Using Operating Research and Panel Data Models to Diagnose the Iraqi Banking Sector

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Abstract

In a world where technology has made it a small village, the banking sector plays a pivotal role in our economic life. The harmony of its inputs and outputs makes it more attractive and interested to customers. This paper came to diagnose the reality of the Iraqi banking economy by using the Data Envelopment Analysis (DEA), and methods of analyzing Panel data. The efficiency was measured through DEA with inputs in which represented by property rights and deposits, while outputs were represented by shareholder rights, deposits, credit facilities and total assets. The Panel's models were employed in these studying, also the correlation among efficiency, profitability and market value. The study concluded that the Iraqi banks enjoy high efficiency, and showed the existence of reciprocal relations between the variables of the study, and the appropriate model was the aggregate model. The study recommended taking advantage of statistical methods in setting reliable economic indicators to detect some weaknesses in the banking sector.

Keywords: Data Envelopment Analysis (DEA), panel data models, efficiency, market value, aggregate regression model.

استخدام التحليل التطويقي للبيانات ونماذج بانل لتشخيص القطاع المصرفي العراقي

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المستخلص:هدفت الدراسة الحالية إلى استخدام التحليل التطويقي للبيانات وأساليب تحليل بيانات بانل لتشخيص واقع الاقتصاد المصرفي العراقي، حيث تمّ قياس الكفاءة من خلال التحليل التطويقي للبيانات حيث تمثلت المدخلات بكل من حقوق الملكية والودائع في حين تمثلت المخرجات بكل من حقوق المساهمين والودائع، ومخرجات متمثلةً التسهيلات الائتمانية وإجمالي الموجودات، كما تمّ استخدام أساليب ونماذج خاصة بالبانل في دراسة العلاقة التبادلية بين الكفاءة والربحية والقيمة السوقية. وقد خلصت الدراسة إلى أنّ المصارف العراقية تتمتع بالكفاءة العالية، كما أظهرت وجود علاقات تبادلية بين متغيرات الدراسة وكان النموذج الملاءم هو النموذج التجميعي. وقد أوصت الدراسة بالاستفادة من الأساليب الإحصائية في وضع مؤشرات اقتصادية يمكن الاعتماد عليها في تشجيع القطاع المصرفي

الكلمات المفتاحية: التحليل التطويقي للبيانات، الكفاءة، القيمة السوقية، تقنية البانل داتا، نموذج الانحدار التجميعي.

1. Introduction

The banking sector considered one of the basic sectors of the economy, as it closely related to the rest of the economic sectors, especially the real sector. With the development in banking services, the activities of banks became more sophisticated and more importantly. There was a need to find indicators to measure this performance. These indicators varied, such as indicators related to their market position, profitability, efficiency ratios and many other indicators, and despite the strong foundations of these indicators to know the performance of banks, they are not considered sufficient to assess the behavior of the banking sector. As a result, there was a need for more statics models to measure this performance, including operating research models and panel models.

Despite the development in economic modeling, it focuses on forecasting only, that is, the final model of the study without paying attention to some economic indicators that can extract from statistical methods such as indicators for statistical description of data, correlation between sectional units and other statistical indicators. In light of the foregoing, it can be said that the subject of performance evaluation is not only subject to financial ratios, but also includes the use of advanced statistical methods and the need to develop an economic approach to it and not focus on the final model of the study only. Measuring performance with its traditional and advanced statistical indicators are only to serve the bank in achieving its ultimate goals. As it focuses on achieving high profitability to achieve the bank's sustainability, and achieving high efficiency to send a picture to investors of the bank's ability to perform its role which is a mediator between those with a deficit and those with excess liquidity. There is also the goal of maximizing the market value of the bank. Based on the above, the researchers aim through their research to achieve two goals; the first related to develop an economic approach as the statistical indicators that used to evaluate the performance. The second is modeling to know the relationship between efficiency, market value and profitability.The researchers applied this study to a sample of traditional Iraqi banks during the 2015-2017 period, using Panel models.

Number of experimental studies dealt with the determinants of profitability, efficiency, and market value, we mentioned, Garcia Study (2010)[9], through his study, he aimed to know the determinants of the efficiency of banks operating in Mexico during the period from 2001 to 2009. Initially, the data analysis used to assess efficiency and used as inputs to the model of total costs and deposits. Output of bank represented by loans, assets and other income. He used Regression analysis to find out the effect of equity to assets, net interest margin, return on assets, costs from non-interest to total assets, non-interest return to total assets, market value of the bank, current assets to deposits. The value of non-performing loans to total loans, natural logarithm of total assets are measure the size, gross domestic product. A qualitative variable that takes the value one when the bank's ownership is foreign and zero when the ownership is local. The researcher found through his study that the average degree of efficiency of banks operating in Mexico during the study period 0.841. Upon applying the regression. It found that the model was able to explain 56.2% of the changes in the degree of efficiency. It found that there was a positive effect for both the growth of the gross domestic product and the foreign ownership of the bank, while increasing the expenses without benefits, inflation and the percentage of non-performing loans is an Operational and liquidity will lead to a decrease in the degree of efficiency. Also, Raphael Study (2013)[13], his study focused on knowing the determinants of the efficiency of banks in Tanzania during the period from 2005 to 2008. DEA used to find the degree of efficiency; the inputs were represented in the total deposits, interest expenses, and expenses without interest. Outputs of bank were represented by each of the loans Investments, revenue from interest, revenue without interest. The independent variables consists of size, net margin of interest, credit facilities to total assets, return on assets, ratio of non-performing loans, non-interest expenses to total assets, non-interest to total income, return on total assets, gross domestic product, and consumer price index. The

study showed that the average degree of efficiency reached during the study period 0.873, and after applying the regression. It was found that there was a positive effect for both size, credit facilities, And loans to assets, non-interest income to total income in the degree of efficiency, while the rest of the variables did not have a significant effect on the efficiency of the sample banks, and the explanatory strength of the model was 31.53%. Study of Al-habashnch et el,(2014)[1]. It aimed to know the factors affecting the stock prices of companies listed on the Amman Stock Exchange during the period 1984-2011. The dependent variable represented the market value of the share, while the independent variables were the market share price, distributed profits, earnings per share, trading volume and using long-term models. It was found that there is a long-term relationship of cointegration among the variables. Whereas, the Vikas Study (2015)[14], applied his study to 19 banks in India during the period from 2010 to 2014, he expressed the inputs of both interest and non-interest expenses, while the outputs were represented by interest income and non-interest income, and it was found that the average efficiency of Indian banks was 0.74. In other study.

Study (Al-Hashmi & Al-Jubouri, 2017)[4], aimed to know the effect of financial leverage, return on assets, and total bank credit on the market value of four Iraqi banks during the period 2010-2015 and using multiple regression analysis, the study concluded that there was no significant effect of banking efficiency indicators on market value. In the same year, Al-Hamid Study (2017)[5] applied his study that came under the title "Measuring Technical Efficiency in Private Commercial Banks in Syria Using the Data Envelopment Analysis (DEA). The inputs were represented in all of the assets, equity, deposits, total operating banks. The model's outputs are represented by total operating income, net direct credit facilities, net profit. The study found that the average degree of efficiency is 0.9361. While The Watchmaker's Study (2018)[3] aimed to know the effect of deposits and credit facilities on the financial performance of banks on the Palestine Stock Exchange for six banks during the period 2007-2016. Also, Hasanov Study (2018) [10] applied his study on 22 Abrorgia banks during the period 2012-2017 in a quarterly frequency. The independent variables used the leverage, size, liquidity ratio, employment ratio, deposits to assets, oil and non-oil GDP, inflation expectations, change in the exchange rate, The change in the price of oil. The variable dependent on the return on assets represented, and one of the most important results of the study is the presence of a positive size effect on the return on assets. at (2019),Wabel Study [7] aimed to analyze the efficiency of Saudi banks using the data evolvement analysis during the period 2013-2017, whereby the two researchers used the inputs (equity and deposits) while the output was (total loans, total assets). The study found that 4 out of 10 banks are quite efficient. The independent variables represented by both direct credit facilities, bank deposits, customer deposits and credit facilities to deposits. The dependent variables were return on assets, and by using the Panel models, the study found that there is a positive effect of all variables except the size of direct credit facilities that had A negative impact on return on assets.

The current study distinguished from previous studies that it tries to take advantage of the statistical indicators and methods used in the analysis to extract economic indicators that help diagnose the reality of the banking sector in Iraq during the study period. Also, it distinguished by studding the correlation between efficiency, market value, and profitability.

2. The study problem:

With the development-taking place in the banking sector, the importance of finding several indicators to assess the reality of the Iraqi banking sector due to its role in supporting economic development in Iraq increases, and the collapse of the banking sector is due to several collapses in other economic sectors. In addition, it is important to study the relationship of banking indicators with each other. From there comes the study problem represented by the following questions:

1. Is it possible to take advantage of statistical methods to benefit in setting economic indicators for the reality of the Iraqi banking sector?

2. Is there a significant effect of profitability and efficiency on the market value of the sample banks?

3. Is there a significant effect of efficiency and market value on the profitability of the sample banks?

4. Is there a significant effect of the market value and profitability on the efficiency of the sample banks?

2.1 The assumptions:

The study problem followed the following hypotheses:

1. There is no significant effect of profitability and efficiency on the market value of the sample banks.

2. There was no significant effect of efficiency and market value on the profitability of the sample banks.

3. There was no significant effect for the market value and profitability on the efficiency of the sample banks.

2.2 Importance and goals of study:

The study aims to:

1. Develop an economic framework for the methods and statistical indicators used.

2. Study the relationship between efficiency, profitability, and market value indicators.

The importance of the study divided into theoretical and practical significance, where theoretical importance is that it reviews the methods used in the evaluation of efficiency, while the practical importance is that it provides additional information support to reach a clear diagnosis of the Iraqi banking sector.

2.3 Samples and period:

The study community is represented by the traditional banks listed on the Iraq Stock Exchange, while the sample of the study was 8 after it achieved the following conditions:

Availability of data during the entire study period.

The bank has to trade during the study period.

Therefore, the representation percentage is approximately 50%.

2.4 Models:

The study forms consist of the following:

$$Eff = \propto + \beta_1 * roa + \beta_2 * mv + e \dots\dots\dots\dots\dots \text{ (1)}$$

$$roa = \propto + \beta_1 * Eff + \beta_2 * mv + e \dots\dots\dots\dots\dots \text{ (2)}$$

$$mv = \propto + \beta_1 * Eff + \beta_2 * roa + e \dots\dots\dots\dots\dots \text{ (3)}$$

Whereas:

Eff: The degree of efficiency resulting from the DEA of the inputs and outputs used by the Saudi study.

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roa: Return on assets.

mv: The market value and the logarithm used to reduce the large difference in the data.

3. Theoretical Review

This part includes getting acquainted with the most important issues related, which are closely related to the applied side, and the researchers will address the topic closely related to efficiency and based on linear programming, in addition to all that will be handled and related to the statistical aspect.

3.1 The concept of DEA

Shawky defines the data encirclement analysis as a method uses linear programming to find the relative efficiency of a set of decision-making units. It uses a set of inputs and outputs, by dividing the total of outputs by the sum of the inputs for each facility. This ratio is compared with other facilities, and if a facility what is at the best efficiency ratio. It becomes efficient limits and the degree of inefficiency is measured by a ratio to efficient limits using mathematical methods, and the efficiency index is between zero, which represents inefficiency and one, which represents complete efficiency.

3.2 size Efficiency [8]

It is an indication of how close the decision-making unit, it is to the largest size of production, and found by dividing the degree of efficiency according to the fixed returns model to the degree of efficiency according to a model that depends on variable size returns. The event the establishment gets (one) in the size efficiency, this means that the facility is working on the highest possible production limits, and it is less than 1that means this facility did not reach the largest possible production.

The CRS model indicates that the change in output directly reflected in a change in the inputs of the same percentage. The variable returns refer to two parts; the first is the increasing size returns, in this case, the change in the outputs is greater than the change in the inputs, while the second indicates. The change in output is less than the change in inputs.

3.3 Efficiency threshold [11]

It is the limit determined by the efficient decision-making units. It encircles and encapsulates the rest of the production group. These efficient units considered a reference for the inefficient decision-making units, and the decision-making unit is completely efficient only if there are no other developments that can see with the inputs and outputs of this unit. The DEA based on linear programming technology that measures the technical efficiency of the decision-making units according to the input and output directions. It clarifies them in the case of the return of the fixed and variable size, so that those that fall on the efficiency limit called efficient units, while the incompetent units encircled through efficient limits and define Reference units.

There are a number of approaches to identifying model inputs and outputs [6]

3.3.1   Approach to production

This approach based on considering the bank as a product of loans and accounts for deposits. According to this approach, the inputs may include capital and labor inputs. The outputs represented in deposit accounts and loan accounts.

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3.3.2   The mediation approach

It takes the financial dimension of the operations that take place in the bank during a certain period, and the bank sees it as a mediator between the depositors and borrowers, as deposits, work and capital considered inputs while the outputs are represented by the loans granted. Among the approaches to the mediation approach is the used cost method, which depends that any financial product of the bank that makes a positive net contribution to the bank's income is an exit, and every financial product whose contribution is negative that is considered an input.

3.3.3   Operational approach

The bank is a commercial unit whose goal is to achieve revenue based on a set of potential costs, and therefore the bank's outputs are represented in total revenue (banking, financial, operational), while the inputs are total costs of all kinds. The panel models used in the estimation vary among them. [13] .

4. EMPERICIAL REVIEW
4.1 Statistical description of the data:

The following table shows the results of the statistical description of the data

Table No. 1: Statistical description of the data

MV	ROA	EFF	
174806.3	0.018333	0.926250	Mean
143750.0	0.011350	1.000000	Median
631250.0	0.086300	1.000000	Maximum
75000.00	-0.001600	0.660000	Minimum
115761.5	0.019507	0.101202	Std. Dev.
2.647668	1.943560	-1.268161	Skewness
11.14492	7.142405	3.686278	Kurtosis
94.38031	32.26922	6.903906	Jarque-Bera
0.000000	0.000000	0.316845	Probability
24	24	24	Observations

Source: EVIEWS-10 data analysis results.

It is clear from the previous table that, the mean for the efficiency degree was 0.93 and a standard deviation of 0.10, which indicates stability in efficiency with Iraqi banks. Additionally, there is no dispersion in the data, as the probability value corresponding to the Jarque-Bera test of 0.32, which is more than 0.05 that indicates there is a normal distribution of the variable.

The mean of the average return on assets was 0.018, with a standard deviation of 0.02, indicating a large dispersion of data. In addition, the median is close to the mean, which indicates that most banks are performing poorly. In addition, the positive Skewness coefficient indicates that most banks have return on assets greater than the average, as well as, the mean value of the market value amounted to 174,806 million Iraqi dinars and a standard deviation of 115,761 million Iraqi dinars, which indicates a large dispersion in the data. The positive Skewness coefficient indicates that most banks have a market value greater than the average.

4.2 Cross sectional depended:

The following table shows the results of testing the units of return on assets:

Table No. 2: Results of the cross sectional depended of the return on assets:

		Cross-Section Dependence Test	
		Series: ROA	
	Null hypothesis: No cross-section dependence (correlation)		
		Sample: 2015 2017	
		Periods included: 3	
	Cross-sections included: 8		
	Total panel observations: 24		
	Note: non-zero cross-section means detected in data		
	Cross-section means were removed during computation of correlations		
Prob.	d.f.	Statistic	Test
0.0287	28	43.85305	Breusch-Pagan LM
0.0341		2.118453	Pesaran scaled LM
0.9057		0.118453	Bias-corrected scaled LM
0.1127		1.586345	Pesaran CD

Source: EVIEWS-10 data analysis results.

It is clear from the previous table that most tests indicate that the probability value is less than 0.05. The latter means that the behavior of a bank's profitability depends on the behavior of another bank. This can show the fact that achieving a high profitability of an Iraqi bank will pay another bank to work on achieving a high profitability to ensure its continuity in the market Iraqi banker. The table 3 shows the results of cross sectional dependence test among the sectional units of the market value variable:

Table No. 3: Results of cross sectional dependence for market value variable:

Cross-Section Dependence Test			
Series: MV			
Null hypothesis: No cross-section dependence (correlation)			
Sample: 2015 2017			
Periods included: 3			
Cross-sections included: 8			
Total panel observations: 24			
Note: non-zero cross-section means detected in data			
Cross-section means were removed during computation of correlations			
Prob.	d.f.	Statistic	Test
0.0054	28	50.73004	Breusch-Pagan LM
0.0024		3.037429	Pesaran scaled LM
0.2995		1.037429	Bias-corrected scaled LM
0.0087		2.625517	Pesaran CD

The probable value corresponding to most of the correlation test between the sectional units indicates that it is less than 0.05, which means that there is a correlation between the behaviors of an Iraqi bank in another bank for the market value, so the investor prefers between the investments between two banks. In the case of investment in the first bank, the demand for the stocks of the first

bank will increase, and the market value will rise while it will decrease. The value of the second bank as a natural result of the decrease in demand for the stocks of the second bank.

4.3 Panel models

In this section, we will illustrate the identification of the panel data models that will be covered in the practical aspect, as follows.

4.3.1 Market value determinants model

The following table shows the results of the pooled panel model for market value determinant

Table No. 4: Panel data Model of Determinants of Market Value:

Prob.	t-Statistic	Std. Error	Coefficient	Variable
Dependent Variable: LOGMV				
Method: Panel EGLS (Cross-section weights)				
Date: 12/05/19 Time: 16:15				
Sample (adjusted): 2016 2017				
Periods included: 2				
Cross-sections included: 8				
Total panel (balanced) observations: 16				
Linear estimation after one-step weighting matrix				
White period standard errors & covariance (no d.f. correction)				
0.0017	4.036118	0.125529	0.506649	LOGMV(-1)
0.0144	-2.858692	0.271462	-0.776025	EFF
0.0000	-6.574031	1.170685	-7.696120	ROA
0.0017	4.031561	1.640243	6.612738	C
Weighted Statistics				
23.87755	Mean dependent var		0.811237	R-squared
19.10674	S.D. dependent var		0.764047	Adjusted R-squared
1.077830	Sum squared resid		0.299698	S.E. of regression
1.496017	Durbin-Watson stat		17.19062	F-statistic
--------------------------------------			0.000121	Prob(F-statistic)

Source: EVIEWS-10 data analysis results.

   It is clear from the previous table that, the explanatory power of the model was 81%, while the adjusted explanatory power was 76%, meaning that 76% of the changes in the market value are caused by a change in both the degree of efficiency and the return on assets. Additionally, there is a positive impact of the previous values of the market value on the current values, and this can be attributed to the fact that the increase in the market value will increase the demand for the bank's shares, so the stock price increases and the market value increases with it. In additional, there is a significant negative effect of the degree of efficiency and the return on assets in the market value, and this is in contradiction with all previous studies. But it can be attributed to the fact that the efficiency levels of the sample banks are high, reaching average for all banks and during the entire study period 0.94 indicating performance Good for the bank's role as a mediator. The banks were able to play this role, but the profitability of the banks was weak, as they amounted to approximately 2%, and this was reflected negatively in the market value. Whereas. The table 5 shows the results of the panel data Model for Efficiency Determinants:

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Table No. 5: The panel data Model for Efficiency

Prob.	t-Statistic	Std. Error	Coefficient	Variable
0.0000	19.32632	0.040099	0.774966	EFF(-1)
0.0000	-7.023698	0.009455	-0.066410	ROA
0.0004	4.837185	0.000555	0.002686	LOGMV
0.0001	5.783422	0.033672	0.194737	C
Weighted Statistics				
2.790006	Mean dependent var		0.900264	R-squared
2.303301	S.D. dependent var		0.875330	Adjusted R-squared
0.026286	Sum squared resid		0.046802	S.E. of regression
1.600713	Durbin-Watson stat		36.10581	F-statistic
-------------------------------			0.000003	Prob(F-statistic)

Source: EVIEWS-10 data analysis results.

It is clear from the previous table that, the explanatory power of the model was 90%, while the adjusted explanatory power was 88%, meaning that 88% of the changes in the return on assets are caused by a change in both the degree of efficiency and return on the assets. There is a positive impact of the previous values of the degree of efficiency in its current values, and this can be attributed to the fact that the higher efficiency will increase the need for the bank to achieve continuity in this efficiency, which means a reflection of the previous values in the current values. In addition, there is a significant negative impact of the return on assets in the degree of efficiency, when high return on assets may make the bank focus on customers with large deposits and facilities, which leads to a decrease in the efficiency of the bank. There is a positive moral effect of the market value on the average degree of efficiency, and this can be attributed to the fact that the increase in the market value will increase the ability of the bank to perform its function as a mediator through the influence of deposits and credit facilities.

4.3.2 profitability determinants model

The following table shows the results of the Pannell model for profit determinants

Table No. 6: The Panel data Model of Profitability Determinants

Prob.	t-Statistic	Std. Error	Coefficient	Variable
0.0074	3.217418	0.108580	0.349347	ROA(-1)
0.2757	-1.142033	0.004908	-0.005605	LOGMV
0.0191	2.706469	0.028955	0.078366	EFF
0.9860	-0.017864	0.076311	-0.001363	C
	Weighted Statistics			
0.020077	Mean dependent var		0.568852	R-squared
0.013694	S.D. dependent var		0.461065	Adjusted R-squared
0.001501	Sum squared resid		0.011185	S.E. of regression
2.686845	Durbin-Watson stat		5.277565	F-statistic
----------------------------------			0.014944	Prob(F-statistic)

Source: EVIEWS-10 data analysis results.

It is clear from the previous table that, the explanatory power of the model was 57%, while the adjusted explanatory power was 46%, meaning that 46% of changes in the return on assets are caused by a change in both the degree of efficiency and the return on the assets. There is a positive effect of the previous values of the return on the assets in its current values, and this can be attributed to the fact that the increase in profitability will increase the need for the bank to achieve continuity in this profit,

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which means a reflection of the previous values in the current values. Additionally, there is a positive moral effect of the degree of efficiency in the return on assets, as high efficiency indicates the ability of the bank to attract deposits and grant credit facilities, and this increases its opportunity to better manage the investment-oriented cluster, which leads to the granting of productive credit facilities that generate more profits. As well as, there is no significant effect of the market value on the rate of return on assets. One can see that can be attributed to the fact that the high market value needs for a long time in order to reach high levels and the banks decide to increase their activity. That is the development of the market value needs a long time and therefore this effect did not appear in profitability.

5. Results and recommendations

In this section, the researchers will illustrate the

5.1 Conclusion

In this section, we will include the most important conclusions reached based on the practical results, from which we mention:

There is a significant negative impact of the degree of efficiency and return on assets in the market value. In fact, that contrary to all previous studies, but this can be attributed to the fact that the efficiency degrees in the sample banks are high. The average for all banks during the entire study period 0.94. It shows the performance good for the role of the bank as an intermediary banks have been able to play this role, but the profitability of banks was weak as it amounted to nearly 2% and thus reflected negatively in the market value. In addition, there is a significant negative impact on the return on assets in the degree of efficiency, when the high return on assets may make the bank focus on customers with large deposits and facilities, which leads to low efficiency of the bank.

There is a significant positive effect of market value on the efficiency score. This can be attributed to the fact that the increase in market value will increase the bank's ability to function as an intermediary through the impact of deposits and credit facilities. Additionally, there is a positive impact of the previous values of the return on assets on its current values, as well as, There is a significant positive effect on the efficiency of the return on assets. The increase in efficiency indicates the bank's ability to attract deposits and grant credit facilities. .

There is no significant effect of the market value on the rate of return on assets. This can be attributed to the fact that the rise in the market value takes a long time to reach high levels and banks decide to increase their activity, i.e., the development of the market value takes a long time and therefore this effect did not appear in profitability.

There is a similarity in behavior in banks and this has been shown by the conclusion that the aggregate model is the best model. There is a correlation in behavior among Iraqi banks both for market value and for profitability.

5.2 Recommends:

Given the importance of the scientific approaches used and their tools, the researchers made a recommendation for each instrument they used, indicating the usefulness of this tool and giving a signal of its usefulness in economic analysis, as follows:-

The researchers show that using the Cross-sectional dependence aims to know if the values of a cross sectional unit depend on the values of another one. It has economic concept that aims to find out if the behavior of the bank is related to the behavior of another one, therefore; they recommended

to investors can predict the behavior of the bank depending on the behavior of another bank, as there is a convergence in behavior, and so is the strength of this link. When the central bank sees that, there is a strong correlation between sectional units, which means that any collapse in a bank will lead to a collapse in the rest of the banks. Additionally, they show that using the Comparison of mean and standard deviation aims to see if there is high variance data dispersion. It has economic concept that extent of stability in the economy, therefore; they recommended; in the event that the data is large for the variable of the market value. This indicates the instability of the financial market situation and the central bank and the authority overseeing the Iraqi financial market set price limits to ensure that there are no large fluctuations in market values, as we do not advise investing in such markets.

The researchers show that using the Skewness indicates to the data orientation (orientation towards positive or negative values). It has economic concept that it point to the performance of the banking sector, so they recommended that if the Skewness factor is to the right, it mean that most values are greater than the arithmetic average. If the Skewness coefficient is positive, it means that most banks listed in the market are above average, so the investor can invest in companies in this market. As well as, they show that using the fitted model aims at finding out if the appropriate model is pooled, fixed, or random. It has economic concept that used to describe the direction of the behavior of banks therefore; they recommended that if the pooled model is appropriate, then the behavior of banks is similar in the face of crises, which means that the wrong behavior of a bank may lead to a complete collapse of banks.

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