Araştırma

EVALUATING CHILDREN'S HOMES OF SOCIAL SERVICES AND CHILDREN PROTECTION AGENCY VIA DATA ENVELOPMENT ANALYSIS

Sosyal Hizmetler ve Çocuk Esirgeme Kurumuna Bağlı Çocuk Yuvalarının Veri Zarflama Yöntemiyle Değerlendirilmesi

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ABSTRACT

The environment that children grow up in has an important role in the formation of their future life and the aim of this paper is to improve the living conditions of children at protection homes. Data Envelopment Analysis (DEA), one of the most common techniques in the efficiency analysis of homogenous organizations, is used to evaluate children's homes of Social Services and Children Protection Agency. Inputs and outputs are defined in the model and to obtain their priority, the weight restrictions are calculated. CCR output model with and without weight restrictions are solved and finally appropriate conditions are proposed for the protection homes.

Key Words: *Efficiency, Data Envelopment Analysis, Social Services and Children Protection Agency, Weight restrictions*

ÖZET

Çocukların içinde büyüdükleri ortamın, onların gelecek yaşantılarının şekillenmesinde önemli bir rolü vardır. Bu çalışmanın amacı da çocuk esirgeme kurumlarında kalan çocukların yasam koşullarının iyileştirilmesine yöneliktir. Bu çalışmada, homojen birimlerin etkinliklerinin çözümlenmesinde yaygın olarak kullanılan yöntemlerden biri olan Veri Zarflama Analizi (VZA) Sosyal Hizmetler ve Çocuk Esirgeme Kurumu'na bağlı çocuk yuvalarını değerlendirmek üzere kullanılmıştır. Model için gerekli girdi ve çıktılar, önceliklerini belirlemek üzere tanımlanmış ve ağırlık kısıtları hesaplanmıştır. CCR çıktı modeli için, ağırlık kısıtlarının bulunduğu ve bulunmadığı durumlara yönelik çözümler aranmıştır. Elde edilen sonuçlar yorumlanmış ve esirgeme kurumları için uygun koşullar önerilmiştir.

Anahtar Sözcükler: *etkinlik, veri zarflama analizi, Sosyal Hizmetler ve Çocuk Esirgeme Kurumu, ağırlık sınırlamaları*

INTRODUCTION

Among the newborns, human babies are the ones who need help of other humans most. Children necessitate continuous care; therefore his/her parents take this responsibility. Sometimes this

duty of caring for children can not be carried due to death, illness, abandonment or divorce of the families. In these cases the government takes the child's responsibility (Sayar, 2008). Social service organizations give importance to human rights, and support the ones who are in a more difficult situation than the other citizens.

The detailed information about the foundation and development of social services organizations in Turkey can be obtained from Cavusoglu (2008). There is an increase in service quality, but it is not sufficiently in parallel to the development in economic and social structure of the country. General Directorate of Social Services and Children Protection Agency (Sosyal Hizmetler ve Cocuk Esirgeme Kurumu Genel Mudurlugu, SHCEK) has branches in each city of the country. The basic duty of the organization is to determine the children who needs care, to take care of the children, to keep them up, to be interested in their education, to provide every opportunity for them to get a career and job, etc.

These organizations are vital because they serve people, have a significant role in the arrangement of social equality, and find answers to social problems. Unfortunately the government can share only about 0,006% from the government budget annually. Also the importance of the organization is still not well understood by politicians, bureaucrats, and the community. On the other hand, the need for social services is increasing day by day and these organizations are trying to meet the demand. Despite the scarce sources, the staffs in these organizations try to keep this business afloat in the most efficient way. Some children's homes are more advantageous because of their geographical situation. These homes get more aid from the humanitarians, and also children may spend more time with their educators. The unbalanced construction of these units is the starting point of this study. The main aim of the study is to evaluate the performance of Children Protection Agency and to find out the inefficient units, and finally to propose comments to increase their efficiency. The most appropriate and reliable methodology in performance evaluation is known as DEA. In literature, decision making units (DMUs) are usually considered as units of organizations like banks, universities and hospitals which execute the same functions and usually use resources to provide products or services (Emrouznejad, 2005).

There are numerous studies in literature using DEA. The recent studies in health care systems are Arocena and Prado (2007), Fernandes (2007), Hajialiafzali et al. (2007), Fulton et al. (2007), O'Neill and Dexter (2007), Barbetta et al. (2007), Masiye (2007), Smet (2007), Vera and Kuntz (2007), Masiye et al. (2006), Pilyavsky et al.(2006), Kontodimopoulos and Niakas (2006), Pilyavsky and Staat (2006), Prior (2006), Kontodimopoulos et al (2006), Siciliani (2006), Zere et al.(2006), Osei et al.(2005), Stat (2003), Sol and Prior (2001), Ersoy et al.(1997), Hollingsworth and Parkin (1995). Examples of DEA studies in education are Giménez et al.(2007), Leitner et al.(2007), Waldo (2007), Salerno (2006), Gimenez and Martinez(2006), Johnes(2006a), Johnes (2006b), Martin (2006), Köksal and Nalçaci (2006), Abbott and Doucouliagos (2003), More-

no and Tadepalli (2002), Chalos (1997), Arcelus and Coleman (1997), Beasley (1990). On the other hand Hahn (2007a) Hahn (2007b), Al-Tamimi and Lootah (2007), McEachern and Paradi (2007), Beccalli (2006), Brown (2006), Sufian (2006), Weill (2004), Luo (2003), Lozano-Vivas (2002), Athanassopoulos (1997), Macada and Becker (1999), Yeh (1996) studied DEA in financial services. From the literature review it is apparent that children's homes of Social Services and Children Protection Agency have not been considered before using DEA, and this novel area makes the study significant.

In the following section the structure of the Social Services and Children Protection Agency are explained. Section 3 focuses on the methodology of DEA and factors for evaluation. In Section 4, performances of the decision units are evaluated. Finally the results of the study are discussed and comments on future studies are given in the last section.

SOCIAL SERVICES AND CHILDREN PROTECTION AGENCY

The most appropriate place for children to grow up is usually a comfortable home environment. Unfortunately some children don't have a chance to share their house with their families. In most of the places over the world there are children in needy circumstances because of being abandoned, being foundlings, having socio-economic insufficiencies, family divorcement, etc. It is desired to eliminate these kinds of problems completely, but it is known that it is not that easy.

The children in these situations in Turkey are always protected by General Directorate of Social Services and Children Protection Agency (SHCEK). It is clear that this kind of social care foundations have an important position for development of the countries since the children represent the future. These agencies are entrusted with emotional, mental, and physical development of the children.

The children's homes provide for the needs of the children about education, health, food, dressing, pocket-money, transportation, holiday etc. These homes have some management rules such as keeping the brothers/sisters together as long as possible, and avoiding moves among children's homes. In order to comfort children and support their development, separate homes are designed for children aged between 0-6, 0-12, 7-12, and also for teenagers (13-18). Each year, the government allocates the allowance among the children's homes. These organizations also get financial help from individuals to serve children as much as possible. Although all units have to be in a standard condition, due to the capacity constrains or scarce sources the efficiency of children's homes are not equal. This study points out the importance of these societies and state that their performances should be evaluated by use of scientific techniques. The requirements for the development of homes should be tracked continuously for the sake of the children protected there, and also for a bright future (Civi et al., 1993).

DATA ENVELOPMENT ANALYSIS

Data Envelopment Analysis (DEA), developed by Charnes et al. (1978), is a

mathematical programming technique to measure the relative efficiencies of homogenous decision making units (DMU) with multiple inputs and outputs. DEA method compares the performance of the DMUs and finds out the most efficient unit(s). On the other hand, target values for the inefficient units are also determined based on the efficient units.

The formulation of DEA model for maximum efficiency for DMU k_0 can be defined by using the following notation:

z: number of units

w_j: weight of j^{th} output

m: number of inputs

v_i: weight of i^{th} input

n: number of outputs

ε: a small positive number

Formulation of basic model is defined as:

$$\max e_0 = \frac{\sum_{j=1}^{n} w_j y_{j0}}{\sum_{i=1}^{m} v_i x_{k0}}$$

subject to

$$\frac{\sum_{j=1}^{n} w_j y_{jk}}{\sum_{i=1}^{m} v_i x_{ik}} \le 1 \quad k=1,..,z$$

$$w_j, v_i \ge \varepsilon \qquad \forall j, \quad i$$

Charnes, Cooper and Rhodes (CCR) model, which is the basic DEA model solves the problem with the assumption of constant returns to scale.

The output oriented CCR model used in this study is defined as (Norman and Stoker, 1991; Seiford and Zhu, 1999):

$$Max\theta$$

s.t.

$$\sum_{j=1}^{n} \lambda_j x_{ij} \le x_{io}$$

$$-\sum_{j=1}^{n} \lambda_j y_{rj} + \theta y_{io} \le 0$$

$$\lambda_j \ge 0; \; r = 1,..., s;$$

$$i = 1,..., m; \quad j = 1,..., n$$

Selecting DMUs

Table 1 illustrates the number of children's homes and the number of protected children aged between 7-12 (www.shcek.gov.tr).

Table 1.Number of children's homes and protected children

Year	Number of children's homes	Number of protected children
2000	78	7568
2001	81	7863
2002	82	8552
2003	83	8910
2004	91	9609
2005	95	9935
2006	107	9670
2007	103	10041

In this study, children's homes are considered as decision making units. Among these children's homes 50 homogenous units are selected. After the required data for the units are collected, the analyses are performed. The DMUs considered in this study are given in Table 2.

Selecting inputs and outputs

One of the most important steps for DEA is selecting inputs and outputs. The factors must be determined carefully such that they can represent different conditions. The efficient DMUs may change due to the sensitivity to the factors. As the relative efficiency is

Table 2. Decision Making Units considered for the problem

DMU No	DMU	DMU no	DMU
1	Adıyaman Sevgi Cocuk Yuvası	26	Kars Halime Arslan
2	Afyon M.A.Ersoy Cocuk Yuvası	27	Kırklareli Coc.Sit.
3	Amasya Cocuk Yuvası	28	Kırşehir C.Y
4	Ankara Gazi Cocuk Yuvası	29	Kütahya C.Y
5	Ankara Sincan Cocuk Yuvası	30	Malatya Atatürk C.Y
6	Aydın 80.Yıl Cocuk Yuvası	31	Muğla C.Y
7	BalıkesirAyvalıkAlibeyC.Yuvası	32	Muş 80 Yıl C.Y
8	Balıkesir Bandırma Cocuk Yuvası	33	Niğde Bor Esat Atlı C.Y
9	Bitlis 100.Yıl Cocuk Yuvası	34	Ordu C.Y
10	Canakkale M.Değirmencioğlu C.Y.	35	Ordu Ünye C.Y
11	Denizli Buldan Cocuk Yuvası	36	Rize Atatürk C.Y
12	Elazığ Harput Cocuk Yuvası	37	Sakarya Arifiye C.Y
13	Erzurum Nene Hatun Cocuk Yuvası	38	Sakarya BremenMızıkacıları C.Y
14	Eskişehir 80 Yıl Halis Toprak C.Y.	39	Siirt SaraCoğlu C.Y
15	Gaziantep Şahinbey C.Y.	40	Sivas C.Y
16	İstanbul Emrullah Turanlı C.Y.	41	Şanlıurfa C.Y
17	İstanbul Eyüp Cocuk Yuvası	42	Tekirdağ Cerkez Köy C.Y
18	İstanbul K.Yalı Cocuk Yuvası	43	Tokat Turhal C.Y
19	İstanbul Kasımpaşa Cocuk Yuvası	44	Trabzon Fatih C.Y
20	İstanbul Şeyh Zayed Cocuk Yuvası	45	Tunceli C.Y
21	İstanbul Üsküdar Cocuk yuvası	46	Uşak C.Y
22	İstanbul Yakacık Y.Ab. C.Yuvası	47	Van C.Y
23	İzmir Şehit Ast.A.D.C.Y.	48	Yalova Anadolu Kalk.Vakfı C.Y
24	Karabük Bulak C.Y	49	Yozgat C.Y
25	Karaman Coc.Sitesi	50	Zonguldak C.Y

measured, it is recommended that the factors be determined with experts.

This application takes children as a base matter, and the factors are selected to increase their comfort and happiness. The inputs and outputs for the problem are given in Table 3.

Inputs are determined as utilization, number of children per manager, and number of children per other staff. Utilization shows the occupancy rate via the ratio of children to capacity. It is actually interesting that this value is greater than 1 in some protection homes. Number of children per manager and number of children per other staff have to be few so that the staff could take care of the children diligently. The other staff include cooks, cleaners and drivers. Specified outputs are the number of educators, closed area and the number of children returned to a family. Educators consist of teachers, psychologists, volunteer mothers and trainers. The educators play a very vital part in the stage of child development and therefore their number should be as large as possible. Also, closed area is another important item because environment that children live should be suitable, so it is taken as an output. On the other hand, it is considered that number of children returned to family is a performance criterion.

Obtaining data

After determination of the factors, reliable data must be obtained. DEA is sensitive to anomalities and extreme points in the data and it is one of the disadvantages of the method. Therefore, uncertain data that can affect the results of the analyses should not be used. In order to avoid these, data for 2005 is gathered from the information gathering service (bilgi edinme servisi) of General Directorate of the Social Services and Child Protection Agency (SHCEK), which is the sole holder of reliable data for protection units.

Obtained data for determined inputs and outputs is given in Table 4.

Another important point is the degree of correlation between factors. Strong correlation between factors shows similar behavior in the system, and they are redundant. In order to check data appropriateness, the correlation matrix is given in Table 5.

As seen from Table 5, there are not any strong relationships between the factors, so the inputs and outputs are appropriate for the analysis.

PERFORMANCE EVALUATION AT CHILDREN' HOMES

To evaluate the performance of 50 Children' Homes, output oriented CCR model and CCR model with weight restrictions are used.

Table 3. Inputs and outputs for the problem

Inputs	Outputs
I1.Utilization I2.Number of children/number of manager I3.Number of children/number of other staff	O1.Number of educators O2.Closed area (m^2) O3.Number of children returned to family

Table 4. Data for factors

DMU	I1	I2	I3	O1	O2	O3	DMU	I1	I2	I3	O1	O2	O3
1	0,88	11,67	2,5	5	660	12	26	0,44	20	20	4	2560	0
2	2,4	84	6	10	1642	3	27	0,4	9	3,6	11	6157	6
3	0,87	32,5	5	10	3537,38	5	28	0,89	17,8	8,9	7	2905	1
4	1,15	11,5	2,56	19	4602,63	3	29	0,57	11,33	3,4	6	1464	11
5	0,55	14,4	3,6	26	948,8	8	30	0,88	98	4,67	9	1152	13
6	0,96	25	10	4	676,09	10	31	0,74	18,5	2,18	9	1848	8
7	0,86	17,2	10,75	4	2518	12	32	0,65	65	7,22	4	3422,44	13
8	1	11,25	4,5	3	1621	21	33	1,6	160	14,55	6	2099,25	5
9	0,97	31	3,65	7	611	0	34	0,65	71	3,55	13	4841,08	9
10	0,9	54	9	7	1358,77	8	35	0,78	25,5	3,4	6	1934	13
11	0,96	48	4,8	6	825	2	36	0,5	13,33	2,86	8	3100	17
12	0,83	16,67	2,17	12	1457,1	12	37	0,85	51	5,1	11	10500	6
13	0,37	44	2,1	5	5907,58	5	38	1,07	32	10,67	2	650	7
14	0,58	42	42	1	1860	4	39	0,61	14,67	5,5	4	1200	6
15	1	100	5	6	1978	13	40	0,9	16,8	5,25	9	1200	11
16	1,08	43	4,3	7	2280	15	41	0,56	22,5	3,21	6	2396	21
17	1,07	32	5,82	8	895,5	13	42	1,08	32,5	9,29	6	7416	9
18	0,67	66,5	4,29	16	5550	28	43	1,2	48	6,86	8	4228,14	10
19	1,49	33,5	4,47	8	2315	20	44	0,8	25,67	6,42	8	2432,8	6
20	1,19	209	13,93	9	5000	24	45	0,74	14,8	3,89	5	2514,75	13
21	1,1	13,25	2,94	8	1090	13	46	1,06	17,67	3,79	6	984,72	0
22	1,05	42	4,42	6	2970	10	47	0,7	18,67	7	6	2559	2
23	1	15,2	9,5	15	7830	18	48	0,7	28	56	5	593,12	4
24	0,68	34	6,8	6	1330	9	49	0,99	39,5	6,08	11	2312	15
25	0,44	17,5	3,18	12	3096,36	6	50	0,46	17,25	3,14	7	5141,31	18

Table 5. Correlation matrix for factors

Correlation	I1	I2	I3	O1	O2	O3
I1	1	0,41	-0,05	0,01	-0,13	-0,02
I2	0,41	1	0,13	-0,01	0,13	0,19
I3	-0,05	0,13	1	-0,3	-0,13	-0,22
O1	0,01	-0,01	-0,30	1	0,30	0,11
O2	-0,13	0,13	-0,13	0,3	1	0,17
O3	-0,02	0,19	-0,22	0,11	0,17	1

Table 6. Reference set for CCR model

DMU	Reference set (lambda)	DMU	Reference set (lambda)
1	36 (0,87)	26	13 (0,28) 27 (0,86)
2	4 (1,29) 5 (0,51) 12 (0,40)	27	27 (1,00)
3	4 (0,22) 5 (0,34) 13 (0,41) 27 (0,55) 50 (0,13)	28	4 (0,18) 5 (0,18) 27 (1,47)
4	4 (1,00)	29	5 (0,12) 8 (0,24) 36 (0,51)
5	5 (1,00)	30	5 (0,09) 12 (0,31) 18 (0,86)
6	8 (0,04) 36 (1,84)	31	4 (0,19) 12 (0,51) 18 (0,11) 50 (0,04)
7	8 (0,20) 23 (0,23) 36 (0,86)	32	18 (0,24) 50 (1,07)
8	8 (1,00)	33	5 (0,51) 18 (0,87) 27 (1,83)
9	4 (0,54) 5 (0,63)	34	4 (0,09) 5 (0,30) 13 (0,73) 18 (0,17)
10	5 (0,50) 18 (0,56) 50 (0,54)	35	12 (0,19) 18 (0,11) 36 (0,39) 41 (0,43)
11	4 (0,27) 5 (0,92) 13 (0,35) 18 (0,02)	36	36 (1,00)
12	12 (1,00)	37	13 (0,99) 27 (0,84)
13	13 (1,00)	38	36 (1,48) 50 (0,71)
14	13 (0,67) 50 (0,74)	39	5 (0,13) 8 (0,03) 23 (0,10) 36 (0,82)
15	18 (0,72) 41 (0,60)	40	5 (0,45) 8 (0,46) 36 (0,38)
16	12 (0,19) 18 (0,37) 36 (0,13) 41 (0,60)	41	41 (1,00)
17	5 (0,16) 12 (0,15) 18 (0,09) 36 (1,59)	42	13 (0,17) 27 (2,20) 50 (0,31)
18	18 (1,00)	43	4 (0,25) 5 (0,15) 13 (0,44) 27 (0,24) 50 (1,23)
19	12 (0,33) 18 (0,05) 41 (1,10)	44	5 (0,49) 18 (0,07) 27 (0,68) 50 (0,47)
20	18 (1,57) 50 (0,32)	45	8 (0,23) 27 (0,14) 36 (0,82)
21	5 (0,11) 8 (0,02) 36 (0,85)	46	4 (0,64) 5 (0,48) 13 (0,06) 27 (0,08)
22	4 (0,17) 13 (0,11) 18 (0,34) 50 (0,74)	47	5 (0,21) 27 (1,46)
23	23 (1,00)	48	5 (0,67) 18 (0,14) 50 (0,51)
24	5 (0,24) 18 (0,24) 50 (0,85)	49	5 (0,36) 18 (0,24) 36 (0,97) 50 (0,31)
25	5 (0,36) 13 (0,14) 18 (0,03) 27 (0,37) 50 (0,04)	50	50 (1,00)

CCR Model

Based on basic output oriented CCR model results, the DMUs numbered as 4, 5, 8, 12, 13, 18, 23, 27, 36, 41, 50 are found as efficient. The reference set and λ values for inefficient DMUs are given in Table 6.

Target values based on reference sets for each DMU are calculated. The most inefficient DMU is found as Nigde Bor children's home for this model.

Table 7 shows that the number of educators, closed area, and the number of children returned to family should be increased. Also children/manager, and children/other should be decreased to the projection values that are calculated with DEA. Similar comments for other inefficient homes can be made to improve efficiency. The efficiency scores for CCR model are given in the following section for comparison.

CCR Model with weight restrictions

In analysis, to improve the quality of the results, weight restrictions can be calculated and added to the model. In this study weight restrictions are determined in a similar way to Kocakoc (2003). The weights of inputs and outputs can be determined by the decision maker to differentiate the importance of the factors. The weights can be set based on a priority matrix introduced in Saaty (2001) given in Table 8.

The pairwise comparisons to obtain weights for input factors are given in Table 9. The value at the priority matrix corresponding to Input 1 and Input 2's cell is 7. This means that the ratio of Input 1 and Input 2's priority should be at least 7. Other values in the matrix can be explained in a similar way.

Comparisons for outputs are shown in Table 10.

Table 7. Target values for Nigde Bor Protection Home

DMU I/O	Score Data	Projection	Difference	%
Niğde Bor Esat Atlı Ç.Y (7-12)	0,13			
UTILIZATION	1,60	1,60	0,00	0,00
CHILDREN/MANAGER	160,00	82,09	-77,91	-0,49
CHILDREN/OTHER	14,55	12,21	-2,34	-0,16
EDUCATOR	6,00	47,54	41,54	6,92
CLOSED AREA	2099,25	16631,78	14532,53	6,92
CHILDREN RETURNED TO FAMILY	5,00	39,61	34,61	6,92

Table 8. Saaty's prioritization scale

Intensity of Importance	Definition	Explanation
1	**Equal importance**	**Two activities contribute equally to the objective**
3	**Weak importance of one over another**	**Experience and judgment strongly favor one activity over another**
5	**Essential or strong importance**	**Experience and judgment strongly favor one activity over another**
7	**Very strong or demonstrated importance**	**An activity is favored very strongly over another; its dominance demonstrated in practice**
9	**Absolute importance**	**The evidence favoring one activity over another is of the highest possible order of affirmation**
2,4,6,8	**Intermediate values between adjacent scale values**	**When compromise is needed**

Table 9. Priority matrix for inputs

	Utilization	# of children / # of manager	# of children / # of other staff
Utilization	1	7	5
# of children / # of manager	1/7	1	1/3
# of children / # of other staff	1/5	3	1

Table 10. Priority matrix for outputs

	# of educators	# of children returned to family	Closed area
# of educators	1	7	5
# of children returned to family	1/7	1	1/3
Closed area	1/5	3	1

Input and output restrictions are determined according to the comparison coefficients. The notations of the weight restrictions can be stated in mathematical formulation as follows:

Inputs *Outputs*

$$v_1 - 7v_2 \geq 0 \quad u_1 - 7u_2 \geq 0$$
$$v_1 - 5v_3 \geq 0 \quad u_1 - 5u_3 \geq 0$$
$$3v_2 - v_3 \geq 0 \quad 3u_2 - u_3 \geq 0$$

The CCR model with restrictions is solved with EMS 3.1 software developed by Holger Scheel. The calculated efficiency scores with CCR model and CCR model with restrictions are given in Table 11.

Table 11 shows that three of DMUs, which are considered as efficient units in CCR model, are inefficient in CCR with restrictions model. These inefficient protection homes are 4, 12 and 41.

Table 11. Efficiency scores

DMU	Efficiency (CCR)	Efficiency (CCR with restrictions)	DMU	Efficiency (CCR)	Efficiency (CCR with restrictions)
1	0,81	0,69	**26**	0,37	0,37
2	0,24	0,11	**27**	1,00	1,00
3	0,46	0,36	**28**	0,29	0,28
4	1,00	0,94	**29**	0,74	0,74
5	1,00	1,00	**30**	0,46	0,38
6	0,31	0,31	**31**	0,77	0,53
7	0,52	0,52	**32**	0,50	0,50
8	1,00	1,00	**33**	0,13	0,13
9	0,26	0,17	**34**	0,82	0,66
10	0,27	0,27	**35**	0,61	0,48
11	0,19	0,15	**36**	1,00	1,00
12	1,00	0,74	**37**	0,95	0,79
13	1,00	1,00	**38**	0,18	0,18
14	0,24	0,24	**39**	0,35	0,34
15	0,40	0,31	**40**	0,56	0,55
16	0,55	0,39	**41**	1,00	0,96
17	0,40	0,38	**42**	0,46	0,46
18	1,00	1,00	**43**	0,36	0,29
19	0,70	0,50	**44**	0,33	0,33
20	0,48	0,48	**45**	0,66	0,65
21	0,82	0,68	**46**	0,23	0,21
22	0,42	0,29	**47**	0,28	0,28
23	1,00	1,00	**48**	0,22	0,22
24	0,38	0,38	**49**	0,47	0,46
25	0,81	0,78	**50**	1,00	1,00

The average efficiency for CCR model is 0.58 and 0.53 for CCR model with restrictions. CCR model with restrictions gives more reliable results compared with CCR model based on the number of efficient units and efficiency scores. Therefore the decisions can be made based on the results obtained from the restricted model.

CONCLUDING REMARKS AND FUTURE RESEARCH DIRECTIONS

In recent years there has been an increase in the number of children who need care. The government supports these children and provides the required shelter and food via General Directorate of Social Services and Children Protection Agency (SHCEK). These societies should serve in the most active and efficient way, and be evaluated continuously.

In this study, performances of the existing children' homes in Turkey are evaluated with two models, based on the determined inputs and outputs. About 81% of the protection homes are found inefficient. Appropriate adjustments to increase performance of the homes are indicated by projection values.

Gorur (2006), states that all social services should get sufficient and equal service without the effect of politics and region. Therefore, this study may be the starting point to enable the efficient and homogenous children's homes. The number of researches concerning this subject has to be increased.

In future studies different inputs and outputs can be defined such as the number of adopted children, success index for children at their schools, financial data etc. Also, efficiency of protection homes can be calculated for different years. Furthermore, the trend in performance increase/decrease of decision making units can be tracked. As a result required arrangements for the units can be made.

REFERENCES

Al-Tamimi H., Lootah H.A. (2007) "Evaluating the operational and profitability efficiency of a UAE-based commercial bank". Journal of Financial Services Marketing 11(4), .333-348.

Arocena P., Prado A.G. (2007) "Accounting for quality in the measurement of hospital performance: evidence from Costa Rica". Health Economics 16(7), 667-685.

Barbetta G.P., Turati G., Zago A.M. (2007) "Behavioral differences between public and private not-for-profit hospitals in the Italian national health service". Health Economics 16(1), 75-96.

Beccalli E., Casu B., Girardone C. (2006) "Efficiency and Stock Performance in European Banking". Journal of Business Finance Accounting, 33 (1-2).

Brown R. (2006) "Mismanagement or mismeasurement? Pitfalls and protocols for DEA studies in the financial services sector". European Journal of Operational Research 174 (2), 1100-1116.

Civi S., Altuhul S., and Yayci M. (1993) "7-12 Yas Grubu Yuva Çocukları ile Aile Cocuklarinin Psikososyal Davranışları", Journal of Sağlık ve Sosyal Yardım Vakfı, 3, 4, http://www.sosyalhizmetuzmani.org/yuvacocuklari.pdf

Cooper, W.W., Seiford, L.M. and Tone, K. (2000) DEA:A Comprehensive Text with Models, Applications, References and DEA-Solver Software, Kluwer Academic Publishers, London, 318p.

Çavuşoğlu, T. (2008) "Çocuk Esirgeme Kurumunda Tarihsel Gelişim", http://www.sosyalhizmetuzmani.org/cocukesirgemekurumu.htm

Emrouznejad, A. (2005) Measurement Efficiency and Productivity in SAS/OR, Computers and Operations Research, 32 (7), 1665-1683

Fernandes E., Pires H.M., Ignacio A.A., Sampaio L.M. (2007) "An analysis of the supplementary health sector in Brazil". Health Policy 81(2-3), 242-57.

Fulton L.,Lasdon L.S, McDaniel R.R. (2007) "Cost drivers and resource allocation in military health care systems". Military Medicine 172(3), 244-9.

Giménez V., Prior D., Thieme C. (2007) "Technical efficiency, managerial efficiency and objective-setting in the educational system: an international comparison". The Journal of the Operational Research Society 58(8), 996-1007.

Gimenez, V.M., Martinez, J.L. (2006) "Cost efficiency in the university: A departmental evaluation model". Economics of Education Review (0272-7757) 25(5), 543-553.

Görür, B. (2006) "Sosyal Hizmetler Nereye?" http://www.sodav.org/sosyalhizmetlernereye.doc

Hahn F.R. (2007a) "Environmental determinants of banking efficiency in Austria". Empirica 34(3).

Hahn F.R. (2007b) "Domestic mergers in the Austrian banking sector: a performance analysis". Applied Financial Economics 17(3), 185-196.

Hajialiafzali H., Moss,J.R., Mahmood M. A.. (2007) "Efficiency Measurement for Hospitals Owned by the Iranian Social Security Organisation" Journal of Medical Systems Vol.31(3), 166-172.

Johnes, J. (2006a) "Measuring Efficiency: A Comparison of Multilevel Modelling and Data Envelopment Analysis in the Context of Higher Education". Bulletin of Economic Research 58(2), 75-104.

Johnes, J. (2006b) "Measuring teaching efficiency in higher education: An application of data envelopment analysis to economics graduates from UK Universities 1993". European Journal of Operational Research (0377-2217).174(1), 443-456.

Kocakoç, İ. (2003) Veri Zarflama Analizi'ndeki Ağırlık Kısıtlamalarının Belirlenmesinde Analitik Hiyerarşi Sürecinin Kullanımı, Journal of D.E.Ü.İ.İ.B.F,18, 2, 1-12.

Koksal, G., Nalcaci, B. (2006) "The Relative Efficiency of Departments at a Turkish Engineering College: A Data Envelopment Analysis". Higher Education 51(2), 517-538.

Kontodimopoulos N., Bellali T., Labiris G., Niakas D. (2006) "Investigating sources of inefficiency in residential mental health facilities". Journal of Medical Systems 30(3), 169-76.

Kontodimopoulos N., Niakas D. (2006) "A 12-year analysis of Malmquist total factor productivity in dialysis facilities". Journal of Medical Systems 30(5), 333-42.

Leitner K., Prikoszovits J., Schaffhauser-Linzatti, M., Stowasser, R., Wagner, K. (2007) "The impact of size and specialisation on universities' department performance: A DEA analysis applied to Austrian universities".Higher Education 53(4), 517-538.

Martin, E. (2006) "Efficiency and Quality in the Current Higher Education Context in Europe: an application of the data envelopment analysis methodology to performance assessment of departments within the University of Zaragoza".Quality in Higher Education (1353-8322). 12(1), 57-79.

Masiye F. (2007) "Investigating health system performance: an application of data envelopment analysis to Zambian hospitals". BMC Health Services Research 7, 58.

Masiye F., Kirigia J.M., Emrouznejad A., Sambo L.G., Mounkaila A., Chimfwembe D., Okello D. (2006) "Efficient management of health centres human resources in Zambia". Journal of Medical Systems 30(6), 473-81.

McEachern D., Paradi J.C. (2007) "Intra- and inter-country bank branch assessment using DEA". Journal of Productivity Analysis 27(2), 123-136.

Norman, M. and Stoker, B. (1991), Data Envelopment Analysis, John Wiley & Sons, 262p.

O'Neill L., Dexter F. (2007) "Tactical increases in operating room block time based on financial data and market growth estimates from data envelopment analysis". Anesthesia & Analgesia 104(2), 355-68.

Pilyavsky A., Staat M. (2006) "Health care in the CIS countries : the case of hospitals in Ukraine". European Journal of Health Economics 7(3), 189-95.

Pilyavsky A.I., Aaronson W.E., Bernet P.M., Rosko M.D., Valdmanis V.G., Golubchikov M.V. (2006) "East-west: does it make a difference to hospital efficiencies in Ukraine?". Health Economics 15(11), 1173-1186.

Prior D. (2006) "Efficiency and total quality management in health care organizations: A dynamic frontier approach". Annals of Operations Research 45(1).

Saaty,T.L. (2001) Analytic Hierarchy Process, McGraw-Hill.

Salerno C. (2006). "Using Data Envelopment Analysis to Improve Estimates of Higher Education Institution's Per-student Education Costs". Education Economics 14(3), 281 – 295.

Sayar, Ş. (2008) "Çocuk Yuvalari Ve Yetiştirme Yurtları Üzerine", http://www.sosyalhizmetuzmani.org/cocukyuvalari.htm

Seiford, L.M. and Zhu, J. (1999) "An Investigation of Returns to Scale in Data Envelopment Analysis". Omega, 27, 1-11.

Siciliani L. (2006) "Estimating technical efficiency in the hospital sector with panel data: a comparison of parametric and non-parametric techniques". Applied Health Economics & Health Policy 5(2), 99-116.

Smet, M. (2007) "Measuring performance in the presence of stochastic demand for hospital services: an analysis of Belgian general care hospitals". Journal of Productivity Analysis, Norwell (0895-562X) 27(1), 13-29.

Sufian F. (2006) "The Efficiency of Non-Bank Financial Institutions: Empirical Evidence from Malaysia". International Research Journal of Finance & Economics 6, 49-65.

Waldo S. (2007) "Efficiency in Swedish Public Education: Competition and Voter Monitoring". Education Economics 15(2), 231-251.

Vera A, Kuntz L. (2007) "Process-based organization design and hospital efficiency". Health Care Management Review 32(1), 55-65.

Vivas A.L., Pastor J.T., Pastor J.M. (2002) "An Efficiency Comparison of European Banking Systems Operating under Different Environmental Conditions". Journal of Productivity Analysis 18(1).

Weill L. (2004) "Measuring Cost Efficiency in European Banking: A Comparison of Frontier Techniques". Journal of Productivity Analysis. 21(2), 133-152.

Yeh Q.J.. (1996) "Application of data envelopment analysis in conjunction with financial ratios for bank performance evaluation". Journal of the Operational Research Society 47(8), 980-988.

Zere E., Mbeeli T., Shangula K., Mandlhate C., Mutirua K., Tjivambi B., Kapenambili W. (2006) "Technical efficiency of district hospitals: Evidence from Namibia using Data Envelopment Analysis". Cost Effectiveness & Resource Allocation (4), 5.