



Measuring the Technical Efficiency of the Private Commercial Banks in Iraq Using Data Envelopment Analysis (DEA)

Prof. Dr. Abdul Ameer A. H. Al-Ali*
Prof. Dr. Z. A. Al-Hemyari**
and Researcher Ahlam Hameed Alabasy***

*Al-Esraa University - College of Administration and Economics,
Dept. of Accounting, Baghdad / Iraq

**University of Nizwa, Oman / Sultanate of Oman

***Iraqi Central Bank , Baghdad / Iraq

E-mail : abdalameer@esraa.edu.iq

قياس الكفاءة النسبية للمصارف التجارية الخاصة في العراق باستخدام تحليل مغلف البيانات

أ. د. عبد الامير عبد الحسين العلي*

أ. د. زهير عبد الامير الحميري**

و الباحثة أحلام حميد العباسي***

*جامعة الاسراء - كلية الادارة و الاقتصاد \ قسم المحاسبة , بغداد \ العراق

**جامعة نزوه , عمان \ سلطنة عمان

***البنك المركزي العراقي , بغداد \ العراق



Abstract

In this research, the relative efficiency of commercial bank of Iraq was measured to select the effective banks that were able to use the available amount of inputs to achieve bigger outputs, and select the non-effective banks, In addition, setting new requirements for the non-effective banks to accomplish to achieve the relative efficiency, by using data envelopment analysis to financial data for the period (2013-2020).

This research has concludes numerous results and they are, most of the banks that didn't achieve optimal outputs, as it indicated that the union bank of Iraq is the bank that achieved the highest relative efficiency (0.926) for the period (2013-2020) and credit bank of Iraq has achieved the lowest relative efficiency (0.396) during the research period.

The research has recommended the banks that didn't achieve optimal relative efficiency to exploit their available resources in better way.

Keywords:

Data Envelopment Analysis (DEA), Relative efficiency, Commercial banks.



المستخلص

تناول البحث استخدام قياس الكفاءة النسبية للمصارف التجارية العراقية الخاصة , وتحديد البنوك الفعالة القادرة على استخدام الكميات المتاحة من المدخلات لتحقيق مخرجات اكبر , وكذلك تحديد البنوك الغير فعالة بالاضافة الى وضع متطلبات جديدة للمصارف التجارية العراقية الغير كفوءة لتحقيق الكفاءة النسبية بأستخدام تحليل مغلف البيانات للفترة من (2013-2020) , وتوصل البحث الى نتائج عديدة منها أن معظم المصارف لم تحقق المخرجات المثلى حيث ان مصرف الاتحاد العراقي حقق اعلى كفاءة نسبية (0.926) للمدة (2020-2023) , وقد حقق مصرف الائتمان العراقي ادنى كفاءة نسبية (0.396) .

واوصى البحث بأن تقوم المصارف التجارية التي لم تحقق الكفاءة النسبية المثلى باستغلال مواردها المتاحة بشكل افضل.

الكلمات المفتاحية : تحليل مغلف البيانات , الكفاءة النسبية , المصارف التجارية



1 - Introduction

The commercial banks play an important role in the economics of Iraq by providing the sufficient funding for the companies and projects, the bank efficiency is considered a primary factor for financial institutes that seek to achieve their goals, (Henriques, Iago cotraim, Sobreiro, Herbert Kimura, *et al.*, (2018).

This study aims to determine efficient financial banks that were able to use available amount of inputs (capital, deposits) to achieve better outputs (cash credit, pledged credit, investments, profit), determine the inefficient commercial banks that were unable to achieve better outputs by using the available inputs also determine the amounts of inputs that should be increase or decrease by inefficient banks to achieve perfect efficiency, there are many types of bank efficiencies such as artistic efficiency which represents the banks' ability to achieve the best result using the available resources, also efficiency refers to ability of the banks to produce output with minimal resources or input, (Othman *et al.*, 2016), volumetric efficiency that determines if the bank works in the optimal volume, volumes returning either will be constant which means the outputs increase in the same amount as the inputs do, or means the outputs increase is more than inputs increase, this indicates the expansion of banks activity, volumes returning is diminishing which means the inputs increase is more than outputs, specialty efficiency indicates the banks' ability to use the inputs or outputs in an optimal ratio.



2. Method of Research

The liner programming was used to measure the relative efficiency for multiple commercial banks (decision making unit) by selecting the best mix of inputs group (capital, deposit) and outputs group (cash credit, pledged credit, investments, profit) during the period (2013-2020), the efficiency indicator should be between (1) which represents optimal efficiency and, (0) which represents inefficacy

If we assume the availability of a set of decision - making unit (XK.YK), $K=1, \dots, K$

For input X and output Y, we may build a data envelopment analysis method in case of maximization as Follows:

$$T = \{(x, y): \sum_{k=1}^k z_k X_{kn} \leq x_n \dots \dots \dots n = 1, \dots, N \quad (1)$$

$$\sum_{k=1}^k z_k Y_{km} \geq y_m \dots \dots \dots m = 1, \dots, M$$

$$z_k \geq 0 \quad k = 1, \dots, K\}$$

It is assumed that each (DMA) produces at least on type of output, it requires that each DMA uses at least one input, also it requires positive input and output (Zhu,2016:13)

3. Data envelopment analysis

Data envelopment analysis method is considered one of multi- criteria decision making in which we can choose the “ most suitable “ or “ desirable



“ alternative from a large group of choices, and when it is necessary,taking into account many features, like objective function of the decision maker DEA, also help facilitating analysis by providing a single digit score referred to as “efficiency”, the efficiency according to the analysis of the data envelop by dividing the total weighted outputs on the total weighted inputs for all decision- making units, depending on the efficiency we have through the use of mathematical models (liner programming) ,and the efficiency index value is between (0-1) when it indicates value of “1” that has a complete efficiency but when the unit indicates a value of “zero” which means it a lacks efficiency (Zanboori, *et al.*, 2014:1). the application of data envelopment analysis requires data ability of asset of basic condition, which are as follows (AL- Delaimi and AL-Ani,2006):-

- 1- The input and output variables must be positive and non-zero numbers.
- 2- The nature of the relationship between input and output should be direct, which means that any increase in input leads to an increase in output.
- 3- The sample size upon submitting should be more than or equal to three times the total input and output.
- 4- The correlation of the decision - making units or the sample under research, which means that all variables in the evaluation group must have data on input and output in positive qualities.



4. Applied study

First; research sample

The research sample included (18) Iraqi commercial banks for the period (2013-2020), which means we have (144) observations, which is a large sample that allows a comparison between same bank and over a period of time, and the method of exit guidance was applied because the bank seeks to achieve the greatest value from their output according to the input they have, and by depending on a method of financial meditation in determining the input and output, so four outputs were determined (Cash credit, Pledge credit, Investments, Profits).

For the input, (Capital, Deposits).

The following are the average of the inputs and outputs of research sample bank for period 2013-2020 (numbers in Iraqi dinar)

Table (1) The average indication under the study of the bank, the sample of bank, the research found in (2012-2020)

Bank	Capital	Deposits	Cash Credit	Pledged Credit	Investments	Profit
United Bank for Investment	300000.0	169687.8	325664.5	810670.1	6602.1	7836.4
National Bank of Iraq	237750.0	271724.1	160464.0	292706.5	20563.8	8846.8
Investment Bank of Iraqi	238125.0	251189.1	147672.4	115334.0	7299.3	11547.9
Credit Bank of Iraq	237500.0	220218.4	1667.1	108915.6	100159.9	6096.6
Iraqi Middle East Investment Bank	237500.0	348222.8	129036.5	81248.4	14053.1	5216.5
Union Bank of Iraq	239500.0	238761.5	375037.3	425245.5	353.0	7493.8
Gulf Commercial Bank	293750.0	318857.5	230076.4	284754.5	28401.9	12960.8
Commercial Bank	237500.0	139648.8	10482.4	33298.4	49688.3	11994.4
RT Bank	250000.0	291176.5	140543.5	88203.9	1091.8	11994.4
Al-Mansour Bank for Investment	250000.0	863750.1	108916.3	47403.6	259986.6	15983.1
Sumer Commercial Bank	242162.5	85130.5	95890.9	1002.1	1640.8	1844.9



Bank	Capital	Deposits	Cash Credit	Pledged Credit	Investments	Profit
Mosul Bank for Development & Investment	239875.0	109813.8	142063.5	46215.4	5964.5	7047.8
Ashur International Bank for Investment	245000.0	113549.0	33814.9	72542.8	4000.5	11957.6
Baghdad	250000.0	2568054.8	190964.3	252739.6	112367.4	15539.3
Erbil Bank	265000.0	184796.3	131888.4	227567.9	295.9	6713.9
Babylon Bank	226964.8	98182.6	131281.3	100882.3	1301.0	3619.5
Economy Bank for Investment & Finance	221432.8	201567.4	127665.9	622805.1	8357.8	2455.0
International development Bank for Investment & Finance	250000.0	395856.3	271399.1	179657.4	375.0	15424.0
Mean	247892.2	381677.1	153029.4	210621.8	34583.5	9142.9
Min	221432.8	85130.5	1667.1	1002.1	295.9	1844.9
Max	300000.0	2568054.8	375037.3	810670.1	259986.6	15983.1

Source : research depending on the data of appendix (A)

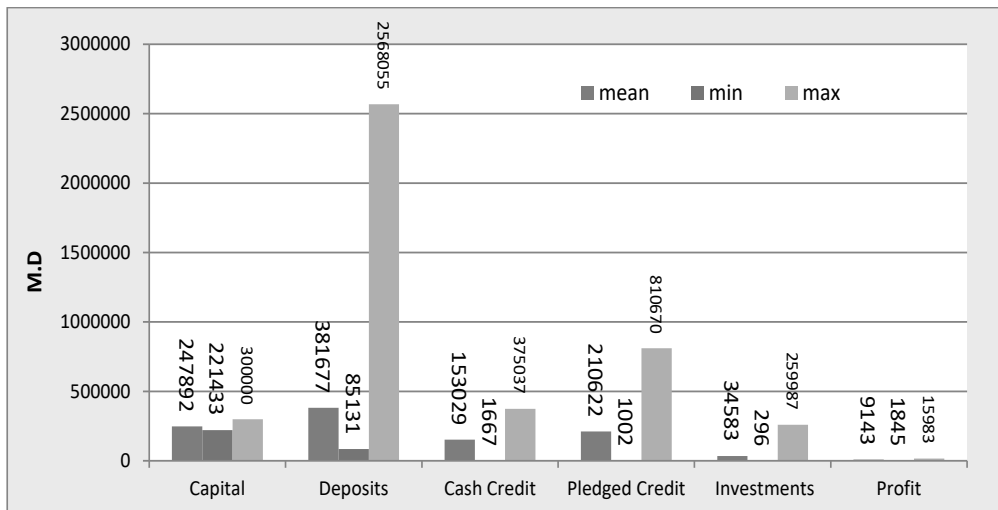


Figure (1) Show the averages, highest and lowest values for variables of the study sample for the period 2013-2020

From Table (1) and Figure (1) we find the following:

- The highest average capital was the share of union investment, the investment was 300 billion Iraqi dinars



- The highest average deposits were held by the bank of Baghdad, and the investment was 2568 billion Iraqi dinars
- The highest average cash credit was for the united bank, which was 375 billion Iraqi dinars
- The highest average pledge credit was for union investment bank, the it was 810 billion Iraqi dinars
- The highest average investment was for Al - Mansour bank, the it was 259 Iraqi dinars
- The highest average profit was for the bank of Baghdad, the it was 15 billion Iraqi dinars

Table (2) The correlation coefficients between inputs and outputs.

		Capital	Deposits
Cash Credit	Pearson Correlation	.224**	.083
	Sig. (2-tailed)	.007	.321
	N	144	144
Pledged Credit	Pearson Correlation	.134	.157
	Sig. (2-tailed)	.108	.060
	N	144	144
Investments	Pearson Correlation	-.079	.372**
	Sig. (2-tailed)	.345	.000
	N	144	144
Profit	Pearson Correlation	-.147	.257**
	Sig. (2-tailed)	.078	.002
	N	144	144

** . Correlation is significant at the (0.01) level (2-tailed).

From Table (2) we find the following:

There is significant correlation between capital and cash credit and between deposits with investment and profits



Second: The analysis of the result of efficiency indicators

The output guidance was applied to extract the variable efficiency indicators (1) of the research sample bank and the (EMS) program version 1.3.0 was employed to extract the efficiency indicators for the research sample bank

Table (2), Figures (2) and (3) illustrates the level of expenses efficiency and the required output levels, according to the bank of the research sample

Table (2) Efficiency and improvement indicator that is required to the banks for the period by (2013-2020)

Banks	Score	Target
Union Bank of Iraq	0.926	0.074
United Bank for Investment	0.901	0.099
Economy Bank for Investment & Finance	0.768	0.232
Ashur International Bank for Investment	0.671	0.329
Mosul Bank for Development & Investment	0.659	0.341
International development Bank for Investment & Finance	0.653	0.347
Babylon Bank	0.646	0.354
Al-Mansour Bank for Investment	0.620	0.380
Commercial Bank	0.588	0.412
Gulf Commercial Bank	0.581	0.419
Baghdad	0.575	0.425
National Bank of Iraq	0.519	0.481
RT Bank	0.477	0.523
Investment Bank of Iraqi	0.456	0.544
Erbil Bank	0.404	0.596
Sumer Commercial Bank	0.399	0.601
Credit Bank of Iraq	0.396	0.604
Iraqi Middle East Investment Bank	0.374	0.626
Mean	0.590	0.410

Source: Work of the researcher was based on the output of EMS program



We notice from the results that the average efficiency of all researches of the bank during the period (2013-2020) was 59% and this shows poor optimal exploitation of the bank economical resources and there is (0) misuse, the amount of waste was 41%

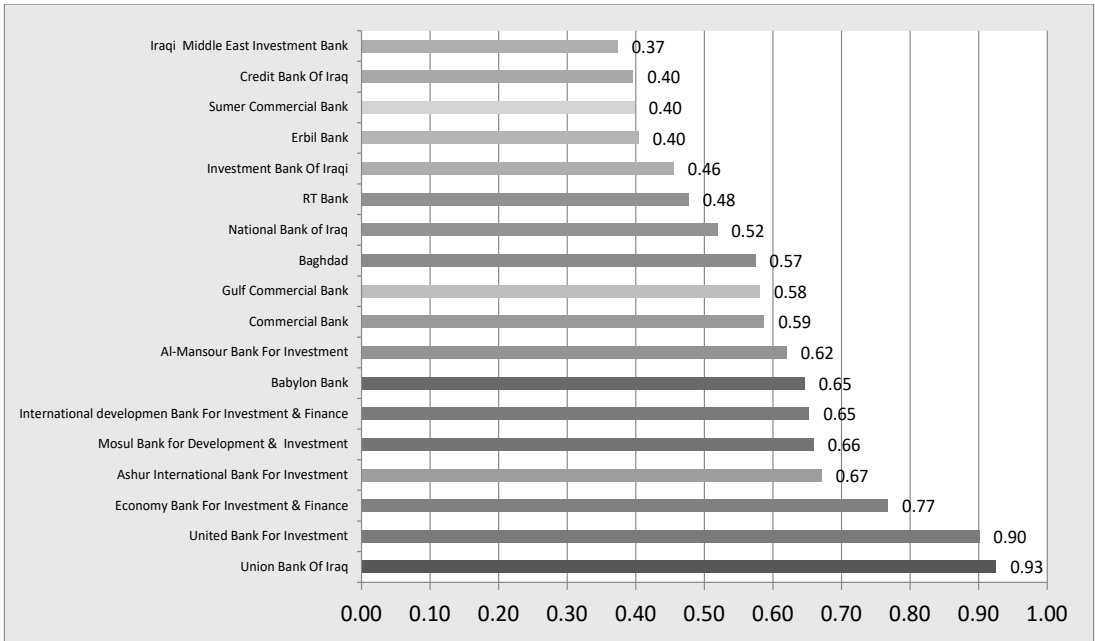


Figure (2) Efficiency average earned by banks in the research community for the period 2013-2020, Source : Table (2)

It appears from Figure (2).that the best average efficiency was achieved by the united bank,with an average efficiency of 93% for the period (2013-2020), which means the bank has to increase the output by (7%) until it reaches full efficiency as in Figure (3), also Figure (2) shows the bank of middle east achieved the lowest efficiency for the period (2013-2020) which was (37%) this shows the bank must raise the level of outputs by 63% until it researches full efficiency as in Figure (3)

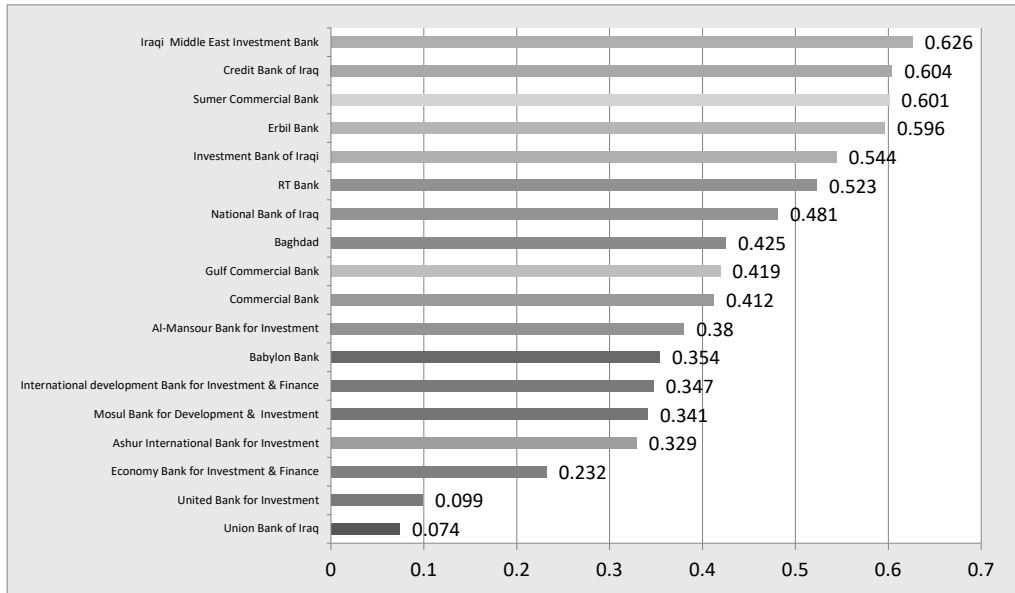


Figure (3) Target averages of required outputs by banks for the period 2013-2020, Source :Table (2)

Table (3) and Figure (4) indicates the efficiency during the years of the research.

Table (3) Relative efficiency indicators during the years (2013-2020)

Year	2013	2014	2015	2016	2017	2018	2019	2020
Score	.85990	.74269	.64628	.59392	.52412	.43498	.42503	.49049

Source: Worker research relies on EMS outputs

From Table (3) and Figure (4), it appears that the highest average of bank efficiency was in 2013, it was (0.59), and lowest average of efficiency was (0.42%)

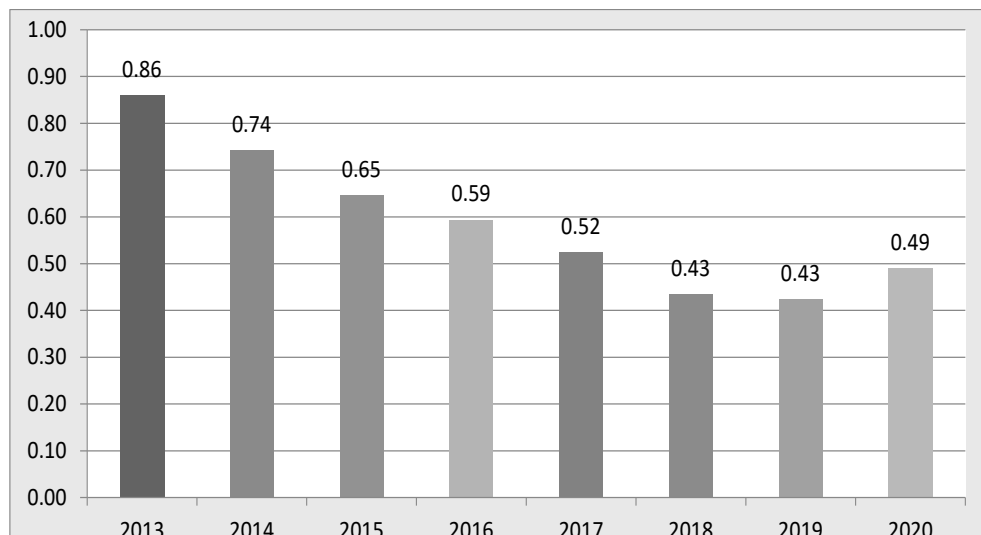


Figure (4) Indications of relative efficiency through the years of research
Source: Table (4)

Third: Hypothesis testing

First hypothesis, the average of banks relative efficiency differs significantly for the period (2013-2020), we can use the variance research o test this hypothesis as results of disparity Table are:

Table (4) Analysis of variance (ANOVA) for the first hypothesis

Score	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	3.621	17	.213	3.564	.000
Within Groups	7.529	126	.060		
Total	11.150	143			

Source: Outputs of statistical program SPSS ver.22

The result shows a variance in the averages of banks efficiency because level of significance is less than (0.05)



Second hypothesis, averages of banks relative efficiency differ throughout the years, significantly through the period (2013-2020), we can use the disparity table to test this hypothesis as it shown in Table (5), results of variance are as following:

Table (5) Analysis of variance (ANOVA) for second hypothesis

Score	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	2.967	7	.424	7.044	.000
Within Groups	8.183	136	.060		
Total	11.150	143			

Source: Source : Outputs of statistical program SPSS ver.22

Results show a contrast in the averages of efficiency throughout the years because level of significance is less (0.05)

5- Conclusion

This study has come with a set of conclusions and they are: All of the Iraqi banks didn't achieve complete relative efficiency and they don't know how to properly use the elements of inputs to achieve a certain value of output.

As the results indicated that the union bank of Iraq, united bank of investment were able to get the highest relative efficiency and it was (0.926), (0.901) respectively, while these banks (Iraqi middle east), (credit bank of Iraq) and (summer commercial bank), they achieved the lowest relative efficiency (0.374), (0.396) and (0.399) respectively.

According to the analysis, it seems the banks that has efficiency between (0.90-0.95) are only (11%) of the total banks in this research,



whereas the economy bank for investment and finance has recorded (5%) of the total banks, and it was in the second place, whereas the banks has efficiency ratio (0.60) and less than (0.70), they from (28%) of the total banks, whereas the banks that has efficiency ratio (0.30) and less than (0.60), they come in the fourth place and they form (56%) of the total banks, As for the general mean of performance efficiency of the banks according to data envelopment analysis is (0.59).

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Appendix (A) Inputs and outputs of Iraqi private banks for the years (2013-2020) (billion Iraqi dinar)

Bank	Year	Input		Output			
		Capital	Deposits	Cash Credit	Pledged Credit	Investments	Profit
United Bank for Investment	2013	300,000	349,520	537,829	1,191,808	14,103	30,139.00
National Bank of Iraq	2013	152,000	360,329	116,289	144,820	31,941	13,874.00
Investment Bank of Iraqi	2013	155,000	283,288	244,163	121,044	4,250	26,802.00
Credit Bank of Iraq	2013	150,000	380,530	2,532	189,305	391,570	11,532.00
Iraqi Middle East Investment Bank	2013	150,000	551,856	206,778	169,737	19,065	20,876.00
Union Bank of Iraq	2013	152,000	247,364	257,067	501,409	66	43,020.00
Gulf Commercial Bank	2013	250,000	417,143	286,574	583,171	64,784	47,452.00
Commercial Bank	2013	150,000	96,691	3,956	61,721	112,852	8,877.00
RT Bank	2013	250,000	105,499	108,784	17,967	225	8,877.00
Al-Mansour Bank for Investment	2013	250,000	485,306	89,655	55,779	474,861	25,278.00
Sumer Commercial Bank	2013	187,300	105,254	105,472	2,377	1,510	1,698.00
Mosul Bank for Development & Investment	2013	202,000	269,410	153,689	61,883	14,937	38,689.00
Ashur International Bank for Investment	2013	210,000	83,164	96,974	99,586	12,608	15,756.00
bank Baghdad	2013	250,000	13,935,584	219,170	671,705	410,178	32,067.00
Erbil Bank	2013	265,000	160,474	131,962	261,705	0	11,710.00
Babylon Bank	2013	150,000	165,532	190,502	66,803	2,985	3,554.00
Economy Bank For Investment & Finance	2013	150,000	414,070	165,669	1,178,369	4,210	3,480.00
International developmen Bank For Investment & Finance	2013	250,000	339,837	91,928	20,214	0	23,067.00
United Bank for Investment	2014	300,000	186,156	429,494	819,668	13,420	21,636.00
National Bank of Iraq	2014	250,000	338,628	165,477	202,119	13,806	7,067.00
Investment Bank of Iraqi	2014	250,000	256,736	165,469	155,667	3,790	28,877.00
Credit Bank of Iraq	2014	250,000	311,750	1,229	191,628	408,720	13,443.00
Iraqi Middle East Investment Bank	2014	250,000	358,118	187,865	143,258	26,860	3,606.00



Bank	Year	Input		Output			
		Capital	Deposits	Cash Credit	Pledged Credit	Investments	Profit
Union Bank of Iraq	2014	252,000	375,327	352,813	636,050	66	14,265.00
Gulf Commercial Bank	2014	300,000	455,212	288,100	560,040	77,925	36,147.00
Commercial Bank	2014	250,000	121,063	7,154	64,069	280,263	9,215.00
RT Bank	2014	250,000	215,940	208,888	22,340	225	9,215.00
Al-Mansour Bank for Investment	2014	250,000	568,325	102,038	60,146	486,807	16,909.00
Sumer Commercial Bank	2014	250,000	135,694	143,050	3,366	1,510	2,307.00
Mosul Bank for Development & Investment	2014	202,000	71,465	165,164	70,320	5,579	1,821.00
Ashur International Bank for Investment	2014	250,000	109,506	85,074	118,498	4,923	9,655.00
Bank Baghdad	2014	250,000	1,491,599	228,904	775,227	455,022	27,781.00
Erbil Bank	2014	265,000	194,953	108,922	282,344	0	12,740.00
Babylon Bank	2014	178,859	112,650	174,843	83,858	1,670	4,853.00
Economy Bank For Investment & Finance	2014	207,154	344,506	152,818	854,280	2,432	0.01
International developmen Bank For Investment & Finance	2014	250,000	387,961	224,173	260,845	0	27,436.00
United Bank for Investment	2015	300,000	228,903	324,229	1,131,896	4,584	19,831.00
National Bank of Iraq	2015	250,000	267,566	179,516	214,019	1,631	2,207.00
Investment Bank of Iraqi	2015	250,000	250,916	123,242	83,857	16,932	17,499.00
Credit Bank of Iraq	2015	250,000	157,788	6,645	152,887	100	11,639.00
Iraqi Middle East Investment Bank	2015	250,000	331,666	149,925	90,585	42,573	5,421.00
Union Bank of Iraq	2015	252,000	272,225	473,231	460,688	58	0.01
Gulf Commercial Bank	2015	300,000	370,218	330,993	200,537	6,983	9,396.00
Commercial Bank	2015	250,000	90,661	9,835	12,321	726	7,360.00
RT Bank	2015	250,000	240,590	184,523	67,302	225	7,360.00
Al-Mansour Bank for Investment	2015	250,000	735,205	112,748	66,927	617,994	20,006.00
Sumer Commercial Bank	2015	250,000	84,631	113,909	1,314	1,758	3,613.00
Mosul Bank for Development & Investment	2015	252,500	8,650	156,907	66,609	5,329	0.01
Ashur International Bank for Investment	2015	250,000	115,498	28,440	27,763	2,509	17,788.00



Bank	Year	Input		Output			
		Capital	Deposits	Cash Credit	Pledged Credit	Investments	Profit
Bank Baghdad	2015	250,000	878,666	261,797	229,387	7,026	6,448.00
Bank Erbil	2015	265,000	242,787	88,373	257,308	0	11,399.00
Babylon Bank	2015	236,859	89,418	147,396	55,598	1,686	3,579.00
Economy Bank For Investment & Finance	2015	207,154	201,990	108,580	806,296	2,432	4,646.00
International developmen Bank For Investment & Finance	2015	250,000	415,571	290,690	184,616	0	17,154.00
United Bank for Investment	2016	300,000	139,125	272,652	1,099,027	6,741	1,059.00
National Bank of Iraq	2016	250,000	162,017	124,683	233,874	1,615	23,502.00
Investment Bank of Iraqi	2016	250,000	254,003	103,401	172,887	16,983	10,179.00
Credit Bank of Iraq	2016	250,000	179,282	2,931	100,611	100	4,976.00
Iraqi Middle East Investment Bank	2016	250,000	251,840	113,713	124,828	9,349	11,750.00
Union Bank of Iraq	2016	252,000	185,129	424,838	402,128	63	20.00
Gulf Commercial Bank	2016	300,000	427,201	287,550	152,712	12,831	5,871.00
Commercial Bank	2016	250,000	121,222	9,904	1,864	650	7,578.00
RT Bank	2016	250,000	159,259	210,258	72,276	0	7,578.00
Al-Mansour Bank for Investment	2016	250,000	781,010	114,535	51,946	38,303	14,391.00
Sumer Commercial Bank	2016	250,000	67,663	108,062	481	839	3,760.00
Mosul Bank for Development & Investment	2016	252,500	91,857	172,318	81,261	4,308	3,522.00
Ashur International Bank for Investment	2016	250,000	94,830	9,623	297,873	1,098	14,742.00
Bank Baghdad	2016	250,000	827,926	195,066	93,606	5,865	20,245.00
Erbil Bank	2016	265,000	227,859	100,047	242,182	0	8,931.00
Babylon Bank	2016	250,000	57,253	138,294	109,448	1,456	7,352.00
Economy Bank For Investment & Finance	2016	207,154	184,301	13,749	586,942	2,230	491.00
International developmen Bank For Investment & Finance	2016	250,000	311,922	279,132	194,696	0	16,536.00
United Bank for Investment	2017	300,000	103,904	329,053	899,206	4,188	0.01
National Bank of Iraq	2017	250,000	184,729	134,356	310,859	2,549	2,965.00
Investment Bank of Iraqi	2017	250,000	246,006	118,712	80,139	3,739	3,996.00



Bank	Year	Input		Output			
		Capital	Deposits	Cash Credit	Pledged Credit	Investments	Profit
Credit Bank of Iraq	2017	250,000	162,366	0	66,904	0	6,707.00
Iraqi Middle East Investment Bank	2017	250,000	324,585	100,252	34,045	3,027	0.01
Union Bank of Iraq	2017	252,000	299,025	391,938	377,664	50	97.00
Gulf Commercial Bank	2017	300,000	265,804	204,275	40,638	17,543	4,230.00
Commercial Bank	2017	250,000	134,227	10,789	19,297	467	10,050.00
RT Bank	2017	250,000	209,943	172,684	23,674	4	10,050.00
Al-Mansour Bank for Investment	2017	250,000	977,536	116,743	25,530	306,716	14,834.00
Sumer Commercial Bank	2017	250,000	89,771	94,838	173	1,738	401.00
Mosul Bank for Development & Investment	2017	252,500	100,690	173,464	25,987	4,061	4,895.00
Ashur International Bank for Investment	2017	250,000	75,772	10,398	6,758	2,614	13,498.00
Baghdad Bank	2017	250,000	747,999	169,579	66,050	4,676	6,122.00
Erbil Bank	2017	265,000	146,133	138,711	214,868	0	6,641.00
Babylon Bank	2017	250,000	37,265	104,810	26,230	456	3,400.00
Economy Bank For Investment & Finance	2017	250,000	131,487	129,874	438,964	22,422	0.01
International developmen Bank For Investment & Finance	2017	250,000	319,875	267,038	223,562	0	12,722.00
United Bank for Investment	2018	300,000	128,221	341,002	640,324	3,450	-10,494.00
National Bank of Iraqi	2018	250,000	190,732	76,828	330,425	2,588	0.01
Investment Bank of Iraqi	2018	250,000	238,584	141,059	81,681	4,385	339.00
Credit Bank of Iraq	2018	250,000	144,170	0	64,122	0	5,598.00
Iraqi Middle East Investment Bank	2018	250,000	429,602	94,572	36,278	3,068	0.01
Union Bank of Iraq	2018	252,000	228,865	375,926	374,550	832	67.00
Gulf Commercial Bank	2018	300,000	232,935	171,492	28,811	16,427	591.00
Commercial Bank	2018	250,000	134,552	11,933	20,120	579	10,864.00
RT Bank	2018	250,000	527,316	126,369	228,086	799	10,864.00
Al-Mansour Bank for Investment	2018	250,000	1,239,309	123,812	42,876	152,994	21,164.00
Sumer Commercial Bank	2018	250,000	80,745	78,931	103	2,524	913.00



Bank	Year	Input		Output			
		Capital	Deposits	Cash Credit	Pledged Credit	Investments	Profit
Mosul Bank for Development & Investment	2018	252,500	116,674	110,982	21,459	4,201	2,584.00
Ashur International Bank for Investment	2018	250,000	177,356	5,624	10,030	2,661	4,735.00
Baghdad Bank	2018	250,000	786,386	161,955	60,687	5,216	4,152.00
Erbil Bank	2018	265,000	194,766	158,422	197,695	789	2,290.00
Babylon Bank	2018	250,000	69,247	95,535	97,905	1,245	3,775.00
Economy Bank For Investment & Finance	2018	250,000	96,223	121,981	356,310	9,988	1,887.00
International developmen Bank For Investment & Finance	2018	250,000	326,473	288,004	120,049	0	7,663.00
United Bank for Investment	2019	300,000	69,439	252,215	420,110	3,253	0.01
National Bank of Iraq	2019	250,000	250,557	168,964	399,096	38,184	9,164.00
Investment Bank of Iraq	2019	250,000	210,962	146,506	113,991	4,170	17.00
Credit Bank of Iraq	2019	250,000	208,359	0	63,345	0	0.01
Iraqi Middle East Investment Bank	2019	250,000	271,418	94,051	22,960	3,410	79.00
Union Bank of Iraq	2019	252,000	149,074	364,011	341,492	845	1,628.00
Gulf Commercial Bank	2019	300,000	201,580	144,624	468,498	15,129	0.01
Commercial Bank	2019	250,000	146,013	11,447	23,425	557	6,554.00
RT Bank	2019	250,000	591,176	70,437	169,596	2,963	6,554.00
Al-Mansour Bank for Investment	2019	250,000	1,157,608	109,127	23,393	1,104	8,278.00
Sumer Commercial Bank	2019	250,000	62,692	76,837	103	1,229	1,003.00
Mosul Bank for Development & Investment	2019	252,500	118,624	114,743	19,345	4,201	3,419.00
Ashur International Bank for Investment	2019	250,000	139,173	9,278	8,130	2,695	4,659.00
Baghdad Bank	2019	250,000	803,012	149,603	65,926	5,173	7,299.00
Erbil Bank	2019	265,000	176,702	150,772	181,283	789	0.01
Babylon Bank	2019	250,000	126,548	98,885	180,108	456	1,322.00
Economy Bank For Investment & Finance	2019	250,000	90,427	130,460	375,590	10,572	5,013.00



Bank	Year	Input		Output			
		Capital	Deposits	Cash Credit	Pledged Credit	Investments	Profit
International developmen Bank For Investment & Finance	2019	250,000	405,738	345,327	142,277	0	5,182.00
United Bank for Investment	2020	300,000	152,234	118,842	283,322	3,078	520.00
National Bank of Iraq	2020	250,000	419,235	317,599	506,440	72,196	19,908.00
Investment Bank of Iraqi	2020	250,000	269,018	138,827	113,406	4,145	4,674.00
Credit Bank of Iraq	2020	250,000	217,502	0	42,523	789	0.01
Iraqi Middle East Investment Bank	2020	250,000	266,697	85,136	28,296	5,073	0.01
Union Bank of Iraq	2020	252,000	153,083	360,474	307,983	844	853.00
Gulf Commercial Bank	2020	300,000	180,767	127,003	243,629	15,593	1.00
Commercial Bank	2020	250,000	272,761	18,841	63,570	1,412	35,457.00
RT Bank	2020	250,000	279,689	42,405	104,390	4,293	35,457.00
Al-Mansour Bank for Investment	2020	250,000	965,702	102,672	52,632	1,114	7,005.00
Sumer Commercial Bank	2020	250,000	54,594	46,028	100	2,018	1,064.00
Mosul Bank for Development & Investment	2020	252,500	101,140	89,241	22,859	5,100	1,452.00
Ashur International Bank for Investment	2020	250,000	113,093	25,108	11,704	2,896	14,828.00
Baghdad Bank	2020	250,000	1,073,266	141,640	59,329	5,783	20,200.00
Erbil Bank	2020	265,000	134,696	177,898	183,158	789	0.01
Babylon Bank	2020	250,000	127,548	99,985	187,108	454	1,121.00
Economy Bank For Investment & Finance	2020	250,000	149,535	198,196	385,690	12,576	4,123.00
International developmen Bank For Investment & Finance	2020	250,000	659,473	384,901	291,000	3,000	13,632.00



Appendix (B) Competency Indicators and Target Levels of Outputs

Bank	Year	Score	Target
United Bank for Investment	2013	1.000	0.000
National Bank of Iraq	2013	0.531	0.470
Investment Bank of Iraqi	2013	0.935	0.070
Credit Bank of Iraq	2013	1.000	0.000
Iraqi Middle East Investment Bank	2013	1.000	0.000
Union Bank of Iraq	2013	1.000	0.000
Gulf Commercial Bank	2013	1.000	0.000
Commercial Bank	2013	1.000	0.000
RT Bank	2013	0.524	0.480
Al-Mansour Bank for Investment	2013	1.000	0.000
Sumer Commercial Bank	2013	0.579	0.420
Mosul Bank for Development & Investment	2013	0.898	0.100
Ashur International Bank for Investment	2013	1.000	0.000
Baghdad	2013	1.000	0.000
Erbil Bank	2013	0.503	0.500
Babylon Bank	2013	1.000	0.000
Economy Bank for Investment & Finance	2013	1.000	0.000
International development Bank for Investment & Finance	2013	0.508	0.490
United Bank for Investment	2014	1.000	0.000
National Bank of Iraq	2014	0.378	0.620
Investment Bank of Iraqi	2014	0.669	0.330
Credit Bank of Iraq	2014	1.000	0.000
Iraqi Middle East Investment Bank	2014	0.436	0.560
Union Bank of Iraq	2014	0.776	0.220
Gulf Commercial Bank	2014	0.865	0.140
Commercial Bank	2014	1.000	0.000
RT Bank	2014	0.516	0.480
Al-Mansour Bank for Investment	2014	0.948	0.050
Sumer Commercial Bank	2014	0.432	0.570
Mosul Bank for Development & Investment	2014	1.000	0.000



Bank	Year	Score	Target
Ashur International Bank for Investment	2014	0.519	0.480
Baghdad	2014	1.000	0.000
Erbil Bank	2014	0.449	0.550
Babylon Bank	2014	1.000	0.000
Economy Bank for Investment & Finance	2014	0.734	0.270
International development Bank for Investment & Finance	2014	0.646	0.350
United Bank for Investment	2015	1.000	0.000
National Bank of Iraq	2015	0.394	0.610
Investment Bank of Iraqi	2015	0.459	0.540
Credit Bank of Iraq	2015	0.433	0.570
Iraqi Middle East Investment Bank	2015	0.390	0.610
Union Bank of Iraq	2015	1.000	0.000
Gulf Commercial Bank	2015	0.615	0.380
Commercial Bank	2015	0.433	0.570
RT Bank	2015	0.433	0.570
Al-Mansour Bank for Investment	2015	1.000	0.000
Sumer Commercial Bank	2015	0.462	0.540
Mosul Bank for Development & Investment	2015	1.000	0.000
Ashur International Bank for Investment	2015	0.842	0.160
Baghdad	2015	0.574	0.430
Erbil Bank	2015	0.338	0.660
Babylon Bank	2015	0.612	0.390
Economy Bank for Investment & Finance	2015	1.000	0.000
International development Bank for Investment & Finance	2015	0.647	0.350
United Bank for Investment	2016	1.000	0.000
National Bank of Iraq	2016	0.815	0.190
Investment Bank of Iraqi	2016	0.317	0.680
Credit Bank of Iraq	2016	0.184	0.820
Iraqi Middle East Investment Bank	2016	0.342	0.660
Union Bank of Iraq	2016	1.000	0.000
Gulf Commercial Bank	2016	0.541	0.460
Commercial Bank	2016	0.343	0.660
RT Bank	2016	0.607	0.390



Bank	Year	Score	Target
Al-Mansour Bank for Investment	2016	0.354	0.650
Sumer Commercial Bank	2016	0.489	0.510
Mosul Bank for Development & Investment	2016	0.648	0.350
Ashur International Bank for Investment	2016	1.000	0.000
Baghdad	2016	0.511	0.490
Erbil Bank	2016	0.301	0.700
Babylon Bank	2016	0.819	0.180
Economy Bank for Investment & Finance	2016	0.796	0.200
International development Bank for Investment & Finance	2016	0.622	0.380
United Bank for Investment	2017	1.000	0.000
National Bank of Iraq	2017	0.401	0.600
Investment Bank of Iraq	2017	0.279	0.720
Credit Bank of Iraq	2017	0.232	0.770
Iraqi Middle East Investment Bank	2017	0.217	0.780
Union Bank of Iraq	2017	0.828	0.170
Gulf Commercial Bank	2017	0.450	0.550
Commercial Bank	2017	0.415	0.590
RT Bank	2017	0.444	0.560
Al-Mansour Bank for Investment	2017	0.617	0.380
Sumer Commercial Bank	2017	0.349	0.650
Mosul Bank for Development & Investment	2017	0.634	0.370
Ashur International Bank for Investment	2017	0.951	0.050
Baghdad	2017	0.374	0.630
Erbil Bank	2017	0.412	0.590
Babylon Bank	2017	0.642	0.360
Economy Bank for Investment & Finance	2017	0.598	0.400
International development Bank for Investment & Finance	2017	0.590	0.410
United Bank for Investment	2018	0.951	0.050
National Bank of Iraq	2018	0.337	0.660
Investment Bank of Iraq	2018	0.322	0.680
Credit Bank of Iraq	2018	0.222	0.780
Iraqi Middle East Investment Bank	2018	0.205	0.790
Union Bank of Iraq	2018	0.841	0.160



Bank	Year	Score	Target
Gulf Commercial Bank	2018	0.399	0.600
Commercial Bank	2018	0.447	0.550
RT Bank	2018	0.300	0.700
Al-Mansour Bank for Investment	2018	0.567	0.430
Sumer Commercial Bank	2018	0.315	0.690
Mosul Bank for Development & Investment	2018	0.377	0.620
Ashur International Bank for Investment	2018	0.154	0.850
Baghdad	2018	0.356	0.640
Erbil Bank	2018	0.367	0.630
Babylon Bank	2018	0.433	0.570
Economy Bank for Investment & Finance	2018	0.611	0.390
International development Bank for Investment & Finance	2018	0.626	0.370
United Bank for Investment	2019	0.945	0.050
National Bank of Iraq	2019	0.513	0.490
Investment Bank of Iraq	2019	0.345	0.650
Credit Bank of Iraq	2019	0.060	0.940
Iraqi Middle East Investment Bank	2019	0.207	0.790
Union Bank of Iraq	2019	0.997	0.000
Gulf Commercial Bank	2019	0.444	0.560
Commercial Bank	2019	0.250	0.750
RT Bank	2019	0.184	0.820
Al-Mansour Bank for Investment	2019	0.246	0.750
Sumer Commercial Bank	2019	0.338	0.660
Mosul Bank for Development & Investment	2019	0.391	0.610
Ashur International Bank for Investment	2019	0.188	0.810
Baghdad	2019	0.334	0.670
Erbil Bank	2019	0.363	0.640
Babylon Bank	2019	0.331	0.670
Economy Bank for Investment & Finance	2019	0.769	0.230
International development Bank for Investment & Finance	2019	0.744	0.260
United Bank for Investment	2020	0.315	0.680
National Bank of Iraq	2020	0.785	0.210
Investment Bank of Iraq	2020	0.317	0.680



Bank	Year	Score	Target
Credit Bank of Iraq	2020	0.040	0.960
Iraqi Middle East Investment Bank	2020	0.193	0.810
Union Bank of Iraq	2020	0.965	0.030
Gulf Commercial Bank	2020	0.335	0.670
Commercial Bank	2020	0.812	0.190
RT Bank	2020	0.808	0.190
Al-Mansour Bank for Investment	2020	0.230	0.770
Sumer Commercial Bank	2020	0.224	0.780
Mosul Bank for Development & Investment	2020	0.327	0.670
Ashur International Bank for Investment	2020	0.715	0.280
Baghdad	2020	0.449	0.550
Erbil Bank	2020	0.500	0.500
Babylon Bank	2020	0.335	0.670
Economy Bank for Investment & Finance	2020	0.637	0.360
International development Bank for Investment & Finance	2020	0.842	0.160