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**STUDYING THE EFFICIENCY OF NON-BANKING FINANCIAL AND CREDIT  
INSTITUTIONS BASED ON DATA ENVELOPMENT ANALYSIS APPROACH (DEA)**

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**ABSTRACT**

In 2004, in the course of implementing the article 10 of Monetary and Banking Law, fulfilling the article 92 of third development plan and in order to regulate active financial institutions in the country as much as possible, the law of country monetary unorganized market was ratified. After crises created by interest-free loan funds, non-banking financial and credit institutions were considered more than before; and central bank issued the essential agreement of changing to financial and credit institution to three interest-free loan funds, Mehr, Ansar and Qavamin if and only if they take charge of regulating part of failed funds. This type of financial institutions, on the one hand are facing some restrictions in providing services according to law, and on the other hand, they don't oblige themselves to observe central bank's instructions regarding banks specially deposit interest rate. With regard to these conditions, studying the efficiency of these institutions toward banking system is a subject which has been discussed in this research using a statistical method (Data Enveloping Analysis). Results indicate that the efficiency of these institutions is lower than the operation of banking system.

**Key words: non-banking credit institutions- efficiency- Data Enveloping Analysis**

**INTRODUCTION**

Evidence shows a positive and undeniable effect of financial market on growth of real sector of economy. The experience of developed and developing countries in recent

decades is the best confirmer of organized, efficient and active financial markets' role in forming capital and economic development.

Legal entities that are active in the money market, are banking financial institutions (commercial and specialized banks) and on-banking financial institutions (financial and credit institutions and, etc.). The main responsibility of financial system is in fact on the shoulder of these institutions and they have a determinant role in directing resources to production and creation of added value in economy. In reality, they play a basic role in reducing the danger of investment, efficient allocation of resources, reducing transaction costs and finally in economic growth and prosperity through non-stop activities in equipping short and long period financial resources (micro-entities' deposits).

As a non-banking financial institution, the financial and credit institutions are those which operate as fund mediator in financial markets. Their services in many fields are like the services provided by banks. Their type of service, the degree of freedom and the extension of activity are not the same in all countries and they are obedient to country's special conditions and rules.

According to the regulation of establishing financial and credit institutions' rules and its

operating method, these institutions try to equip resources through absorbing all types of valid banking deposits and using other financial instruments, and they allocate these resources to provide credit facilities or in any other way, based on the recognition of Islamic Republic of Iran's central bank and within the law, regulations and implementation of instructions of interest-free banking operations, work as a mediator between suppliers and clients of financial resources.

Thus, financial and credit institutions as banking system's supplement, have an effective role in dynamism of country's financial market. But unfortunately, in many developing countries such as Iran, financial system is possessed with many flaws and inefficiencies which cause the quantity and the quality of providing financial service to be in a quite low level. In Iran, the present financial institutions including banks, credit institution, interest-free loan funds and credit unions do not play their role properly in efficient growth, accumulation and distribution of capital and financial interest, and partly offer their services to the society very non-professionally. In other words, country's financial system doesn't perform its main duty which is the allocation of resources with the minimum transaction costs through

using savings, the allocation of resources, controlling and effective supervision on applicants and loan borrowers, the improvement of risk management and facilitation of business (minimizing bureaucracy) as it is expected to perform.

In developing countries, financial institutions are mostly refer to banks, in other words, their financial system is based on bank. These are the banks which upon their presence in the economic sphere, possess a determinant role in providing liquidity and finance of companies, enterprises and etc. unfortunately the role and the function of financial and credit institutions have been weakened. Despite financial and credit institutions are operating beside banks, but could never play their main and influential role in economy.

In spite of this, according to the published statistics, many non-banking financial institutions are active in our county which have allocated a considerable sum of community's liquidity (6 percent proportion of liquidity) through doing banking common activities, it shows that in spite of all restrictions, financial and credit institutions were able to work beside private and state banks through extending their branches and obtain a proper proportion of market. But until now, a comprehensive research hasn't

been done concerning the efficiency and the comparison of these institutions' function and banking system and the role of which they play in country's financial system.

## **2. Literature of research**

### **Efficiency**

When we search about the etymology of the word "efficiency", we realize that this word has been used as the meaning of manifestation. It may be said that historically "efficient" was the adjective of work or an activity during which some potential talents were converted into action. The history and how this word entered the domain of economy's literature is not clear, but it can be guessed that at least from Adam Smith's period, the father of economics, the concept of efficiency, in one way or another, was one of the economists' concerns. Undoubtedly, when Smith was explaining some particular duties, such as preserving public security, extension of justice, providing public services and avoiding government from doing trading activities, he has a specific image of efficiency's concept in his mind. It means that he believed, in comparison to other duties, government can do some of its duties with better quality. Therefore, perhaps we can claim that the very doing duty with "better

quality” is one of the sources of efficiency’s concept in the literature of economy.

But “better quality” is a very general phrase. Because if we classify economic activities in two different levels of production and distribution, each level has dissimilar aspects, thus it may be better to define the word “efficiency’s” domain of usage, limit our study to the field of production and clearly specify that we are going to deal with which aspect of different aspects.

Production is a process in which raw materials that are called data, are combined with each other through a special technology manifested in production function, and the final product is achieved under the name of output. Clearly, the goal of economic production is creating goods or special goods for offering and selling in the market. Therefore, production is a kind of economic behavior linked with a specific goal. Certainly, this goal can be offering products to the market with the minimum price, achieving more market proportion or maximizing interest and etc. However, searching about which behavioral goal has been achieved and which one hasn’t, and what is the degree of achieving goals, need to have an appropriate index.

Since the concept of efficiency is relative, it may be better to define one or some indexes

of “favorable function” and “observed function”. Furthermore, with regard to this point that the general function of a producer has different parts, it is suitable to define the proper index of efficiency proportional to each component.

In addition to general divisions mentioned above, there are some general issues in discussing efficiency which must be noted:

- In what ways may a producer distance from efficient production?
- How can we identify and measure the different types of inefficiency?
- What are the consequences of each type of inefficiency?

In order to answer above questions, it is needed to make a common model of production.

In the most general condition, producer applies some producing factors to produce some varied products. The process of converting data and outputs is done through a known and specific technology. It is clear that the producer follows a behavioral goal, but depending on what variables are extrovert and what variables are introvert, his goals can be:

- Minimizing cost
- Minimizing income
- Maximizing interest

- Obtaining the maximum of market proportion

Up to now, we haven't talked about this kind of market. But it can be shown that if the markets are competitive, this methodology and perhaps except from article four, can be achieved through making modifications. For measuring efficiency, we compare present situation with favorable situation. Favorable situation is a situation in which producer's behavioral goals are achieved. This comparison can be done based on physical quantities (data or output) or monetary quantities (cost, income or interest).

Whatever the behavioral goal of the producer is, we can define three types of productive efficiency based on the concept of "the boundary of production facilities". These three types consist of:

- Technical efficiency
- Structural efficiency
- A locative efficiency

Production technically is efficient when it is done in the boundary of production facilities. This condition corresponds to the first time maximization which is raised in the theory of microeconomics. If the production is technically efficient, it will be structurally efficient too when it is done in the area of boundary in which there is no congestion.

This area is called "economic area" of production boundary. Therefore, production may be done in the boundary of production facilities, but if it be in non-economic area or congested area, it will be technically efficient but structurally inefficient. Ultimately, there would be a locative efficiency, when production is technically and structurally efficient, and it is done in a non-dense area of production facilities' boundary, in a way, there is the possibility of achieving producer's behavioral goals in that area. The limit of this area is determined by the relative price of production factors and the price of selling produced goods. Thus, a production is allocative inefficient when it is done in an inappropriate area of non-dense productive possibilities' boundary, regarding the present relative prices.

### **Non-banking network**

In our society, there is a high amount of financial hidden facilities, which according to the recent statistics, only one tenth or even less than that, is distributed in the banks. This wandering capital mainly turns to unknown and informal markets, and if a small proportion of it is deposited at the banks, it is again due to lack of existence of risk-taking culture. Therefore, we can realize the difficult activity of credit institutions which are going

to play a remarkable role in the future of our economy. At the same time, it is necessary for the central bank to direct the activity of credit institutions in a way in which credits tend to a direction where economic development needs. There is a simple definition of non-banking network that is every institution which does financial affairs and is not a bank, is included in this network. Based on this definition, stuck market is also counted as a part of this network.

Some features of non-banking networks consist of:

First, it is not allowed to open a visual deposit account.

Second, their duties are much more related to private banks.

Third, compared to the banks, their long term loans are much longer.

Another feature of this network is that their deposit interest is more than banks in controlled markets.

According to the definition of paragraph(H) of Article 31 of the Monetary and Banking approved in 1972:

Non-banking credit institutions are those which don't use the title of bank in their own, but based on Islamic Republic of Iran's central bank's recognition, they are the mediator between suppliers and applicants of

funds in credit and their operation is influential in the volume and the method of credit distribution.

In the course of implementing the article 10 of Monetary and Banking Law, fulfilling the article 92 of third development plan and in order to regulate active financial institutions in the country as much as possible, the law of country monetary unorganized market was ratified by The Islamic Consultative Assembly in 2004.

According to article 1 of regulation of establishing non-banking credit institutions' rules and its operating method, non-banking credit institution is an institution that tries to equip resources through absorbing all types of valid banking deposits (except current free-interest deposit), obtaining facilities and using other financial instruments, and it allocates these resources to provide credit facilities or in any other way, based on recognition of Islamic Republic of Iran's central bank, works as a mediator between suppliers and clients of financial resources.

With regard to the problems and crisis produced by some free-interest funds' activity and in answer to judicial and political conditions, the central bank tends to have special monitoring on the mentioned institutions and through agreement in

principle in converting them to credit institutions, an important step has been taken to organize this part of country's financial markets.

After that, the agreement in principle of establishing credit institution (Qavamin, Basijian (Mehr)) and Ansar Al Mojahedin) was issued.

### **3. Research method**

The nature of this study is applied research and the method used is descriptive. In order to evaluate the efficiency and answer the question "how is the function of financial and credit institutions (compared to the banks)?" we have used Data Envelopment Analysis (DEA) technique.

In this research, in order to study the research background about studying the efficiency of financial and credit institutions, and also the model used here (DAE), we referred to information centers in person. For counting input and output indices to be used in research model, a questionnaire was designed and given to search and development assistance experts and different assistances of one of financial and credit institutions.

Statistical society of this research includes all bank branches and non-banking credit institutions. in this study, financial and credit institutions are divided into four groups which

include governmental banks, private banks, on-banking financial and credit institutions. Governmental banks are also divided into trading banks and specialized banks.

Since the information of all bank branches are effective in bank yearly operation, the research domain is all Iran's bank branches and financial and credit institutions. The information of branches out of country are not included in this research. Here, the information of banks and financial and credit institutions' operation in 2008, is used in an answer to the hypothesis of the research and it is counted as a cross sectional research. This research has been done based on Data Enveloping Analysis technique.

### **4. The hypothesis of the research**

The efficiency of financial and credit institutions is weak.

### **The definition of inputs and outputs**

The first and the most important step in implementing this model is defining model's inputs and outputs. Through studying different researches done about efficiency, based on study' goals, various inputs and outputs are used.

In order to obtain inputs and outputs appropriate with research, we have designed a questionnaire in which all types of bank's inputs and outputs are designed. Because non-

banking credit institutions don't have foreign exchange activity, related indices to the activity of these banks are deleted. Non-banking credit institutions, are not connected to interbank information interchange network, that's why these institutions' customers don't show any tendency to use these services. Regarding this restriction of credit institutions, indices related to electronic services, were not considered as a single index. Although, all these institutions proceed banking electronic services.

Providing these services for customers, indicate its quantity and quality in profitability as a main index. So in evaluating the efficiency of non-banking credit institutions' system, results derived from providing electronic services are indirectly considered.

The results of this questionnaire are defined in terms of 9 inputs and 7 outputs.

Outputs:

- 1- The average profitability
- 2- Monetary volume of interest-free deposits
- 3- Monetary volume of investment deposits
- 4- Monetary volume of other deposits
- 5- Monetary volume Of Current deposits

6- Total volume of payable loans

7- Total number of deposits

Inputs:

1-personnel costs

2-Rent costs

3-Other costs

4-Current assets

5-Intangiblefixed assets

6-The number of personnel

7-The number of people who have academic degree

8-People's background

As it is observed, mentioned indices are overlapping in many cases. On the other hand, in order to use Data Enveloping Analysis model that have DMU 20, usually possess 3-4inputs and 4-5 outputs.

With regard to above subject, in order to measure the efficiency of financial and credit institutions, 4inputs and 3 outputs are defined as follows:

Model inputs:

1-Total costs

2-total fixed assets

3-the number of personnel

4-the number of branches

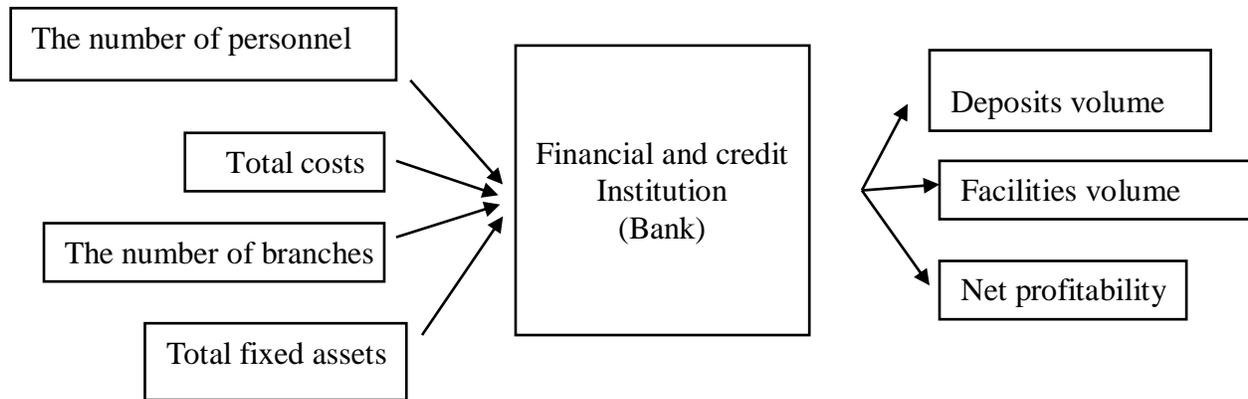


Figure 1: Model

**Model's outputs"**

- 1- The average of profitability
- 2- Loans volume
- 3- Deposit volume

After defining inputs and outputs, we have calculated these indices in four classifications which are:

- 1- Governmental trading banks (C.B.1 TO C.B.7)
- 2- Governmental specialized banks (E.B.1 to E.B.4)
- 3- Private banks (P.B.1 to P.B.7)
- 4- Non-banking credit institutions (F &C.I)

The amount of measured indices are shown in the next page table. (All monetary figures are in billions of dollars).

For implementing research model, we have used Frontier Analyst software.

For using efficiency, CCR has been applied (If we use the BCC model inefficient state to different scales, all the in situations have been shown effective against actual performance with respect to financial indices).it is necessary to say that this model has been implemented in two states of minimizing inputs and maximizing outputs.

**Studying the results of the model**

In order to have a better and more precise conclusion about the condition of non-banking credit institutions" efficiency, the main hypothesis "the efficiency of non-banking financial and credit institutions in

comparison to banking system's operation is weak" is classified into two sub-hypotheses which include:

A) In comparison to governmental trading and private banks, the efficiency of non-banking financial and credit institutions is weak.

B) In comparison to private banks, the efficiency of non-banking financial and credit institutions is weak.

Each hypothesis is studied as follows:

A) In comparison to trading governmental and private banks, the efficiency of non-banking financial and credit institutions is weak.

In this stage, the efficiency of non-banking credit institutions compared to governmental banking system is studied based on segregation of trading governmental banks and governmental specialized banks. The results derived from model implementation are shown below in **Figure 2**.

As it is shown, the efficiency of non-banking credit institutions is more than only one specialized bank and one trading bank, and less than 9 governmental banks. In other words, since the average efficiency of governmental banks and non-banking credit institutions is respectively 93.37 and 88.6, in comparison to governmental banking system, the lower efficiency of these institutions has been confirmed.

According to the results, in order for non-banking credit institutions to reach the level of governmental banks' efficiency, used indices in the model must be promoted in the following ways:

❖ In a way in which minimizing inputs is focused (CCR mode).

1- In this condition, non-banking credit institutions reduce 25% of their branch.

2-The cost of these institutions is much higher than what was expected to be, and they must reduce 44% of their cost.

3- In comparison to governmental banking system, these institutions' fixed assets are higher and they must have 14% negative modification in their assets.

Regarding facilities, non-banking credit institutions must increase their resource volume up to 10%. In comparison to governmental banking system's operation, these institutions' profitability and the volume of providing facilities are appropriate. A summary of reformative measures' method is shown below.

❖ In a way in which maximizing outputs is focused (CCR)

1-In this condition, credit institutions must have 20% negative modification in their branches.

2-In the condition of maximizing outputs, non-banking credit institutions reduce 40% of their cost to reach the favorable amount.

3-With regard to governmental banks, non-banking credit institutions, as compared to outputs have much fixed assets, and they must have 9% modification about their fixed assets.

4-In this condition, in comparison to governmental banks, the number of non-banking credit institutions' personnel is appropriate, but there must be a 6% increase in profitability.

5-These institutions must have a 17% and 6% increase respectively in volume of deposits and the amount of facilities.

In the following diagram, the summary of operating improvement's method for non-banking credit institutions is shown in the condition of outputmaximizing.

With regard to the results, the hypothesis (A) showing the lower efficiency of non-banking

credit institutions in comparison to governmental banking operation is confirmed.

B) In comparison to private banks, the efficiency of non-banking financial and credit institutions is weak.

After inputting data to software and calculating the efficiency of non-banking credit institutions, results have come out in the following way Figure 3:

Table 1: The amount of measured indices

| Branches | Inputs    |              |       | Outputs        |              |               |       |
|----------|-----------|--------------|-------|----------------|--------------|---------------|-------|
|          | Personnel | Fixed Assets | Costs | Deposit Volume | Loans Volume | Profitability |       |
| 3277     | 42117     | 22275        | 23489 | 368404         | 319977       | 375           | C.B.1 |
| 1759     | 18277     | 9139         | 10466 | 134887         | 137273       | 131           | C.B.2 |
| 1076     | 28312     | 1471         | 20064 | 54837          | 46209        | 5528          | C.B.3 |
| 363      | 21523     | 20987        | 6562  | 271138         | 199288       | 1200          | C.B.4 |
| 3238     | 24963     | 12299        | 12628 | 218982         | 146055       | 2494          | C.B.5 |
| 1986     | 10619     | 13924        | 16995 | 278712         | 243951       | 2922          | C.B.6 |
| 1868     | 2442      | 619          | 602   | 7996           | 5997         | 107           | C.B.7 |
| 1869     | 16091     | 8260         | 11940 | 103088         | 117119       | 121           | E.B.1 |
| 1128     | 10995     | 6890         | 7930  | 112476         | 43325        | 1932          | E.B.2 |
| 31       | 1100      | 2490         | 1043  | 8251           | 7488         | 1626          | E.B.3 |
| 43       | 928       | 1186         | 1402  | 9564           | 7173         | 683           | E.B.4 |
| 656      | 4322      | 3093         | 10711 | 56504          | 27786        | 503           | F&C.I |
| 72       | 1306      | 974          | 679   | 29779          | 22047        | 1218          | P.B.1 |
| 97       | 1456      | 2228         | 1047  | 34545          | 17906        | 441           | P.B.2 |
| 200      | 3904      | 3097         | 3063  | 169086         | 122394       | 3324          | P.B.3 |
| 220      | 2127      | 1749         | 2883  | 87382          | 62296        | 1794          | P.B.4 |
| 202      | 2312      | 2837         | 1898  | 80761          | 64016        | 2346          | P.B.5 |
| 73       | 971       | 852          | 361   | 3890           | 11804        | 1610          | P.B.6 |
| 253      | 2021      | 866          | 513   | 24901          | 21275        | 500           | P.B.7 |

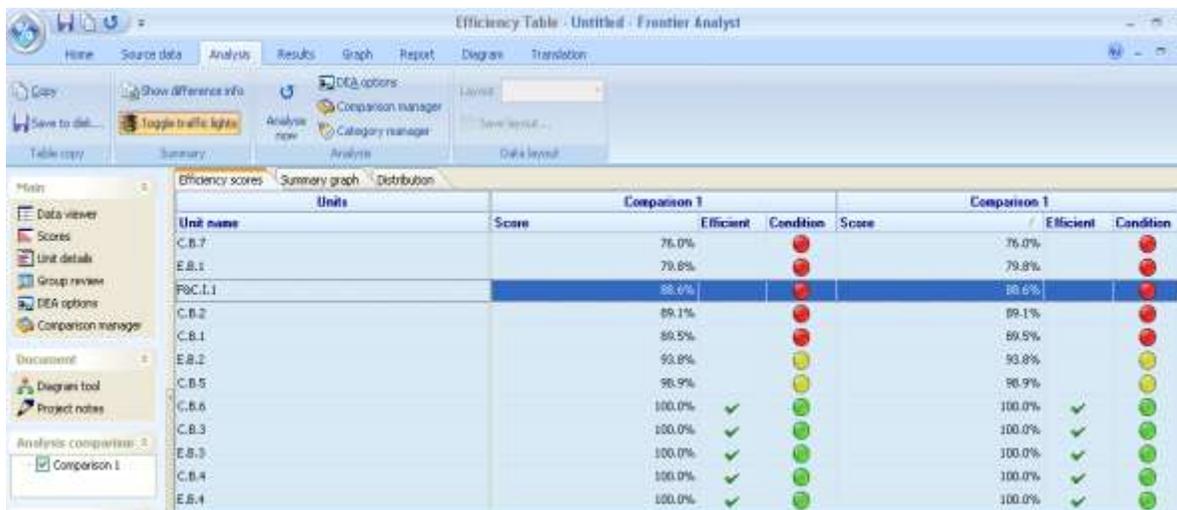


Figure 2: Statistical output

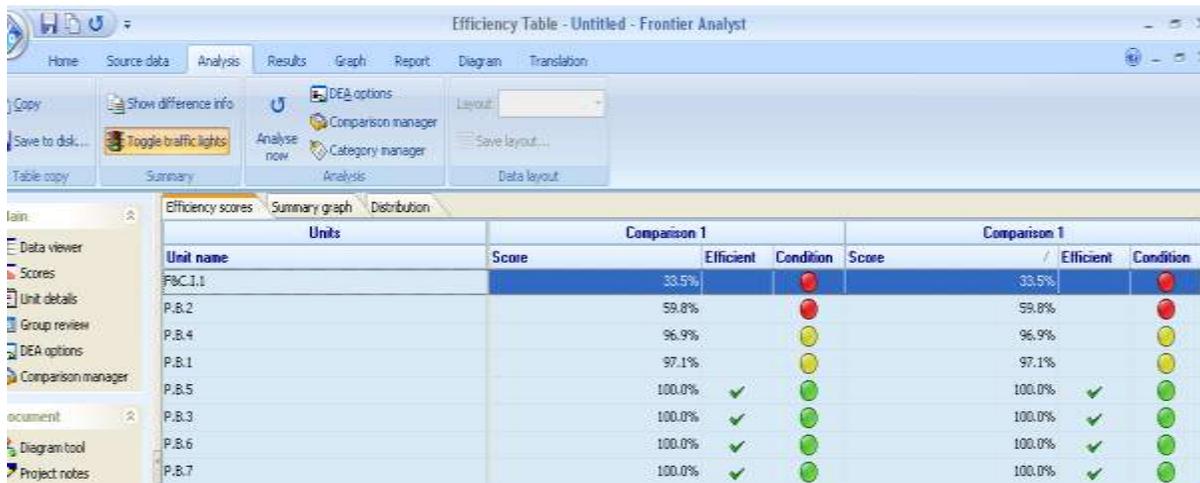


Figure 3: Statistical output

As it is shown in results table 2, in comparison to private banks, the efficiency of non-banking credit institutions is much lower. The average efficiency of private banks is 93% in which in comparison to 33.5% efficiency of non-banking credit institutions is much higher. According to the results, in order to reach private banks' efficiency level, non-banking

credit institutions must promote used indices in the model in the following way:

- ❖ In a way in which minimizing inputs is focused (CCR mode).

1-In comparison to private banks, credit institutions have much lower profitability. These institutions in order to reach a favorable degree of efficiency must increase their profitability to 42%.

2-In comparison to private banks, the cost of these institutions regarding outputs, is lower. Reducing cost up to 12%, beside other items, can help these institutions to reach private banks' efficiency level.

3-About the number of branches and personnel, credit institutions must respectively have 13% and 11% negative modification.

4-About fixed assets, non-banking institutions must have a -7% modification.

5-In order to have a similar efficiency with private banks, these institutions must increase their resources 5%, and beside that, increase the amount of facilities 10%.

❖ In a way in which maximizing outputs is focused.

1-In maximizing outputs, credit institutions must increase the amount of profitability 53%.

2-In this condition, fixed assets are shown agreeable, but in order to approach the level of private banks' efficiency, these institutions' cost must be reduced 6%.

3-About the number of branches and personnel in non-banking credit institutions, we can say that, in order to reach the same efficiency of private banks, these institutions must modify 6% of branches and 4% of personnel.

4-In comparison to private banks, institutions' volume of deposits and facilities is lower. These institutions must increase 13% of deposit volume and 17% of facilities volume.

According to the results, the hypothesis of non-banking credit institutions' lower efficiency in comparison to private banking operation, has been confirmed.

In order to ensure the operation method of non-banking credit institutions, 10 important financial proportions have been defined for studying financial and credit institutions' operation, and its amount has been counted for banking and non-banking credit institutions and it has been compared with results obtained from model. These indices are as follows:

As it is shown in the table 2, non-banking credit institutions in 6 indices (capitation of branch deposit, capitation of personnel facilities, capitation of branch facilities, capitation of personnel cost, capitation of personnel profit and capitation of branch profit) were lower than banks. In other indices, they were lower than private and specialized banks, but they don't show any significant difference with trading banks.

According to above results derived from implementing DAE model and confirming them through financial proportions, the

hypothesis concerning non-banking credit banking system will be confirmed. institutions' lower efficiency with regard to

Table 2: Financial indices

|                                    | Governmental banks | Trading banks | Specialized banks | Private banks | Non-banking institutions |
|------------------------------------|--------------------|---------------|-------------------|---------------|--------------------------|
| Capitation of personnel deposit    | 8.63               | 10.05         | 22.21             | 33.29         | 13.07                    |
| Capitation of branch deposit       | 93.670             | 111.029       | 221.753           | 415.285       | 86.134                   |
| Capitation of personnel facilities | 8.480              | 8.851         | 6.649             | 23.092        | 6.425                    |
| Capitation of branch facilities    | 91.990             | 97.787        | 66.389            | 288.038       | 42.356                   |
| Capitation of personnel cost       | 0.631              | 0.610         | 0.733             | 0.750         | 1.141                    |
| Capitation of branch cost          | 6.845              | 6.739         | 7.316             | 9.350         | 6.135                    |
| Capitation of personnel profit     | 0.095              | 0.086         | 0.143             | 0.806         | 0.054                    |
| Capitation of branch profit        | 1.036              | 0.947         | 1.430             | 10.056        | 0.288                    |
| Assets efficiency                  | 0.01               | 0.01          | 0.02              | 0.03          | 0.01                     |
| The remaining deferred assets      | 0.109              | 0.082         | 0.032             | 0.057         | 0.087                    |

## CONCLUSION AND SUGGESTIONS

As it is observed, the results of implementing efficiency evaluating model indicate the lower efficiency of non-banking credit institutions in comparison to banking system operation.

Presently, on the one hand, due to equal banking interest rate determined by central bank for banks and non-banking credit institutions, and on the other hand, some non-banking institutions' restrictions compared with banks, have led to an unequal competition between these two kinds of unions in monetary market. Commission related to only banking services which are formed mainly based on using checks in banking system, and income related to all types of foreign exchange transactions, efforts

in the field of issuing letters of credit and etc., have been led to an inequality between banks and non-banking credit institutions. Therefore, designing a proper framework for a fair activity and competition between banks and financial and credit institutions is an urgent affair.

Since the article 98 of chapter 10 of the third economic development plan, under the title of regulating financial markets has given the permission of establishing non-governmental financial and credit institutions to natural and legal person for increasing competitive conditions in financial markets, encouraging to deposit, invest and create the field of country's economic development, qualified organizations can provide the opportunity of

financial markets' development and prosperity, and increasing the efficiency of non-banking credit institutions through following items:

1. Creation of monetary organized law, special for financial and credit institutions to integrate their operation in the country.
2. Elimination of mono poly and legal obstacles in establishing and developing financial and credit institutions and other financial institutions to create a healthy competitive environment among banks and financial and credit institutions.
3. Constant control on financial and credit institutions' operation and clarifying their duties.

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