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A Study on Efficiency for the Department of Trade in Universities

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Ⅰ. Introduction

Currently, "half-price tuition" in universities has become very controversial issue in Korea, since majority political party's announcement related to this issue stirred up students who had previously been quiet on the issue. This

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also brought about students' street protests. Accordingly, Seoul city mayor has made sudden decision to accept students' request on "half-price tuition" so he enabled "University of Seoul" to reduce the tuition from 2.38 million won per semester to 1.19 million won. Of course, many of Korean colleges give full tuition exemption to some of students who show excellent academic achievements. But this is especially great news to many parents who have suffered from the continuous raising of college tuition. 〈Table 1〉 shows top 20 universities which impose higher tuition fee.

〈Table 1〉 Top 20 universities in terms of higher level of tuition fee (2010-2011) (Unit ; 1000 won)

	2011	Amount	2010	Amount
1	Chugye Univ. for the Arts	9,317	Chugye Univ. for the Arts	9,074
2	Eulji Univ.	9,014	Eulji Univ.	8,798
3	Sangmyung Univ. (Chun-an)	8,999	Hansei Univ.	8,770
4	Hansei Univ.	8,913	Yonsei Univ.	8,666
5	Yonsei Univ.	8,692	Sangmyung Univ.(Chun-an)	8,648
6	Ewha womans Univ.	8,690	Yonsei Univ.(Wonju)	8,607
7	Hanseo Univ.	8,681	Ewha womans Univ.	8,607
8	Korea Aerospace Univ.	8,638	Hanseo Univ.	8,562
9	Yonsei Univ.(Wonju)	8,626	Hongik Univ.(Chochiwon)	8,487
10	Myongji Univ.	8,578	Aju Univ.	8,390
11	Hanyang Univ.	8,568	Myongji Univ.	8,366
12	Sungkyunkwan Univ.	8,508	Korea Aerospace Univ.	8,363
13	Hongik Univ.(Chochiwon)	8,487	Baekseok Univ.	8,350
14	Hanyang Univ.(Erica)	8,461	KyungHee Univ.(International)	8,337
15	Korea Univ.	8,461	Hanyang Univ.	8,322
16	Anyang Univ.	8,420	Hongik Univ.	8,311
17	Aju Univ.	8,408	Sungkyunkwan Univ.	8,264
18	Baekseok Univ.	8,405	Hanyang Univ.(Erica)	8,255
19	KyungHee Univ.(International)	8,397	Korea Univ.	8,226
20	Seo Kyeong Univ.	8,377	Sahmyook Univ.	8,202

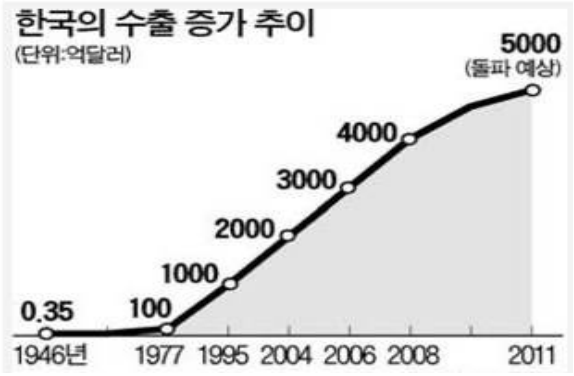
(Source ; The ministry of education, science and technology)

Then, who will pay for portion of price-cut of tuition ? There would be two solutions. One of solution seems to be raising taxes. On the other hand, enhancing the efficiency of education service in universities can be considered. If some of universities which show lower efficiency can improve it, there would be little necessity to raise tuition fee.

In the meantime, 85% of South Korea's gross domestic product(GDP) depends on trade. Trade share of exports in GDP reaches around 52%. Amount of Korea's total exports in 1964 was $ 100 million. 13 years later, in 1977, we've got a country that exports $ 10 billion. 18 years later, in 1995, exports amounted to $ 100 billion. Exports amount in 2011 exceeds $ 5,000Billion. Korea is expected to achieve $ 1 trillion total trade volume and will become finally the ninth in the world. The following 〈Figure 1〉 presents the trend of Korean export in trade.

We do not have a lot of natural resources and are bound to export the finished products created to pursue economic development. In other words, trade sector is very essential for Korea to continue economic growth.

〈Figure 1〉 The trend of Korean export in trade (Unit ; 100 million$)



Source ; KITA(Korea International Trade Association)

Despite of the importance of trade sector in Korean economy, number of the department of trade and/or international commerce[1] (hereinafter

"the Department") in universities is being decreased gradually. So the paper will attempt analyzing the efficiency of "the Department". Through the analysis, the paper would suggest how to improve efficiency in "the Department" which show lower one, since the enhancement of efficiency for "the Department" will be resulted in attracting more students who want to study "the Department" and they will become the future important pillars who will lead Korean's economic growth. This will be also one of ways to have indirect effect to impact on the adjustment of tuition fee. DEA(Data Envelopment Analysis) model will be applied to assess the efficiency of "the Department".

Ⅱ. Review of Related Literatures

In terms of studies regarding the "Department", Han, E.S. & Park, K.S.(2010)[2] studied on how to train global trade expert of Korean university under global trade environment. Park, K.S. & Yu, K.H. (2008)[3] investigated the way of modification of the trade and international business curriculum. Kim, W.B. & You, B.B.(2006)[4] made comparative analysis of international trade education of Korea and Japan. Up to now, there would be no papers which handle the analysis of efficiency for "the Department".

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1) The curriculum for the department of international commerce is almost similar to that of trade department.

2) Han, E.S. & Park, K.S., "A Study on the Proposal for Training of Global Trade Expert of Korean University under Global Trade Environment", The International Commerce & Law Review, Vol.47, 2010.8., pp.403-428.

3) Park, K.S. & Yu, K.H., "A Study on a Direction of Modification of the Trade and International Business curriculum for Global Trade Expert ", The International Commerce & Law Review, Vol.37, 2008.2., pp.329-360.

4) Kim, W.B. & You, B.B., "A Comparative Analysis of International Trade Education of Korea and Japan in the View of International Commerce", Korea International Commerce Review, Vol.21.4.,2006.12.,pp.3-22.

With regards to studies for DEA model, Sohn, S.Y. & Joo, Y.G.(2004)[5] reviewed efficiency on education projects for "Brain Korea 21" , using DEA model. Kim, H.Y. et al.(2011)[6] analyzed operational efficiency of college in Kyunggido. Kim, H.J. & Yun, W.C. (2006)[7] conducted analysis on efficiency for educational performance of high schools in Seoul. Sreekumar, S. & Mahapatra, S.S.(2011)[8] presented performance modeling of Indian business schools via DEA model. Johnes, J.(2006)[9] examined efficiency of higher education through DEA analysis. Alexandra,M.B. & Konstantinos, T.(2007)[10] evaluated performance for non-profit social service organization using DEA analysis.

〈Table 2〉 Related literatures for evaluating efficiency by DEA model

Researcher's name	Input	Output	The concerned education service
Sohn, S.Y. & Joo,Y.G. (2004)	supported amounts, number of participated professors, number of participated students	number of published international papers, number of published Korean papers, number of published books	Brain Korea 21

5) Sohn, S.Y. & Joo, Y.G., "Data Envelopment Analysis and Logistic Model for Brain Korea 21", IE Interfaces, Vol.17, No.3, 2004, pp.249-260.

6) Kim, H.Y., Lee, J.G. & Song, B.S., "A Study on the analysis of Operational Efficiency of College in Kyunggido : Focus on Scholarship and Percentage of Regulations", Korean Corporation Management Review, Vol.18(1),2011.3., pp.143-158.

7) Kim, H.J. & Yun, W.C., "Analysis on Efficiency Difference Using DEA Approach and Tobit Model : For Educational Performance of High Schools in Seoul", Journal of Public Finance, Vol.21(1), 2006.8.,pp.97-114.

8) Sreekumar,S. & Mahapatra, S.S., "Performance Modeling of Indian Business Schools : a DEA-neutral network approach," *Benchmarking : An International Journal*, Vol.18(2),2011.4. pp.221-239.

9) Johnes, J., "Data Envelopment Analysis and its Application to the Measurement of Efficiency in Higher Education," *Economics of Education Review*, Vol.25(3)., 2006.6., pp.273-288.

10) Alexandra, M,B. & Konstantinos, T., "A Conceptual Framework to Evaluate Performance of Non-Profit Social Service Organization'" *International Journal of Technology Management*, Vol.37(1/2), 2007, pp.147-161.

Kim, H.Y. et.al. (2011)	total number of staffs, percentage of securing facilities,	percentage of students who got job, amount of scholarship per student	College in Kyunggido
Kim, H.J. & Yun,W.C.(2006)	total number of students per class, total career of teachers, percentage of teachers who worked more than 17years, land per students, social welfare amounts per students	percentage of students who entered college	High School in Seoul
Sreekumar, S. & Mahapatra, S.S. (2011)	Intellectual capital, Infrastructure & facilities, Fee collected from students	Industry interface, placement performance, international linkage, satisfaction, Extra curricular, Salary	Indian Business School
Johnes, J. (2006)	Total number of students studying for a first degree multiplied by the average A level points, total number of postgraduate students, total number of full-time academic staff, total depreciation & interest payable, total expenditure on central libraries etc	Total number of first degrees awarded, total number of higher degrees awarded, value of the recurrent grant for research awarded	Higher education

Ⅲ. The Analysis of Efficiency for “the Department”

DEA(Data Envelopment analysis), being a robust mathematical tool, has been employed to evaluate relative efficiency of "the Department". DEA, basically, takes into consideration the input and output components of a DMU(Decision-making Unit) to calculate technical efficiency. This is treated as an indicator for performance of DMUs and comparison has been made among them.

1. Identification of DMU (Decision Making Unit)

DEA model requires DMUs which should be almost homogeneous, if it's possible. So criterias to fix target DMUs for the analysis may require following things. First, target DMUs should belong to “the Department" in the main campus of universities. Second, total number of enrolled professors in "the Department" of college should be more than 4, at least to handle the required lectures . Third, "the Department" should have no missing values in 2011 on input & output variables which are mentioned at the internet site for "the Information service of Higher Education in Korea". Based on such parameters, 30 DMUs is selected as per the below-mentioned 〈Table 3〉.

〈Table 3〉 List of DMUs

DMUs (Universities)	type	location
KAN1	National	Local
KON2	Private	Seoul
KYU3	Private	Local
KYU4	Private	Seoul
KEI5	Private	Local
KWA6	Private	Local
DAN7	Private	Seoul
DAE8	Private	Local
DON9	Private	Local
BAE10	Private	Local
PUS11	National	Local
SIL12	Private	Local
INC13	Private	Seoul
ChO14	National	Local
ChO15	Private	Local

DMUs (Universities)	type	location
ChA16	National	Local
ChU17	National	Local
HAN18	Private	Local
GAN19	National	Local
GYE20	National	Local
KON21	National	Local
GWA22	Private	Seoul
DUK23	Private	Seoul
DON24	Private	Seoul
DON25	Private	Local
SOO26	Private	Seoul
YEU27	Private	Local
WON28	Private	Local
INH29	Private	Seoul
KOR30	National	Local

2. Input & output variables

Input & output variables in DEA model should be complied with following rule. Total number of DMUs should be at least more than two times as sum of total number of input & output variables[11]. Considering this rule, this paper selects 3 input variables and 4 output variables as per the below -mentioned 〈Table 4〉 & 〈Table 5〉.

11) Fitzsimmons, J.A. & Fitzsimmons, M.J.,"Service Management for Competitive Advantage," Mcgraw-Hill College, 1994.

〈Table 4〉 Input variables

DMU	total no. of staff	total no. of student	total no. of professor
KAN1	4	136	8
KON2	8	257	12
KYU3	6	382	8
KYU4	10	178	11
KEI5	3	125	4
KWA6	4	165	5
DAN7	8	249	7
DAE8	3	182	4
DON9	4	279	6
BAE10	4	255	5
PUS11	19	355	6
SIL12	4	275	5
INC13	10	325	14
ChO14	20	522	10
ChO15	14	677	11
ChA16	11	282	6
ChU17	8	261	5
HAN18	4	248	6
GAN19	6	169	5
GYE20	8	204	7
KON21	4	101	5
GWA22	1	57	9
DUK23	5	187	5
DON24	4	150	9
DON25	4	250	5
SOO26	9	470	6
YEU27	17	665	17
WON28	6	385	6
INH29	10	480	17
KOR30	8	172	4

〈Table 5〉 Output variables

DMU	lecture by prof.	employ-ment	external research-fund	no. of paper per prof.
KAN1	63.5	49.5	201,787	1.55
KON2	47.8	66.7	137,500	0.75
KYU3	58.8	48.9	175,000	0.89
KYU4	56.1	61.2	51,750	1.35
KEI5	89.0	83.3	8,750	1.15
KWA6	72.3	48.0	39,881	1.50
DAN7	46.3	63.5	25,956	1.86
DAE8	57.6	48.6	75,800	0.25
DON9	63.4	57.7	27,000	0.78
BAE10	33.7	41.7	50,000	2.30
PUS11	41.5	67.0	367,387	0.92
SIL12	41.1	57.8	28,750	1.58
INC13	63.6	61.7	130,387	1.41
ChO14	37.5	53.4	158,300	0.67
ChO15	61.0	46.6	8,750	2.65
ChA16	45.0	61.9	15,000	1.25
ChU17	32.0	54.2	86,272	0.78
HAN18	88.1	61.1	423,335	1.82
GAN19	68.9	40.6	64,863	0.36
GYE20	60.9	60.0	18,000	1.53
KON21	71.8	57.6	228,377	1.32
GWA22	52.0	51.4	15,000	0.26
DUK23	57.2	63.3	12,650	2.24
DON24	54.7	61.9	180,000	1.19
DON25	50.0	67.9	8,400	1.14
SOO26	22.8	68.5	177,500	1.62
YEU27	76.7	45.0	24,376	0.89
WON28	60.3	40.0	18,000	1.23
INH29	59.6	66.1	171,481	0.96
KOR30	40.3	59.6	10,000	1.70

3. The results of DEA analysis

1) CCR model

The software of DEA-Solver[12] is used for analysis to assess the efficiency. This paper uses CCR output mode to check how much level of output variables should be enhanced for increasing efficiency. The results of the analysis show in 〈Table 6〉. The value of score presents efficiency level. DMUs which show 1 in the value of score mean "the Department" of universities have the highest effectiveness and will become the reference group against inefficient groups of "the Department".

〈Table 6〉 The status of efficiency for each DMU

No.	DMU	Score	Reference(λ)
1	KAN1	1.00	-
2	KON2	0.43	5(0.82), 18(0.05), 21(1.28), 22(0.23)
3	KYU3	0.45	5(0.64). 18(0.91)
4	KYU4	0.59	21(1.71), 22(0.10)
5	KEI5	1.00	-
6	KWA6	0.89	1(0.07), 5(0.60), 10(0.04), 18(0.05), 23(0.32)
7	DAN7	0.65	5(0.30), 18(0.02), 21(0.07), 23(1.07)
8	DAE8	0.73	5(0.65), 18(0.23)
9	DON9	0.54	5(1.19), 18(0.09), 22(0.08)
10	BAE10	1.00	-
11	PUS11	0.98	5(0.17), 18(0.88)
12	SIL12	0.82	5(0.52), 18(0.45), 18(0.02), 23(0.12)
13	INC13	0.38	5(0.60), 18(0.08), 21(1.32), 23(0.52)
14	ChO14	0.37	5(1.01), 18(0.99)
15	ChO15	0.53	10(0.50), 23(1.70)

12) Cooper, W., Seiford, L.M. and K. Tone, "Data Envelopment analysis: a Comparative Text with Models, Applications, Reference and DEA-Solver Software," The Netherlands, Kluwer Academic Publishers, 2000.

16	ChA16	0.59	5(0.72), 18(0.03), 30(0.74)
17	ChU17	0.64	5(0.80), 18(0.30)
18	HAN18	1.00	-
19	GAN19	0.68	5(0.94), 18(0.21)
20	GYE20	0.63	5(0.28), 21(0.59), 23(0.58)
21	KON21	1.00	-
22	GWA22	1.00	-
23	DUK23	1.00	-
24	DON24	0.82	5(0.25), 18(0.21), 21(0.55), 22(0.19)
25	DON25	0.71	5(0.99), 10(0.01), 18(0.00), 23(0.20)
26	SOO26	0.82	5(0.37), 18(0.50), 30(0.39)
27	YEU27	0.21	5(3.96), 18(0.20)
28	WON28	0.58	5(0.81), 18(0.04), 23(0.50)
29	INH29	0.31	5(1.25), 18(1.04), 21(0.42), 22(0.41)
30	KOR30	1.00	-

The average amounts of external research fund in DMUs like "KAN1, HAN18 and KON21" show three times as that of inefficient group of DMUs. In addition to this, the input level of DMUs like "KEI5, BAE10, GWA22, DUK23 and KOR30" present half level to be compared with inefficient group of DMUs. Based on above-mentioned facts, "the eight Department" like KAN1, KEI5 etc. belong to DMUs with 100% efficiency comparatively.

As per the below mentioned 〈table 7〉, the required level of output variable for inefficient DMUs to become efficient DMUs can be calculated

$$\text{as } \sum_{j=1}^{n} y_{rj}\lambda_j.$$

〈Table 7〉 The required level of output variables for inefficient DMUs

DMU		Output			
		lecture by prof	employment	e_research-fund	paper/prof
KON2	Score	47.80	66.70	137,500	0.75
	Projection	180.97	156.73	3230,89	2.78
	Difference	133.17	90.03	185,589	2.03
KYU3	Score	58.75	48.90	175,000	0.89
	Projection	136.83	108.75	389,178	2.39
	Difference	78.08	59.85	214,178	1.50
KYU4	Score	56.05	61.20	517,50	1.35
	Projection	127.64	103.34	391,488	2.28
	Difference	71.59	42.14	339,738	0.93
KWA6	Score	72.25	48.00	39,881	1.50
	Projection	80.98	77.68	44,698	1.68
	Difference	8.73	29.68	4,817	0.18
DAN7	Score	46.25	63.50	25,956	1.86
	Projection	94.38	97.76	39,959	2.86
	Difference	48.13	34.26	14,003	1.00
DAE8	Score	57.55	48.60	75,800	0.25
	Projection	78.49	68.57	103,385	1.17
	Difference	20.94	19.97	27,585	0.92
DON9	Score	63.40	57.70	27,000	0.78
	Projection	117.59	108.39	50,077	1.55
	Difference	54.19	50.69	23,077	0.77
PUS11	Score	41.45	67.00	367,387	0.92
	Projection	93.36	68.52	375,695	1.81
	Difference	51.91	1.52	8,308	0.89
SIL12	Score	41.10	57.80	28,780	1.58
	Projection	69.29	70.27	34,954	1.92
	Difference	28,19	12.47	6,204	0.34
INC13	Score	63.55	61.70	130,387	1.41
	Projection	184.76	163.76	346,057	3.74
	Difference	121.21	102.06	215,670	2.33

CHO14	Score	37.45	53.40	158,300	0.67
	Projection	177.35	144.83	429,332	2.97
	Difference	139.90	91.43	271,032	2.30
CHO15	Score	60.95	46.60	8,750	2.65
	Projection	114.03	128.49	46,461	4.96
	Difference	53.08	81.89	37,711	2.31
CHA16	Score	45.00	61.90	15,000	1.25
	Projection	96.24	105.66	25,604	2.13
	Difference	51.24	43.76	10,604	0.88
CHU17	Score	32.00	54.20	86,272	0.78
	Projection	94.48	84.81	135,002	1.47
	Difference	65.48	30.61	48,730	0.69
GAN19	Score	68.85	40.60	64,863	0.36
	Projection	101.80	90.90	95,904	1.46
	Difference	32.95	50.30	31,041	1.10
GYE20	Score	60.85	60.00	18,000	1.53
	Projection	100.93	64.52	144,803	2.41
	Difference	40.08	34.52	126,806	0.88
DON24	Score	54.70	61.90	180,000	1.19
	Projection	90.51	75.49	219,523	1.45
	Difference	35.81	13.59	39,523	0.26
DON25	Score	50.00	67.90	8,400	1.14
	Projection	99.84	95.51	11,815	1.60
	Difference	49.84	27.61	3,415	0.46
SOO26	Score	22.75	68.5	177,500	1.62
	Projection	91.97	83.98	217,614	1.99
	Difference	69.22	15.48	40,114	0.37
YEU27	Score	76.7	45.00	24,376	0.89
	Projection	369.18	341.55	117,330	4.91
	Difference	292.48	296.55	92,954	4.02
WON28	Score	60.25	40.00	18,000	1.23
	Projection	104.41	101.79	31,194	2.13
	Difference	44.16	61.79	13,194	0.90
INH29	Score	59.60	66.10	171,481	0.96
	Projection	254.30	212.98	552,538	3.99
	Difference	194.70	146.88	381,057	3.03

To reach efficient position, inefficient DMUs should increase the level of output variables as the figures shown in the part of difference. If this is not available, those DMUs may consider decreasing the level of input variables.

2) BCC model

CCR model does not consider the scale of "the Department" while calculating efficiency. To analyze the efficiency in terms of size, BCC model of DEA can be used. 〈Table 8〉 indicates the level of efficiency in scale.

〈Table 8〉 The efficiency of scale for each DMUs

DMU	Score (CCR)	Score (BCC)	Efficiency in scale
KAN1	1.00	1.00	1.00
KON2	0.43	0.87	0.49
KYU3	0.45	0.69	0.65
KYU4	0.59	0.83	0.71
KEI5	1.00	1.00	1.00
KWA6	0.89	0.93	0.96
DAN7	0.65	0.94	0.69
DAE8	0.73	1.00	0.73
DON9	0.54	0.71	0.76
BAE10	1.00	1.00	1.00
PUS11	0.98	1.00	0.98
SIL12	0.82	0.87	0.95
INC13	0.38	0.87	0.43
ChO14	0.37	0.72	0.51
ChO15	0.53	1.00	0.53
ChA16	0.59	0.81	0.72
ChU17	0.64	0.70	0.92
HAN18	1.00	1.00	1.00
GAN19	0.68	0.78	0.87
GYE20	0.63	0.85	0.75

DMU	Score (CCR)	Score (BCC)	Efficiency in scale
KON21	1.00	1.00	1.00
GWA22	1.00	1.00	1.00
DUK23	1.00	1.00	1.00
DON24	0.82	0.91	0.90
DON25	0.71	0.85	0.84
SOO26	0.82	0.98	0.83
YEU27	0.21	0.86	0.24
WON28	0.58	0.68	0.84
INH29	0.31	0.89	0.35
KOR30	1.00	1.00	1.00

*The efficiency in scale=efficiency score(CCR)/efficiency score(BCC)

8 DMUs like "KAN1, KEI5 etc." indicate score 1 in BCC as well as efficiency in scale, which mean these DMUs have technical efficiency as well as scale efficiency. 3 DMUs like "DAE8, PUS11 and CHO15" with score 1 in BCC, which do not have score 1 in efficiency in scale should be further analyzed to decide the characteristics of RTS(Returns to Scale) as per following rules.

* If $\sum_{j=1}^{n}\lambda_j=1$, RTS indicate CRS(constant returns to scale) position.

If $\sum_{j=1}^{n}\lambda_j<1$, RTS indicate IRS(increasing returns to scale)poistion.

If $\sum_{j=1}^{n}\lambda_j>1$, RTS indicate DRS(decreasing returns to scale)position.

〈Table 9〉 The status of RTS

DMU	Σ λj	RTS
DAE8	1.36	DRS
PUS11	1.06	DRS
CHO15	2.00	DRS

As shown in 〈Table 9〉, all 3 DMUs show DRS position, which mean they should rationalize the operation process of "the Department" to improve the level of efficiency.

4. Group analysis

All "the Department" can be classified as three groups(. First, national universities vs. private universities/ regional location vs. Seoul & suburb location/ Reputed universities vs. non-reputed universities). To check the group efficiency, tobit regression analysis is conducted. SPSS R Essential 19 version is used for the analysis.

〈Table 10〉 The results of tobit regression

	Coef.	Std. Error	Z value	P
(Intercept)	.811	.085	9.561	.000
Type	-.709	.216	-3.286	.001
Location	.486	.203	2.395	.017
Type+Repu.	.705	.202	3.485	.000
Log(Scale)	-1.416	.159	-8.903	.000

*Lower bound: 0, upper bound: 1
tobit(formula = efficiency ~ type+location+type_repu, left = 0, right = 1, dist = "gaussian", data = dta, na.action = na.exclude)
Scale: 0.2428
Residual d.f.: 25
Log Likelihood : -13.437 D.f: 5
Wald Statistic: 13.964 D.f.: 3

** Type- National Univ.; 0, Private Univ. ; 1
Location - Seoul & suburb ; 0, Local ; 1
Reputation - Reputed ; 0, Non-reputed ; 1

As per shown in 〈Table 10〉, first, the group of "the Department" in national universities show higher efficiency than that of private universities group. Second, "The Department" in universities which are located in Seoul & suburb show higher efficiency than that of regional universities. Lastly, "The Department" in Seoul & suburb which do not belong to reputed universities show relatively higher efficiency. The list of reputed universities is based on top 30 universities which are announced by Joongang-ilbo(Joongang newspaper) in 2011.

Ⅳ. Conclusion

The objectives of the paper focus on the operational efficiency of "the Department" in universities. As a result based on CCR model as well as BCC model in DEA analysis, 8 DMUs like KAN1, KEI5 BAE10 etc. show relatively higher efficiency. So other DMUs like KON2, KYU3 etc. which show lower efficiency should try to put more effort to improve the level of output variables like employment rate, receiving amount of external research fund and so on. In doing so, they can become more efficient "the Department" and attract better students who want to join "the Department".

The indirect underlying rationale on the result is that there would be little necessities for such inefficient DMUs to raise tuition fee, if they can improve the level of efficiency. In other words, enhancing efficiency of "the Department" can be considered before adjusting school tuition fee. There would be some limitations of the study. First, the study do not reflect time lag between input and output variables so many years of data analysis can

be considered in next study. Second, total thirty number of DMUs are used in the study since data files for other candidates of DMUs on the site for "the information service of Higher Education in Korea" are unavailable. Increasing total number of DMUs can be contemplated in next study, if it's possible. Third, the evaluation of "the Department" can be done in various ways so the results of efficiency in DEA analysis do not indicate absolute discrimination in deciding tuition fees as well as superiority. The results of the study only show a part of whole pictures in the assessment of "the Department".

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ABSTRACT

A Study on Efficiency for the Department of Trade in Universities

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85% of South Korea's gross domestic product(GDP) depends on trade. Exports amount in 2011 exceeds $ 5,000Billion. Korea is expected to achieve $ 1 trillion in total trade volume and will become finally the ninth in the world.

We do not have a lot of natural resources and are bound to export the finished products to pursue economic development. In other words, trade sector is very essential for Korea to continue economic growth. The department of trade in universities have brought up the concerned students serving for trade sectors.

Currently, "half-price tuition" in universities has become very controversial issue in Korea so this paper studies the efficiency of "the Department" because the universities may reconsider the adjustment of tuition fee, if they can enhance the efficiency level. DEA model is used for the analysis.

As a result, 8 DMUs like KAN1, KEI5, BAE10 etc. show relatively higher efficiency levels.

Key Words : The Department of Trade, DEA, Efficiency