Using Data Envelopment Analysis To Measure Cost Efficiency With an Application on Islamic Banks

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Abstract

This paper aims to use Data Envelopment analysis in measuring and analyzing the relative cost efficiency of 24 Islamic banking institutions. Cost efficiency considered the most important type of efficiency that firms can achieve it, by find a combination of inputs which enable them to produce the desired outputs at minimum costs. The most recent style in measuring efficiency is DEA, which is a linear program approach based on this concept. DEA measures the efficiency of Decision Making Units by doing linear program for each one as a comparison to other units. Accordingly the DMUs lie on frontier curve (which envelops the data) are efficient in choosing the optimal mixture of inputs to achieve the aimed level of outputs. whereas the DMUs that isn't lie on the curve are considered inefficient. This paper shows that most Islamic banking institutions which are the sample of the paper are efficient and the rest is on the way of improving their efficiencies.

Keywords: Cost efficiency, Data envelopment analysis, Islamic banking.

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Introduction

The interest in measuring the efficiency of decision making units increases to know the goodness of using scarce economic resources, and in the most recent time data envelopment analysis is used for this purpose.

This paper aims to use Data Envelopment Analysis (DEA) in measuring and analyzing the relative cost efficiency of 24 of Islamic banking institutions determined by the ability to obtain the data* for the period 1999-2001.

This paper adopted the deduction approach depending on **CCR** model to calculate the cost efficiency of 24 Islamic banking institutions. The theoretical aspect of DEA system was covered by the most recent research and studies in this field*.

The importance of this paper comes from its smooth and simplified presentation of data envelopment analysis system with the procedures and conditions of using it to measure cost efficiency through the application on Islamic banking institutions . This makes it easy to other researcher to understand and apply this approach to measure the efficiency of other decision making units.

The out-line of this paper takes the following points:

1. Efficiency: the concept and graphical presentation.
Meanings of efficiency
Efficiency graphically

2. Data envelopment analysis .
2-1- What is DEA?
2-2- Theoretical construction of DEA system.
2-3- DEA conditions.

* General Council of Islamic Banking and Institutions (www.islamicfi.net/arabic.asp).
** For example study of : Charnes Cooper & Rhodes (1978), A. D. Athanass Pouls & D. Giokas (2000), Ilian S. Ilieva (2004) , W. W. Cooper , L. M. Siefor & Joe Zhu (2004), M. E. T. Al-Saqqa (2000) (in Arabic)… etc.

1-Efficiency: The Concept and Graphical Presentation.

1-2. Meaning of Efficiency

The most common concept of efficiency is "Technical Efficiency", which means transferring physical inputs such as labour and capital into outputs at the best level of performance. i.e. TE requires (suppose that production techniques are constant) there is no waste in using inputs to produce specific quantity of output. TE is represented by a minimum combination of inputs necessary to produce specific level of outputs, and it measures the success of a firm to produce maximum quantity of outputs from a given set of inputs. As a result full TE (100%) a firm could achieve if – and only if it can not improve some of inputs or outputs without worsening some of there inputs or outputs.

Consequently, a firm is technically efficient when it cannot increase any output or decrease any input without reducing other outputs or increasing other inputs. As a result, a high degree of TE means either the possible increasing in outputs by using specific set of inputs, or the possible decreasing in inputs to produce specific quantity of outputs, when there is no waste. So a firm is considered technically efficient as a compared to another firm (or other firms) if it produced the same level of outputs by less inputs, or more of outputs by the same or less inputs.

It is necessary to mention that this concept of efficiency avoids the need to recourse the prices and the assumptions of weights which reflect the relative importance of the different inputs and outputs. But the existence of prices makes us able to discuss the other meanings of efficiency:

There is the “Distributive Efficiency” or “ Allocative efficiency ” which refers to the choosing of inputs to the specific level of outputs at specific level of the prices of the later, where the cost of production is minimum.

Another concept of efficiency is called “Cost Efficiency” , or “Economic Efficiency”, which can be achieved when the firms find a combination of inputs that makes them able to produce the desired outputs at minimum cost. CE is the product or mixture of the technical and allocation efficiencies.

1-2. The Efficiency Graphically

The meaning of efficiency mentioned above can be expressed graphically throughout the following discussion:

Suppose that a firm uses two inputs X1 & X2 to produce Y of output represented by isoquant I, which also represents all combinations technically efficient between the two inputs to produce the same level of output. AB represents isocost. The tangent point E represents the optimal operation point or firm’s equilibrium point, where marginal rate of technical substitution MRTS between X1 & X2 is equal the ratio of their prices, and a firm which operates at this point achieves technical and economic efficiencies.

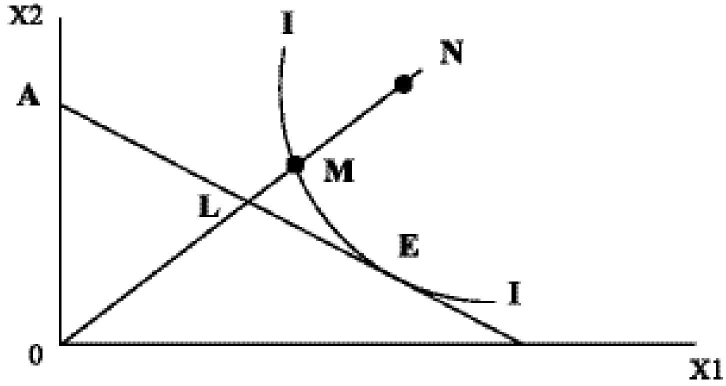

Figure (1) the graphical representation of efficiency

A firm at the point M is technically efficient because it lies on isoquant*, but it is not cost efficient. A firm at N isn't efficient neither technically nor economically. TE of this firm equals OM/ON, whilst its AE equals OL/OM. It reflects the ability of the firm to use the inputs at optimum combination at given prices.

Cost (economic) efficiency is calculated by OL/ON, or equals: (OM/ON)*(OL/ON). It is the product of technical and allocative efficiency coefficients. All three measures are bound by values from zero to one.

2- Data Envelopment Analysis

2-1 What is DEA?

DEA is a mathematical linear programming, approach based on the technical efficiency concept, it can be used to measure and analyze TE of different entities: productive and non productive, public and private, profit and non profit seeking firms. It is a non-parametric approach that calculates efficiency level by doing linear program for each unit in the sample.

DEA measures the efficiency of the decision-making unit by the comparison with best producer in the sample to derive compared efficiency.

DEA submits subjective measure of operational efficiency to the number of homogenous entities compared with each other, through a number of sample's units which form together a performance frontier curve that envelopes all observations. So, this approach is called Data Envelopment Analysis. Consequently, DMUs which lie on the curve are efficient in distributing their inputs and producing their outputs, while DMUs which do not lie on the curve are considered inefficient.

*It is known that any point on the isoquants representing the best technical combination between the two inputs achieves the same level of output represented by the isoquant. As a result a firm which lies at any point on the curve is technically efficient.

For example suppose that there are five DMUs (A, B, C, D, E) each of them used the two inputs X1, & X2 to produce Y of outputs. The data of inputs and outputs related to these units determined the levels of their efficiencies as shown in figure 2. The DMUs A, C, & D forms together frontier curve, consequently they are efficient, while B & E are inefficient because they do not lie on the efficient curve.

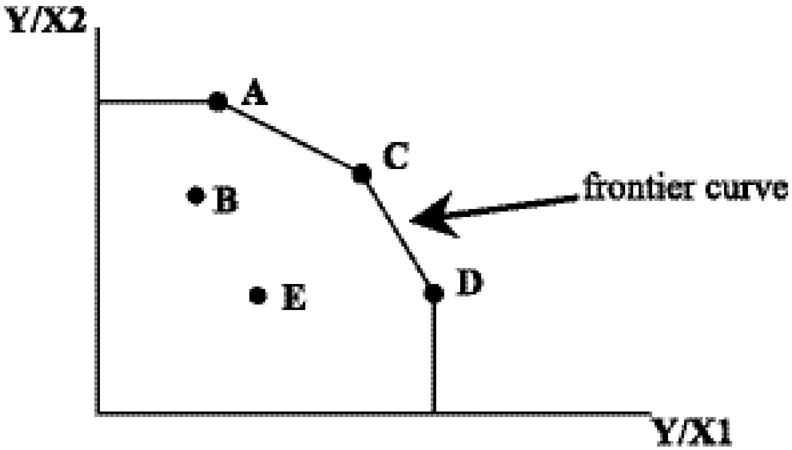

figure (2) The frontier curve

It is worth noting that DMUs which lie on the frontier curve represent virtual performance, not optimal one in its theoretical concept. Consequently, they reflect the actual style of the distribution process of resources and products.

Finally DEA submits further information used in directing inefficient DMUs to improve their performance. By submitting peer DMUs for each inefficient DMUs, such units are useful to determine the efficient operation style and by exposing them to the inefficient DMUs can help the latter to improve their performance.

2-2- Theoretical Construction of DEA System.

As we have seen DEA is based on TE concept which is:

$$\text{Technical efficiency} = \frac{\sum \text{weighted output}}{\sum \text{weighted input}}$$

Mathematically we can express the above relation by the following formula :

$$E_k = \frac{\sum_{j=1}^{M} U_j O_{jk}}{\sum_{i=1}^{N} V_i I_{ik}} \qquad (1)$$

Where :

A) **data:**

E_k : TE for the DMU_K (between zero and one).

k : number (#) of DMUs in the sample (k=1,2,… k).

N : # of the inputs used (i=1,2, …..N).

M : # of outputs (j=1,2,… M).

O_{jk}: the observed level of output j from DMU_k.

I_{ik}: the observed level of input i from DMU_k.

B) **model's variables**:

V_i : the weight of input i.

U_j : the weight of outputj.

To measure TE for DMUs by using linear program the following problem must be solved :

Max. TE

S. to

Ek ≤ 1 k=1,2, …. K (2)

Where TE is either maximizing outputs from given inputs, or minimizing inputs for a given level of outputs.

The above problem cannot be solved as stated because of difficulties associated with nonlinear (fractional) mathematical programming. Charnes, Cooper and Rhodes (1978) have developed a mathematical transformation which converts the above nonlinear programming to linear one. Existing duality theory and simplex algorithms in linear programming are used to solve the transformed problem.

For linear programming, there are two expressions which are dual to each other:

First problem :- Modified Linear programming :

$$\begin{aligned} & Max\sum_{j=1}^{M} U_j O_{je} \\ & S.to \\ & \sum_{i=1}^{N} V_i I_{ie} = 1 \\ & \sum_{j=1}^{M} U_j O_{jk} \leq \sum_{i=1}^{N} V_i I_{il} \\ & U_j, V_i \geq \varepsilon > 0 \end{aligned} \qquad (3)$$

Second problem : Dual of modified L.P.

$$\begin{aligned} & Min\Theta - \varepsilon\sum_{j=1}^{M} S_j^{+} - \sum_{i=1}^{N} S_i^{-} \\ & S.to \\ & \sum_{k=1}^{K} \lambda_k O_{jk} - S_j^{+} = O_{je} \\ & \sum_{k=1}^{K} \lambda_k I_{ik} + S_i^{-} = \Theta I_{ie} \\ & \lambda_k \geq 0 \end{aligned} \qquad (4)$$

2-3 DEA conditions

We presents some issues which are important in using DEA :

2-3-1 Positively property

Generally, the DEA formulation requires that the inputs, and outputs variables be positive (greater than zero).

2-3-2 Isotinicity property

It is required that the functions relating inputs to out puts have mathematical property called isotonicity which means that an increase in any input results in some output increase and not a decrease in any output.

2-3-3 Number of decision making units

A general rule is that three DMUs are required for input and output variables used in the model in order to insure sufficient degrees of freedom for a meaningful analysis.

2-3-4 Homogeneity of DMUs .

DEA requires a relatively homogenous set of entities. That is all entities included in the evaluation set should be have the same inputs and outputs in positive amounts.

2-3-5 Window analysis

In order to capture the variations of efficiency over time, Charnes proposed a technique called ‘ Window Analysis ‘ in DEA. Window Analysis assesses the performance of a DMU over time by treating it as a different entity in each time period. This method allows for tracking the performance of a unit or process. For example, if there are *n* units with data on their inputs and outputs measure in *k* periods, then a total of *nk* units need to be assessed simultaneously to capture the efficiency variations over time.

2-3-6 Control of weights

The weights U_j, V_i are determined by solving the DEA model. These weights are computed in such that a way the organization under evaluation is placed in the best light possible relation to the other units in the data set. The weights developed via DEA may not represent the same relative subjective weights that management might apply as to the relative importance of the variables (especially the output variables) used in the DEA models.

3- The Model of the Research

3-1. Model variables

The model of this paper includes three inputs and two outputs of Islamic banks and financial institutions. We can describe and express them as follows:

3-1-1 The inputs :

a- Capital, measured as follows :

Capital = Assets – (Liabilities + Capital Reserves)

b- capital reserves , means profits ready to distribute but they are not distributed (reserved profit).

c- Deposits which consists of current, saving and investment deposits.

3-1-2 The outputs:

a- Investments take : Musharakah, Murabaha, Ijarah …etc.

b- Assets.

The data related with these variables showing by tables 1, 2 and 3 at the appendix.

3-2 Adopted model

We adopted (CCR) model prepared by Charnes, Cooper, Rhodes, (with constant return to scale) which is a development for DEA model to measure the cost efficiency of 24 the Islamic banking institution. The Islamic banking institution will be more cost efficient when it is able to use less of inputs to produce the same level of output as compared to other institutions. The highest efficiency degree that can be achieved is 100%.

4- The Results and Discussion

4-1 Levels of efficiency

The results show (table 4) that nine of Islamic banking institutions achieved cost efficiency in the year 1999 ,and these banks are 5,7,9,11,12,13,15,17 and 23. while other banks are inefficient and the lowest level of efficiency is at bank 14 (Yamen Islamic Bank for Financing).

In 2000 (table 4) the number of efficient banks is increased to (16), and these banks are: 1,2,5,6,7,9,10,11,12,13,17, 18,19,20,23 and 24. while other banks are inefficient. Bank no. 4 (Arab Islamic Bank) recorded the lowest level of CE.

In 2001 (table 4) there are fourteen efficient Islamic banking institutions: 2,3,5,6,7,9,11,12,13,17,18,19,20,23 & 24, while the banks: 1,4,8,7,10,14,15,16, 21, & 22 are inefficient.

4-2 Window analysis

In the window analysis the available data cover a three-year span from 1999 through 2001. A two year period was chosen to allow two window. In each windows, the number of banks is doubled because each bank at a different year is treated as independent firm. Table 5 lists the DEA scores of 24 banks by year in each window. A bank can receive a different DEA efficiency score for the same year in different windows. This variation in the DEA scores of bank reflects both the performance of that bank over times as well as of the other banks.

Banks,17, 23 were efficient for every year in window over the 1999-2001 period, we can consider these banks a best banks in our sample. Banks 1,6,12,18,19,20 gradually improve their efficiency over three years, and were almost fully efficient in the last year. While banks 2,3,10,15,16,21,22,24 their DEA scores fluctuated in the two windows. In contrast, bank 14 was the worst bank of the 24 Islamic banks analyzed.

The window analysis enables us to identify the best and the worst banks in a relative sense, as well as the most stable and variable banks in DEA scores.

4-3 Improving Efficiency Level

It is shown in table (6,7 & 8) that the efficient units (whose their efficiency score equal 1) used best mixture to their inputs (in comparison with other units of sample) to achieve target level of outputs, and as a result they achieved the advanced level of cost efficiency. Consequently they need no target inputs or outputs.

But target inputs or outputs are essential requirements for inefficient units in order to reach the optimal mixture and achieve advanced level of efficiency.

For example the inefficient bank1 (Islamic Baraka Bank) in year 1999 must decrease its using from: capital by 51.5% (from $ 50 millions approximately to $ 24.3 millions)., reserves by 51.5 % (from $ 9.3 Ms. to $ 4.5 Ms.) and deposits by 51.5% (from $ 101.5 Ms. to $49.2 Ms.), in order to form asset worth $ 193.3 millions and to make financial investment activities worth 148.9 Ms., to achieve cost efficiency 100%.

And, for example, the inefficient bank14 (Yamen Islamic bank for Financing) must reduce its: capital, reserves and deposits by 23.8% for each of them in year 2000 to become efficient.

Thus, for other inefficient banks they must do reductions in their inputs to become efficient as shown in table (6,7 & 8).

5- Conclusion

Efficiency concepts vary according to the variety of the matters related to it, there is Cost Efficiency or Economic Efficiency and distributive efficiency or allocative efficiency. But the most common concept is technical efficiency .

The paper focused on Cost Efficiency, because it is considered the most important type of efficiency that firms can achieve when they find a combination of inputs which enable them to produce the desired outputs at minimum costs. Cost Efficiency is the product of technical and allocative efficiencies.

The most recent style in measuring efficiency is Data Envelopment Analysis, which is a linear program approach based on this concept. Data Envelopment Analysis measures the efficiency of Decision Making Units by doing linear program for each in comparison to other units. Accordingly the Decision Making Units lie on frontier curve (which envelops the data) are efficient in choosing the optimal mixture of inputs to achieve the aimed level of outputs. Whereas the units that do not lie on the curve are considered inefficient. Besides we make use of Data Envelopment Analysis to advise inefficient units by doing certain change in inputs and /or outputs to improve their efficiencies.

This paper shows that most Islamic banking institutions which are the sample of the paper are efficient and the rest is on the way of improving their efficiencies.

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Appendix

Sample of Paper

Bank1	Al Baraka Banking Group-Bahrain
Bank2	Islamic Investment Bank
Bank3	Bahrain Islamic Bank
Bank4	Arab Islamic Bank-Bahrain
Bank5	Abu Dhabi Islamic Bank
Bank6	Dubai Islamic Bank
Bank7	Al Baraka Bank -Algeria
Bank8	Al Rajhi Banking and Investment Corporation
Bank9	Al Baraka Bank-Sudan
Bank10	Al Faisal Bank Sudan
Bank11	Saudia-Sudan Bank
Bank12	Kuwait Finance House
Bank13	Islamic Finance Company-Kuwait
Bank14	Yemen Islamic Bank
Bank15	Saba Islamic Bank-Yemen
Bank16	Investment House- Tunisia
Bank17	Palestinian Islamic Bank
Bank18	Qatar International Islamic Bank
Bank19	Qatar Islamic Bank
Bank20	Al Baraka Bank Lebanon
Bank21	Egypt-Saudia investment Bank
Bank22	Al Faisal Bank Egypt
Bank23	International Islamic Bank for Investment -Egypt
Bank24	Al Wafa Islamic Bank- Mauritania

Table 1: Financial data in the year 1999 (1000$)

DMUs	reserve	Deposits	capital	Investment	assets
bank1	9287	101518	50000	148879	193254
bank2	7348	35036	112500	134064	170569
bank3	18420	923019	100000	680518	1092050
bank4	2559	264505	56417	205566	305101
bank5	6643	408153	272257	677725	725338
bank6	13038	2076537	272257	2300401	2546180
bank7	5465	10623	7159	120931	170371
bank8	850497	8948368	600000	9412982	11434610
bank9	186	20082	679	6759	46425
bank10	3179	29308	679	9160	38335
bank11	1148	27625	11	10015	41152
bank12	358552	4391447	187500	4939828	5819078
bank13	1015	78	49180	12986	84416
bank14	2182	37486	6532	23142	49011
bank15	153	15579	7260	17436	30395
bank16	5899	100661	50000	153887	167289
bank17	42	8253	9073	1472	18678
bank18	31198	407369	21974	463308	505413
bank19	12444	902274	68669	977779	1094147
bank20	257	39904	7926	24216	59485
bank21	6737	475143	30223	392108	529420
bank22	11136	1796474	132000	1897281	2189857
bank23	801	859740	39077	981996	941032
bank24	1464	13865	10971	34869	46618

Table 2 :Financial data in the year (2000) (1000$)

DMUs	reserve	Deposits	capital	Investment	assets
bank1	8134	124866	50000	179002	218945
bank2	15702	45985	112500	179289	193442
bank3	5195	991563	230000	904032	1316337
bank4	3722	371690	56417	137690	279018
bank5	9909	826157	272219	1126123	1187834
bank6	23080	2660268	272219	2873544	3204956
bank7	8540	128705	6585	130417	199027
bank8	850497	10009660	600000	10611235	12981449
bank9	466	29367	797	12728	39083
bank10	887	35781	3808	14367	53500
bank11	1238	34410	11	15136	49941
bank12	413209	5080653	200467	5981882	6619647
bank13	1620	2178	49180	21137	64219
bank14	3255	44452	7276	30691	57530
bank15	148	35855	7004	30601	45049
bank16	5871	109111	50000	163118	178160
bank17	68	14753	9829	19218	26187
bank18	20660	467683	24725	529711	576343
bank19	14823	910744	68681	1035229	1115127
bank20	277	61737	7957	39452	81702
bank21	6292	473318	30548	359115	528090
bank22	43600	1948853	132000	2017955	2340305
bank23	714	807069	34312	628318	893646
bank24	7892	20096	7763	38471	50582

Table 3: :Financial data in the year (2001) (1000$)

DMUs	reserve	Deposits	capital	Investment	assets
bank1	8134	101518	50000	148879	10071
bank2	15702	239705	112500	398183	30080
bank3	5195	924445	230000	844217	14686
bank4	3722	524637	56417	524637	3722
bank5	9909	1275784	272190	1584862	14290
bank6	23080	3571591	272190	3689766	36755
bank7	8540	164229	6196	154499	11167
bank8	850497	10833489	600000	11373248	850497
bank9	466	32379	797	18845	466
bank10	887	37359	3906	18007	944
bank11	1238	37054	1734	27039	3203
bank12	413209	6049153	211804	7225000	463433
bank13	1620	20	49180	23612	988
bank14	3255	51565	8824	40030	5002
bank15	148	58881	6987	42079	236
bank16	5871	106284	50000	157885	6162
bank17	68	15269	9829	20370	68
bank18	20660	613327	27442	675895	24961
bank19	14823	1002467	68605	1113633	18881
bank20	277	52851	7640	54767	266
bank21	6292	448794	28301	363922	5591
bank22	43600	1852308	132000	2017955	43600
bank23	714	731667	29091	511748	618
bank24	7892	28254	7160	39135	8186

Table 4 : Efficiency Score

DMUs Name	Efficiency Score		
	1999	2000	2001
bank1	0.485	1.000	0.877
bank2	0.704	1.000	1.000
bank3	0.597	0.974	1.000
bank4	0.683	0.544	0.922
bank5	1.000	1.000	1.000
bank6	0.905	1.000	1.000
bank7	1.000	1.000	0.940
bank8	0.692	0.915	0.877
bank9	1.000	1.000	1.000
bank10	0.646	1.000	0.486
bank11	1.000	1.000	1.000
bank12	1.000	1.000	1.000
bank13	1.000	1.000	1.000
bank14	0.376	0.762	0.850
bank15	1.000	0.956	0.882
bank16	0.630	0.970	0.929
bank17	1.000	1.000	1.000
bank18	0.873	1.000	1.000
bank19	0.796	1.000	1.000
bank20	0.809	1.000	1.000
bank21	0.670	0.891	0.770
bank22	0.903	0.954	0.961
bank23	1.000	1.000	1.000
bank24	0.747	1.000	1.000

Table 5 Window analysis

windows	1999	2000	2001
bank1	0.483	0.570	
		0.970	1.000
bank2	0.704	0.487	
		1.000	0.987
bank3	0.596	0.846	
		0.844	0.805
bank4	0.680	0.401	
		0.481	0.959
bank5	1.000	0.938	
		1.000	1.000
bank6	0.903	0.856	
		1.000	0.998
bank7	1.000	0.782	
		1.000	0.987
bank8	0.653	0.714	
		0.908	0.907
bank9	1.000	0.753	
		0.952	1.000
bank10	0.646	0.548	
		0.955	0.865
bank11	1.000	1.000	
		1.000	0.998
bank12	0.921	1.000	
		0.993	1.000
bank13	1.000	0.717	
		1.000	1.000
bank14	0.375	0.340	
		0.714	0.706
bank15	0.985	0.826	
		0.853	0.813
bank16	0.630	0.645	
		0.965	0.951
bank17	1.000	1.000	
		1.000	1.000
bank18	0.820	0.858	
		0.990	1.000
bank19	0.796	0.787	
		1.000	1.000
bank20	0.783	0.802	
		0.905	1.000
bank21	0.670	0.657	
		0.844	0.871
bank22	0.903	0.696	
		0.952	0.952
bank23	1.000	1.000	
		1.000	1.000
bank24	0.746	0.283	
		1.000	0.946

Table 6: Target Financial Indictors (1999) (1000$)

	reserve	Deposits	capital	Investment	assets
bank1	4504.31	49237.52	24250.63	148879.00	193254.00
bank2	5172.08	24661.01	16515.82	134064.00	180392.70
bank3	10998.96	551153.78	59712.07	680518.00	1092050.00
bank4	1748.84	180765.12	38555.89	205566.00	305101.00
bank6	11805.46	1880232.79	246519.34	2300401.00	2546180.00
bank8	588741.81	6194352.64	415339.60	9412982.00	11651490.02
bank10	626.36	18926.11	438.48	9160.00	38335.00
bank14	820.30	14092.48	2455.64	23142.00	49011.00
bank16	3716.64	63421.09	31502.31	153887.00	185306.99
bank18	27223.00	355465.29	19174.25	463308.00	547988.70
bank19	9911.29	718635.14	54692.87	977779.00	1094147.00
bank20	207.94	32286.91	6413.04	24216.00	59485.00
bank21	4516.80	318558.43	20262.93	392108.00	529420.00
bank22	10060.38	1622954.08	119250.23	1897281.00	2189857.00
bank24	1093.55	10356.65	8194.94	34869.00	46618.00

Table 7: Target Financial Indictors (2000) (1000$)

	reserve	Deposits	capital	Investment	assets
bank3	5059.94	965784.68	224020.54	904032.00	1316337.00
bank4	2025.60	202282.40	30703.45	137690.00	279018.00
bank8	778588.13	9163350.88	549270.46	10611235.00	12981449.00
bank14	2480.67	33877.40	5545.13	30691.00	57530.00
bank15	141.54	34290.35	6698.36	30601.00	45049.00
bank16	5694.92	105838.52	48500.39	163118.00	178160.00
bank21	5604.92	421632.16	27212.19	359115.00	528090.00
bank22	41602.93	1859587.05	125953.83	2017955.00	2340305.00

Table 8: Target Financial Indictors (2001) (1000$)

	reserve	Deposits	capital	Investment	assets
bank1	5899.85	89028.56	43848.66	148879.00	11213.37
bank4	3432.20	483787.86	52024.27	524637.00	5244.69
bank7	8024.08	147408.14	5821.69	154499.00	11167.00
bank8	746112.67	9503858.84	526360.00	11373248.00	850497.00
bank10	430.94	18150.39	1897.68	18007.00	944.00
bank14	2766.12	43820.28	7498.69	44757.45	5002.00
bank15	130.54	51935.94	6162.88	42079.00	236.00
bank16	5451.55	98690.61	46427.78	157885.00	10135.78
bank21	4842.27	345388.21	21780.22	363922.00	6103.07
bank22	41901.98	1780169.18	126859.21	2017955.00	52117.61