

aged society)

[2].
2.1 DEA
(Efficiency)

[3,4].

[8].

DEA(Data Envelopment Analysis,)

(Empirical Efficiency

Frontier)

(DMU: Decision Making Unit)

[5,6].

(Data Envelopment Analysis: DEA) DMU DMU

DEA 1978 Charnes, Cooper Rhodes (Decision Making Unit: DMU)

DEA Farrell[9]

CCR[7]

BCC[10]

Charnes[10] CCR (CCR Ratio Definition)

[7].

DMU

10 , 10 (,)

$$\max h_0 = \frac{\sum_{r=1}^s u_r y_{r_0}}{\sum_{i=1}^m v_i x_{i_0}}$$

subject to $1 \geq \frac{\sum_{r=1}^s u_r y_{r_j}}{\sum_{i=1}^m v_i x_{i_j}}$, $j=1, \dots, n$,

$$u_r, v_i > 0, \quad i=1, \dots, m; \quad r=1, \dots, s,$$

(DRS)

(IRS)

$$h_0^* = \max h_0$$

$$u_r^*, v_i^* > 0 \quad 0 \leq h_0^* \leq 1 \quad 2.2$$

2.1.1 CCR

CCR (TE: Technical Efficiency)
(CCR Ratio Definition)

BCC

DEA

(degree of freedom)

[13].

CCR

1

(CRS: Constant Returns to

Scale) DMU(: Decision Making Unit)

1

0

2.1.2 BCC

BCC CCR

3.

(CRS: Constant Returns to Scale)

(VRS: Variable Returns to Scale) 3.1

Scale) (PTE: Pure Technical Efficiency)
(SE: Scale Efficiency)

10

10

(

2007-2009

BCC Banker[11]

DEA

Shephard[12]

Package DEAP 2.1

(CRS:

Constant Return to Scale)

DEA

2007-2009

CCR(), BCC(), SE(

(DRS: Decreasing Return to Scale),

)

(IRS: Increasing Return to Scale)

(Economies of Scale)

(Diseconomies of Scale)

[1]

[Table 1] Variable choice of preceding study

()	
Banker, Conrad, Strauss(1986)	114
Grosskopf, Valdmanis(1987)	
Pina, Torres(1992)	Huesca 1 1
Burgess, Wilson(1998)	
Linna, Hakkinen, Magnussen (2006)	51 41 ()
(1993)	1 1
(1995)	
(1996)	54
(2004)	
(2008)	
(2008)	250 4 6
(2009)	

: [3],[4],[15],[16],[17],[18],[19],[20]

3.2

2

[2]

[Table 2] Variable of input and output

MMR, B	, BCG, , DPT,
	BCG, , DPT, , MMR, B

4.

4.1

3 2007-2009
, 2009 (TE)
0.917
8.3% . 8.3%

[3] 2007-2009
[Table 3] Efficiency of public health centers in Gyeongnam Province during 2007-2009

DMU	(TE: CRS)			(PTE: VRS)			(SE)		
	2007	2008	2009	2007	2008	2009	2007	2008	2009
1	1	1	1	1	1	1	1	1	1
1	1	0.753	1	1	0.787	1	1	0.957	
1	1	1	1	1	1	1	1	1	
1	1	1	1	1	1	1	1	1	
1	0.730	1	1	1	1	1	0.730	1	
1	0.614	0.819	1	0.617	0.914	1	0.995	0.895	
1	1	0.887	1	1	1	1	1	0.887	
1	1	1	1	1	1	1	1	1	
1	0.783	1	1	0.800	1	1	0.978	1	
1	1	1	1	1	1	1	1	1	
0.618	0.668	0.595	1	1	1	0.618	0.668	0.595	
0.490	0.685	1	0.758	1	1	0.646	0.685	1	
0.945	1	1	0.985	1	1	0.989	1	1	
0.799	1	1	0.899	1	1	0.889	1	1	
1	1	0.726	1	1	1	1	1	0.726	
1	0.963	1	1	1	1	1	0.963	1	
0.769	0.704	1	0.835	0.891	1	0.921	0.790	1	
0.690	0.482	0.576	0.744	0.615	0.582	0.928	0.78	0.989	
0.932	0.910	1	1	1	1	0.932	0.910	1	
1	1	1	1	1	1	1	1	1	
0.912	0.877	0.917	0.961	0.946	0.964	0.944	0.925	0.952	

(TE) 2007 0.912,
2008 0.877, 2009 0.917 ,
8.8%, 2008 12.3%, 2009 8.3% . 2007

1 , , ,
, 2008
, 2009

(PTE)
2007 0.961, 2008 0.946, 2009 0.964 ,
2007 3.9%, 2008 5.4%, 2009 3.6%

. 2007 1 ,
, , , , , , , ,
, 2008 , , , ,
, , , , , , , ,
, 2009 , , , , , , , ,
, , , , , , , ,
(SE) 2007 0.944, 2008 0.925,
2009 0.952 , 2007 5.6%, 2008 7.5%, 2009
4.8% . 2007 1

4.2
4

[4] :
[Table 4] Improvement target of inefficiency in Hanyanggun

	()	()	
	22	18	-4
	47	37	-10
	12	10	-2
	761,049	1,305,901	+544,852
	7,559	12,967	+5,408
	19,252	33,031	+13,779
	24,681	42,345	+17,664
	363	6,432	+6,069
	5,488	18,567	+13,079

: DEA 1.0 , 1.0

				2,974
	18	4		
37	10		10	2
				6
				1,305,901
544,852			12,967	5,408
	33,031	13,779		
42,345	17,664			6,432
6,069			18,567	13,079
				4

[5] :
[Table 5] Improvement target of inefficiency in Sachensi

	()	()	
	26	25	-1
	36	34	-2
	6	6	-
	700,382	1,317,717	+617,335
	5,871	7,983	+2,112
	11,623	22,244	+10,621
	12,300	35,341	+23,041
	1,729	6,970	+5,241
	18,242	21,216	+2,974

5

				34
25	1			
2				4.3
				1,317,717
617,335			7,983	2,112
	22,244	10,621		
35,341	23,041			6,970
5,241				21,216

[6] :
[Table 6] Improvement target of inefficiency in Masarsi

	()	()	
	23	19	-4
	82	58	-24
	16	13	-3
	773,865	982,963	+209,098
	20,259	25,734	+5,475
	59,320	75,352	+16,032
	26,129	44,527	+18,398
	4,655	9,293	+4,638
	7,529	33,732	+26,203

				982,963
209,098			25,743	5,475
	75,352	16,032		
44,572	18,398			9,293
4,638				33,732
26,203				

[14].

5.

(CRS:

20

Constant Return to Scale)

DEA CCR, BCC

(DRS: Decreasing Return to Scale),

DEA

(IRS: Increasing Return to Scale)

(Economies of Scale)

(Diseconomies of Scale)

(DRS)

(IRS)

7 3

, 2007 IRS()

(7)

2008

[4]

(9)

, 1998 20

2009

(4)

0.868,

0.920,

. DRS() 2009

0.943

2007

, CRS() 2007 13 , 2008 11

0.912,

0.961,

, 2009 14

0.944

, 2008

0.877,

0.946,

0.925

, 2009

0.917,

0.964,

0.952

[7]

[Table 7] Scale efficiency of public health centers in Gyeongnam Province

DMU	(SE)			2007	2008	2009
	2007	2008	2009			
1	1	1	1	CRS	CRS	CRS
1	1	1	0.9576	CRS	CRS	DRS
1	1	1	1	CRS	CRS	CRS
1	1	1	1	CRS	CRS	CRS
1	0.730	1	1	CRS	IRS	CRS
1	0.9953	0.8958	1	CRS	IRS	IRS
1	1	0.8876	1	CRS	CRS	DRS
1	1	1	1	CRS	CRS	CRS
1	0.9789	1	1	CRS	IRS	CRS
1	1	1	1	CRS	CRS	CRS
0.6186	0.6681	0.5951	1	IRS	IRS	IRS
0.6466	0.6853	1	1	IRS	IRS	CRS
0.9591	1	1	1	IRS	CRS	CRS
0.8893	1	1	1	IRS	CRS	CRS
1	1	0.7267	1	CRS	CRS	IRS
1	0.9631	1	1	CRS	IRS	CRS
0.9218	0.7901	1	1	IRS	IRS	CRS
0.928	0.784	0.9894	1	IRS	IRS	IRS
0.9328	0.9105	1	1	IRS	IRS	CRS
1	1	1	1	CRS	CRS	CRS

[20] 2002

0.847,

0.984,

0.861

. 15

8

(53.3%)

1

0.6466

0.9591

0.8893

0.9218

0.928

0.9328

1

13

(86.7%),

0.8893

1

0.7267

0.9631

0.7901

0.9218

0.928

0.9328

13

1

1

0.7267

0.9631

0.7901

0.9218

0.928

0.9328

13

1

1

0.7267

0.9631

0.7901

0.9218

0.928

0.9328

13

0.928

0.9328

0.9894

1

17

(85%)

, 1

1

2007

1

1

1

1

13

(65%),

2008

11

(55%),

13

(65%),

2008

11

(55%),

2009

14

(70%)

14

1998 [4], 2007, 2008, 2009

[5] 14
 , 6 2 (33%), 8
 4 (50%) 0.7
 10 2008 1 (10%) 0.7
 , 2007 2 (20%), 2008 3
 (30%), 2009 2 (20%) 0.7
 (TE)
 2007 0.912, 2008 0.877, 2009 0.917
 2007 8.8%, 2008 12.3%, 2009 8.3%
 (PTE)
 2007 0.961, 2008 0.946, 2009 0.964
 2007 3.9%, 2008 5.4%, 2009 3.6%
 (SE) 2007 0.944, 2008
 0.925, 2009 0.952, 2007 5.6%, 2008 7.5%,
 2009 4.8%
 , 3
 , 2007 IRS()
 , (7) 2008
 , (9) , 2009
 , (4) . DRS(
) 2009 , CRS(
) 2007 13 , 2008 11 , 2009 14

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- 2009 8 : ()
- 2008 3 ~ :
- 2002 8 ~ :

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(Dong-Min Chang) []



- 1989 8 : ()
- 1996 2 : ()
- 1993 9 ~ 1996 8 :
- 1996 9 ~ :

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