Measuring and predicting the risk of potential company's financial failure by using Sherrod's model: An Applied and Analytical Study of a sample of Commercial Banks of the Iraqi Banking Sector

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Abstract

The risk of financial failure is one of the most important financial matters of companies in the world due to the complexity in the business environment. Commercial banks seriously concern about the risk of bankruptcy that may face them during day to day financial activities. Hence, it is crucial for banks to be able to measure and predict any risk exposed them. In this regards, this study attempts to empirically test commercial banks listed on Iraqi stock exchange to predict the financial failure as early as possible if exist by depending on applying Sherrod model because empirical test will help all concern parties to assess the level of risk and the ability of the firm for continuation and survival. The study sample includes ten commercial banks listed on Iraqi stock exchange for the period of 2014-2018. The result reveled that in average, five of the banks in the study sample pose strong financial position with sufficient liquidity to meet obligations with no any threat of bankruptcy, while there is only one bank during the period with very little potentiality to the risk of bankruptcy. The result also showed that the risk prediction of bankruptcy is difficult in respect of four banks in the study sample. Finally, based on the model implemented, there is no any bank that expose to the risk of bankruptcy in a high extent.

Key words: Financial bankruptcy, Sherrod model, Financial failure prediction

ملخص

يعد خطر الفشل المالي أحد أهم الأمور المالية للشركات في العالم بسبب التعقيد في بيئة الأعمال. كما تشعر البنوك التجارية تهتم بشكل كبير من مخاطر الإفلاس التي قد تواجهها خلال الأنشطة المالية اليومية. وبالتالي من الأهمية أن تكون البنوك قادرة على قياس و التنبؤ بأي مخاطرة التي تتعرض لهم. في هذا الصدد، تحاول هذه الدراسة اختبار تجريبي للمصارف التجارية المدرجة في البورصة العراقية للتنبؤ بالفشل المالي في أقرب وقت ممكن إن وجد من خلال الاعتماد على تطبيق نموذج (Sherrod) لأن الاختبار التجريبي سيساعد جميع الأطراف المعنية على تقييم مستوى المخاطر و قدرة الشركة على الاستمرار والبقاء. تشمل عينة الدراسة عشرة مصارف تجارية مدرجة في البورصة العراقية للفترة 2013-2018. أظهرت النتائج أنه بالمعدل خمسة من البنوك في عينة الدراسة تشكل موقعاً ماليًا قويًا مع سيولة كافية للوفاء بالالتزامات دون أي تهديد بالإفلاس ، في حين كان هناك مصرف واحد فقط خلال الفترة مع احتمال ضئيل للغاية لخطر الإفلاس . كما أظهرت النتائج صعوبة التنبؤ بمخاطر الإفلاس فيما يتعلق بأربعة بنوك في عينة الدراسة. وايضا بناءً على النموذج المطبق، لا يوجد أي بنك يعرضه لخطر الإفلاس بدرجة كبيرة.

الكلمات المفتاحية: الافلاس المالية, Sherrod أنموذج, نسب المالية, تنبؤ بالفشل المالي

I- Introduction

During the past decades, the term of financial failure and distress has attracted researcher's attention and developed the research domain in the field of accounting and finance. Firm Failure defined as the inability of the firm to fulfill its obligation or repay its loans that may leads to a critical financial position and in the worst situation results a business bankruptcy (Kenney et al, 2016, 2). It means that, the financial position of a firm declines over time and its cash flow does not meet the expected cash flow. Banks as other firms are not out of the failure and sometimes they are face difficulties financially (Arkan, 2015: 234). Also, it is crucial to mention that the economic consequence of banks failure is greatly significant, especially for those who has a stake in the bank (stakeholders). Thus, financial analysers and researchers attempt to identify the risk of bankruptcy as soon as possible before the occurrence and it has become the matter of study in this field. In this regards, several method have been innovated to pre determine the risk of bankruptcy in order to make the managers and related parties to take the proactive actions to eliminate it and at least decrease its level to the minimum. One and the most modern method used by many researchers to predict the risk of business failure is Sherrod method in which, it relies on six financial ratios with different weight of each of them according to their importance. This model measures the ability of the firm to maintain enough amount of liquidity, the ability of fulfillment of obligation in the short term, and required returns on assets in order to use these as core indicators to predict the financial failure of a firm and identify the firm's ability to continue its operation in the future (Al-Murshedy, 2018: 254). This paper will examine the commercial banks listed on Iraqi Stock Exchange implementing Sherrod method to explorer whether commercial banks in Iraq are exposed to the risk of bankruptcy and measure the level of risk of each bank comparatively.

The rest of this study structured as follow. The following section deals with the relevant review of previous studies conducted in the literature. Next, we illustrate the methodology of the study and the explanation of the model applied in the test. It also includes the hypotheses development and sample selection with data collection. The final section discusses the result of the empirical work in detail for the period of the study.

II- LITERATURE REVIEW

One of the most important accounting concepts in regards of any firm is going concern. This concept implies that the business entity will continue its operations and trades for the foreseeable future without any plan to scale down its activities or to go bankruptcy (Alexander & Nobes, 2010, 40). Hence, business entities usually take the caution term into the consideration in order to be aware of any undesirable financial activity that affects them and weaken their financial situation and finally might go bankrupt. Thus, financial managers and analysts have been tried to find techniques to discover that whether a firm is likely to go bankrupt in the future in attempt to eliminate it before it happens. In this regards, there are several studies trying to test the health of the business using different models. The most common and modern model used by researchers and analysts is Sherrod model, 1987 to predict the financial failure of the business (Orabi, 2014:

33). In this section I am going to demonstrate some of the studies trying to test the prediction of firm bankruptcy.

Orabi, (2014): Empirical Tests on Financial Failure Prediction Models

The study tried to assess the effectiveness of models to predict the financial failure in Jordanian shareholding companies. This study conducted on five successful companies and five companies that went bankrupt applying Altman and Sherrod models during the period of 2011 and 2012. The study revealed that there are some ratios which are suitable in financial failure prediction in both models (Altman, Sherrod). However, according to Orabi, there is no certainty to predict financial failure accurately in none of the models because of several factors and circumstances outside the company. Additionally, the study concluded that Altman model can be applied in both service and manufacturing industry, while Sherrod model is rather useful in service industry only.

Arkan, (2015): Detecting Financial Distress with the b-Sherrod Model:

This study also used Sherrod model to detect if a manufacturing firm in Kuwait liable to financial distress. The study took a period of 2003-2013 for a refrigeration and air conditioning company as a case study. This study concludes that Sherrod model is a reliable method for detecting financial distress and also to evaluate the performance of a company. Finally, according to this study, this model can helps users of financial statements to be able to assess and foresee the ability of the firm to continue its activities.

Babela and Mohammed, (2016): Business Failure Prediction using Sherrod and Kida Models:

This study attempted to confirm that whether publicly traded banks in Iraq Stock Exchange are likely to suffer from financial failure implementing Sherrod & Kida models. The study has been done on 16 banks during the period of 2011-2014. Babela & Mohammed concluded that according to Sherrod model, the banks of the study have very little potentiality of bankruptcy, while Kida model implies that all 16 banks are subject to bankruptcy significantly. From this point of view, the study excluded Kida model in the test as the model is not consistent with the reality of the financial situation of the banks.

Alsaydia, and Al-Hashmee, (2016): Measuring fault Risk By Using Sherrod model an applied study a sample in Iraq commercial Bank

This study aimed to shed light and analyse the reality of the faulty loans and its reasons and consequences relying on Sherrod model. The study included 20 Iraqi banks for the period of 2013. The study concludes that the rise of credit risk is significantly comprehended to the strategy of the banks activities, and the risk directly leads to the loss in the bank portfolio. This finally results the capital and the obligation fulfillment of the bank negatively.

III- RESEARCH METHODOLGY

III-1 The problem of the study

In recent years several indicators revealed that some of Iraqi banks are unable to experience their credit activities to invest and lend in the best possible way. Returns on these lending are not enough to meet the economic development and decrease the possibility to continue their operations and survive in the field of banking industry. Hence, the probability of bankruptcy will increase if they do not manage their financial positions to be strong that make them able to meet the requirement of the country development economically. From this point of view, the problem of this study can be set up with the following points:

1- Is Sherrod's model has the ability and proficiency in predicting the financial bankruptcy of the banks listed on Iraqi Stock Exchange?

2- Are banks listed on Iraqi Stock Exchange exposed to the risk of bankruptcy in the current economic environment?

III-2 The importance of the study

Financial institutions play a significant role in providing different types of services, especially financing the clients and other business entities. It is important for banks to keep their financial position as strong as possible because the failure of financial institutions can significantly affects the economics negatively. However, sometimes banks expose to the risk of bankruptcy and the prediction of failure before it happens might provide an obvious view to managers to eliminate the risk and strength their financial position. From this point of view, it can be said that it is greatly crucial to be aware of any risk that exposes banks and find a mean to predict it and take necessary action to prevent it by the managements.

III-3 Objective of the study:

We can outline the objective of the study briefly as follow:

1- Identify the issue behind the financial failure that may expose to the commercial banks

2- Identify a tool to predict the failure of the banks before it happens utilizing Sherrod's model

3- To help Managements of commercial banks to rely on Sherrod's model to analyse and assess their financial position and take advantage of the model to prevent any risk in the case existence.

III-4 Research hypotheses:

Based on the question raised in the problem of the study and to achieve the objective of the study, we formulated the hypothesis of the study as Sherrod model can be applied in the commercial banks as an indicator to predict the risk of financial bankruptcy in a high extent of accuracy throughout the ratios included in the model.

III-5 The Sherrod model, its formula and calculation:

This study attempts to examine ten trading banks in Iraq by using Sherrod's model, 1987 in predicting financial failure, which is one of the most modern models with a wide range of usage by researchers to test the exposer of banks of financial distress. The reason of applying the Sherrod's model is that it can achieve three main objectives:

1- Credit risk assessment:

This model evaluates the risk of loans granted by the banks to economics projects by dividing the loan to five categories which will be discussed later based on their degree of risks.

(Hayali, 2004: 255).

2- Predicts financial Failure:

It can predict the financial distress before it will happen by using different types of ratios and give different weight to each ratio based on their importance. It also identifies the ability of the firm whether it will continue its operations. (Al-mwrshidy, 2018;262)

3- It also determines the rate of interest to the loans that are granted to clients. (Kubaisi, 2011;28)

Sherrod used six main ratios in his formula and give different weights to each ratio according to its importance in order to achieve the bankruptcy index (Z value). Following are the calculation of each ratio which each of them named as X.

Z value: Bankruptcy index

X1: Working Capital/ Total Assets

X2: Liquid Assets/ Total Assets

X3: Total Equity/ Total Assets

X4: Net Profit before Tax/ Total Assets

X5: Total Assets/ Total Liabilities

X6: Total Equity/ Total Fixed Assets

Each ratio has been weighted based to their relative importance according to Sherrod model as follow:

Table (1) weight of (X)s based on their importance

Ratio	Weight degree	Type of cursor
X1	17	Liquidity
X2	9	Liquidity
X3	3.5	Lift Index
X4	20	Profitability
X5	1.2	Lift Index
X6	0.1	Lift Index

Source: Mohammed Mattar, "Financial analysis methods and tools of scientific and Alasthaddathat", the first edition, the new company for printing and binding, Oman, 1997, p. 174.

The pioneered model of Sherrod is more consistent with trading banks due to the nature of their financial operation, a huge size of investment in current assets, and the difference in weighted relative ratios of the model from financial ratios. (Babela & Mohammed, 2016, 36)

From the above information we can calculate Z value by using the following equation

Z = (17*X1) + (9*X2) + (3.5*X3) + (20*X4) + (1.2*X5) + (0.1*X6)

The result will represent the position of the banks according to the following measures

Table (2): Risk categories according to the model

Category	**Z-Score**	**Degree of risk**
1	Z ≥ 25	The company is exposed to any risk of bankruptcy
2	25 ≥ Z > 20	Very little potentiality of risk of bankruptcy
3	20 ≥ Z > 5	Difficulty of prediction of bankruptcy
4	5 ≥ Z > -5	The company is exposed to the risk of bankruptcy
5	Z < -5	The company is exposed significantly to the risk of bankruptcy

Source: Mohammed Mattar, "Financial analysis methods and tools of scientific and Alasthaddathat", the first edition, the new company for printing and binding, Oman, 1997, p. 174.

As it can be noticed, the potentiality of bank failure depends on the value of (Z) as a main indicator in this model. Thus we can observe two points from the equation:

1- There is a positive relationship between the value of Z and financial position of the firm. It means that the increase of Z value would lead the bank to continue its operation with low risk of bankruptcy.

2- Low value of Z indicates that the bank faces difficulties to continue with a high degree of risk.

(Al-Hamdany,2013:464)

IV- Data presentation and analysis and interpretation of the result:

IV-1 Data collection and sample selection:

This study has collected data from the financial statements of commercial banks listed on Iraq stock exchange. We chose to employ non probability technique to select the sample size of 10 banks throughout the period of 2014 to 2018 as several banks do not have enough information regarding their financial statements. Moreover, we excluded Islamic banks due to the difference in their operations from commercial banks, and they do not provide loans. Finally, due to the nature of the study, we totally relied on secondary data from financial statements which are publicly available in Iraq Stock Exchange website to empirically test the study hypotheses.

IV-2 Data presentation and analysis and interpretation of the result:

In order to achieve the objective of the study and test the hypotheses we used the financial statements of 10 commercial banks listed on Iraq Stock Exchange to calculate the Z-Score using Sherrod's model to predict the risk of bankruptcy for each bank from 2014 to 2018. The results have been presented bellow which have been calculated and extracted through the worksheet of excel.

In order to calculate Z-Score, we need to first calculate the value of X1-X6 which represent financial ratios as indicated above. Thus, we have calculated X values for each bank from 2014-2018 as follows:

Table (3) X Values of Banks of study sample for the year 2014:

Banks	year	X1	X2	X3	X4	X5	X6
Ashur International	2014	0.56	0.69	0.90	0.03	2.64	9.95
Iraq Bank	2014	0.48	0.64	0.80	0.02	2.03	16.35
Gulf Bank	2014	0.36	0.45	0.95	0.05	1.74	6.61
Iraqi Middle-East	2014	0.31	0.51	0.88	0.01	1.82	3.27
Mansour	2014	0.31	0.87	0.37	0.02	1.47	24.30
Mosul	2014	0.74	0.28	2.69	0.06	4.09	43.96
Babil	2014	0.38	0.20	3.11	0.02	2.56	2.71
Baghdad	2014	0.13	0.54	0.29	0.02	1.19	5.09
Sumer	2014	0.57	0.59	1.05	0.01	2.63	12.55
Trans Bank	2014	0.63	0.68	0.98	0.02	2.95	24.70

Source: prepared by the researcher according to the financial statements of the banks of 2014

Table (4) X Values of Banks of study sample for the year 2015

Banks	year	X1	X2	X3	X4	X5	X6
Ashur International	2015	0.53	0.75	0.80	0.03	2.49	9.28
Iraq Bank	2015	0.48	0.66	0.78	0.03	2.04	16.96
Gulf Bank	2015	0.34	0.30	1.31	0.02	1.66	6.43
Iraqi Middle-East	2015	0.27	0.48	0.85	0.01	1.70	2.85
Mansour	2015	0.25	0.30	0.91	0.02	1.37	18.78
Mosul	2015	0.70	0.37	1.94	0.00	3.55	52.05
Babil	2015	0.47	0.21	3.20	0.01	3.15	3.29
Baghdad	2015	0.07	0.54	0.33	0.01	1.22	1.71
Sumer	2015	0.65	0.56	1.28	0.01	3.58	10.31
Trans Bank	2015	0.70	0.48	1.51	0.04	3.62	29.58

Source: prepared by the researcher according to the financial statements of the banks of 2015

Table (5) X Values of Banks of study sample for the year 2016

Banks	year	X1	X2	X3	X4	X5	X6
Ashur International	2016	0.60	0.89	0.76	0.04	3.07	8.58
Iraq Bank	2016	0.47	0.77	0.65	0.02	2.01	18.73
Gulf Bank	2016	0.24	0.38	1.03	0.01	1.66	2.56
Iraqi Middle-East	2016	0.15	0.51	0.86	0.02	1.78	1.49
Mansour	2016	0.24	0.82	0.32	0.02	1.35	12.93
Mosul	2016	0.64	0.40	1.60	0.01	2.84	60.18
Babil	2016	0.55	0.24	3.17	0.03	4.35	3.53
Baghdad	2016	0.10	0.45	0.52	0.02	1.31	1.80

Sumer	2016	0.70	0.61	1.25	0.01	4.16	12.53
Trans Bank	2016	0.64	0.59	1.13	0.05	2.98	27.55

Source: prepared by the researcher according to the financial statements of the banks of 2016

Table (6) X Values of Banks of study sample for the year 2017

Banks	**year**	**X1**	**X2**	**X3**	**X4**	**X5**	**X6**
Ashur International	2017	0.63	0.88	0.80	0.04	3.43	8.74
Iraq Bank	2017	0.42	0.68	0.73	0.01	1.97	6.94
Gulf Bank	2017	0.36	0.37	1.42	0.01	2.14	3.04
Iraqi Middle-East	2017	0.11	0.57	0.64	0.00	1.57	1.45
Mansour	2017	0.20	0.64	0.34	0.01	1.28	10.92
Mosul	2017	0.65	0.41	1.63	0.01	2.95	60.27
Babil	2017	0.59	0.13	6.37	0.01	5.49	3.57
Baghdad	2017	0.20	0.69	0.35	0.01	1.32	5.38
Sumer	2017	0.62	0.67	1.02	0.00	3.18	10.80
Trans Bank	2017	0.76	0.57	1.38	0.04	4.75	28.31

Source: prepared by the researcher according to the financial statements of the banks of 2017

Table (7) X Values of Banks of study sample for the year 2018

Banks	**year**	**X1**	**X2**	**X3**	**X4**	**X5**	**X6**
Ashur International	2018	0.51	0.91	0.63	0.01	2.35	8.46
Iraq Bank	2018	0.40	0.59	0.79	0.00	1.87	6.90
Gulf Bank	2018	0.39	0.43	1.27	0.00	2.19	3.41
Iraqi Middle-East	2018	0.09	0.59	0.56	0.00	1.50	1.37
Mansour	2018	0.17	0.79	0.24	0.02	1.23	10.00
Mosul	2018	0.52	0.46	1.42	0.01	2.85	5.04
Babil	2018	0.55	0.07	9.98	0.01	3.64	3.66

Baghdad	2018	0.21	0.71	0.34	0.00	1.32	6.03
Sumer	2018	0.59	0.73	0.90	0.00	2.90	9.92
Trans Bank	2018	0.81	0.60	1.40	0.02	6.07	31.88

Source: prepared by the researcher according to the financial statements of the banks of 2018

From the information in above tables, we are able to calculate Z-Score for each bank during the study period using Sherrod formula:

$$Z = 17X1 + 9X2 + 3.5X3 + 20X4 + 1.2X5 + 0.1X$$

Hence, we are going to discuss the results of the study among banks year by year in the following section

Table (8) Z-Score of Banks of the study for the year 2014

Banks	Z-Score	Z categories	Risk Degree
Ashur	**24.44**	25 ≥ Z > 20	The company is not exposed to any risk of bankruptcy
Iraq Bank	**21.79**	25 ≥ Z > 20	Very little potentiality of risk of bankruptcy
Gulf Bank	**17.79**	20 ≥ Z > 5	Difficulty of prediction of bankruptcy
Iraqi Middle-East	**16.17**	20 ≥ Z > 5	Difficulty of prediction of bankruptcy
Mansour	**19.38**	20 ≥ Z > 5	Difficulty of prediction of bankruptcy
Mosul	**36.21**	Z ≥ 25	The company is not exposed to any risk of bankruptcy
Babil	**23.67**	25 ≥ Z > 20	Very little potentiality of risk of bankruptcy
Baghdad	**10.76**	20 ≥ Z > 5	Difficulty of prediction of bankruptcy
Sumer	**23.97**	25 ≥ Z > 20	Difficulty of prediction of bankruptcy
Trans Bank	**27.57**	Z ≥ 25	The company is not exposed to any risk of bankruptcy

Source: prepared by the researcher based on Sherrod model

From table 8 above, it is obvious that in 2014, Mosul bank has recorded the highest Z value reached to (36.21) followed by Trans Bank (27.57) which located in the first category of Sherrod model that equal or greater than 25. These two banks are not exposed to the risk of bankruptcy according to the model and they are in a very secure position financially. This means that, the financial positions of these banks are strong enough to cover all their liabilities and they are experience highest level of profitability and liquidity among the other banks of the study.

Furthermore, they are relying on equity rather than of loan to finance their assets, especially fixed assets. In addition to this, Z value of Ashur, Sumer, Babil, and Iraq bank locate on the second category of Sherrod model which is ($25 \geq Z > 20$) with the value of (24.44, 23.97, 23.67, 21.79) respectively. According to the model, banks located in the second category have very little potentiality of bankruptcy. This means that these four banks also have commendable financial positions and enjoy good profitability with sufficient liquidity but not as much as the first category. In 2014, all remaining banks of the study (Mansour, Gulf bank, Iraqi middle-East, and Baghdad) reported Z value in the third category ($20 \geq Z > 5$) as follow (19.38, 17.79, 16.17, and 10.76) accordingly in which, the prediction and risk of business failure of these banks are difficult. This ratio of Sherrod model indicates that banks in the third category own acceptable amount of liquidity, but it is not enough to cover all their operation activities and they also rely on loan reasonably to finance their operations (Ali *et al*, 2019; 160). Finally, it is important to mention that Z value of none of the banks of the study sample located in the fourth and fifth category which means that there is not a bank expose to bankruptcy with high potentiality.

Table (9) Z-Score of Banks of the study for the year 2015

Banks	Z-Score	Z categories	Risk Degree
Ashur	**23.92**	$25 \geq Z > 20$	Very little potentiality of risk of bankruptcy
Iraq Bank	**22.05**	$25 \geq Z > 20$	Very little potentiality of risk of bankruptcy
Gulf Bank	**16.51**	$20 \geq Z > 5$	Difficulty of prediction of bankruptcy
Iraqi Middle-East	**14.90**	$20 \geq Z > 5$	Difficulty of prediction of bankruptcy
Mansour	**14.53**	$20 \geq Z > 5$	Difficulty of prediction of bankruptcy
Mosul	**32.65**	$Z \geq 25$	The company is not exposed to any risk of bankruptcy
Babil	**26.52**	$Z \geq 25$	The company is not exposed to any risk of bankruptcy
Baghdad	**9.43**	$20 \geq Z > 5$	Difficulty of prediction of bankruptcy
Sumer	**27.24**	$Z \geq 25$	The company is not exposed to any risk of bankruptcy
Trans Bank	**30.74**	$Z \geq 25$	The company is not exposed to any risk of bankruptcy

Source: prepared by the researcher based on Sherrod model

From table 9 above, it can be noticed that in 2015, Mosul, Trans bank, Sumer, and Babil reported the highest Z-Score among other banks of the study with value of (32.65, 30.74, 27.24, 26.52) respectively. They located in the first category of Sherrod model that equal or greater than 25. This reveals that these four banks are not subject of any risks of bankruptcy according to Sherrod model due to strong financial position and high level of profitability which resulted the

high value of Z. There are only two banks in the second level of the model which is (25 ≥ Z > 20) these are Ashur and Iraq bank with Z value of (23.92, 22.05) respectively. These two banks have very little potentiality of financial failure because they kept enough liquid assets to cover their short term liabilities with strong financial position. However, it is important to mention that they are not strong enough in comparison to the first category in respect of profitability as well as financial position. The third category includes the rest of the banks of the study sample, these are (Gulf Bank, Iraqi middle-East, Mansour and Baghdad) with Z value of (16.51, 14.90, 14.53, 9.43) respectively. According to the model applied in this study, the prediction of bankruptcy in third category are difficult as they have good financial position and profitability but not strong enough. However, it is worth noting that Net Working Capital of Baghdad bank recorded the lowest value among all the other banks and low amount of profit compared to its liabilities that led to have low value of X1 and X4 which result the lowest Z-score of (9.47) in contrary to the other banks of the study.

Table (10) Z-Score of Banks of the study for the year 2016

Banks	Z -Score	Z categories	Risk Degree
Ashur	**27.07**	Z ≥ 25	The company is not exposed to any risk of bankruptcy
Iraq Bank	**22.57**	25 ≥ Z > 20	Very little potentiality of risk of bankruptcy
Gulf Bank	**14.13**	20 ≥ Z > 5	Difficulty of prediction of bankruptcy
Iraqi Middle-East	**13.33**	20 ≥ Z > 5	Difficulty of prediction of bankruptcy
Mansour	**16.23**	20 ≥ Z > 5	Difficulty of prediction of bankruptcy
Mosul	**30.55**	Z ≥ 25	The company is not exposed to any risk of bankruptcy
Babil	**30.09**	Z ≥ 25	The company is not exposed to any risk of bankruptcy
Baghdad	**10.25**	20 ≥ Z > 5	Difficulty of prediction of bankruptcy
Sumer	**29.46**	Z ≥ 25	The company is not exposed to any risk of bankruptcy
Trans Bank	**28.28**	Z ≥ 25	The company is not exposed to any risk of bankruptcy

Source: prepared by the researcher based on Sherrod model

Table (10) shows that in 2016, Z-Score of half of the study sample is greater than 25, meaning that they are included in the first category. Mosul bank reported the highest Z-Score of (30.55) followed by Babil, Sumer, Trans bank, and Ashur with Z value of (30.09, 29.46, 28.28, and 27.07) accordingly. These banks kept high level of liquid assets to fulfill their current obligations and they rely mainly on equity to finance their fixed assets. In general it can be said that they stand with a strong financial position with no risk of financial bankruptcy. While, there is only one bank located in the second category (25 ≥ Z > 20), with very little risk of financial

failure which is Iraq bank with the Z value of (22.57). On the other hand, Mansour, Gulf Bank, Iraqi Middle-East and Baghdad banks are in the back of the banks among the study sample in respect of Z-Score of (16.23, 14.13, 13.33, and 10.25) respectively. These banks located in the third category ($20 \geq Z > 5$) with difficulty in prediction of financial bankruptcy. However, we can point out that banks included in the third category rely on financing their total assets on loan more than on equity. This means that the risk is a little higher in comparison to the other category and cost of capital will be higher as well. Additionally, There is no any bank in the study sample located in the fourth and fifth category.

Table (11) Z-Score of Banks of the study for the year 2017

Banks	Z-Score	Z categories	Risk Degree
Ashur	**8.25**	$Z \geq 25$	The company is not exposed to any risk of bankruptcy
Iraq Bank	**9.66**	$20 \geq Z > 5$	Difficulty of prediction of bankruptcy
Gulf Bank	**8.14**	$20 \geq Z > 5$	Difficulty of prediction of bankruptcy
Iraqi Middle-East	**1.77**	$20 \geq Z > 5$	Difficulty of prediction of bankruptcy
Mansour	**3.65**	$20 \geq Z > 5$	Difficulty of prediction of bankruptcy
Mosul	**1.14**	$Z \geq 25$	The company is not exposed to any risk of bankruptcy
Babil	**2.43**	$Z \geq 25$	The company is not exposed to any risk of bankruptcy
Baghdad	**3.64**	$20 \geq Z > 5$	Difficulty of prediction of bankruptcy
Sumer	**6.07**	$Z \geq 25$	The company is not exposed to any risk of bankruptcy
Trans Bank	**3.60**	$Z \geq 25$	The company is not exposed to any risk of bankruptcy

Source: prepared by the researcher based on Sherrod model

Table (11) above illustrates the X values of all ten banks of the study sample in 2017. It can be noticed that all ten companies classified into two categories of Sherrod's model equally (the first category and third category). Five of the banks included in the first category (Z value greater than 25) with strong financial position with no threat of financial failure. These banks are (Babil, Trans bank, Mosul, Ashur, and Sumer) with X-Score of (42.43, 33.60, 31.14, 28.25, 26.07) respectively. These banks financed the majority of their assets by equity especially fixed assets with a satisfactory amount of liquidity except Babil bank which its liquidity is low in comparison to total assets (only 13% of total assets), despite the high value of Z-Score. Moreover, they performed well financially and recorded reasonable percentage of Return-On-Asset except Sumer bank with nearly 0% and Mosul banks with only 0.04%. It means that however they are in a safe line in respect of risk of bankruptcy, but they did not perform well in term of profitability. Overall it can be expressed that all five banks in the first category are not exposed to risk of bankruptcy according to Sherrod model. At the same time, all remaining five banks are located in the third

category (20 ≥ Z > 5) in which, the prediction of bankruptcy of this category are difficult (Iraq bank; 19.66, Gulf Bank; 18.14, Mansour; 13.65, Baghdad; 13.64, Iraq Middle-East: 11.77). Also, it is crucial to point out that none of them performed well in respect of profitability in comparison to total assets and they rely to finance their assets on equity as well as loan almost equally. This means that the cost of capital will be high in term of interest rate and finally affected profitability.

Table (12) Z-Score of Banks of the study for the year 2018

Banks	Z-Score	Z categories	Risk Degree
Ashur	**23.65**	25 ≥ Z > 20	Very little potentiality of risk of bankruptcy
Iraq Bank	**18.38**	20 ≥ Z > 5	Difficulty of prediction of bankruptcy
Gulf Bank	**18.55**	20 ≥ Z > 5	Difficulty of prediction of bankruptcy
Iraqi Middle-East	**11.19**	20 ≥ Z > 5	Difficulty of prediction of bankruptcy
Mansour	**14.03**	20 ≥ Z > 5	Difficulty of prediction of bankruptcy
Mosul	**22.84**	25 ≥ Z > 20	Very little potentiality of risk of bankruptcy
Babil	**51.02**	Z ≥ 25	The company is not exposed to any risk of bankruptcy
Baghdad	**13.76**	20 ≥ Z > 5	Difficulty of prediction of bankruptcy
Sumer	**25.14**	Z ≥ 25	The company is not exposed to any risk of bankruptcy
Trans Bank	**36.80**	Z ≥ 25	The company is not exposed to any risk of bankruptcy

Source: prepared by the researcher based on Sherrod model

In 2018, the number of banks included in the first category (Z ≥ 25) decreased as indicated in table (12) above. There are only three banks in this category (Babil, Trans bank, and Sumer) with Z value of (51.02, 36.80, 25.14) respectively. The funding source of these banks are mainly depended on owner's equity that led their financial position to be strong enough to reduce the risk of bankruptcy in a high extend of degree. Additionally, these three banks maintain satisfactory amount of liquid assets that make them able to cover their short term liabilities at due date. Ashur and Mosul Banks located in the second category of Sherrod model (25 ≥ Z > 20) with Z-score of (23.65, 22.84) respectively. They are also hold strong position financially and have very little potentiality of bankruptcy with reasonable amount of liquid assets which reduce the lack of fulfillment of obligations by the banks. The rest of the banks included in the third category (20 ≥ Z > 5) these banks are (Gulf Bank, Iraq Bank, Mansour, Baghdad, and Iraqi Middle-East) with Z-Score of (18.55, 18.38, 14.03, 13.76, and 11.19) accordingly. The prediction of bankruptcy of this category are difficult in some extend according to Sherrod model. Based on the information

obtained in the financial statements of these banks, the financial positions are strong enough but not as first and second category. However, they did not perform well in term of profitability in which, all five banks reported just little higher than 0% of return on assets in 2018. There is not any bank located in the fourth and fifth category as previous years. It means that during the study period, we cannot find a bank in the study sample to be exposed to risk of bankruptcy incredibly.

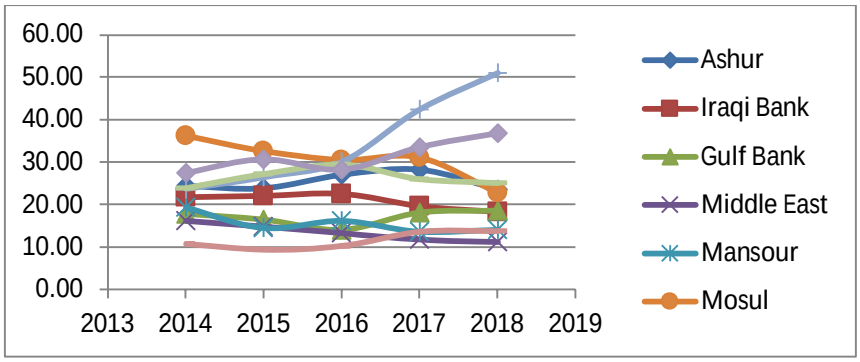
Finally, we created a table and a line chart in this study to display the trend of each bank during the study period with average value in respect of Z-Score to come into a possession of a better understanding of each bank separately in the table and the line chart below:

Table (13) Z-Score of study sample during the study period from 2014-2018

Years	Ashur	Iraqi Bank	Gulf Bank	Middle East	Mansour	Mosul	Babil	Baghdad	Sumer	Trans Bank
2014	24.44	21.79	17.79	16.17	19.38	36.21	23.67	10.76	23.97	27.57
2015	23.92	22.05	16.51	14.90	14.53	32.65	26.52	9.43	27.24	30.74
2016	27.07	22.57	14.13	13.33	16.23	30.55	30.09	10.25	29.46	28.28
2017	28.25	19.66	18.14	11.77	13.65	31.14	42.43	13.64	26.07	33.60
2018	23.65	18.38	18.55	11.19	14.03	22.84	51.02	13.76	25.14	36.80
Average	**25.47**	**20.89**	**17.02**	**13.47**	**15.57**	**30.68**	**34.75**	**11.57**	**26.38**	**31.40**

Source: prepared by the researcher

Figure 1: Z-Score of study sample during the study period from 2014-2018 in chart



Source: prepared by the researcher

We can notice that via table (13), half of the study banks experience with strong financial positions and profitability in which, they are not exposed to risk of bankruptcy considering the value of Z are greater than 25 and fall with in the first category of Sherrod model. The average Z values of these banks are (34.75, 31.40, 30.68, 26.38, and 25.47). The highest value reported by Babil Bank as the best bank in term of financial position and profitability among the study sample with an increasing trend throughout the study period. The second best bank in average is Trans bank followed by Mosul, Sumer and Ashur respectively. Moreover, there is only one bank among the study sample which located in the second category ($25 \geq Z > 20$) in average throughout the study period. This bank is Iraqi Bank with average Z-Score of 20.89 with very little potentiality of risk of bankruptcy and keeping itself in a strong position financially with acceptable percentage of profitability, but not as strong as the banks of first category. However, it is important to address

that the value of Z of Iraqi bank reducing after 2016 which means that from 2016 the financial position of that bank worsened and the level of loan has increased.

The final group of banks has been located in the third category ($20 \geq Z > 5$) which represents 40% of the study sample. These banks are (Gulf bank, Mansour, Iraqi Middle-East, and Baghdad) with the average value of Z (17.29, 15.69, 13.58, 11.64) respectively. As it can be seen, Bank of Baghdad recorded the worst average Z-Score among the study sample during the study period with value of (11.57), despite a slightly increasing trend after 2015 which can be seen as a good indicator somewhat for a better future financially. It also worth mentioning that, all banks in the third category have been in the same category of Sherrod model during all the study period with difficulty in prediction of bankruptcy. These banks are (Gulf Bank, Mansour, Iraqi Middle-East and Bagdad) with Z-Score of (17.02, 15.57, 13.47, and 11.57) respectively. It means that somehow they are in a good financial position and rely on financing their fixed assets on equity with reasonable amount of liquidity, but not enough to cover all their operation activities. Finally, it is important to confirm that there is not any bank located in the fourth and fifth category in the study sample, meaning that there is not any bank exposing to the risk of bankruptcy in the study sample during the study period.

V- CONCLUSION

Based on the result discussion we conclude the following points:

1- The result of the study showed that five of the banks listed on the Iraqi stock exchange pose strong financial positions in average without any risk of bankruptcy with sufficient liquidity to fulfill their short term obligations.

2- Four of the banks of study sample have very little risk of bankruptcy with acceptable liquidity to meet the requirement of liabilities.

3- The result showed that prediction of bankruptcy of some banks listed on Iraqi stock exchange is difficult according to Sherrod model.

4- Based on the result, there is no any bank among the banks of the study exposed to the risk of bankruptcy to a large extent during the study period.

5- According to the result, Sherrod's model measures the risk of bankruptcy with considerable accuracy based on the real financial situation of the banks listed on Iraqi stock exchange.

VI- RECOMMENDATION

We are going to suggest the following recommendations based on the results we achieved in the study:

1- Financial institutions should utilize Sherrod model as a tool to detect and measure the risk of bankruptcy before it happens and take the necessary actions in order to eliminate it.

2- Management of banks should encourage finance and accounting departments to acquire enough knowledge and skills in analyzing the financial statements and provide reliable information to managers in time.

3- All related parties inside the banks should design a credit policy cooperatively to protect themselves from financial risks that may face banks for the sake of preventing financial distress.

4- Future researches should utilize more than one model to measure the risk of bankruptcy and take a wider range of period in the case of availability of information.

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