

## Measuring Performance Efficiency of Iraqi Banks

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### Abstract

This paper aims to estimate the financial performance Efficiency of 22 Iraqi Banks during the period of four years from 2007 to 2010. We used data envelopment analysis (DEA) to measure the financial performance, using output return to scale method. The data analyzed and the results obtained using data envelopment analysis Program 2.1

The results showed that (11) of Iraqi Banks had an efficiency in terms of variable returns to scale(VRS), Iraqi banks obtained mean efficiency is 0.77 with (VRS) method , 0.56 according to constant returns to scale during the period 2007-2010, and the results showed that only six banks reach the Economic optimal size.

**Key Words:** Efficiency, Data Envelopment analysis, Efficiency measurement

### قياس كفاءة الأداء في البنوك العراقية

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الخلاصة

تهدف هذه الورقة إلى تقدير الأداء المالي كفاءة 22 مصرفاً عراقياً خلال فترة أربع سنوات من 2007 إلى 2010. استخدمنا تحليل بيانات التغليف (DEA) لقياس الأداء المالي باستخدام طريقة إرجاع الإنتاج إلى الحجم. البيانات التي تم تحليلها والنتائج التي تم الحصول عليها باستخدام برنامج تحليل بيانات البرنامج 2.1.

وأظهرت النتائج أن (11) من البنوك العراقية حققت كفاءة من حيث العوائد المتغيرة (VRS) ، وحصلت البنوك العراقية على كفاءة متوسطة بلغت 0.77 مع طريقة (VRS) ، 0.56 وفقاً لعوائد ثابتة خلال الفترة 2007-2010. وأظهرت النتائج أن ستة بنوك فقط تصل إلى الحجم الأمثل الاقتصادي.

### 1-Introduction

The Measurement and analysis of banking efficiency is getting an increasing attention in applied economics in recent years due to firstly the rapid globalization of the financial industry, and secondly to increase competitiveness in the international financial markets. Efficiency in a general term in economics describes how well a system performs in generating the maximum output for given inputs. Efficiency is improved if more outputs are generated without changing inputs or fewer inputs with the same amount of outputs. There are two main techniques used to evaluate banking efficiency: parametric methods, such as the stochastic frontier approach, and non-parametric methods, mainly data envelopment analysis.

This study will analyze the economic efficiency of the banking sector in Iraq during the period from 2007 until 2010. DEA is a performance measurement technique that used first by Charnes, Cooper, and Rhodes in 1978.

**Problem Statement:**

Efficiency of the banking system is one of the most important issues in the financial market. A major focus of programs of banking and financial reform in Iraq and other developing countries is the improvement of bank efficiency that may result from exposing domestic institutions and markets to greater competition. I believe that the study of the efficiency of Iraqi banking system is important for three reasons;

**First,** Because Iraq is currently an Observer Member in WTO, and the banking and financial sectors will face serious challenges in the near future because they will be considered for financial liberalization. The banking system in Iraq will be affected by this challenging environment because, with banking liberalization, inefficient banks will be forced out of the market by more efficient ones. To be able to meet these challenges, bank managers as well as regulators need to determine the level and sources of efficiency in the banking industry as an indicator of performance both of individual banks and of the industry as a whole.

**Second,** For the last ten years, the private sector in Iraq has increased opportunities of investment in public utilities. In addition to, Iraqi government has faced the challenges of reforming their economy, through diversifying their sources of income, and adjusting expenditure to conform the developments in public revenues. To meet these challenges, the private sector needs to assume a larger role in economic activities. One vehicle through which the role of the private sector can be enhanced is privatization. Privatization is meant to reduce the role of the public sector in the economy and to stimulate economic activities and development by increasing the contribution of the private sector. In this regard, the banking and financial sector is expected to play an active role in mobilizing national savings to finance the reconstruction and development projects to be implemented under the privatization program or finance the reconstruction and development projects. The efficiency of banks best for performing this function.

**Third,** The study of efficiency features will help policy makers to evaluate how banks will be affected by increasing competition so that they can formulate policies that promote (develop) the banking sector and the economy as a whole.

### **Study's Questions Hypotheses:**

In this study, we will investigate and analyze the level of efficiency in Iraqi banking sector. For achieving this, we will focus our attention on the following questions:

- 1- Is banking sector performance in Iraq has the same level of efficiency ?
- 2- Are the public banks more efficient than private banks?
- 3- Are the Islamic banks more efficient than their traditional counterparts?

### **Study's Objectives**

- 1- Estimating the levels of economic efficiency of the banking sector in Iraq during the period 2007 -2010.
- 2- Comparing the average levels of efficiency between public banks and private banks, and between traditional and Islamic banks.

### **Prior Works**

#### **1- (Wade et al., 2005) Study:**

This study aimed to determine the effect of ownership on banking performance for the period from 1992- 1997, and determine the financial liberalization policies and the banking reform in banking efficiency in Tunisia, using the model of DEA. The study found that the efficiency of private banks in Tunisia higher than the efficiency of State-owned banks, because the participation of foreign investors in the ownership of private banks.

#### **2- (Shahooth & Battall, 2006) Study:**

The study aimed to measure the cost efficiency for (24) Bank of the Arab Islamic banks for the period of (1999-2001), and used the model (DEA) and popping results that the banking efficiency levels improved, with the number of inefficient banks increased from 9 in 2000 to (16 ) in 2001, also used this study to determine the efficient banks on the period of the study is the latest style window analysis, and concluded that only three

banks from the sample have achieved full efficiency during the same period.

**3- (Sufian, 2007) Study:**

The study aimed to compare the relative efficiency of traditional banks and Islamic banks operating in Malaysia for the period of (2001-2004), using a model (DEA), and the study concluded that efficiency indicators in 2002 were low and then rebounded in the years that followed. The study also concluded that the Islamic banks in Malaysia are less efficiency than traditional banks. The study showed that the cause of inefficiency in Islamic banks in general, due to it does not work at the optimal size of the level of production.

**4- (Alsarhan, 2009) Study:**

This study aimed to technical competence 50 banks in the Arab Gulf Cooperation Council (GCC) for the period 2000-2007 . It was efficiency analysis in two phases, the first is the use of DEA program to estimate the banking efficiency using return on the changing size model, in the second phase of the use of the style of downhill (Tobit) to determine the specific impact of banking efficiency factors. Showed the results of the first phase improve banking efficiency are increasingly in the study sample levels, and more banks efficiency were in Qatar, followed by Bahrain and the United Arab Emirates, and that there is a direct correlation between the levels of efficiency and size of profits, as the results of this phase also showed that more efficiency than Islamic banks and traditional.

**5- (Barry et al., 2010) Study:**

This study aimed to know the ownership of the bank's impact on the level of efficiency in 6 countries of South-East Asian during the period from 1994 to 2004, were used to estimate the DEA program of technical competence of the banks. The study concluded that the highest level of the banking efficiency was in South Korea, was in the Philippines.

**6- (Ibraheem, 2015) Study:**

The practical problem faced by the General Company for Land Transport to reach the efficiency of their operations and try to find a solution to the problems relating to the performance of its business process, through the improvement of the business process, and access to the business the most efficient process, has been the use of the program (DEA)

to analyze the data to determine the General Company for transfer efficiency wild and branches productivity. The study found that there are deficiencies in the level of efficiency achieved by the General Company for Land Transport and its subsidiaries productivity; there is also a disparity in the levels of productivity that efficiency between branches of the company.

#### **7- (Islam, 2015) Study:**

The study aimed To measure the efficiency of in 22 Iraqi banks for (2007-2010), the study adopt the output oriented model ,we select two output (investment and loans) , three inputs (expensive of labor , capital and deposits)

The rest of paper is as follow: Section two conserved with efficiency concepts, section three provides a brief overview of the methodology, section four discusses data and results and the final section concludes.

## **2- Efficiency Concepts**

The interest in the best usage of resources within the framework of So-called efficiency began since ancient times, and that for reasons related to the element of scarcity that characterized most of the resources, and it is in many ways, and resulted in many of the concepts and theories about the concept of efficiency and ways to achieve them (guide & Ruslan, 1989). Efficiency Usually measured through the relationship between input and output, or how to successfully transform inputs into outputs (Bartuseviciene & Sakalyte, 2013).

The concept of efficiency is linked to the concept of performance measurement (Kibe, 2014), as it refers to reduce the efficiency, and improvement the use of resources in a way to make the same amount of input produce more output (Homayounizadpanah & Baqerkord, 2012). This is called production efficiency defined as maximizing output at less costs. Efficiency is a relationship between the amount of resources used in the production process and the product of that process (peaceful, 1985).

It can distinguish two main importance in measuring the efficiency of organizations to exploit their resources; it launched the first direction of the closed-system perspective, which focused on the resources used by the organization as inputs to outputs (Abu Fara, 2001). And highlights the efficiency in this direction through the ability of internal activities to reduce the cost of inputs, the organization is more efficient as reduced cost of

inputs to outputs, without negative impact on the quality, quantity and price of output.

While launched the second direction indicated by (Narayanan & Nath 1993), the concept of an open system, as it focused on efficiency as a basis for achieving the organization's survival and continuity, given that the primary goal of the unity of strategic business is to adapt to the environment (Abu Fara,1998).

There are several entrances can be described as strategies that can choose some or all by the organization to improve efficiency are as follows: (Heizer & Render, 2009).

- a. Reduce the input with output stability.
- b. Increase output with the stability of inputs.
- c. Increase the outputs with the increase the inputs by lower rate.
- d. Reduce output while reducing input at a higher rate.
- e. Increase output while reducing input, and this is the entrance of the best entrances, as they are on the way to achieve greater output with less input.

The concept of efficiency is linked to the concept of effectiveness. There are three trends confirm this fact. The first focused on efficiency, the second face of the effectiveness, recalling (Hassan, 1989) noted that the efficiency and effectiveness are two faces of successful organization the second direction on the effectiveness as an extension of efficiency, it must check the organization a certain degree of efficiency and effectiveness at the same time, in order to maintain the survival and continuity (Al-Hiti & Al-Obeidi, 1995). The third trend goes from the concept to the concept of efficiency and effectiveness link their use of indicators to measure the success of organizations (Herbert, 1981).

The concept of efficiency found the attention of scientific, to expand the dimensions and diversity of trends, until it came to associate with the concept of effectiveness, which reflects the degree of achieving the organization's objectives while the efficiency reveal the best method for disposal of the Organization with the available resources to achieve the goals (Skinner, 1990).

It is useful to clarify the concept of efficiency in order to avoid confusion between both concepts, especially since the standard of efficiency is the most important function of the success of the Organization's standards, it was known as the effectiveness of the degree

to which the organization achieve its goals (Daft, 2000). In the sense that it represents the organization's ability to achieve its goals, which cannot continue to maintain without them, and lead to the signal of the need for precision in setting goals, and some believe that the goals objectives outputs and objectives of supporting or dolly may be, as is the output targets, is a product that can affect the environment surrounding the organization, either chock objectives are that reduce the severity of the circumstances surrounding the organization needed to achieve the organization's mission (Lee, 2004).

Efficiency analysis is concerned with measuring the competence with which inputs are converted into valued outputs. In general, it treats the organization as a black box, and does not seek to explain why it exhibits a particular level of efficiency (Fried, Lovell & Schmidt 1993).

The most common concept of efficiency is ' Technical Efficiency' (TE) which means transferring physical inputs such as labor and capital into outputs at the best level of performance.. TE is represented by a minimum combination of inputs necessary to produce specific level of output (Al- Delaimi & Al-Ani ,2006). As result a high degree of TE means either the possible increasing in outputs by using specific quantity of outputs, when there is no waste. Health care center considered TE as compared to other center if it produced the same level of outputs by less input, or more of outputs by the same or less inputs.

A starting point for examining the basic notion of efficiency is shown in Figure 1, which illustrates the case of just one input and one output. The line OC indicates the simplest of all technologies: no fixed costs and constant returns to scale. A technically efficient organization would then produce somewhere on this line, which can be thought of as the production possibility frontier (Jacobs et al., 2006). Any element of inefficiency would result in an observation lying strictly below the line OC. For an inefficient organization located at P0, the ratio  $XOP_0/XOP^*0$  offers an indication of how far short of the production frontier it is falling, and therefore a measure of its efficiency level.

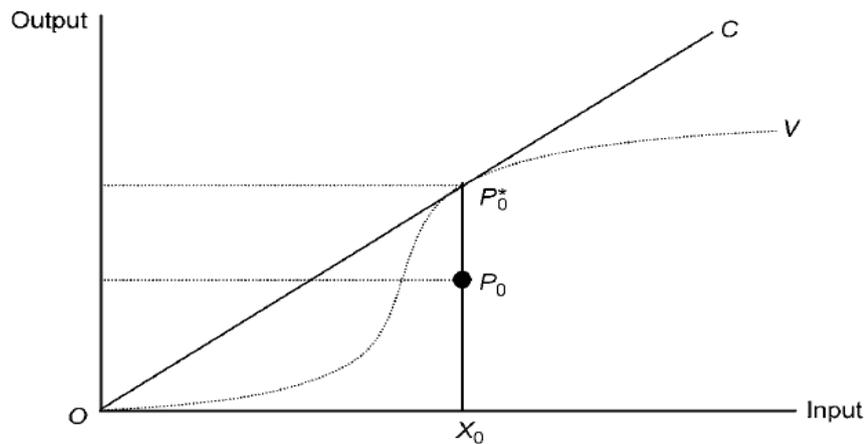


Fig 1. Efficiency measurement under constant returns to scale.

Source: Jacobs R, Peter C. Smith and Andrew Street (2006) *Measuring Efficiency in Health Care: Analytic Techniques and Health Policy*, Cambridge University Press, New York.

Many other technologies are possible. For example, the curve  $OV$  indicates a frontier with variable returns to scale. Up to the point  $P^*0$ , the ratio of output to input decreases (increasing returns to scale), but thereafter it increases (decreasing returns to scale).

We have so far assumed constant returns to scale. That is, the production process is such that the optimal mix of inputs and outputs is independent of the scale of operation. In practice there exist important economies and diseconomies of scale in most production processes. This is illustrated in Figure 2 for the case of one input and one output. The production frontier is illustrated by the curve  $OV$ , which suggests regions of increasing and decreasing returns to scale. The optimal scale of production is at the point  $P^*$  where the ratio of output to input is maximized. Although lying on the frontier, the points  $P1$  and  $P2$  secure lower ratios because they are operating below and above (respectively) the scale-efficient point of production. (Jacobs et al., 2006).

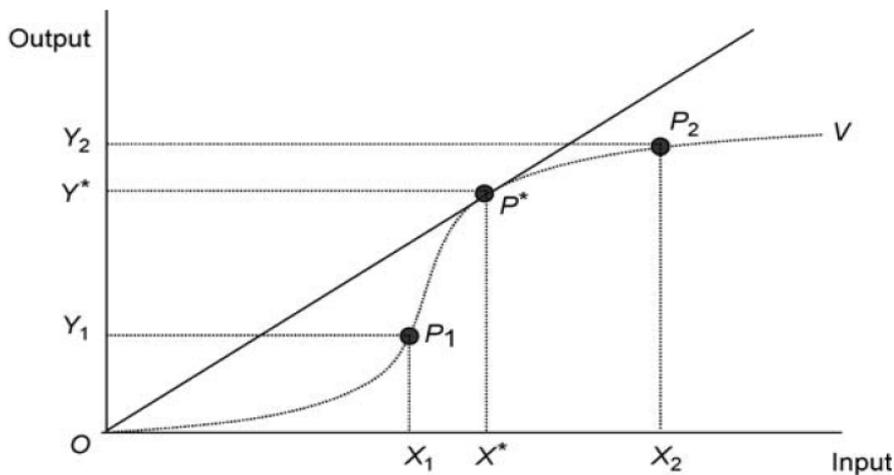


Fig.2 Economies of scale.

**Source:** Jacobs R, Peter C. Smith and Andrew Street (2006) *Measuring Efficiency in Health Care: Analytic Techniques and Health Policy*, Cambridge University Press, New York.

### 3- Data Envelopment analysis

Data envelopment analysis (DEA) is a technique for measuring the relative efficiency of decision making units (DMUs) with multiple inputs and outputs (Charnes et al., 1978, 1994; Banker et al., 1984). The method has become popular in banks performance measurement. There are various kinds of DEA methods such as constant return to scale (CRS), variable return to scale (VRS), (Cooke & Zhu, 2005). DEA measures the efficiency of the decision making unit (DMUs) of a unite by comparison with best firm in the sample to drive compared efficiency. DEA submits subjective measure of operational efficiency to the number of homogenous entities compared with each other, through a number of samples unit which form together a performance frontier curve envelopes all observations. (Al-Delaimi & al-Ani, 2006). In this study we adopted the output oriented model with variable return to scale to estimate efficiency score, this model developed by (Banker et al., 1984):

$$\begin{aligned} \theta^* &= \max_{\theta, \lambda} \theta \\ \text{s.t. } \theta x_{io} &\leq \sum_{j=1}^n \lambda_j x_{ij} \quad i = 1, \dots, m \\ y_{ro} &\geq \sum_{j=1}^n \lambda_j y_{rj} \quad r = 1, \dots, s \\ \sum_{j=1}^n \lambda_j &= 1 \\ \lambda_j &\geq 0 \quad \forall j \end{aligned}$$

where  $x_{ij}$  and  $y_{rj}$  denote the levels of the  $i$ th input and  $r$ th output of the  $j$ th banks,  $j = 1, \dots, n$ . The first two constraints require that the performance of a given bank  $o$  in terms of its inputs  $x_{io}$  and outputs  $y_{ro}$  is located within a production possibility set defined by the envelopment of all data points. The last two constraints, where  $\lambda$  is an  $N \times 1$  vector, allow for variable returns to scale by imposing a convexity restriction which generates a frontier in the form of a convex hull of intersecting planes.

#### 4- Data and Results

##### 4.1- Data

Data collected for (22) Iraqi banks, for the period of (2007-2010), through the Central Bank of Iraq and Iraq Stock Exchange and annual reports of Iraqi private banks. We identified three inputs banking (capital, labor expenses, and deposits), while the output included investments and loans, it was to follow the way of financial intermediation.

Many studies indicate the existence of two methods in the definition of inputs and outputs of banking activity, namely: (production) provided by the method (Sherman & Gold, 1985), which sees the banks as institutions produce deposits and loans, and define input as labor and capital, and critical of this method is ignored the cost of interest, and to give greater attention to the cost of labor and capital, and this is why it may ignore the nature of the primary function of banking institutions. The way is the (Intermediation Approach) provided by (Berger & Humphrey, 1999), it runs from the traditional role of banks as financial intermediaries, the task of converting financial assets of units that have a surplus to units that deficit, and consists inputs banking process according to the method of (labor, capital, and deposits), while the banking process outputs represented in income-generating assets in the bank's budget, and also

called assets in a way because they limit the output in the asset side only (Hjalmaisson et al, 1999: 266).

This was confirmed by (Shaffer & David, 1999), who believes that the deposits are considered input in the banking production function, because it positively costs and do not check any income, to be transferred to the assets. This means that the deposit is one of the elements of production by way of financial intermediation, therefore, the total cost of inputs to the production process includes a work-related operating expenses, and capital, and the expenses of interest on deposits, as a component of the cost of deposits.

It was relying on the method of banking intermediation in determining the inputs and outputs of Iraqi banks, and this study is consistent with number of studies as (Avkiran, 2011) , (Mustafa, 2009); (Sufyan, 2007); (Shahooth & Battal, 2006); And (Anwar, 2011) used the method of banking intermediation in the measurement of the efficiency of banks using the method of (DEA).

According to the intermediation Approach, input elements has been identified (capital, labor, and time deposits), while the outputs elements are identified (investments and loans). This study has adopted a variable returns to scale changing of output oriented in measuring the efficiency of Iraqi banks for two reasons:

- a. On the assumption that the Iraqi private banks did not reach the optimal size for the recent emergence of most of them.
- b. The choice of a variable returns to scale changing with outputs oriented, it means the ability to increase banking outputs, and the inability to reduce the banking inputs, because of conditions imposed by the Central Bank, which include not least the bank's capital about 250 billion Iraqi dinars, and therefore be error of applying the model of variable returns to scale of inputs oriented.

Table (1) shows the descriptive statistics for the inputs and outputs of the study sample of Iraqi banks, for the period of (2007-2010).

Tab (1) descriptive statistics for Iraqi Banks for periods 2007-2010 (billion ID)

Banks		Investment	loans	labor	capital	deposits
ASHUR	Mean	6.36	68.66	1.03	1.25	2.92
	Std. Deviation	6.72	51.72	0.46	0.16	0.12
Babylon	Mean	17.71	2.77	1.21	0.64	5.29
	Std. Deviation	8.29	1.17	0.45	0.31	2.38
Baghdad	Mean	91.44	148.72	4.75	6.03	7.18
	Std. Deviation	61.05	55.74	2.64	2.38	2.35
Commercial	Mean	10.15	111.15	1.09	6.03	9.27
	Std. Deviation	9.74	66.62	0.13	4.62	8.49
CREDIT	Mean	12.42	207.36	3.92	2.88	8.24
	Std. Deviation	5.76	100.31	0.44	0.49	3.72
Daressalam	Mean	12.57	34.53	4.56	9.29	8.70
	Std. Deviation	4.84	65.78	1.15	2.63	5.23
Dijlah&Furat	Mean	33.70	22.11	1.28	2.26	0.69
	Std. Deviation	17.45	14.79	0.50	1.05	0.32
Economy	Mean	58.53	2.63	2.72	2.86	3.74
	Std. Deviation	59.26	1.74	1.97	1.75	3.27
ELAF	Mean	11.21	2.55	0.63	1.84	0.45
	Std. Deviation	12.65	1.70	0.47	0.78	0.43
GULF	Mean	29.86	108.68	3.59	2.44	5.70
	Std. Deviation	13.84	34.78	1.23	0.61	1.44
Investment	Mean	36.30	1.97	2.23	2.15	3.76
	Std. Deviation	31.19	1.22	0.49	0.86	0.50
Iraqi	Mean	2017.51	1134.16	9.07	27.34	24.00
	Std. Deviation	774.39	777.21	4.07	3.13	27.57
Iraqi Islamic	Mean	7.94	3.52	0.79	0.47	0.14
	Std. Deviation	5.96	2.61	0.25	0.18	0.09
Kurdistan	Mean	22.47	34.24	2.51	2.76	5.33
	Std. Deviation	35.45	46.82	0.78	0.71	2.78
Mansour	Mean	13.08	85.83	0.96	1.01	2.60
	Std. Deviation	15.43	18.09	0.29	0.28	1.28
Middle east	Mean	60.37	106.10	6.07	4.02	13.59
	Std. Deviation	59.03	79.55	0.81	0.68	3.73
Musel	Mean	44.13	5.96	1.62	1.13	1.29
	Std. Deviation	25.21	1.95	0.57	0.30	0.29
NATIONAL	Mean	18.55	11.76	2.14	1.22	1.56
	Std. Deviation	13.35	8.25	0.21	0.23	0.42
North	Mean	124.91	4.13	3.38	2.42	20.03
	Std. Deviation	68.58	4.17	1.26	0.66	7.72
Rasheed	Mean	1587.15	1582.58	42.07	24.13	64.80
	Std. Deviation	835.12	1099.91	30.54	35.16	7.53
SUMMER	Mean	31.19	2.23	0.98	0.82	1.43
	Std. Deviation	19.62	1.53	0.26	0.31	1.55
UNITED	Mean	93.70	4.93	1.35	0.84	4.45
	Std. Deviation	123.33	2.68	0.88	0.54	4.90
Total	Mean	197.33	167.57	4.45	4.72	8.87
	Std. Deviation	558.32	463.64	10.28	9.68	14.96

Source : 1-Central bank of Iraq , Yearly Bulletin from 2007-2010. 2-Iraq stock exchange , yearly financial banks report from 2007-2010.

## 4.2- Results

The results showed that eleven banks achieved full efficiency with (VRS) method, and seven banks get full efficiency according to constant returns to scale during the period 2007-2010. The study found that the public banks are more efficient than private banks, the average efficiency for public banks is 0.995, in terms of (VRS) whereas private banks is 0.78, this can be explain by government support to those public banks and those banks not under the supervision of central bank of Iraq ( see fig 3). The results showed that 27% of Iraq banks reach the Economic optimal size, Which indicates that more than two-thirds of Iraqi private banks did not reach the economic optimum size, and is due to the fact that most of these small banks size relatively, to focus mostly in the city of Baghdad, and they do not possess only a few branches in other Iraqi cities, which reflected negatively on the size its operations, and these results are consistent with a study (Sufian, 2007), which found that the percentage of banks that operate in Malaysia optimal size ranged between 26% and 35% during the period from (2001-2004).

The results showed that (5) of Iraqi private banks from the total of (7) with foreign participation in capital achieved full efficiency by VRS, which means high-impact of foreign property in the improvement of these banks, in addition to the experience gained from such prestigious banks. This is consistent with the study of (Barry et al, 2011), which found that the participation of foreign investors in the ownership of traditional banks in Malaysia, may have led to improved efficiency.

Results also showed that the traditional best of the banks, Islamic banks efficiently in (VRS) model, and is due to the fact that the number of Islamic banks involved in the evaluation were few, as well as boiling expertise in a few banking business, which was reflected in the low level of efficiency, as well as the subordination of Islamic banks to the requirements of the Islamic law, which limit the increase of its operations, and that these banks regulated by the Central Bank such as conventional banks, although not awarded preference of the central bank, apart from the other banks, and these results are not consistent with the study (Alsharhan, 2009).

Table (2) Technical efficiency score of Iraqi banks.

Banks	constant returns to scale efficiency	Viable returns to scale efficiency	Scale efficiency	Return to scale
Iraqi	1.00	1.00	1.00	-
Rasheed	0.99	0.99	1.00	drs
Mean of public banks	1.00	1.00	1.00	
Baghdad	1.00	1.00	1.00	-
North	1.00	1.00	1.00	-
Middle east	0.97	1.00	0.97	irs
Daressalam	1.00	1.00	1.00	-
CREDIT	1.00	1.00	1.00	-
SUMMER	0.01	0.02	0.85	irs
UNITED	0.31	1.00	0.31	irs
GULF	0.52	0.93	0.56	irs
Investment	0.23	0.32	0.74	irs
Economy	0.29	0.39	0.73	irs
Commercial	0.32	1.00	0.32	irs
Musel	0.30	1.00	0.30	irs
Mansour	0.54	1.00	0.54	irs
Babylon	0.45	0.83	0.54	irs
ASHUR	0.19	0.28	0.68	irs
Mean of private banks	0.54	0.78	0.70	
Iraqi Islamic	0.26	0.40	0.65	irs
NATIONAL	0.03	0.05	0.63	irs
ELAF	0.59	0.78	0.76	irs
Dijlah&Furat	0.42	0.95	0.45	irs
Kurdistan	1.00	1.00	1.00	-
Mean of Islamic banks	0.46	0.64	0.70	
Overall mean	0.565	0.769	0.728	

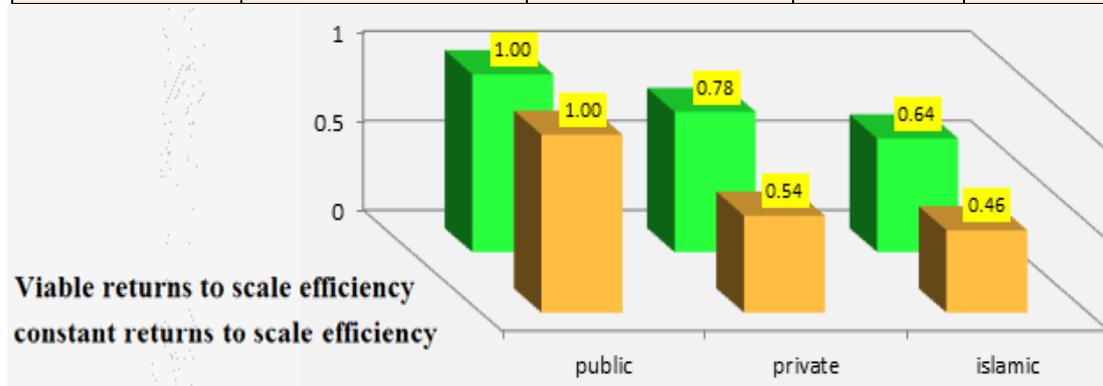


Fig (3) shows the efficiency level in Iraqi banks.

## 5 – Conclusions

The study aimed to measure the efficiency of Iraqi private banks, for the period from the year 2007 – 2010, by using data envelopment analysis, and adopted (VRS) model with output oriented. The results showed for (11) Bank are getting full efficiency, with an average efficiency of (0.77) in terms of (VRS), and this means that there is an un used resource by (0.23), and showed that the government banks were more efficient than private banks, with an average efficiency of government banks (1.00), while the average efficiency of the private banks (0.78), and the reason for this to the absolute confidence in government banks, in addition to government support.

The results showed that the traditional private banks are more efficient than Islamic banks, with an average efficiency of the Islamic banks (0.64), compared private traditional banks (0.78), and can be explained for the reason that the Islamic banks don't to get preferential treatment given to traditional banks from the Central Bank of Iraq, in addition to being subject to the teachings of Islamic law, which makes a limited dealings within the limits of it, and showed scale efficiency of, the average total of all banks is about (0.72), is an indication that it can increase its operations by (0.28).

Results showed by return to scale, that (6) Bank achieved in economic size optimization, while (15) Bank of which operate at increasing return to scale, meaning that any increase input of set by a larger increase outputs, and there is one bank is (Rasheed Bank) works in decreasing return to scale, meaning that any increase in input of set by a smaller increase in output.

## 6 - Recommendations

- a. The Banks that have not achieved the full efficiency should benefit from the reference banks. (See Appendix No. 2).
- b. The need for the integration of small-sized banks, so that they can compete with large private banks and government banks.
- c. Iraqi Central Bank Must give preferential treatment to Islamic banks, through the insurance of preferred by law for Islamic banks and other private banks.
- d. Proceed to create an independent credit intelligence organization, for the private banks to provide financial disclosure to borrowers.
- e. The restructuring of State-owned banks, failing that can be used to participate in the management, through foreign banks, to promote competition in the banking Iraq.

## References

1. Al- Delaimi, Khalid Shahooth Khalaf and Al-Ani, Ahmed Hussein Battall. 2006. "Using Data Envelopment Analysis to Measure Cost Efficiency with an Application on Islamic Banks" Scientific Journal of Administrative Development, Vol: 4. pp. 134-156.
2. Banker, R.D., Charnes, A., Cooper, W.W. (1984). Some models for the estimation of technical and scale inefficiencies in Data Envelopment Analysis. *Management Science*, 30, 1078–1092.
3. Charnes, A., Cooper, W.W., Rhodes, E. (1978). Measuring the efficiency of decision making units. *European Journal of Operational Research*, 2, 429–444.
4. Cooke W, and Zhu J. (2005) *Modeling Performance Measurement : Applications and Implementation Issues in DEA* , Springer, New York,
5. Fried, H. O., Lovell, C. A. K. and Schmidt, S. S. (eds.) 1993. *The Measurement of Productive Efficiency*. Oxford: Oxford University Press
6. Jacobs R, Peter C. Smith and Andrew Street (2006) *Measuring Efficiency in Health Care: Analytic Techniques and Health Policy*, Cambridge University Press, New York.
7. Central bank of Iraq , Yearly Bulletin from 2007-2010
8. Iraq stock exchange , yearly financial banks report from 2007-2010
9. Barry Thierno Amadou , Santos Jose Dacanay III , Amine Tarazi and Laetitia Lepetit (2010) Ownership structure and Bank Efficiency in the Asia Pacific Region, *Journal Philippine Management Review*, Vol.18, (Special Issue).
10. Shahooth, Khalid & Battall , Ahmed Hussein (2006) Using Data Envelopment Analysis to measure Cost Efficiency With an application on Islamic Banks" *Scientific Journal of Administrative Development*, vol. 4.
11. Sherman, H.D. & Gold, F. (1985) Bank Branch Operating Efficiency: Evaluation with Data Envelopment Analysis, *Journal of Banking and Finance*, vol.9, No.2

12. Sufian Fadzlan (2007) The efficiency of Islamic banking industry in Malaysia: Foreign vs domestic banks, *Humanomics* Vol. 23 No. 3 .
13. Wade , Cook , Moez Hababou, & Liang Liang (2005) Financial Liberalization and Efficiency in Tunisian Banking Industry: DEA Test, *International Journal of Information Technology & Decision Making* Vol. 4, No. 3.
14. Alsarhan, Abdulwahab (2009) Banking efficiency in the Gulf Cooperation Council countries: An empirical analysis using Data Envelopment Analysis approach , Unpublished Ph.D. Dissertation Colorado State University, USA.
15. Mostafa, Mohamed (2009) Modeling the efficiency of top Arab banks: A DEA–neural network approach, *Journal of Expert Systems with Applications* Vol.36 . No.1.
16. Berger, A.N. & Humphrey, D.B. (1991) The Dominance of Inefficiencies Over Scale and Product Mix Economies in Banking, *Journal of Monetary Economics*, Vol. 28.No.1.
17. Shaffer, S., & E. David.(1991) Economies of Super scale in Commercial Banking, *Applied Economics*, Vol. 23, No.2.
18. Hjalmarrsson, Lennart, Irene Andersson, and Aziz Mlima. (1999) Swedish Banking Efficiency and Productivity in an International Perspective, Department of Economics, Goteborg University, Goteborg, Sweden, September.
- 19.- Naranayan, V.K., & Nath Raghu,1993," Organization Theory :Astrategic Approach ",(Burr Ridge, Illinois:Richard D.Irwin, Inc.
20. Bartuseviciene, Ilona,& Sakalyte, Evelina, (2013), "Organizational AssesSment: Effectiveness VS. Efficiency", *Social Transformations in Contemporary Society*, No. 1, .
21. Homayounizadpanah & Baqerkord, (2012), "Effect of Implementing Performance Managem990ent on the Productivity, Efficiency and Effectiveness of the Chabahr Municipal Employees", *Research Journal of Applied Sciences, Engineering and Technology* 4(12), pp. 1767-1784.
22. Kibe, Caroline Wanjiku, (2104), " Effects of Communication Strategies on Organizational Performance: A Case Study of Kenya

Ports Authority", European Journal of Business and Management, Vol.6, No.11, pp. 6- 10.

23. Islam Md. Nazmul,(2015)," Production Efficiency of Sugar of Bangladesh: An Application of Data Envelopment Analysis , (D) Global Journal of Management and Business Research, Vol.15, Issue.1, Version.1
- 24.Abou El- Seoud, (2013)," Measuring Efficiency of Reformed Public Hospitals in Saudi Arabia: An Application of Data Envelopment analysis", International Journal of Economics, Vol.2, No.9, PP.44-53.
- 25.Ibraheem, Laith Kahleel,(2015)," Business process re-engineering, and the development of organizational readiness to improve operational efficiency", Field research in the General Company for Land Transport, Thesis (in Arabic Language) submitted to the Council of the College of Administration and Economics at the University of Baghdad, and is part of the requirements for the degree of Doctor of Philosophy in Science Business Administration.

## Appendix (1)

### Inputs and outputs of Iraqi banks for 2007-2010 (Billion Iraqi Dinar)

year	bank	outputs		Inputs		
		investment	loans	labour	capital	Deposit
2007	Iraqi	1145.13	1880.27	4.21	24.76	10.77
2007	Rasheed	719.39	913.98	31.65	4.33	54.96
2007	Baghdad	58.10	84.98	2.04	3.33	4.47
2007	North	88.84	1.01	2.00	2.56	10.04
2007	Middle east	18.50	151.05	4.86	3.31	10.70
2007	Daressalam	19.57	1.48	3.00	6.37	7.83
2007	CREDIT	19.01	155.78	3.31	2.24	9.12
2007	Kurdistan	2.24	7.91	1.44	1.84	6.78
2007	UNITED	1.69	2.11	0.55	0.41	0.46
2007	GULF	15.77	59.14	1.92	1.65	3.59
2007	Investment	24.37	1.30	1.72	1.90	3.98
2007	Economy	4.15	0.06	0.59	0.57	0.42
2007	Commercial	23.43	138.84	0.95	1.58	16.49
2007	Musel	18.54	4.78	0.94	0.84	0.93
2007	Mansour	0.66	69.99	0.56	0.71	0.73
2007	ELAF	0.13	0.32	0.29	0.79	0.20
2007	Dijlah&Furat	14.72	1.00	0.76	1.09	0.50
2007	Babylon	19.93	3.47	0.65	0.41	2.78
2007	ASHUR	3.97	0.51	0.49	1.07	3.09
2007	Iraqi Islamic	2.31	2.55	0.50	0.25	0.15
2007	NATIONAL	7.19	0.44	2.15	1.46	1.09
2007	SUMMER	11.86	2.23	0.70	0.38	0.29
2008	Iraqi	1613.17	1410.17	7.69	25.49	65.21
2008	Rasheed	1539.91	424.89	62.65	8.53	71.03
2008	Baghdad	47.37	217.15	3.28	4.75	10.05
2008	North	70.51	1.59	2.91	2.06	18.04
2008	Middle east	16.54	187.57	6.32	3.63	18.85
2008	Daressalam	10.60	1.66	4.42	8.35	15.85
2008	CREDIT	5.09	143.79	3.89	2.77	12.38
2008	Kurdistan	3.14	7.95	2.40	2.78	4.16
2008	UNITED	1.23	7.90	0.73	0.41	0.15
2008	GULF	21.22	129.90	3.41	2.39	6.73
2008	Investment	13.07	1.33	2.00	1.31	4.05
2008	Economy	24.38	3.08	1.52	2.47	2.38
2008	Commercial	10.14	12.63	1.11	2.61	16.75
2008	Musel	26.42	5.02	1.39	0.92	1.63
2008	Mansour	3.49	111.29	0.91	0.91	2.85
2008	ELAF	0.54	2.12	0.81	1.69	0.25
2008	Dijlah&Furat	23.70	23.80	0.93	1.66	0.37
2008	Babylon	8.91	4.05	1.06	0.41	3.89
2008	ASHUR	1.98	113.51	0.83	1.45	2.92
2008	Iraqi Islamic	9.03	0.34	0.70	0.41	0.26
2008	NATIONAL	10.46	15.32	1.89	1.01	1.82
2008	SUMMER	16.75	4.39	0.89	0.92	0.64
2009	Iraqi	2828.34	49.98	10.65	27.37	7.20
2009	Rasheed	1367.00	2200.34	70.26	6.84	70.34
2009	Baghdad	79.50	163.20	5.67	7.81	7.82
2009	North	116.48	3.81	3.63	1.78	24.77
2009	Middle east	63.80	77.07	6.61	4.27	13.61
2009	Daressalam	8.51	1.77	5.53	9.81	7.84
2009	CREDIT	11.73	173.14	4.16	3.35	8.11

2009	Kurdistan	75.45	16.92	3.06	2.84	2.06
2009	UNITED	109.78	3.31	1.69	0.97	7.32
2009	GULF	36.59	135.53	4.34	2.60	6.05
2009	Investment	25.44	1.43	2.34	2.05	4.01
2009	Economy	67.50	3.58	4.23	4.49	8.11
2009	Commercial	6.66	159.53	1.27	9.02	1.72
2009	Musel	65.40	5.17	1.97	1.27	1.30
2009	Mansour	13.43	76.76	1.10	1.07	3.51
2009	ELAF	20.29	3.98	0.21	2.46	0.25
2009	Dijlah&Furat	52.28	34.91	1.68	3.00	0.81
2009	Babylon	13.87	1.72	1.43	0.65	6.49
2009	ASHUR	3.13	103.75	1.39	1.24	2.81
2009	Iraqi Islamic	4.58	4.96	0.88	0.54	0.10
2009	NATIONAL	19.57	19.73	2.12	1.04	2.00
2009	SUMMER	46.97	1.10	1.03	0.84	1.08
2010	Iraqi	2483.40	1196.22	13.73	31.74	12.83
2010	Rasheed	2722.30	2791.10	3.72	76.81	62.87
2010	Baghdad	180.80	129.54	7.99	8.22	6.40
2010	North	223.80	10.12	4.99	3.28	27.27
2010	Middle east	142.63	8.70	6.48	4.85	11.18
2010	Daressalam	11.58	133.20	5.30	12.61	3.29
2010	CREDIT	13.85	356.74	4.32	3.17	3.37
2010	Kurdistan	9.03	104.18	3.14	3.58	8.33
2010	UNITED	262.09	6.40	2.44	1.55	9.88
2010	GULF	45.87	110.16	4.68	3.11	6.45
2010	Investment	82.33	3.80	2.86	3.35	3.02
2010	Economy	138.09	3.81	4.56	3.93	4.04
2010	Commercial	0.36	133.59	1.02	10.90	2.13
2010	Musel	66.16	8.89	2.19	1.47	1.32
2010	Mansour	34.71	85.30	1.25	1.36	3.32
2010	ELAF	23.89	3.77	1.21	2.40	1.09
2010	Dijlah&Furat	44.10	28.72	1.73	3.29	1.08
2010	Babylon	28.14	1.86	1.70	1.07	8.00
2010	ASHUR	16.37	56.88	1.44	1.22	2.87
2010	Iraqi Islamic	15.84	6.22	1.09	0.66	0.05
2010	NATIONAL	36.97	11.55	2.41	1.36	1.34
2010	SUMMER	49.18	1.21	1.32	1.12	3.71

**Source :**

1-Central bank of Iraq , Yearly Bulletin from 2007-2010

2-Iraq stock exchange , yearly financial banks report from 2007-2010

## Appendix (2)

### Reference banks.

Banks	Peers				
<b>Iraqi</b>					
<b>Rasheed</b>	<b>North</b>	<b>Iraqi</b>	<b>Credit</b>	<b>Baghdad</b>	
<b>Baghdad</b>	<b>Baghdad</b>				
<b>North</b>	<b>North</b>				
<b>Middle east</b>	<b>Middle east</b>				
<b>Daressalam</b>	<b>Daressalam</b>				
<b>Credit</b>	<b>Credit</b>				
<b>Kurdistan</b>	<b>Kurdistan</b>				
<b>United</b>	<b>United</b>				
<b>GULF</b>	<b>Credit</b>	<b>Mansour</b>	<b>Iraqi</b>	<b>United</b>	
<b>Investment</b>	<b>Iraqi</b>	<b>United</b>	<b>Credit</b>		
<b>Economy</b>	<b>United</b>	<b>Credit</b>	<b>Iraqi</b>	<b>Baghdad</b>	
<b>Commercial</b>	<b>Commercial</b>				
<b>Musel</b>					
<b>Mansour</b>					
<b>Elaf</b>	<b>Baghdad</b>	<b>Mansour</b>	<b>Daressalam</b>		
<b>Dijlah&amp; Furat</b>	<b>Credit</b>	<b>Iraqi</b>	<b>United</b>	<b>Mansour</b>	
<b>Babylon</b>	<b>Credit</b>	<b>Mansour</b>	<b>Iraqi</b>	<b>United</b>	
<b>ASHUR</b>	<b>Mansour</b>	<b>Credit</b>	<b>Iraqi</b>	<b>United</b>	<b>Commercial</b>
<b>Iraqi Islamic</b>	<b>Baghdad</b>	<b>Credit</b>	<b>Commecia</b>		
<b>National</b>	<b>Baghdad</b>	<b>United</b>	<b>Kurdistan</b>	<b>Commercial</b>	
<b>SUMMER</b>	<b>Baghdad</b>	<b>Mansour</b>	<b>Commercial</b>	<b>Iraqi</b>	