

# **A Survey and Measuring Efficiency Level in the Country's Banking System, and the Effective Factors**

**Ali Hassanzadeh, Ph.D<sup>1</sup>,**

## **Abstract**

Human being always wants to be more efficient in order to achieve more profit or welfare. In economic point of view, efficiency means optimize allocation of resources and maximize use of resources with minimum cost in a given technology.

Nowadays, efficiency calculation in organizations or in different industries is a necessary step for comparing the level of competition in domestic and foreign environment of a country. So, the banking system is not an exception. For this reason, calculating the efficiency level of the banks and knowing the effective factors are very important. At first, we look at literature about efficiency and then we try to find how to calculate it and how to compare the efficiency indices in the banking system which affect them. In continuation, we calculate the efficiency level in the banking system of Iran, then with the data from fourteen banks during the years (1996-2003), we evaluate the effectiveness of operational and structural variables on the performance of the banking system, in Iran.

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<sup>1</sup> - Faculty member and Vice President, Monetary and Banking Academy, Central Bank of Iran (I.R.).

## **Introduction**

In this study we look at efficiency in the banking system for comparing two situations and choosing a more efficient one and then try to offer some policies on this way, if we try to avoid the misallocation of resources or try to have more output, then we can claim that we are efficient.

Therefore, efficiency is defined as the proper allocation of resources subject to minimum cost with a given technology. In experimental studies the production functions or marginal costs are valuable measures for calculating the efficiency of factors of production. Every kinds of wasting resources or not using them optimally, having inappropriate structure, and unnecessary expenditures, also unbalanced credit policy, or having over regulation, all represent poor resource allocation and not being efficient.

Nowadays, if we want to compare the competitiveness of different organizations or industries in domestic or international level, we should be able to calculate their efficiency level. In continuation, at first we try to define different kinds of efficiency and the way of calculating the efficiency, and next we review the studies about the efficiency of the banking system and its performance, the theoretical model for estimating the effective factors on the efficiency of the banking system and finally, the concluding remarks comes at the last part.

## **Efficiency**

Efficiency is defined as the ratio of output to input. Output is the production of the firm which leads to revenue. Inputs are defined as labor force, capital and other material products, which are used for production. Therefore, the working hours used for offering output or service or the money which will be spent on employing labor or capital, all represent the

used resources. From another point of view, for the banking systems, as the economic unit for offering services, efficiency is defined as the ratio of minimum possible cost to realized cost for presenting some determined level of output in comparison to other units of industry. As a whole, an efficient fiscal system is one which does fiscal services accurately with appropriate quickness and minimum cost, where also the applicants' expectations can best be fulfilled.

## **Types of Efficiency**

The banking system efficiency is categorized as scale efficiency, operational efficiency, technical efficiency, resource allocation efficiency, economic efficiency and price efficiency. All lead to maximum product and minimum expenditure and finally maximization of profit.

## **Methods of Calculating Efficiency**

We can determine efficiency with two different approaches, econometric approach, and liner programming. In the first method, we apply a parametric model with random walk in which the random walk shows un-efficiency. Aigner, Lovell and Schmidt are pioneers in this field.

This model is based upon some special assumptions about random walk which can be estimated by econometric techniques and finally efficiency can be determined. The methods are Likelihood Frontier, Thick Frontier, Free Distribution, and Recursive Thick Frontier approach.

The second method is based on a Free Distribution method and it does not need to specify a specific function, so linear programming technique can be applied for efficiency and productivity. In this method, there is no noise, and we assume that the effect of all variables can be realized clearly

without any bias. Kooper, Charles and Yanker are pioneers of this method. Their methods try to find an envelope curve for containing all active firms in a special industry and it would be considered as a measurement of efficiency and productivity.

## A review on Banking Efficiency

Considering the point that talking about efficiency and maximum use of factors of production and resources goes back to the definition of economics by Adam Smith, so the researchers applied many measures for calculating efficiency in different activity groups. Measuring efficiency not only can show the power of management, but it can also postulate the problems which cause inefficiency. A lot of texts were written about efficiency all of which want to make a balance between inputs and outputs. The followings are some of them:

Donsyah Yodistria research: An empirical analysis about efficiency for eighteen Islamic banks

The research is about measuring the efficiency of eighteen Islamic banks during the years (1997-2000) by applying "Data Envelope Analysis Method". For realizing the input-output variables in Islamic banks, intermediary approach was applied which is based upon the original principles of Islamic finance.

The writer applied the two stage methods suggested by Coelli, Prasada & Battese (1998). After solving by Data Envelope Analysis, during the first stage of analysis, the efficiency grade will be applied to technical efficiency which is estimated with ordinary least square approach.

$$\xi = \alpha + \beta_1 kA_{s,t} + \beta_2 NTA_{s,t} + \beta_3 \log(A_{s,t}) + \beta_4 MP_{s,t} + \beta_5 MID_{s,t} + \beta_6 PUB_{s,t} + \varepsilon_{s,t}$$

s : Stands for bank.

$t$  : Shows the time period.

$\xi$  : Is a dependent variable which stands for technical efficiency.

Measuring the effect of banks size on efficiency is defined by measuring (log A). The bank profitability is defined as the ratio of net income to total asset (NTA). The ratio of capital to total asset (KA) shows the relation between efficiency and risk-acceptance. The larger the ratio is, the greater would be the accepted risk. The writers try to show the ability of the banks for absorbing more deposits by the ratio of each banks deposits over the total deposits in the region, which is stated by (MP), and like Miller & Novlas (1996) they are entered in the efficiency model. The geographical situation which is stated by (MID) also entered the model, which want to know, whether there is any difference between the efficiency of banks in the Middle East or not. The data received shows that until 1998, the Islamic banks had better technical efficiency in the Middle East region than other banks.

### **Abid Burki, Chulam Shabbir & Khan Naizi Research: The Effect of Privatization and Competition on the Efficiency of Banks in Pakistan During (1991-2000)**

In this research the banks are categorized into three groups as State, Private and Foreign banks, and their performance are measured by their efficiency level with "Data Envelope Enalysis". Moreover, the allocation efficiency, technical efficiency and scale efficiency have been also calculated. At the second stage, with applying the model of "fixed effect on panel data", the calculated efficiency is fitted on appropriate policy variables. The writers calculated the total cost efficiency by applying "Farel" approach. In this article, we have three hundred sixty six observations which are related to thirty-six banks, (there are twenty-three

commercial banks for the year 1991 and thirty-six banks for the period 1992-94 and thirty-nine banks for the year 1995; four banks for the 1996-98 period, and thirty-nine banks for the year 1999, thirty-seven banks for the year 2000). In this article, the intermediation approach was chosen. On this basis, three output or exit named as loans, facilities and contra accounts were chosen. Also, four inputs as, labor, physical capital, operational cost and fiscal capital was chosen.

The results show that efficiency is indirectly related to the ratio of total cost over total revenue and has a direct relation with the ratio of loan over asset. Entering competition as a variable with negative sign decreases the average performance of banks after doing reformations. The reason is that, with increasing competition between the state banks, private and foreign banks, the share of state banks from assets, deposits, advance payments and investment would decrease instead of leading to optimal allocation of resources. But the competition variable can affect the bank efficiency.

### **Mohammad Hanif Akhtar Research: X-Efficiency Analysis of Commercial Banks in Pakistan**

The data is gathered from the banking data of Pakistan for the years (1998-99), which are issued by the state bank in Pakistan<sup>1</sup>. This is an annual report, which provides important data about the public, private and foreign banks. The writer applied intermediation approach in calculating the bank efficiency. Here, a bank is an intermediary for transferring fiscal asset from surplus units to deficit units, in other words, a bank is like a firm which convert inputs to outputs e.g. it converts deposits to loans and investments. In this article, inputs are deposits and capital and outputs are defined as investments and total loans and facilities.

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<sup>1</sup> - Banking Statistics of Pakistan.

Three types of efficiency are calculated, Allocative, Technical and Overall efficiencies. Overall efficiency is equal to the technical efficiency multiplied by allocative efficiency. According to the concluding results, the overall efficiency of the banks in Pakistan is equal to 80 percent which is less than global efficiency mean which is equal to 86 percent and is calculated by Berger and Hamphery for the year 1997. Technical efficiency which shows the factors of production efficiency in Pakistan is less than the technical efficiency which asserts that banks in Pakistan should increase their factors efficiency like deposits and capital. Since creating competitive situation in banking sector is difficult, the banks need to rationalize their operational costs.

### **Michael Skully and Kym Brown Research (2004)**

This research is concerned with the efficiency in Islamic banks with "Data Envelope Analysis Method". In this research 13 banks were chosen among 21 Islamic banks for the years (1998-2002), the obtained figures are in U.S. dollar at the end of converting year, and the approach for calculating the Total Factors Productivity (TFP) is by applying "Data Envelope Analysis". The inputs are labor force cost and capital. The outputs are total loans and acquisition of assets (the assets, other than loans) and the total deposits. The research asserts that considering (TFP) index, the two countries (Indonesia and Yaman) known as the two most developed countries, and Asia as the best operational region. Also, United Arab Emirate as a country and Middle East as a region apply in the best way the inputs and outputs for improving their efficiency.

On the contrary, Indonesia and Yaman have the best improvements in technology and Asia is considered as the best region for operational work. Finally, change in efficiency and (TFP) index have an indirect relation with the bank age.

### **Khaled A. Hussein Research: Calculating Cost Efficiency for the Banks of Sudan**

Here, we applied non-parametric approach. Of course, in some researches the parametric approach was used for determining banks efficiency. For example in "operational efficiency in Islamic banking, an empirical experience from Sudan" which was carried out by Khaled Hossein, the Stochastic Frontier Approach (SFA) was applied. In this research, the cost in-efficiency was estimated for the banks in Sudan during the years (1990-2000). With the use of input-output data, the marginal cost was determined and then efficiency was estimated.

After estimating the in-efficiency and finding the effective factors on Sudanian banks; the result showed that in-efficiency of average costs exist for all banks in the sample. As a result, the average cost of Sudanian banks is 13 percent more than a completely efficient bank with the same product. On the other hand, operational efficiency during the years (1990-2000) had no improvement and in-efficiency was doubled during the years (1992-93) on average, but in the second half of 1990s it was slowly improved.

### **Imed Limam Research: Calculating the Technical Efficiency in Kuwaiti Banks**

The best advantage of (SFA) approach is that the Frontier bias can be due to the noise in data or the existence of special errors and it can not necessarily be from in-efficiency. In this article, the cost frontier model of Cobb-Douglas was introduced for measuring the efficiency of banks in Kuwait as follow:

$$\lim C_{it} = \beta_0 + \beta_1 \lim y_{it} + \beta_2 \lim w_{1it} + \beta_3 \lim w_{2it} + \beta_4 \lim w_{3it} + u_{it} + v_{it}$$



Simultaneously test of models was done by maximum likelihood method which was explained by Coelli (1992-1996). Then, the technical in-efficiency for each bank in a given time period is written by the following model:

$$INEFF_{it} = EXP(u_{it}) = EXP(z_{it} \delta + w_{it})$$

Finally, the article concludes that earning assets will be obtained under the conditions of fixed return to scale and under the condition of increasing return to scale; it is less likely to be obtained. Also, there exists great opportunity for technical efficiency improvement for most of the Kuwait banks. Except for "WBK" and "GB" which are the largest banks of Kuwait. On the other hand, greater banks, with greater share of assets and being more profitable can create better efficiency. In a general conclusion, the greater competition, having more skilled and experienced bankers and managers, continuous training, having skilled employees, de-link of management and ownership also the increase of the share of equities in the total asset and privatization can improve efficiency.

### **Khataee-Abedifar Research: About Technical Efficiency in Iran Banking System**

The research tries to estimate the technical efficiency in the banking system of Iran and determining the effective factors. They applied the "Stochastic Frontier Function" approach and the applied model was the "variable x-efficiency model" of Battese and Coelli (1992) and the Battese and Coelli in-efficiency model of Battese and Coelli (1995).

The concluding results shows that from technical efficiency point of view of the labor force "Tejarat Bank" has the first grade and "Refah Bank" has the last grade. From offering banking services view "Tejarat

Bank" is more stabilized in comparison with other banks and "Refah Bank" is less stabilized, also if the banks want to increase their branches, they need more labor force, which would increase the labor force costs. The Qard-al-Hassaneh saving deposits and labor force costs have inverse relation with each other. More over, there exists a positive significant relation between in-efficiency and labor costs.

### **Borhani's Research: The Relation Between Efficiency and the Organizational and Fiscal Size**

Another research tries to find the relation between the efficiency in commercial banks of Iran and the organizational and fiscal size of them. The organizational variables are the size and the number of branches, the employees' education level, and the fiscal variables are profit and loss, also the percentage of fixed assets over the total assets in each bank.

The results show a positive relation between the bank size, the number of branches, the level of education of employees and profit and loss balance with the efficiency and shows a negative relation between the efficiency with the ratio of fixed assets to total assets.

### **Theoretical Model of Research**

Data Envelop analysis literature began two decades after article the Farel article was published in (1957). In 1978 one of the specialists in planning, named Charles, with applying statistical data and DEA, started the assessment of the performance of economic firms for finding the optimum performance among them.

According to (DEA) one producer or one economic firm is actually a decision maker in Decision Making Unit (DMU) that can supply homogenous product with the use of different inputs.

Reading the advantages of non-parametric models, the study has tried to estimate the efficiency (technical, allocative and economic efficiency) index by applying data envelop analysis and use of econometric technics, and the share of effective factors on efficiency were analyzed.

The offering model is known as "BCC" model which is based upon variable return to scale and emphasis on K input, M product and N active firms in industry.

The characteristic nature of BCC model is that it reduces several products and inputs to one product and one input. Therefore, the model can be defined as follows:

### A Model for Calculating Technical Efficiency

$$\begin{array}{l} \text{Min}_{\theta, \lambda} \theta \\ \text{Subject to: } \left\{ \begin{array}{l} \theta X^i - X\lambda \geq 0 \\ -Y^i + Y\lambda \geq 0 \\ N^1 \lambda = 1 \\ \lambda \geq 0 \end{array} \right. \end{array}$$

$\theta$ : stands for a constant which gives the efficiency grade for each decision making bank.

$Y^i$ : is a vector of firm's outputs.

$X^i$ : is a vector of inputs for the firm.

$Y$ : is a matrix of outputs for N firms.

$X$ : is a matrix of inputs for N firms.

$\lambda$ : is a vector of constant coefficients.

$N^1$ : is a  $(1 \times X)$  vector.

The first restriction is about the amount of required input for the production of a given amount of output.

The second restriction, asserts that the given firm's output is equal to or less than the original or reference firms in the model (the reference firms are the firms with the maximum amount of efficiency coefficients). The third restriction asserts that given firms have variable return to scale.

### Cost Efficiency and Allocative Efficiency Model

$$\text{Min } W_i x_i^*$$

$$\text{Subject to: } \begin{cases} x_i^* - X\lambda \geq 0 \\ -y_i + Y\lambda \geq 0 \\ N^1 \lambda = 1 \\ \lambda \geq 0 \end{cases}$$

$W_i$  : Factors of productions' cost.

$X$ : Is a vector of factors of production which leads to the minimization of the firm's cost with  $W_i$  factors of production cost and production level of  $Y_i$ .

$Y^i$  : A vector of firm's output.

$Y$  : A Matrix of output for all the firms in an industry.

$X$  : Is a matrix of inputs of all firms in an industry.

$\lambda$  : Is a vector of constant coefficients.

$N^1$  : A (1×X) vector.

### Inputs and Outputs

The concept of input and output are not really clear in banking activity, because banks are servicing industries and offer a lot of services. There are two different views about measuring input and output in banking activity one is production view, the other is intermediary view.

According to production view point, banks are productive institutions

which can offer (produce) different services with the use of labor force and capital. In this definition, deposit absorption is also considered as one kind of their productions. In this approach usually the numbers of services which are offered are important.

In intermediary view, the banks are considered as intermediaries for gathering funds which can bring together deposits and offer them in the form of facilities (loans) to different applicants. In this approach, the value of services is important. In this article, banks are considered as intermediaries because the values of services which are offered are more important than the number of them. The used variables are as follows:

- 1- Inputs include the amount of deposits ( $X_1$ ) the amount or the value of fixed assets ( $X_2$ ) and the number of employees ( $X_3$ ).
- 2- Outputs include the facilities which are offered ( $Y_1$ ), participations and investments ( $Y_2$ ).

For calculating economic efficiency, we need the price of inputs. By input prices we mean the average cost of an input, the prices used are as follows:

$W_1$  : Is the weighted profit rate of deposit.

$W_2$  : The average depreciation cost.

$W_3$  : The average cost for each employee.

The weighted profit rate of deposits is a weighted average of profit paid to different deposits applying the value of deposits as weights for calculation.

The average depreciation is the average depreciation of the fixed assets and average cost of employees is the ratio of total costs of employees over the number of employees.

## Model Prediction

The model is introduced at first with considering domestic banks,

commercial, specialized and private banks for the period (1996-2003) and then solved with regarding all domestic banks and eight banks in the Middle East and South Africa for the period (2000-2003). The linear programming model is solved (N) times for each year and every time for each firm and then, we obtain the efficiency for every firm. If the efficiency is equal to one, then the firm is efficient; otherwise, it is inefficient. The definition of efficiency in this model is not absolute and an efficient firm will be determined in comparison with other firms.

The analysis of the period (1996-2003) showed that "Melli Bank" and "Industry and Mine Bank" had technical, allocative and economic efficiency. "Melli Bank" had decreasing return to scale and "Industry and Mine Bank" had constant return to scale.

During the period of study, the efficiency of Saderat and Mellat Bank gradually increased, in such a way that "Saderat Bank" had become more efficient during the years (1999-2002) from technical, allocative and economic points of view, and the position of Mellat Bank during the years (1998-2003) is such that in the beginning of the year (1998) it had become technically more efficient, then during the regarding period, and then, were efficient technically, allocatively and economically.

"Saderat Bank" during the above period had decreasing return to scale; "Mellat Bank" during the years (1996-2002) had decreasing return to scale, and in 2003, it had constant return to scale.

During the first years of the period "Export Development Bank of Iran" was technically efficient and during the last years it was in-efficient.

Private Banks like "Saman", "Eghtesad Novin" and "Parsian" were at least technically efficient during the years (2001-2003).

The average technical efficiency of banks during the years (1996-2000) was increasing and it improved from 0.685 to 0.979, and then with a trivial fluctuation it became fixed at 0.9. The allocative efficiency was also increased from 0.783 in 1996 to 0.953 in 2000, then it decreased to

0.857 and 0.863 respectively in the years 2001 and 2002, again in the year 1993 it increased to 0.947. Economic efficiency is also increased from 0.598 in the year 1994 to 0.934 in the year 1999; and during the rest of the period, with decreasing fluctuation it reached to 0.867 in 2003.

During this period, among the Iranian banks, bank of "Industry and Mine", "Saman", and "Eghtesad Novein" were efficient during the whole period and "Melli" and "Mellat" banks were efficient for three years. Among the foreign banks, "Islamic Bank of Dubai" and "Kuwaiti Golf Bank" were efficient during the whole period. Among these efficient banks, "Industry and Mine" bank, also the Islamic bank of Dubai and "Kuwaiti Golf" were efficient with constant return to scale, "Saman" and "Eghtesad Novin" had increasing return to scale.

### **Predicating the Effective Factors on the Level of Banking System Efficiency**

Considering the characteristics of the Islamic banking system of Iran, we can introduce some factors as the effective factors on the banking system of Iran, and by estimating an economic model, the effects of the variables on efficiency have been studied. Here we assume technical efficiency as an dependent variable and the other variables such as the number of branches, the type of ownership, the ratio of demand deposits over the total deposits and the ratio of cash assets over the total deposits as independent variables. The reasons for choosing these variables are as follows:

- Number of branches (BR): this variable which can show the accessibility of customers to the banks can also be considered as a measurement for absorbing deposits and paying facilities which finally is a source of earning income and profit for the banks. We

expect a positive relation between the number of branches and the efficiency of a bank.

- The type of ownership (OW): this variable is used for presenting the effect of the type of ownership on the efficiency of the bank. For this purpose a Dummy variable with the value of one for state owned banks and with value zero for private banks was introduced.
- The ratio of demand deposits on total deposits (DTD): this variable is a measure for presenting the access to cheap resources and their effect on the efficiency of a bank.
- The ratio of liquid (cash) assets over the total deposits (CATD): This variable represents the ability of a bank for doing its obligations and attracting the depositors' trust.
- The ratio of capital over the total assets (KA): since the capital of a bank is a supplement for paying its obligations, this ratio is applied for presenting the volatility of the economic activities of a bank. For fitting a model we applied the statistics for the period (2001-2003) and with applying panel data approach the model was estimated.

The estimated equation is as follow:

$$\begin{aligned}
 EF: & 0.99 + 0.000459 BR - 0.178591 OW + 0.001968 DTD + 0.000128 \\
 & (32.79) \quad (5.72) \quad \quad (-4.98) \quad \quad (4.55) \quad \quad (0.77) \\
 & -0.002236 KA \\
 & \quad \quad \quad CATD (-2.9)
 \end{aligned}$$

The figures in parentheses are (t) statistics.

$$\bar{R}^2 = 0.99, D.W = 1.95$$

The effect of all variables, except the ratio of liquid assets over total deposits, are statistically significant. The relation between efficiency and the number of branches is a positive relation, and one unit increase in the number of banks' branches can increase efficiency as much as 0.000459 unit (or 459 points). The variable of type of ownership has a negative



relation with efficiency and its co-efficient is greater in comparison with other variables (0.178591). The ratio of demand deposits over the total deposits has a positive relation with efficiency. In other words, with increase in the ratio of demand deposits over deposits, the efficiency would increase. The ratio of capital to total assets has negative relation with efficiency; the reason for which can be the huge amount of government banks asset in comparison with private banks; and regarding the higher efficiency of private banks, it has a negative sign.

## **Adding up and Conclusion**

In this article, the efficiency indices for Iranian banks have been calculated for the period (2000-2003) and for some Islamic banks in the region for the period (2001-2003). This survey has two differences with other surveys, which distinguish it from them; they are as follows:

- The considered time period, coincides with the first four years of the Third Development Plan, so examining the effects of monetary deregulation on the efficiency of banking system is worthy to be mentioned.
- Measuring efficiency for domestic and selected Islamic banks in the region can provide a situation for comparing the different efficiency level of banks in the region on the basis of usury-free banking system.

Upon the obtained results during this period:

- There is an improvement in the trend of efficiency in banking activity, which asserts the improvement trend in monetary sector.
- The allocative efficiency index is higher in comparison with technical efficiency and economic efficiency.
- The average index of technical, allocative and economic efficiency is greater in commercial banks than specialized banks.

- Private banks have greater technical efficiency than state owned banks.
- Among the commercial banks, "Melli Bank" and among specialized banks, "Bank of Industry and Mine" and among the private banks "Eghtesad Novin" has higher efficiency level.
- The least efficiency indices among the commercial banks belong to "Refah Bank" and among the specialized banks, "Maskan Bank" and among private banks, "Karafarin Bank" had least efficiency indices.
- The ratio of return to scale among commercial banks is decreasing which asserts the great size and non economic performance of these firms.
- Among the private banks, "Keshavarzi" and "Maskan" banks had decreasing return to scale which can postulate that extending their operations in the present situation can not economically be correct.
- "Export Development Bank" or "Toseahe Saderat Bank " had increasing return to scale. As a result, expanding the size of its operation in the market can economically be economical for this bank.
- "Industry and Mine" bank had constant return to scale. The size of its operations is economically good.
- The ratio of return to scale for private banks is increasing so we can increase the size of their operations.
- Comparing the technical efficiency of Iranian banks with foreign banks asserts during the years (2000-2001), the efficiency index of domestic banks was higher than foreign banks; but during the years (2002-2003) it had a decreasing trend.
- The ratios of return to scale for foreign banks were increasing, which asserts that we can develop the region of their activity.



Source: Calculations of researchers.

**Table 2-Banking System Allocative Efficiency Index During 1996-2003**

Banks	1996	1997	1998	1999	2000	2001	2002	2003
Melli Iran	1	1	1	1	1	1	1	1
Sepah	0.612	0.654	0.66	0.846	0.986	1	0.988	0.998
Saderat	0.981	0.997	0.917	1	1	1	1	0.990
Tejarat	0.612	0.702	0.786	0.858	0.872	0.945	0.95	0.990
Mellat	0.811	0.885	0.93	1	1	1	1	1
Refah	0.99	0.822	0.347	0.976	1	0.971	0.975	0.997
Export Development	0.903	0.917	0.475	0.522	0.83	0.687	0.678	0.836
Maskan	0.908	0.459	0.34	0.358	0.854	0.728	0.451	0.995
Keshavarzi	0.908	0.945	1	0.963	0.987	0.88	1	0.969
Industry & Mine	1	1	1	1	1	1	1	1
Kar Afarin	-	-	-	-	-	0.331	0.511	0.915
Saman	-	-	-	-	-	0.494	1	1
Eghtesad Novin	-	-	-	-	-	-	1	0.944
Parsian	-	-	-	-	-	-	0.528	0.619

Source: Calculations of researchers.

**Table 3-Banking System Economic Efficiency Index During 1996-2003**

Banks	1996	1997	1998	1999	2000	2001	2002	2003
Melli Iran	1	1	1	1	1	1	1	1
Sepah	0.385	0.49	0.4	0.6	0.865	1	0.958	0.915
Saderat	0.549	0.656	0.897	1	1	1	1	0.829
Tejarat	0.441	0.604	0.669	0.858	0.868	0.916	0.866	0.950
Mellat	0.709	0.77	0.93	1	1	1	1	1
Refah	0.274	0.269	0.091	0.698	1	0.920	0.875	0.992
Export Development	0.903	0.917	0.475	0.522	0.757	0.422	0.49	0.712
Maskan	0.157	0.101	0.196	0.35	0.854	0.331	0.442	0.506
Keshavarzi	0.56	0.945	1	0.902	0.922	0.98	1	0.969
Industry & Mine	1	1	1	1	1	1	1	1
Kar Afarin	-	-	-	-	-	0.322	0.511	0.701
Saman	-	-	-	-	-	0.494	1	1

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Eghtesad Novin	-	-	-	-	-	1	1	0.944
Parsian	-	-	-	-	-	-	0.528	0.619

**Source:** Calculations of researchers.

Table 4-Banking System Returnee to Scale Index During 1996-2003

Banks	1996	1997	1998	1999	2000	2001	2002	2003
Melli Iran	decreasing	decreasing	decreasing	decreasing	decreasing	decreasing	decreasing	decreasing
Sepah	decreasing	decreasing	decreasing	decreasing	decreasing	decreasing	decreasing	decreasing
Saderat	decreasing	decreasing	decreasing	decreasing	decreasing	decreasing	decreasing	decreasing
Tejarat	decreasing	decreasing	decreasing	decreasing	decreasing	decreasing	decreasing	decreasing
Mellat	decreasing	decreasing	decreasing	decreasing	decreasing	decreasing	decreasing	constant
Refah	increasing	increasing	increasing	increasing	increasing	decreasing	increasing	decreasing
Export	increasing	increasing	increasing	increasing	decreasing	increasing	increasing	increasing
Development								
Maskan	increasing	increasing	increasing	decreasing	decreasing	decreasing	decreasing	decreasing
Keshavarzi	decreasing	decreasing	decreasing	decreasing	increasing	decreasing	decreasing	decreasing
Industry & Mine	constant	constant	constant	constant	constant	constant	constant	constant
Kar Afarin	-	-	-	-	-	increasing	constant	Increasing
Saman	-	-	-	-	-	increasing	increasing	increasing
Eghtesad Novin	-	-	-	-	-	increasing	increasing	increasing
Parsian	-	-	-	-	-	-	-	constant

Source: Calculations of researchers.

**Table 5-Average Efficiency of the Banking System During 1996-2003**

<b>Year</b>	<b>Technical Eff.</b>	<b>Allocative Eff.</b>	<b>Cost Eff.</b>
1996	0.685	0.873	0.598
1997	0.796	0.838	0.675
1998	0.827	0.745	0.666
1999	0.934	0.852	0.934
2000	0.972	0.953	0.927
2001	0.919	0.857	0.799
2002	0.963	0.863	0.834
2003	0.917	0.947	0.867

**Source:** Calculations of researchers.

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