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Efficiency Measurement of Regional Development Agencies in Turkey by Using Data Envelopment Analysis (DEA)

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Abstract

In this study, relative efficiencies of Regional Development Agencies (RDA) work in Turkey were determined using Data Envelopment Analysis (DEA). The goal of DEA is to measure relative efficiencies of comparable Decision Making Units which produce similar input and output. At the end of the analysis, reference decision making units will be determined for inefficient decision making units. To do this data are gathered from efficiency reports of Regional Development Agencies and based on these data, efficiency scores are calculated. At the end of the study, recommendations are given with the help of findings to improve RDAs performances.

Keywords: *Regional Development, Regional Development Agencies, Efficiency, Data Envelopment Analysis, CCR Model, BCC Model.*

JEL Classification Codes: *C21, D24, D61, L25.*

Veri Zarflama Analiziyle Türkiye'deki Bölgesel Kalkınma Ajanslarının Etkinliğinin Ölçülmesi

Öz

Bu çalışmada Veri Zarflama Analizi (VZA) kullanılarak Türkiye'deki Bölgesel Kalkınma Ajanslarının (BKA) göreli performansları karşılaştırılmıştır VZA'nın amacı, benzer girdilerle benzer çıktılar üreten karşılaştırılabilir karar birimlerinin göreli etkinliklerini ölçmektir. Analiz sonucunda etkin olmayan karar birimleri için referans olacak karar birimleri belirlenmektedir.. Etkinlik skorları BKA tarafından yayınlanan faaliyet raporları baz alınarak hesaplanmıştır. Çalışmanın sonucunda, elde edilen bulgulardan yola çıkarak BKA'nın performansının nasıl artırılabileceğine yönelik öneriler sunulmuştur.

Anahtar Sözcükler: *Bölgesel Kalkınma, Bölgesel Kalkınma Ajansları, Etkinlik, Veri Zarflama Analizi, CCR Modeli, BCC Modeli.*

JEL Sınıflandırma Kodları: *C21, D24, D61, L25.*

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1. INTRODUCTION

There has been transformation in the field of regional development with the help of changes occurred during production and globalization processes. As a result, instead of national development regional development policy started to appear. (Keating, 2004; Stimson et al. 2006) Europe led the change along with some other countries which are developing regional competitions and giving more and more importance on regional economies. (Bachtler and Yuill, 2001; Ansell, 2000) Every region has different needs related to its condition thus, policy development effort to cater for every need of the regions is acknowledged as a strategy to trigger inner pote**n**tial. (Maillat, 1998, p. 119) It has been proposed that national development will gain speed as results of reformation of regional development policies so that regions improve capacities and local resources and they will compete with each other. (Rao and Babu, 1996, p. 96) As a result, difference in socio-cultural and economic aspects in local created a path to new regional development tools which focus on regional needs and resources (Halkier et al., 1998, p. 45), and this made the way for key people play a more efficient role on decision-making processes.

Development agencies, considered as new and important tool for regional development. They are organizational forms that brought about as a result of new perspectives and with the efforts of institutionalization in the field of regional development. Agencies financial expenditures are fulfilled by government and private sector institutions. Agencies represents many people and are created based on laws and carries independent or semi-independent unit properties. (Mountford, 2009) On the other hand, according to The European Association of Development Agencies (EURADA) development agencies are units which focuses on problems in field of either sectoral or general and develops tools to solve these problems in order to improve region's social and economic problems and supports regional development projects. (EURADA, 1999)

Turkey also adopted a new regional development approach with process of becoming a member of EU in which regional competition gains importance and

regions start to improve their capacities and inner dynamics are triggered. (DDK, 2014, p. 771). According to this approach regional planning must be dealt with a new perspective and tools need to be recycled. It considers not only potential of underdeveloped regions but potential of all regions and it focuses on determining policy tools which contribute to increasing regional competitive advantages.

Turkey's efforts to increase global competition power and extent of developmental level differences among regions gave priority to forming of regional policy and development strategies. Thus, need for agents and tools to provide regional competitiveness brought out idea of establishing regional development agencies. In connection with this, parallel to developments all around the world, since 2006 Turkey has been establishing RDAs. Even though long time has passed since establishing of RDAs there are still differences between countryside and cities in terms of developmental level so that speeding up regional development continues to be one of the priorities. From this point of view, RDAs have been established in order to create regional competitiveness however, success rate of development agencies in facilitating competition among regions and contributing to Turkey's economy has been a debate topic.

Development agencies are considered as regional economical development tool. The function they are expected to fulfill and contributions of operations they carry out to the region are closely connected with the ability of qualified production and efficiency level. The goal of this study is to compare efficiencies of 26 RDAs in Turkey and determining input and output targets for inefficient agencies to help them improve their performances.

In the following chapters of this study, firstly Data Envelopment Analysis (DEA) theory is reviewed, then findings are introduced which were found according to performances of agencies related to income status according to constant and variable scale. 26 operating regional development agencies in Turkey are listed below:

Table 1. Development Agencies in Turkey

Region	Cities	Regional Development Agencies
TR10	Istanbul	Istanbul Development Agency
TR21	Tekirdağ, Edirne, Kırklareli	Trakya Development Agency
TR22	Balıkesir, Çanakkale	Güney Marmara Development Agency
TR31	Izmir	Izmir Development Agency
TR32	Aydın, Denizli, Muğla	Güney Ege Development Agency
TR33	Manisa, Afyon, Kütahya, Uşak	Zafer Development Agency
TR41	Bursa, Eskişehir, Bilecik	Bursa Eskişehir Bilecik Development Agency
TR42	Kocaeli, Sakarya, Düzce, Bolu,Yalova	Dogu Marmara Development Agency
TR51	Ankara	Ankara Development Agency
TR52	Konya, Karaman	Mevlana Development Agency
TR61	Antalya, Isparta, Burdur	Batı Akdeniz Development Agency
TR62	Adana, Mersin	Çukurova Development Agency
TR63	Hatay, Kahramanmaraş, Osmaniye	Dogu Akdeniz Development Agency
TR71	Kırıkkale, Aksaray, Niğde,Nevşehir, Kırşehir	Ahiler Development Agency
TR72	Kayseri, Sivas, Yozgat	Orta Anadolu Development Agency
TR81	Zonguldak, Karabük, Bartın	Batı Karadeniz Development Agency
TR82	Kastamonu, Çankırı, Sinop	Kuzey Anadolu Development Agency
TR83	Samsun, Tokat, Çorum, Amasya	Orta Karadeniz Development Agency
TR90	Trabzon, Ordu, Giresun, Rize, Artvin, Gümüşhane	Dogu Karadeniz Development Agency
TRA1	Erzurum, Erzincan, Bayburt	Kuzeydogu Anadolu Development Agency
TRA2	Ağrı, Kars, Iğdır, Ardahan	Serhat Development Agency
TRB1	Malatya, Elazığ, Bingöl, Tunceli	Fırat Development Agency
TRB2	Van, Muş, Bitlis, Hakkari	Doğu Anadolu Development Agency
TRC1	Gaziantep, Adıyaman, Kilis	Ipekyolu Development Agency
TRC2	Şanlıurfa, Diyarbakır	Karacadağ Development Agency
Region	**Cities**	**Regional Development Agencies**
TRC3	Mardin, Batman, Şırnak, Siirt	Dicle Development Agency

2. DATA ENVELOPMENT ANALYSIS

Based on the work of Farrell (1957), DEA is known as a nonparametric mathematical model and linear programming technique to analyze efficiency. The return of this approach over parametric methods (i.e. regression) is that no assumptions are needed regarding the relationship between the inputs and outputs. Thus, complex or ambiguous relationships can still be modeled (Sadiq, 2011).

The goal is to measure relative performances of production units, which are assumed to be homogenous in DEA, and to make comparison among them. By weighting input/output rate the most, efficiency of Decision Making Units is tried to be made maximum. (Charnes et al., 1978) From this aspect, division of weighted sum of outputs to weighted sum of inputs is accepted as a basic criterion for efficiency. DEA provides a relative efficiency score for each decision making unit. As a result of the analysis, it is clear that group which consumes less input and produces more output considered as efficient; conversely, if group consumes more and produces less, it is considered as inefficient. Relative efficiency is defined as the ratio of total weighted sum of outputs to the weighted sum of inputs. (Adler et al., 2002)

Efficiency = weighted sum of outputs / weighted sum of inputs (1)

Efficiency score, which is ratio of weighted sum of outputs to weighted sum of inputs, can be 1 at most. Decision making units that have score of 1 are considered as efficient. Inefficient units have score in a range from 0 to 1 relatively.

CCR model was developed by Charnes, Cooper and Rhodes and BCC model was developed by Charnes & Cooper and they are used widely in literature. CCR model is based on constant return assumption to scale. However, BCC model is based on variable return assumption to scale.

There are two types of approaches in DEA input oriented and output oriented; input oriented is to get the most output with the determined input and output oriented is to determine the least amount of needed input for efficiently producing expected output. Input-oriented models investigate how much of the input can be reduced while output is constant. On the other hand, output oriented models investigate how much of output can be increased by keeping input constant.

2.1. CCR Model

The relative efficiency score of j_0 DMU with m different inputs and s outputs is given by solving the following DEA ratio model (CCR) proposed by Charnes et al. (1978). Efficiency in DEA is defined as the ratio of total weighted output to total

weighted input. By comparing n units with s outputs denoted by y_{rj} ; r = 1, . . . ,s, and m inputs denoted by x_{ij} , i = 1, . . . ,m, the mathematical form is shown below. The basic mathematical formulation of the relative efficiency score of j_0 DMU has the following form:

$$\max h_{jo} = \frac{\sum_{r=1}^{s} u_r y_{r\,j0}}{\sum_{i=1}^{m} v_i x_{i\,j0}} \qquad (2)$$

h_{j0} is the DEA relative efficiency measure. The weights, u_r and v_i, are non-negative. Here, $x_{ij} \geq 0$ parameter shows i input amount used by j decision unit, and $y_{rj} > 0$ parameter shows r output amount used by j decision unit. It is referred to as DMU_j in a collection of j=1,…,n entities which utilize these i= 1, … ,m inputs and produce these r=1, …,s outputs (Bowlin, 1998: 5). Symbols, used in model, are defined as below:

n= Number of DMU {j = 1,2,…, n}

s= Number of outputs {r =1,2,…, s}

m=Number of inputs {i =1,2,…, m}

y_{rj}= Quantity of r^{th} output of j^{th} DMU

x_{ij}= Quantity of i^{th} input of j^{th} DMU

u_r = weight of r^{th} output

v_i = weight of i^{th} input

The ratio of weighted sum of output to weighted sum of input is equal to 1 or smaller than 1. This is the first defined constraint:

$$\frac{\sum_{r=1}^{s} u_r y_{rj}}{\sum_{i=1}^{m} v_i x_{ij}} \leq 1 \quad for\ each\ unit\ j \qquad (3)$$

$$\frac{u_r}{\sum_{i=1}^{m} v_i x_{i_0}} > \varepsilon$$

$$\frac{v_i}{\sum_{i=1}^{m} v_i x_{i_0}} > \varepsilon\varepsilon > 0$$

The ε represents a non-archimedean constant which is smaller than any positive valued real number. The second constraint prevents used input and output to be negative is given below:

$$u_r, v_i \geq 0$$

2.1.1. Input-Oriented CCR Model

Input-oriented CCR model investigates combination of the least input for determined level of output. Eq. (2) is the ratio form of DEA. This fractional programming model can be converted to a linear programming problem (Bowlin, 1998: 7). Model that is formed after transformation known as "Charnes-Cooper Transformation" is given below:

$$\max h_{j0} = \sum_{r=1}^{s} u_r y_{rj_0} \tag{4}$$

In fractional function denominator of aim function is equated to 1 in transformation.

$$subject\ to \ \sum_{i=1}^{m} v_i x_{ij_0} = 1 \tag{5}$$

$$\sum_{r=1}^{s} u_r y_{rj} - \sum_{i=1}^{m} v_i x_{ij_0} \leq 0 \qquad j = 1,2,\dots,n$$

$$u_r, v_i \geq 0 \ \forall r, i; \qquad -u_r \leq -\varepsilon; \qquad -v_i \leq -\varepsilon$$

It is hard to determine reference decision units in fractional and linear programming models. For this reason, envelopment model is formed by taking the dual of weighted model above:

$$minimize: \theta - \varepsilon[\sum_{i=1}^{m} s_i^{-} + \sum_{r=1}^{s} s_r^{+}] \tag{6}$$

$$subject\ to: 0 = \theta x_{i_0} - \sum_{j=1}^{n} x_{ij}\lambda_j - s_i^-$$

$$y_{r0} = \sum_{j=1}^{n} y_{rj}\lambda_j - s_r^+$$

$0 \leq \lambda_j,\ s_i^-,\ s_r^+$ for i= 1, …, m; r = 1, …, s; j = 1, … ,n

In dual model weights on DMU, "λ_j" is calculated instead of weights on input and output. Thus, λ variable is used for determining efficient reference sets.

2.1.2. Output-Oriented CCR Model

CCR is another model which is used to produce maximum amount of output with determined input level. Linear programming model for output oriented case is given below:

$$\min h_{j0} = \sum_{i=1}^{m} v_i x_{ij_0} \quad (7)$$

$$subject\ to - \sum_{r=1}^{s} u_r y_{rj} + \sum_{i=1}^{m} v_i x_{ij} \geq 0$$

$$j = 1,2,\dots,n$$

$$\sum_{r=1}^{s} u_r y_{ij_0} = 1$$

r=1, … ,s; i=1, … ,m

Envelopment model is formed by taking dual of weighted output oriented model above:

$$maximize: \beta - \varepsilon[\sum_{i=1}^{m} s_i^- + \sum_{r=1}^{s} s_r^+] \quad (8)$$

$$subject\ to: 0 = x_{i_0} - \sum_{j=1}^{n} x_{ij}\lambda_j - s_i^-$$

$$\beta y_{r0} = \sum_{j=1}^{n} y_{rj}\lambda_j - s_r^+$$

$0 \leq \lambda_j,\ s_i^-,\ s_r^+$ for i= 1, … ,m; r = 1, … ,s; j = 1, … ,n

2.2. BCC Model

Another version of DEA, which is used commonly, is the Banker, Charnes, and Cooper (BCC) (1984) model. They have upgraded the model suggested by Banker et al. (1984), Charnes et al. (1978) to make it match with variable returns assumption to scale.

The main distinction between the BCC and the CCR model is the treatment of returns to scale. The CCR version bases the evaluation on constant returns to scale. The BCC version is more flexible and allows variable returns to scale (Bowlin, 1998: 8).

2.2.1. Input-Oriented BCC Model

Input-oriented BCC primal linear programming problem is depicted below (Banker et al., 1984: 1085):

$$maximize: \sum_{r=1}^{s} u_r y_{r0} \; - u_0 \tag{9}$$

$$subject\ to: \sum_{r=1}^{s} u_r y_{rj} \; - \sum_{i=1}^{m} v_i x_{ij} \; - u_0 \leq 0$$

$$\sum_{i=1}^{m} v_i x_{i_0} \; = 1$$

$$v_i, u_r \geq \varepsilon; \qquad u_0 \; free\ in\ sign.$$

The above formulations assume that x_{ij}, $y_{rj} \geq 0$ ∀i, r, j. The dual form of the (BCC) model, is presented in (10):

$$minimize: \theta - \varepsilon[\sum_{i=1}^{m} s_i^{\,-} + \sum_{r=1}^{s} s_r^{\,+}] \tag{10}$$

$$subject\ to: 0 = \theta x_{i_0} \; - \sum_{j=1}^{n} x_{ij}\lambda_j - s_i^{\,-}$$

$$y_{r0} \; = \sum_{j=1}^{n} y_{rj}\lambda_j - s_r^{\,+}$$

$$\sum_{j=1}^{n} \lambda_j = 1$$

$0 \leq \lambda_j,\ s_i^-,\ s_r^+$ for i= 1, … ,m; r = 1, … ,s; j = 1, … ,n

θ and λj are dual variables; s− and s+ are slack variables.

2.2.2. Output-Oriented BCC Model

The formulation for these BCC model is presented in (11) (Tone, 1996: 610):

$$minimize: \sum_{i=1}^{m} v_i x_{i0} - v_0 \qquad (11)$$

$$subject\ to: -\sum_{r=1}^{s} u_r y_{rj} + \sum_{i=1}^{m} v_i x_{ij} - v_k \geq 0$$

$$\sum_{r=1}^{s} u_r y_{ij_0} = 1$$

$$u_r \geq \varepsilon, \qquad v_i \geq \varepsilon$$

Envelopment model of output oriented BCC model is written as below:

$$maximize: \beta + \varepsilon[\sum_{i=1}^{m} s_i^- + \sum_{r=1}^{s} s_r^+] \qquad (12)$$

$$subject\ to: 0 = x_{i_0} - \sum_{j=1}^{n} x_{ij}\lambda_j - s_i^-$$

$$\beta y_{r0} = \sum_{j=1}^{n} y_{rj}\lambda_j - s_r^+$$

$$\sum_{j=1}^{n} \lambda_j = 1$$

$0 \leq \lambda_j,\ s_i^-,\ s_r^+$ for i= 1, … ,m; r = 1, … ,s; j = 1, … ,n

Difference between BCC and CCR stems from convexity constraint. In BCC it is accepted that sum of λs are equal to 1. These λs are calculated as the results of linear programming problem which will be solved for every decision unit. (Cooper et al., 2007) Furthermore, in CCR model, which does analysis with an assumption of variable returns to scale, line passes through origin but in BCC model it does not have to pass through origin.

3. CASE STUDY

In this section of the study these will be discussed; introduction of method, selection of variables that take place in analysis, formation of data sets, application of data envelopment analysis and evaluation of results.

3.1. Methodology

In this study Data Envelopment Analysis (DEA) is used to evaluate obtained data. The study was carried out to relatively measure operational efficiencies of Turkish development agencies that have similar input-output structure and same goals. Efficiency measurement is done with the help of Win4DEAP computer program by using input and output oriented BCC and CCR Model.

3.2. Selection of Input and Output

Firstly, 26 Regional Development Agencies in Turkey were identified as decision units for DEA Model. In connection with the aim of this study analyses were done by using data belong to every agency. Data sets, used in the study, were taken from agencies' operation reports from the year 2013. There are hardly any studies related to research for the efficiency of Regional Development Agencies (RDA). Many input and output variable can be identified to be used in agency evaluation. However, limited data on the operation reports that agencies published formed a constraint on selecting variable.

Studies in different fields in Literature were reviewed and seven input and one output found on table 2 have been added to analysis.

Table 2. Input and Output Variables That Were Used in Efficiency Evaluation

Inputs	**Outputs**
I1: Number of staff with a Bachelor's degree	O1: Number of supported projects
I2: Number of staff with a Master's degree	
I3: Supporting expenses of Projects and operations	
I4: Number of published reports	
I5: Number of meetings held	
I6: Trainings given	
I7: Participation to meetings and trainings	

4. FINDINGS OF THE STUDY

Before making efficiency analysis, correlation and definitive statistics belong to input and output used in research were analyzed. Summary statistics for data sets of case study are shown in table 3.

Table 3. Summary Statistics over Input and Output Variables

Variables	**O1**	**I1**	**I2**	**I3**	**I4**	**I5**	**I6**	**I7**
Mean	109.3077	17.03846	19.38462	26285387	23.23077	30.15385	49.88462	2941.077
Median	97	18	20.5	12412592	15.5	13.5	41	2305.5
Maximum	337	30	42	3.31E+08	73	209	181	12469
Minimum	30	4	3	6897612	2	1	2	150
Std. Dev.	58.95881	7.017012	8.471491	62533608	18.50256	45.03127	36.58123	2550.339
Observations	26	26	26	26	26	26	26	26

Moreover, in table 4 correlation between input and output is seen. It is clear that from this point of view analysis is based on reliable source since there is high correlation between neither inputs nor outputs. When correlation analysis values had been evaluated no changes were made on input and output variables.

Table 4. The Correlation between Input and Output

	O1	**I1**	**I2**	**I3**	**I4**	**I5**	**I6**	**7**
O1	1							
I1	-0.1759	1						
I2	0.134056	-0.54194	1					
I3	0.268511	0.009082	-0.41759	1				
I4	0.028203	0.120392	0.048408	-0.14634	1			
I5	0.010166	0.04454	-0.29428	-0.06381	0.368946	1		
I6	-0.18485	0.097567	-0.10169	-0.02815	0.234067	0.054646	1	
I7	0.282179	0.049097	0.042494	-0.0142	0.20149	-0.21547	0.639526	1

RDA's efficiency scores, obtained at the end of the analysis, are given in table 5. Averages values show arithmetic mean of agencies' efficiency scores. Agencies, which have efficiency scores equal to 1, are fully efficient. Rests of agencies' operations are interpreted positively as their scores approach to 1.

Efficiency scores calculated at the end of the analyses can be different according to used DEA model. In addition to this, as it is observed in Table-4 input and output oriented efficiency scores, which are calculated based on constant return assumption to the scale, give the same results for all KVBs.

Agencies with an efficient result according to both input and output oriented CCR Model, are efficient according to BCC results as well. It is observed that at input oriented cases 5 development agencies work with a constant return to scale. On the other hand, 21 development agencies work with an increasing return to scale. agencies in regions TR10, TR41, TR52, TR63 and TR90 are efficient according to input and output oriented CCR model while agencies in regions TR10, TR21, TR22, TR41, TR52, TR61, TR63, TR71, TR81, TR83, TR90, TRA2, TRB1, TRB2, TRC1 and TRC3 are efficient according to input and output oriented BCC model.

Table 5. Efficiency scores of Agencies and Reference Sets

RDA	**Scale Efficiency and Return Status to Scale**			
	Input-oriented			
	CCR Efficiency Score	**BCC Efficiency Score**	**Scale Efficiency**	**Return to Scale**
TR10	**1.000**	**1.000**	**1.000**	CRS
TR21	0.789	**1.000**	0.789	IRS
TR22	0.510	**1.000**	0.510	IRS
TR31	0.213	0.938	0.228	IRS
TR32	0.392	0.974	0.403	IRS
TR33	0.654	0.977	0.670	IRS
TR41	**1.000**	**1.000**	**1.000**	CRS
TR42	0.423	0.794	0.533	IRS
TR51	0.780	0.863	0.904	IRS
TR52	**1.000**	**1.000**	**1.000**	CRS
TR61	0.844	**1.000**	0.844	IRS
TR62	0.707	0.877	0.807	IRS

TR63	**1.000**	**1.000**	**1.000**	CRS
TR71	0.483	**1.000**	0.483	IRS
TR72	0.595	0.908	0.656	IRS
TR81	0.792	**1.000**	0.792	IRS
TR82	0.591	0.991	0.596	IRS
TR83	0.702	**1.000**	0.702	IRS
TR90	**1.000**	**1.000**	**1.000**	CRS
TRA1	0.458	0.745	0.614	IRS
TRA2	0.567	**1.000**	0.567	IRS
TRB1	0.551	**1.000**	0.551	IRS
TRB2	0.381	**1.000**	0.381	IRS
TRC1	0.647	**1.000**	0.647	IRS
TRC2	0.579	0.930	0.623	IRS
TRC3	0.207	**1.000**	0.207	IRS
Avg.	**0.649**	**0.961**	**0.673**	
RDA	**Output-oriented**			
	CCR Efficiency Score	**BCC Efficiency Score**	**Scale Efficiency**	**Return to Scale**
TR10	**1.000**	**1.000**	**1.000**	CRS
TR21	0.789	**1.000**	0.789	IRS
TR22	0.510	**1.000**	0.510	IRS
TR31	0.213	0.219	0.976	IRS
TR32	0.392	0.825	0.476	IRS
TR33	0.654	0.853	0.767	IRS
TR41	**1.000**	**1.000**	**1.000**	CRS
TR42	0.423	0.430	0.985	IRS
TR51	0.780	0.796	0.980	DRS
TR52	**1.000**	**1.000**	**1.000**	CRS
TR61	0.844	**1.000**	0.844	IRS
TR62	0.707	0.767	0.922	DRS
TR63	**1.000**	**1.000**	**1.000**	CRS
TR71	0.483	**1.000**	0.483	IRS

TR72	0.595	0.607	0.981	DRS
TR81	0.792	**1.000**	0.792	IRS
TR82	0.591	0.659	0.897	IRS
TR83	0.702	**1.000**	0.702	IRS
TR90	**1.000**	**1.000**	**1.000**	CRS
TRA1	0.458	0.466	0.982	DRS
TRA2	0.567	**1.000**	0.567	IRS
TRB1	0.551	**1.000**	0.551	IRS
TRB2	0.381	**1.000**	0.381	IRS
TRC1	0.647	**1.000**	0.647	IRS
RDA	**CCR Efficiency Score**	**BCC Efficiency Score**	**Scale Efficiency**	**Return to Scale**
TRC2	0.579	0.602	0.961	DRS
TRC3	0.207	**1.000**	0.207	IRS
Avg.	**0.649**	**0.855**	**0.785**	

Scale efficiencies are calculated through division of efficiency results obtained via CCR model to the results obtained via BCC model. When scale efficiency scores are reviewed it is observed that agencies in regions TR10, TR41, TR52, TR63 and TR90 have services at suitable scale and the highest scale efficiency. TRC3 has the lowest efficiency score, 0,207 and cannot be considered as efficient. In Turkey average scale efficiency score is 0,673 for CCR and 0,785 for BCC. Average efficiency scores in Turkey for CCR 0,673 and for BCC 0,785. According to CCR & BCC models 57% and 38% of 26 RDAs are below average.

In table 6 efficiency scores of agencies are shown separately according to both input and output oriented BCC models. Agency in region TRC3 has the lowest efficiency score, 0,207, according to input oriented CCR model while Agency in region TRA1 has the lowest efficiency score, 0,745, according to input oriented BCC model among 26 agencies.

Table 6. Efficiency Scores and Efficiency Rankings of Agencies

RDA	Input-Oriented				Output-Oriented			
	CCR	**Rank**	**BCC**	**Rank**	**CCR**	**Rank**	**BCC**	**Rank**
TR10	**1.000**	1	**1.000**	1	**1.000**	1	**1.000**	1
TR21	0.789	4	**1.000**	1	0.789	4	**1.000**	1
TR22	0.510	15	**1.000**	1	0.510	15	**1.000**	1
TR31	0.213	21	0.938	5	0.213	21	0.219	11
TR32	0.392	19	0.974	4	0.392	19	0.825	3
RDA	**Input-Oriented**				**Output-Oriented**			
	CCR	**Rank**	**BCC**	**Rank**	**CCR**	**Rank**	**BCC**	**Rank**
TR33	0.654	8	0.977	3	0.654	8	0.853	2
RDA	**CCR**	**Rank**	**BCC**	**Rank**	**CCR**	**Rank**	**BCC**	**Rank**
TR41	**1.000**	1	**1.000**	1	**1.000**	1	**1.000**	1
TR42	0.423	18	0.794	10	0.423	18	0.430	10
TR51	0.780	5	0.863	9	0.78	5	0.796	4
TR52	**1.000**	1	**1.000**	1	**1.000**	1	**1.000**	1
TR61	0.844	2	**1.000**	1	0.844	2	**1.000**	1
TR62	0.707	6	0.877	8	0.707	6	0.767	5
TR63	**1.000**	1	**1.000**	1	**1.000**	1	**1.000**	1
TR71	0.483	16	**1.000**	1	0.483	16	**1.000**	1
TR72	0.595	10	0.908	7	0.595	10	0.607	7
TR81	0.792	3	**1.000**	1	0.792	3	**1.000**	1
TR82	0.591	11	0.991	2	0.591	11	0.659	6
TR83	0.702	7	**1.000**	1	0.702	7	**1.000**	1
TR90	**1.000**	1	**1.000**	1	1.000	1	**1.000**	1
TRA1	0.458	17	0.745	11	0.458	17	0.466	9
TRA2	0.567	13	**1.000**	1	0.567	13	**1.000**	1
TRB1	0.551	14	**1.000**	1	0.551	14	**1.000**	1
TRB2	0.381	20	**1.000**	1	0.381	20	**1.000**	1
TRC1	0.647	9	**1.000**	1	0.647	9	**1.000**	1
TRC2	0.579	12	0.930	6	0.579	12	0.602	8
TRC3	0.207	22	**1.000**	1	0.207	22	**1.000**	1
Ort.	**0.649**		**0.961**		**0.649**		**0.855**	

Agency in region TRC3 has the lowest efficiency score, which is 0,207, according to output oriented CCR and agency in region TR31 has the lowest efficiency score, which is 0,219, according to output oriented BCC model.

According to input oriented CCR model agencies in regions TR61, TR81, TR21 and TR51 are the nearest ones to efficiency score with scores of 0,844, 0,792, 0,789, and 0,780 respectively. Agencies in regions TR82, TR33, TR32 and TR31 according to input oriented BCC are the nearest ones to efficiency score with scores 0,991, 0,977, 0,974 and 0,938 respectively. Agencies in regions TR33, TR32, TR51 and TR62 according to output oriented BCC model, are the nearest ones to efficiency score with scores 0,853, 0,825, 0,796 and 0,767 respectively.

Table-7 shows original and aimed values of input and output of agencies which do not have an efficiency score equal to 1 according to input oriented CCR model. Difference between current situation and aimed values describes remoteness of inefficient decision unit to efficiency verge. In addition, difference is are also shown on the table which signifies the amount of change needed to be made and potential improvement ratio for inefficient agencies to become efficient. Agencies can increase their efficiencies by taking those potential improvement ratios on the table into consideration. Only input oriented BCC values were studied due to unavailability of enough room.

When we analyze results in depth, for the agencies in region TR31, these are needed to be decreased accordingly; number of staff with a Bachelor's Degree (G1) from 12 to 11 with ratio of 6,6%, number of staff with a Master's Degree (G2) from 31 to 2 with ratio of 32%, project and operation supporting expenses (G3) from 11,2 Million Liras to 10,5 Million Liras with a ratio of 6%, number of published reports (G4) from 11 to 10 with ratio of 9%, number of meetings held (G5) from 14 to 13 with a ratio of 7%, training programs given from 42 to 21 with a ratio of 50%, attendance to meetings and trainings (G7) from 2.469 to 928 with a ratio of 62%. On the other hand, number of supported projects (C1) is needed to be increased from 41 to 95 with a ratio of 131%.

For TR32; these should be decreased; G1 from 19 to 17, G2 from 21 to 15, G3 from 7.4 Million Liras to 7.2 Million Liras, G4 from 50 to 28, G6 from 42 to 32, G7 from 2.930 to 2.221; however, C1 should be increased from 69 to 74. For TR33; these should be decreased accordingly; G3 from 1.7 Million Liras to 1.36

Million Liras, G5 from 38 to 37, G6 from 59 to 34, G7 1.726 to 1.126; but, C1 should be the same. For TR42 these should be decreased; G1 from 11 to 9, G6 from 186 to 21, G7 from 12.469 to 1.792; on the other hand, C1 mustn't be changed. For TR51 these should be decreased; G1 from 18 to 16, G2 from 20 to 17, G3 from 1.7 Million Liras to 1.46 Million Liras, G4 from 27 to 11, G5 from 26 to 22, G6 from 36 to 22, G7 from 2.289 to 1.975; but C1 should stay same.

For TR62 these should be decreased; G1 from 19 to 13, G2 from 18 to 16, G3 from 2.56 Million Liras to 1.98 Million Liras, G4 from 11 to 4, G5 from 8 to 7, G6 from 35 to 17, G7 from 2.322 to 629; however C1 shouldn't be changed. For TR82 these should be decreased; G1 from 14 to 13, G2 from 27 to 21, G3 from 1.11 Million Liras to 1.10 Million Liras, G4 from 22 to 13, G5 from 6 to 2, G7 from 1.739 to 1.723; but C1 should be increased from 96 to 137. For TRA1 these should be decreased; G1 from 19 to 14, G2 from 20 to 15, G3 from 15 Million Liras to 11 Million Liras, G4 from 55 to 25, G5 from 96 to 36, G6 from 50 to 37, G7 from 2.684 to 1.930; and C1 should be increased from 95 to 96. For TRC2 these should be decreased accordingly; G1 from 23 to 15, G2 from 11 to 10, G3 from 32 Million Liras to 24 Million Liras, G4 from 73 to 9, G5 from 80 to 26, G6 from 33 to 21, G7 from 1.772 to 1.647; but C1 should be increased from 98 to 157.

In table 8 there are reference sets of inefficient agencies according to input and output oriented CCR and BCC. For example, an agency which operating in TR21 region and needs to reach efficiency score of "1" within the scope of output oriented CCR analysis so that it has to take agencies located in regions TR41, TR90 and TR63 as reference. As TR21 is efficient according to input and output oriented BCC, there is no need for agency in TR21 region to take any agencies as reference. Similar interpretations can be done according to reference sets in table for other inefficient agencies as well. Agencies in regions TR41 and TR63 have the most references.

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Table 7.Potential Improvements of Inefficient Agencies according to Input Oriented CCR and BCC

RDA	Variables		CCR			BCC		
		Done	Goal	Difference	Improvement	Goal	Difference	Improvement
TR21	I1	10	7,9	2,1	-%21	10	0	0
	I2	24	18,9	5,1	-%21,2	24	0	0
	I3	7537125	5949948,8	1587176,2	-%21,1	7537125	0	0
	I4	32	14,5	17,5	-%54,7	32	0	0
	I5	13	4,4	8,6	-%66,1	13	0	0
	I6	81	8,4	72,6	-%89,6	81	0	0
	I7	2209	1743,8	465,2	-%21,1	2209	0	0
	O1	120	120	-32,1	%26,7	120	0	0
TR22	I1	20	2,8	0	0	20	0	0
	I2	14	7,1	6,9	-%49,3	14	0	0
	I3	15025021	2563869,8	12461151,2	-%82,9	15025021	0	0
	I4	9	4,1	4,9	-%54,4	9	0	0
	I5	2	1	1	%50	2	0	0
	I6	34	2,5	31,5	-%92,6	34	0	0
	I7	7150	1602,6	5547,4	-%77,6	7150	0	0
	O1	86	86	0	0	86	0	0
TR31	I1	12	2,3	9,7	-%80,8	11	1	-%6,6

	I2	31	5,4	25,6	-%82,5	21	10	-%32
	Variables	**Done**	**Goal**	**Difference**	**Improvement**	**Goal**	**Difference**	**Improvement**
	I3	11197547	2388627,9	8808919,1	-%78,7	10497875,3	699671,7	-%6
	I4	11	2,3	8,7	-%79,1	10	1	-%9
	I5	14	0,7	13,3	-%95	13	1	-%7
	I6	42	1,5	40,5	-%96,4	21	21	-%50
	I7	2469	526,7	1942,3	-%78,7	928	154	-%62
	O1	41	41	0	0	95	-54	%131
TR32	**I1**	19	2,8	16,2	-%85,3	17	2	-%10
	I2	21	6,8	14,2	-%67,6	15	6	-%28
	I3	7439430	2919323,0	4520107	-%60,7	7246563,1	192866,9	-%2,6
	I4	50	3,0	47	-%94	28	22	-%44
	I5	2	0,8	1,2	-%60	2	0	0
	I6	47	1,9	45,1	-%96	32	15	-%31
	I7	2930	1111,1	1818,9	-%62	2221	709	-%24
	O1	69	69	0	0	74	-15	%22
TR33	**I1**	7	4,6	2,4	-%34,3	7	0	0
	I2	22	11,0	11	-%50	22	0	0
	I3	17220846	5385156,3	11835689,7	-%68,7	13622652,5	3598193,5	-%21
	I4	10	3,3	6,7	-%67	10	0	0

	I5	38	1,0	37	-%97,4	37	1	-%2,3
	I6	59	2,3	56,7	-%96,1	34	25	-%42
	Variables	**Done**	**Goal**	**Difference**	**Improvement**	**Goal**	**Difference**	**Improvement**
	I7	1726	1129,5	596,5	-%34,5	1126	600	-%35
	O1	90	90	0	0	90	0	0
TR42	**I1**	11	4,6	6,4	-%58,2	9	2	-%18
	I2	27	11,4	15,6	-%57,8	21	6	-%22
	I3	22590817	4415228,4	18175588,6	%80,5	12326716	10264100	-%45
	I4	53	6,6	46,4	-%87,5	11	42	-%78
	I5	14	1,7	12,3	-%87,9	11	3	-%20
	I6	181	4,5	176,5	-%97,5	21	160	-%88
	I7	12469	2581,8	9887,2	-%79,3	1792	10677	-%85
	O1	139	139	0	0	139	0	0
TR51	**I1**	18	10,1	7,9	-%43,9	16	2	-%11
	I2	20	15,6	4,4	-%22	17	3	-%15
	I3	16989918	13249251,4	3740666,6	-%22	14659838,4	2330079,6	-%14
	I4	27	8,3	18,7	-%69,3	11	16	-%58
	I5	26	20,3	5,7	-%22	22	4	-%14
	I6	36	13,7	22,3	-%62	22	14	-%38
	I7	2289	1785,0	504	-%22	1975	314	-%14

	O1	151	151	0	0	151	0	0
TR61	**I1**	18	7,8	10,2	-%56,7	18	0	0
	I2	23	18,4	4,6	-%20	23	0	0
	Variables	**Done**	**Goal**	**Difference**	**Improvement**	**Goal**	**Difference**	**Improvement**
	I3	8450699	713431,3	1316385,7	-%15,6	8450699	0	0
	I4	13	11,0	2	-%15,4	13	0	0
	I5	62	3,5	58,5	-%94,4	62	0	0
	I6	31	6,5	24,5	-%79	31	0	0
	I7	1258	1062,0	196	-%15,6	1258	0	0
	O1	102	102	0	0	102	0	0
TR62	**I1**	19	10,2	8,8	-%46,3	13	6	-%31
	I2	18	12,7	5,3	-%29,4	16	2	-%11
	I3	25645413	16015741,9	9629671,1	-%37,5	19857477,6	5787935,4	-%22
	I4	11	3,5	7,5	-%68,2	4	7	-%60
	I5	8	5,7	2,3	-%28,7	7	1	-%12
	I6	35	13,9	21,1	-%60,3	17	18	-%51
	I7	1174	830,3	343,7	-%29,3	1029	145	-%12
	O1	114	114	0	0	141	-27	%24
TR71	**I1**	17	3,0	14	-%82,3	17	0	0
	I2	15	7,2	7,8	-%52	15	0	0

	I3	6897612	3333435,0	3564177	-%51,7	6897612	0	0
	I4	30	3,0	27	-%90	30	0	0
	I5	2	1,0	1	-%50	2	0	0
	I6	34	2,2	31,8	-%93,5	34	0	0
	Variables	**Done**	**Goal**	**Difference**	**Improvement**	**Goal**	**Difference**	**Improvement**
	I7	2334	1127,9	1206,1	-%51,7	2334	0	0
	O1	72	72	0	0	72	0	0
TR72	**I1**	14	6,7	7,3	-%52,1	13	1	-%7
	I2	22	13,1	8,9	-%40,5	20	2	-%9
	I3	15893545	9462480,7	6431064,3	-%40,5	14434222,9	1459322,1	-%9
	I4	4	2,4	1,6	-%40	4	0	0
	I5	6	1,3	4,7	-%78,3	4	2	-%35
	I6	53	4,6	48,4	-%91,3	19	34	-%65
	I7	2322	614,3	1707,7	-%73,5	629	1693	-%73
	O1	90	90	0	0	112	-22	%24
TR81	**I1**	6	4,7	1,3	-%21,7	6	0	0
	I2	22	11,3	10,7	-%48,6	22	0	0
	I3	8952004	5690133,3	3261870,7	-%36,4	8952004	0	0
	I4	16	3,1	12,9	%80,6	16	0	0
	I5	19	0,9	18,1	-%95,3	19	0	0

	I6	30	2,2	27,8	-%92,7	30	0	0
	I7	1317	1043,0	274	-%20,8	1317	0	0
	O1	89	89	0	0	89	0	0
TR82	**I1**	13	6,7	6,3	%48,5	12	1	-%5
	I2	27	16,0	11	%40,7	21	6	-%21
	Variables	**Done**	**Goal**	**Difference**	**Improvement**	**Goal**	**Difference**	**Improvement**
	I3	11162652	6591789,1	4570862,9	%41	11057658,7	104993,3	-%9
	I4	22	8,3	13,7	-%62,3	13	9	-%43
	I5	6	2,6	3,4	-%56,7	2	4	-%66
	I6	13	5,0	8	-%61,5	13	0	0
	I7	1739	1027,0	712	-%41	1723	16	-%0,9
	O1	96	96	0	0	137	-41	%43
TR83	**I1**	28	8,6	19,4	-%69,3	28	0	0
	I2	12	8,4	3,6	-%30	12	0	0
	I3	22959275	13621105,8	9338169,2	-%40,7	22959275	0	0
	I4	12	5,3	6,7	-%55,8	12	0	0
	I5	28	3,4	24,6	-%87,9	28	0	0
	I6	23	16,1	6,9	-%30	23	0	0
	I7	2794	1960,6	833,4	-%29,8	2794	0	0
	O1	132	132	0	0	132	0	0

TRA1	**I1**	19	6,4	12,6	-%66,3	14	5	-%25
	I2	20	9,1	10,9	-%54,5	15	5	-%25
	I3	15005384	6868325,2	8137058,8	-%54,2	11179911,6	3825472,4	-%25
	I4	55	8,8	46,2	-%84	25	30	-%54
	I5	96	32,6	63,4	-%66	36	60	-%62
	I6	50	11,2	38,8	-%77,6	37	13	-%25
	Variables	**Done**	**Goal**	**Difference**	**Improvement**	**Goal**	**Difference**	**Improvement**
	I7	2684	1228,5	1455,5	-%54,2	1930	754	-%28
	O1	95	95	0	0	96	-1	%1
TRA2	**I1**	26	4,2	21,8	-%83,8	26	0	0
	I2	9	5,1	3,9	-%43,3	9	0	0
	I3	10669465	6045984,1	4623480,9	-%43,3	10669465	0	0
	I4	28	3,6	24,4	-%87,1	28	0	0
	I5	21	1,8	19,2	-%91,4	21	0	0
	I6	81	7,7	73,3	-%90,5	81	0	0
	I7	5317	1416,3	3900,7	-%73,3	5317	0	0
	O1	82	82	0	0	82	0	0
TRB1	**I1**	26	4,8	21,2	-%81,5	26	0	0
	I2	19	10,5	8,5	-%44,7	19	0	0
	I3	9769996	5386846,5	4383149,5	-%44,9	9769996	0	0

	I4	9	5,0	4	-%44,4	9	0	0
	I5	11	1,5	9,5	-%86,4	11	0	0
	I6	90	4,5	85,5	-%95	90	0	0
	I7	5245	1874,8	3370,2	-%64,2	5245	0	0
	O1	114	114	0	0	114	0	0
TRB2	**I1**	27	2,3	24,7	-%91,5	27	0	0
	I2	12	4,6	7,4	-%61,7	12	0	0
	Variables	**Done**	**Goal**	**Difference**	**Improvement**	**Goal**	**Difference**	**Improvement**
	I3	7461431	2841304,6	4620126,4	-%61,9	7461431	0	0
	I4	15	2,1	12,9	-%86	15	0	0
	I5	6	2,3	3,7	-%61,7	6	0	0
	I6	40	2,5	37,5	-%93,7	40	0	0
	I7	1750	666,4	1083,6	-%61,9	1750	0	0
	O1	46	46	0	0	46	0	0
TRC1	**I1**	4	2,6	1,4	-%35	4	0	0
	I2	23	6,3	16,7	-%72,6	23	0	0
	I3	14592050	2874271,8	11717778,2	-%80,3	14592050	0	0
	I4	10	2,3	7,7	-%77	10	0	0
	I5	78	0,6	77,4	-%99,2	78	0	0
	I6	55	1,5	53,5	-%97,3	55	0	0

	I7	1311	848,7	462,3	-%35,3	1311	0	0
	O1	58	58	0	0	58	0	0
TRC2	**I1**	23	9,3	13,7	-%59,6	15	8	-%35
	I2	11	6,4	4,6	-%41,8	10	1	-%7
	I3	32119815	14955755,6	17164059,4	-%53,4	24015983,7	8103831,3	-%25
	I4	73	5,3	67,7	-%92,7	9	64	-%88
	I5	80	16,4	63,6	-%79,5	26	54	-%67
	I6	33	19,1	13,9	-%42,1	31	2	-%6
	Variables	**Done**	**Goal**	**Difference**	**Improvement**	**Goal**	**Difference**	**Improvement**
	I7	1772	1025,7	746,3	-%42,1	1647	125	-%7
	O1	98	98	0	0	157	-59	%60
TRC3	**I1**	30	1,7	28,3	-%94,3	30	0	0
	I2	10	2,1	7,9	-%79	10	0	0
	I3	10631529	2195833,6	8435695,4	-%79,3	10631529	0	0
	I4	9	1,8	7,2	-%80	9	0	0
	I5	17	3,5	13,5	-%79,4	17	0	0
	I6	110	3,1	106,9	-%97,2	110	0	0
	I7	2372	490,0	1882	-%79,3	2372	0	0
	O1	30	30	0	0	30	0	0

Yayın Geliş Tarihi: *12.05.2016* *Dokuz Eylül Üniversitesi*
Yayın Kabul Tarihi: *04.04.2017* *İktisadi ve İdari Bilimler Fakültesi Dergisi*
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Table 8. Reference Sets of Inefficient Agencies According to Input and Output Oriented CCR and BCC

RDA	**Input-oriented CCR**	**Input-oriented BCC**	**Output-oriented CCR**	**Output-oriented BCC**
TR21	TR41, TR90, TR63	TR21	TR41, TR90, TR63	TR21
TR22	TR63	TR22	TR63	TR22
TR31	TR90, TR41, TR63	TR61, TR41, TR81, TR63	TR41, TR51, TR63	TR41, TR61, TR21, TR90, TR63
TR32	TR41, TR63	TR41, TR71	TR41, TR63	TR63, TR41, TR71
RDA	**Input-oriented CCR**	**Input-oriented BCC**	**Output-oriented CCR**	**Output-oriented BCC**
TR33	TR63, TR41	TR41, TRC1, TR81, TR10, TR63	TR63, TR41	TR10, TR41, TR81, TR63, TRC1
TR42	TR10, TR63	TR41, TR81, TR10, TR63	TR63, TR10	TRC1, TR63, TR10
TR51	TR41, TR10, TR52, TR63	TRB2, TR71, TR41, TR10, TR52	TR41, TR10, TR52, TR63	TR41, TR10, TR52, TR63
TR61	TR90, TR63, TR41	TR61	TR90, TR63, TR41	TR61
TR62	TR41, TR10, TR52	TR52, TR41, TR10	TR41, TR10, TR52	TR41, TR52, TR63, TR10
TR71	TR10, TR41, TR52, TR63	TR71	TR10, TR41, TR52, TR63	TR71
TR72	TR10, TR41, TR63	TR81, TRC3, TR41, TR10	TR10, TR41, TR63	TR10, TR41, TR63
TR81	TR41, TR63	TR81	TR41, TR63	TR81
TR82	TR41, TR90, TR63	TR63, TR71, TR41	TR41, TR90, TR63	TR61, TR41, TR71, TR90, TR63
TR83	TR63, TR41, TR10	TR83	TR41, TR63, TR10	TR83
TRA1	TR41, TR52, TR63	TR52, TR10, TR81, TR71	TR41, TR52, TR63	TR41, TR52, TR63
TRA2	TR10, TR63	TRA2	TR10, TR63	TRA2
TRB1	TR10, TR41, TR63	TRB1	TR10, TR41, TR63	TRB1
TRB2	TR10, TR41, TR52, TR63	TRB2	TR10, TR41, TR52, TR63	TRB2
TRC1	TR41, TR63	TRC1	TR41, TR63	TRC1
TRC2	TR41, TR52, TR10	TR52, TR41, TR10	TR41, TR52, TR10	TR41, TR52, TR10, TR63
TRC3	TR41, TR52, TR10, TR63	TRC3	TR41, TR10, TR52, TR63	TRC3

5. CONCLUSION

To cater for national development from the heart of it and multi dimensionally, regional development agencies were established. The aim is to compensate for regional development differences and to support local and regional entrepreneurship. It has been more than 5 years since RDAs have been established in Turkey. However, there are still differences between countryside and cities in terms of developmental level so that speeding up regional development continues to be one of the major priorities. Reasons such as economic and social convergence with EU and alignment with acquis increase importance of development agencies for the country. Moreover, agencies' duties and authorities, financial resources, relationships with central and local management, corporate identities, legal, administrative and financial structures and operations bring many arguments with them. For that matter, it is important to reveal that how efficient in agencies produce quality service and how efficient they fulfill the function that they are expected to.

With this study efficiency measurements of RDA which operates in Turkey were done for the year 2012. Results obtained from the study are expected to be resources for finding new strategies for managers of agencies. DEA is preferred in efficiency measurements due to having similar input - output structure and same goals with RDA. DEA is a quantitative method that is based on measuring performances of decision units relatively and calculating technical efficiencies. At the end of the analysis done with CCR and BCC models agencies' current values and target values are defined and it is found out that to make them more efficient which input will be decreased and which output will be increased. With the help of input oriented DEA these values are calculated; RDA's average efficiency value for CCR model 0,649 and for BCC model 0,961, scale efficiency 0,673. On the other hand, by using output oriented DEA these values are calculate; RDA's average efficiency value for CCR model 0,649, for BCC model 0,855; scale efficiency 0,785 so that agency operated efficiently. Consequently, among 26 analyzed RDAs for CCR model only 5 are efficient while this number is 16 for

BCC model which shows agencies are not operating efficiently in Turkey. Agencies in regions TR10, TR41, TR52, TR63 and TR90 showed the best performances; but in CCR analysis agencies in regions TRC3, TR31, TRB2, TR32 and TR42; in BCC analysis agencies in regions TR31, TR42, TRA1, TRC2 and TR72 showed insufficient performances.

It's important to direct RDA to productive fields in order to make it both economically and technically efficient. Agencies need to increase their popularity and their operations need to be widespread in order to support projects that provide efficient solutions to financial problems. Developing humane, technical and institutional capacities is another aspect that have indirect effect on RDA's efficiency. In this context, it is thought that training programs for staff working at agencies would be effective from the aspect of professional experience. Development agencies should cooperate and share information-experience with various institutions especially universities and agencies in other regions.

Obtained results within the scope of DEA are periodic and limited with variable set which is used. Change in solved models' results can be observed in detail by using different input-output sets at different times. In future studies, DEA can be more comprehensive by adding different variables to analysis such as agency capacity, service quality, success of supported projects and contributions to economy.

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