Determinative factors for performance and risk in commercial banks

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Abstract

Identifying and managing risks in competitive conditions of the present age is inevitable. All economic units to increase their share should act to increase efficiency and performance. Meanwhile, banks and financial or credit institutes have a vital role in economic stability at the macro level. When changes in performance is to stimulate risk, business unit managers must take better measures to counter or in the efficient use of resources to reduce risk and increase the efficiency of their terms. The concept of risk and efficiency in banks in the first place and determine their next step in this research is the main concern. In this study, accepted banks in Tehran's Stock Exchange have been investigated by considering 5 inputs and 4 outputs.

Keywords: risk, performance, efficiency, DEA.
1. Introduction

Today, companies operate in a complex and changing environment. In these circumstances, companies to achieve their goals and reduce adverse effects of volatility, give significant importance to manage the risks they face. MSB Business services are associated with risk and cannot get the profits without risk. Due to the nature of the business with financial institutions, Risk management for such companies has special importance. In fact, these institutions must accept the risks and manage them. Bank’s stimulation in risk managing starts where the risk of causing a decline in banking performance. Subject of risk management in banks is not only a profound effect on the performance of banks, but also has a significant effect on economic growth. Any move to improve the efficiency of the banking system will cause the improvement of Current savings, investment and resource allocation.

It is clear that identifying the risk cause optimal management and ultimately reduces the overall risk of a complex economy. Bank directors, system monitoring and public customers Desiring to analyze the efficiency of the banking system, because Leading to lower prices and cost mediation services institutions and also increases the quality of their services.

2. Problem statement

While life continues today, Uncertainty has overshadowed in all fields and decision making process has changed. Changes in commodity prices, exchange rate changes, interest rate changes as well as changes in stock prices are what today's organizations are constantly grappling with it. Integrated risk management and financial engineering, perform their duty, and by offering new solutions and innovative strategies for businesses, could create systematic approaches for products and services especially financial institutions, credit and banks.

Due to constant changes in environmental and economic systems, every day different risks affect the financial structure of the various institutions. Institutions, including financial institutions and even governments with regard to the scope of its performance, Face with particular risks.

In general, the risk in the banking industry and non-financial risks can be divided into two main groups. Financial risks include market risk, credit and liquidity risk and operational risk, including non-financial risks, rules and regulations. Credit risk is defined as losses caused by defaulting borrowers events or events that caused the decline in the credit quality of borrowers. This simple definition hides numerous risks. Credit risk is the result of three risks: (1) the risk of default; (2) Value at Risk and (3) Risk Processing (ACP) (Besis 1999).

Each organization, especially in complex and dynamic environments, Need to evaluate the system performance to determine the extent of the appropriateness and quality of its activities. The absence of performance measurement system in an organization means lack of communicating with the environment inside and outside the organization which its result is aging and ultimately death of the organization (Adel, 2005). Monetary financial system stability and performance plays a key role in the economic environment, maintaining the stability of general price level, supports production of facilitating the economic development of the country, so that the efficiency of the financial system, monetary stability, strengthening and supporting the real sector of economy, efficiency in contrast, instability and lack of efficiency of financial and monetary system causes instability and inefficiency of the real sector economy. The basic tasks of monetary financial system are the mobilization of
financial resources and allocation of economic support and facilitate the production and expansion of the welfare system and economic development. The Monetary financial system, including financial markets (stock market held specifically) that in the Iranian banking system due to lack of proper development of financial markets, the Iranian banking system is much stronger as a result of a very important role in providing and mobilizing financial resources for investment and encouraging investors to optimize resource desired Finance is responsible for facilitating economic growth.

3. Theoretical Foundations

Banks face a variety of risks. Major Banks are already doing remarkable work in the field of operational risks, the measures included the following steps:

1- Identifying operational risks in the financial institution (here are the same operating losses);
2- assessment or rather quantifying operational risks (resulting in determining the amount of capital is needed to deal with operational risks);
3- The management of operational risks, including risk transfer (using insurance instruments, etc.) and measures to reduce the operational risks of the organization);

Since Need to identify and manage financial risks and financial situation has necessitated for a center of international policy and staff have the responsibility to duty in relation to the risks involved in organizations; Therefore abbreviated Bank of International Settlements (BIS) launched Basel committee that its main function was monitoring the capital position of banks in different countries. The committee also has the task of determining the standards for banking risks.

3.1. Basic definitions of risk

For the term 'risk in different sources, different definitions have been proposed, but all include single concept. Some of these definitions are mentioned below:

"Risk is the deviation of the consequences that can be used during a specified period, in a given situation happen" (C Arthur, 2003). This definition means that, if an event is only possible deviation and risk is zero, in other words, there is not the potential for the future is quite predictable. Another definition of risk is stated as follows:

Risk in the general sense is the negative impact of the vulnerability by considering the "possibility" of and "effect" in the processes of a system (Gary Stony Buller et al., 2002). The general sense of risk is, such as:

“The possibility of occurrence of damage and losses, both financial and non-financial result of a job.”

In today's society, almost all people somehow are familiar with the concept and acknowledge that life is risky. Risk in common language, is a danger that, due to uncertainty about the incident occurs in the future and as this uncertainty is higher, so-called greater risk. Webster dictionary, defined risks as (the exposure of danger). Also risk is defined as a potential loss of investment that is computable. First, Harry Markowitz, based on the quantitative definition provided, introduced SD multi-period as a numerical index of risk

3.2 Performance concept and its variants

Overall performance is a relative concept and performance shows comparisons between actual and ideal performance. Performance is mainly in three areas, Engineering, Management and
Economics. The concept of efficiency in the economy is the optimal allocation of resources (Alem Tabriz et al. 2009). Every organization uses a set of inputs to produce outputs of goods or services and etc. Introduction of variety practical methods of measuring performance has been made by Farrell (1957). He suggested that to measure the efficiency of an enterprise, the best companies in the industry should be compared. Farrell raised three types of performance for firms (Faqih Nasiri et al., 2010). He represented his own view as A simple example of a firm that deals with Using two factors of production to produce an output with minimum input based on the assumption of constant returns to scale.

.3.2.1 Technical performance
This work reflects the ability of firms to obtain maximum yield from a given amount of input or use minimum input for a given amount of output.

.3.2.2. Allocative efficiency
This work suggests that how the mighty the firm using the optimum combination of production factors with regard to price them so that the production cost is minimized.

.3.2.3. Economic performance
Economic efficiency is multiplied technical efficiency in allocative efficiency.

Methods for measuring performance
In general, the performance of a firm Parametric is measured two ways described below:

Parametric methods
In parametric methods, which are largely based on the principles of Econometrics, and are used in the economy, initially intended to be a functional form for the production. First, the unit must have only one product, while those Units under evaluation may be several products. Second, the method of least squares to estimate the parameters of the production function is not a perfect expression of the production.

Non-parametric methods
In an effort to resolve problems in ways parametric, non-parametric methods were created. Farrell in 1957, Provided the first non-parametric method to determine the efficiency of the two inputs and one output (Bohayrayi, 2012).

4. Research History
Nasser Nastiri, the "efficiency measurement and rating of the branches of the Agricultural Bank using (DI A)” 2001, using (DI A) examined of Performance 172 Branches of the Agricultural Bank in the provinces of East and West Azarbaijan and Ardebil. He calculated Technical efficiency and scale, assuming constant performance and variable returns to scale, according to specific characteristics such as scope of practice, scope, size branches, and lastly, has introduced branches as well as a reference and model for inefficient units. One of the results of his research is that the average technical efficiency of rural branches of the Agricultural Bank group is closer to the efficient frontier and only 31% of the units investigated Have the technical and scale efficiency.

Mohsen Akbarpour Shirazi, S. Tahmasby and Nikbakhsh Javadian in the article "Using data envelopment analysis to evaluate the effectiveness of bank marketing" in 2005, said competition has increased banks' need for knowledge and awareness of banking services, expansion of cities, the need for extensive coverage of contacts, reflecting the assessment of banking services customers, retaining existing customers and attracting new customers,
including the factors that cause the importance of bank marketing. In this paper, to evaluate marketing bank, considered a mathematical model based on data envelopment analysis (DIAs).

Fallah Shamsi and Tehrani in an article entitled "define and design a model credit risk in the banking system" in 2005, have studied the efficiency of linear probability models, logistic and artificial neural network to predict the credit risk of customers banking system. The predictor variables in the models were Financial Ratios of borrowers which their significant correlation with credit risk, has been confirmed Using appropriate statistical tests. The Models were designed and tested performance using financial data from 316 of the country's bank corporate customers. The results obtained in this study indicate that the relationship between the variables in the model for predicting credit risk was not linear And the exponential functions and the sigmoid, are the most suitable credit risk prediction models which are more efficient for predicting credit risk related to artificial neural networks and logistic model.

The effect on performance risk, using network data envelopment analysis in the presence of undesirable output conducted by Nora A. et al (2011) and it has been stated that this article reviews the concept of risk management pays to its effect on performance evaluation.

Elena Bkaly and colleagues in a paper titled "performance in banking stocks in Europe" in 2004, intended to replace an efficiency rating and efficiency of the banks and by defining the relationship between the rate of economic and institutional performance in that regard. In this study, they use data envelopment analysis (DI A) and stochastic frontier model (S F A)\textsuperscript{12} to assess Europe's banks in 2000. The results, particularly of the model (DI A), indicate that the changes percentage in stock prices, reflecting the efficiency ratio also the relative superiority (DI A) the model is higher than the model (S F A).

Chltmn (2005) argues that different combinations of assets have different effects on different types of risk. He solved the problem of optimizing asset by multi-objective programming method. But his heart was no integration risk, and ignoring profit is also one of the objectives of commercial banks; Richardo and callus\textsuperscript{14} in an article titled "Application of data envelopment analysis to estimate the efficiency of the banks" in Brazil in 2006, Have tried to evaluate the performance and to compare the banks by taking the top 50 banks and large Brazilian and statistics of the bank's balance sheet variables. The results of this study indicate the superiority of the method (DI A) to run the banks in the ranking and grading them in the traditional way.

5. Research purposes
1- The first objective of this study is to investigate an appropriate model to calculate the performance of banks. To this end, four models of the BCC output-oriented and input-oriented and output-oriented and input-oriented CCR was compared with each other which output looked after the calculation of them. We conducted that the best example and model for efficiency is the input oriented BCC.

2- The second goal is a sensitivity analysis of variables and factors.

3- The second and main aim of this study has been determined performance ratings, taking into account risk factors.

4- And the ranking of banks based on risk determining factors.

5-
6. Research Methods
This study is an applied research in terms of the goal classifying, and is Quasi experimental post-event study in terms if the method. This type of research is focused on the most effective action and has less attention to their cause. As well as in terms of classification method based on research and data collection, this study was descriptive and market-based methodology has been used.

The Target population of this study, where all the banks listed on the Tehran Stock Exchange (2013) and Analysis of interest in relation to sample of this study will be tested. The Names of the banks abbreviated with the letters A through K.

In this study, to collect required information as well as the theoretical background of the study, a library, a study and review of the literature, theses, articles, books in Persian and English and information from Web sites has been used.

The performance calculated by four models, output-oriented BCC and output-oriented input and input-oriented CCR Grove and values the most effective model has been selected to compare with calculation of Performance Assessment and Rating. Data envelopment analysis, the process has been design has been so that the decision DMU units realized as we trying to identify their efficiency. Then, according to specifications and system features, output data for the DMU identified and selected. The data collected regarding the data values and output, each of the DMU values for the evaluation of its effectiveness in accordance with a model of the DEA has been formulated, then the DEA model was calculated for each value of DMU score. The performance of DMU marks has been analyzed so Performance and rankings were selected.

To analyze the data and statistical analysis software, SPSS and GAMS, and Excel software for data pre-processing and sorting them will be used. In addition, to use stock exchange data “Rah Avard Novin” software and “Tadbir Pardaz” database will be used.

6.1. variables in this study
Inputs:
1. Cash (X1)
2. The legal deposit at the central bank (X2)
3. Loans receivable (X3)
4. Foreign currency assets (X4)
5. Investment in bonds (X5)
Outputs:
1. Total debt (Y1)
2. Foreign currency debt (Y2)
3. Bonds issued by (Y3)
4. Facilities (Y4)

7. Research findings
7.1. data covering analysis
In this section, each of the four models has improved efficiency of their input oriented BCC been selected and listed in following table:
A) the performance of banks using four research models
In this stage to get the BCC output-oriented performance of four models and input-oriented and output-oriented input-oriented CCR, performance values have been calculated and
the most effective value of them has been selected for Compare with free cash flow. In the rest of the article mathematical models will be represented:

A -1) output-oriented BCC
MinZ = \sum_{i=1}^{4} (V_i I_{ij}) + W
St:
\sum_{i=1}^{4} (W_r O_{rj}^{g}) = 1
\sum_{i=1}^{4} (W_r O_{rj}^{g}) - \sum_{i=1}^{4} (V_i I_{ij}) + W \leq 0
W_r \geq 0, V_i \geq 0

A -2) input oriented BCC
MaxZ = \sum_{i=1}^{4} (W_r O_{rj}^{g}) + W
St:
\sum_{i=1}^{4} (V_i I_{ij}) = 1
\sum_{i=1}^{4} (W_r O_{rj}^{g}) - \sum_{i=1}^{4} (V_i I_{ij}) + W \leq 0
W_r \geq 0, V_i \geq 0

A -3) input-oriented CCR
MaxZ = \sum_{i=1}^{4} (W_r O_{rj}^{g})
St:
\sum_{i=1}^{4} (V_i I_{ij}) = 1
\sum_{i=1}^{4} (W_r O_{rj}^{g}) - \sum_{i=1}^{4} (V_i I_{ij}) \leq 0
W_r \geq 0, V_i \geq 0

A -4) CCR output-oriented
MinZ = \sum_{i=1}^{4} (V_i I_{ij})
St:
\sum_{i=1}^{4} (W_r O_{rj}^{g}) = 1
\sum_{i=1}^{4} (W_r O_{rj}^{g}) - \sum_{i=1}^{4} (V_i I_{ij}) \leq 0
W_r \geq 0, V_i \geq 0
Table 1: Results of performance in different models

<table>
<thead>
<tr>
<th>correspond Model</th>
<th>Bank</th>
<th>NO</th>
</tr>
</thead>
<tbody>
<tr>
<td>OCR-O</td>
<td>OCR-I</td>
<td>BCC-O</td>
</tr>
<tr>
<td>0.96</td>
<td>0.99</td>
<td>1.00</td>
</tr>
<tr>
<td>0.93</td>
<td>0.85</td>
<td>.89</td>
</tr>
<tr>
<td>0.95</td>
<td>0.94</td>
<td>0.94</td>
</tr>
<tr>
<td>1.00</td>
<td>1.00</td>
<td>0.97</td>
</tr>
<tr>
<td>0.94</td>
<td>0.96</td>
<td>0.98</td>
</tr>
<tr>
<td>1.00</td>
<td>0.92</td>
<td>0.85</td>
</tr>
<tr>
<td>0.95</td>
<td>0.96</td>
<td>0.96</td>
</tr>
<tr>
<td>0.97</td>
<td>0.91</td>
<td>0.95</td>
</tr>
<tr>
<td>0.84</td>
<td>0.89</td>
<td>0.74</td>
</tr>
<tr>
<td>0.96</td>
<td>0.93</td>
<td>0.98</td>
</tr>
</tbody>
</table>

The mean of each variable performance in different banks listed on the Stock Exchange listed in the table above using the software Gomez16.

7.2. Variable sensitivity analysis

In this section to analyze the sensitivity of each variable in each step was calculated by removal efficiency for each variable and these values compared with each other to realizing most sensitive variables. In this section we analyze the sensitivity of the variables. Sensitivity analysis in this section represents the total performance sensitivity to the presence or absence of a variable. This means that if the variable is removed from the studied variables, then how much the efficiency changes. To perform this procedure, first, each of the variables in turn removed from the variables and measure the performance of the rest of variables at the end for each of these scenarios the average performance achieved over years of research has been calculated then compared with primary value. Mean efficiency of the banks in different years is as follows:
In this section, classifying performed so that a variable which caused an increase of efficiency removed as the most sensitive output and a variable that have the least efficiency removed as the most sensitive input, and then omitted variables have been selected. From this step onwards, all calculations are done based on the selected model, with this difference that following limitations have been used:

\[
\text{MinZ} = \sum_{i=1}^{11} (V_{ij}) + W
\]

St:
\[
\sum_{i=1}^{11} (W_r O_{rj}) = 1
\]
\[
\sum_{i=1}^{11} (W_r O_{rj})' - \sum_{i=1}^{11} (V_{ij}) + W \leq 0
\]
\[
20\% \sum_{i=1}^{11} (X_A) \leq \sum_{i=1}^{11} (X_c)
\]
\[
\sum_{i=1}^{11} (X_{\text{cash}}) \leq \sum_{i=1}^{11} (X_A)
\]
\[
W_r \geq 0, V_i \geq 0
\]
7.3. Ranking banks based on risk determining factors
In this section we will review of determinant factors of risk described above and ranking of banks under research.

Table 3: Calculate the efficiency of the banks

<table>
<thead>
<tr>
<th>No</th>
<th>Bank</th>
<th>Performance</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>A</td>
<td>0.896</td>
</tr>
<tr>
<td>2</td>
<td>B</td>
<td>0.996</td>
</tr>
<tr>
<td>3</td>
<td>C</td>
<td>1.000</td>
</tr>
<tr>
<td>4</td>
<td>D</td>
<td>1.000</td>
</tr>
<tr>
<td>5</td>
<td>E</td>
<td>0.987</td>
</tr>
<tr>
<td>6</td>
<td>F</td>
<td>1.000</td>
</tr>
<tr>
<td>7</td>
<td>G</td>
<td>0.994</td>
</tr>
<tr>
<td>8</td>
<td>H</td>
<td>1.000</td>
</tr>
<tr>
<td>9</td>
<td>I</td>
<td>1.000</td>
</tr>
<tr>
<td>10</td>
<td>G</td>
<td>0.890</td>
</tr>
<tr>
<td>11</td>
<td>K</td>
<td>0.885</td>
</tr>
</tbody>
</table>

Bank performance in the above table is calculated based on the determining factors and their rankings can be seen in the following table:

Table 4: Anderson-Peterson Output

<table>
<thead>
<tr>
<th>Rank</th>
<th>Bank</th>
<th>e.f.f</th>
<th>Anderson-Peterson</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>C</td>
<td>1.000</td>
<td>1.596</td>
</tr>
<tr>
<td>2</td>
<td>I</td>
<td>1.000</td>
<td>1.204</td>
</tr>
<tr>
<td>3</td>
<td>H</td>
<td>1.000</td>
<td>1.114</td>
</tr>
<tr>
<td>4</td>
<td>D</td>
<td>1.000</td>
<td>1.002</td>
</tr>
<tr>
<td>5</td>
<td>F</td>
<td>1.000</td>
<td>1.001</td>
</tr>
<tr>
<td>6</td>
<td>B</td>
<td>0.996</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>G</td>
<td>0.994</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>E</td>
<td>0.987</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>A</td>
<td>0.896</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>J</td>
<td>0.890</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>K</td>
<td>0.885</td>
<td></td>
</tr>
</tbody>
</table>

7.3.1. Determining reference branches
At this stage, we will continue to investigate and diagnosis reference branch and the output will be as follows:
7.4. **Ranking of determining risk factors**

In this section, risk determining factors have been discussed. As the input oriented BCC has been selected so all of the efficiency values calculated by this approach.

<table>
<thead>
<tr>
<th>No</th>
<th>E.f.f</th>
<th>reference branches</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>99.6</td>
<td>(DMU01)0.1+(DMU02)0.084</td>
</tr>
<tr>
<td>7</td>
<td>99.4</td>
<td>(DMU01)0.459+(DMU05)0.081</td>
</tr>
<tr>
<td>8</td>
<td>98.7</td>
<td>(DMU01)0.437+(DMU02)0.36+(DMU04)0.206</td>
</tr>
<tr>
<td>9</td>
<td>89.6</td>
<td>(DMU01)0.027+(DMU03)0.496+(DMU04)0.009</td>
</tr>
<tr>
<td>10</td>
<td>89</td>
<td>(DMU01)0.505+(DMU03)0.299</td>
</tr>
<tr>
<td>11</td>
<td>88.5</td>
<td>(DMU01)0.1+(DMU05)0.084+(DMU02)0.29</td>
</tr>
</tbody>
</table>

Table (6): efficiency and weights

<table>
<thead>
<tr>
<th>Bank</th>
<th>X1</th>
<th>X2</th>
<th>X3</th>
<th>X4</th>
<th>X5</th>
<th>Y1</th>
<th>Y2</th>
<th>Y3</th>
<th>Y4</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>1.39</td>
<td>1.59</td>
<td>0</td>
<td>1.09</td>
<td>0.36</td>
<td>0</td>
<td>0.23</td>
<td>0.55</td>
<td>1.99</td>
</tr>
<tr>
<td>I</td>
<td>1.5</td>
<td>0.79</td>
<td>0.39</td>
<td>1.07</td>
<td>0.32</td>
<td>9.56</td>
<td>0.56</td>
<td>0.987</td>
<td>1.5</td>
</tr>
<tr>
<td>H</td>
<td>2.36</td>
<td>0.29</td>
<td>0.55</td>
<td>2.07</td>
<td>0.85</td>
<td>1.39</td>
<td>1.26</td>
<td>2.56</td>
<td>2.36</td>
</tr>
<tr>
<td>D</td>
<td>2.09</td>
<td>0.9</td>
<td>0.56</td>
<td>0.36</td>
<td>0.23</td>
<td>0.03</td>
<td>0.29</td>
<td>0.36</td>
<td>0</td>
</tr>
<tr>
<td>F</td>
<td>2.99</td>
<td>0.28</td>
<td>2.56</td>
<td>0.17</td>
<td>0.29</td>
<td>0.61</td>
<td>1.58</td>
<td>1.26</td>
<td>2.99</td>
</tr>
<tr>
<td>B</td>
<td>1.58</td>
<td>1.96</td>
<td>0.36</td>
<td>0.08</td>
<td>1.26</td>
<td>1.09</td>
<td>0.19</td>
<td>0.38</td>
<td>1.58</td>
</tr>
<tr>
<td>G</td>
<td>1.25</td>
<td>0</td>
<td>0.95</td>
<td>0.19</td>
<td>0.29</td>
<td>1.88</td>
<td>0.59</td>
<td>0</td>
<td>0.19</td>
</tr>
<tr>
<td>E</td>
<td>0.59</td>
<td>0.96</td>
<td>1.06</td>
<td>0.25</td>
<td>0</td>
<td>0.87</td>
<td>0</td>
<td>0.29</td>
<td>1.87</td>
</tr>
<tr>
<td>A</td>
<td>0.58</td>
<td>0</td>
<td>0</td>
<td>0.44</td>
<td>1.05</td>
<td>0.17</td>
<td>0.55</td>
<td>0.27</td>
<td>0.17</td>
</tr>
<tr>
<td>J</td>
<td>0.58</td>
<td>0</td>
<td>0</td>
<td>0.44</td>
<td>1.05</td>
<td>0.17</td>
<td>0.55</td>
<td>0.27</td>
<td>0.17</td>
</tr>
<tr>
<td>K</td>
<td>1.29</td>
<td>1.23</td>
<td>1.58</td>
<td>1.06</td>
<td>0.67</td>
<td>0.29</td>
<td>1</td>
<td>1.54</td>
<td>0.9</td>
</tr>
<tr>
<td>AVG</td>
<td>1.48</td>
<td>0.84</td>
<td>0.73</td>
<td>0.64</td>
<td>0.51</td>
<td>1.44</td>
<td>0.59</td>
<td>0.87</td>
<td>1.23</td>
</tr>
</tbody>
</table>

According to the above table determining factors can be ranked as follows:
General facilities
2. Cash
3. Facility Received
4. Bonds
5. legal deposit at the central bank
6. Foreign currency assets
7. Foreign currency debt
8. Investment Bonds

8. Discussion and conclusion
1. The first objective of this study is to investigate an appropriate model to calculate the performance of banks. To this end, four models of the output-oriented BCC and input-oriented and output-oriented and CCR input-oriented were compared with each other. So they were assessed after calculation, and this result gained that input-oriented BCC, which aims maximizing input values, is the best model in efficiency calculation.
2. The second objective is sensitivity analysis of variables and factors.
3. The third objective of research includes a ranking of performance determining factors values by taking risks and actually banks have been ranked.

8.1. Suggestions for future research
1- The use of quality indicators such as customer satisfaction, employee performance or other quality indicators to measure the performance of banks:
2- Application of DEA models to assess the efficiency of the banks;
3- Evaluate the performance of other banks in the other intervals;
4- Evaluate the performance of other financial institutions such as insurance and stock exchange.
5- Using number of more inputs and outputs for efficiency.
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