413,793	(50.97)	784	(0.10)	811,773
Otolaryngology	396,755	(50.14)	393,623	(49.75)	869	(0.11)	791,247
Psychiatry	81,189	(35.30)	148,410	(64.52)	407	(0.18)	230,006
Preventive Medicine	12,016	(26.26)	33,554	(73.33)	187	(0.41)	45,757
Total	3,134,636		16,809,814		56,768		20,001,217

5.6 The analysis of economic loss from dropout and repeat student

The economic loss from dropout and repeat student (calculated using the formula in page 25) were not a big problem in this Faculty, for the repeat and dropout were low about 0.88% in repeat rate for half to one year and 0% in dropout as show in table 5.12 and 5.13

The unit cost of a graduate (adjusted) is 2,174,091 Baht while the unit cost of a medical student (not adjusted) is 2,161,124 Baht as in table 5.1 and 5.2

Table 5.12 The number of students, number of incomplete student, drop out and time delayed.

Year	Number Student	Number incomplete student	Number student drop out	Time delayed
1	144	0	0	0
2	153	3	0	1 year/student
3	161	0	0	0
4	153	2	0	½ year/student
5	146	1	0	½ year/student
6	150	2	0	½ year/student
Total	907	8	0	0.687 year/student

* Calculated from medical student study in the year 2000 with estimating the time delayed.

Source : The Academic Affair, Faculty of Medicine Chulalongkorn University

Table 5.13 Study status, average years of study and rate of loss of medical student in the year 2000.

Year	Number Student	Number incomplete student	Average years Of study (year)	Rate of loss (%)
1	144	0	1.0	0
2	153	3	1.020	1.96
3	161	0	1.0	0
4	153	2	1.006	1.307
5	146	1	1.003	0.684
6	150	2	1.007	1.333
Total	907	8	6.036	0.882

Note :

1. Average Years of Study

= Years study \times No. Student

= $\frac{\text{Years of study} \times \text{No. Incomplete student} + \text{Assigned years of study} \times \text{No. passed student}}{\text{Total No. of Student}}$

Total No. of Student

2. Rate of loss

= $\frac{\text{No. Incomplete student}}{\text{Total No. of student}}$

Total No. of student

5.7 Indirect Cost of Student

The indirect cost of students is the opportunity cost or income foregone from going study in the university. This indirect cost was calculated by using data from Report of the labor force survey whole Kingdom round 3: August 2000 (National Statistical Office and Office of the Prime Minister 2001).

The income that one should gain was calculated by assuming he go to work in his one situation that is male or female, aged 19 – 25, Bangkok Metropolis, North, Southern, Central or Northeastern Region for home, complete secondary school. The distribution to each sector is as the average. And adjusted by the rate of unemployed then should be the opportunity cost as in table 5.14. The indirect cost of student (opportunity cost) was about 90,826 Baht /person/year and for the whole six years course is 544,956 Baht /person. The fluctuations of opportunity cost between each year were because of the distribution in the factors accounted (sex, age and home address).

Table 5.14 The indirect cost or opportunity cost or income foregone of student

Year	Opportunity Cost/ Person/Year
1	90,960
2	88,908
3	88,584
4	93,564
5	90,876
6	92,064
Total	544,956

Source : Report of the labor force survey whole Kingdom Round 3 :
August 2000, National Statistical Office and Office of the Prince
Minister.

5.8 Sensitivity analysis

When labor cost of the Faculty of Medicine changed by 70 percent increment the total cost, unit cost and Baht/SCH changed as in table 5.15 and 5.16 The total cost change from 324,435,403 Baht to be 478,470,596 Baht and unit cost change from 2,148,579 Baht to be 3,168,679 Baht, whereas the Baht/SCH change from 8,170 Baht to be 12,048 Baht.

Table 5.15 The total cost, unit cost and Baht per student credit hour(SCH) of producing medical doctor and sensitivity analysis if labor cost changed by 70% (not adjusted will delayed and dropout students)

Labor Cost	Total Cost	Unit Cost	Baht/SCH
Labor cost unchanged	324,435,403	2,148,579	8,170
Labor cost increased 70%	478,470,596	3,168,679	12,048

Table 5.16 The total cost, unit cost and Baht /person student credit hour (SCH) of producing medical doctor and sensitivity analysis if labor cost changed by 70% (adjusted with delayed and dropout students).

	TOTAL COST	Unit cost	Baht/SCH
Labor cost unchanged	326,382,015	2,161,470	8,219
Labor cost increased 70%	481,341,420	3,187,691	12,120

If we include the land value in the capital cost, by doing this we estimate the total cost could increase to be 1,154,610,403 Baht, the unit cost, 7,637,993 Baht and

9,098 Baht /SCH this is about 3.5 times of the estimated. (the land value was 75,000 Baht /Square meter) (Value Association of Thailand, 1997).