The Validity of Altman's Models in Predicting Iraqi Private-Banks Soundness

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Abstract

Nowadays, banks play a significant role in the economy. Thus, its fail extends beyond stakeholders, companies and organization. But may reach to threaten the entire economy. Such an institution better to depend on an early warning system to prevent the costly fail of it. Financial distress prediction (FDP) refers to a method of utilizing statistical models to predict business failure or difficulties that may face banks. A famous earlier model suggested by Altman in which use by the current study to assess the soundness of Iraqi private banks and to find out if such a model could be appropriate to predict financial failure. The model applied to two groups of Iraqi private banks. The first group involves already failure banks; in contrast, the second group comprises Non-failure banks. The study finds that the Altman model unable to predict financial distress in Iraqi private bank with worthwhile accuracy. Therefore, it is inapplicable as applied in other business environments.

Keywords

1. Introduction

Banks health an important condition for all parties in each economy, and became a sensitive issue in the time of crises (Walker, 2019, Balakrishnan et al., 2020, Chairunesia, 2020, Maharani et al., 2020). Therefore, the banking sector paves for a strong and stable economy, that what makes it vital in each economy. In light of unstable political policies and deteriorating economic policies in Iraq, Private Iraqi

banks face rigorous challenges to operate and boost economic activities, which make it keep focus to provide essential services under high uncertainty conditions. Under such conditions, Early warning system still important issue for all participants in the business environment, particularly to depositors, borrowers, and stakeholders. Therefore, utilizing financial failure prediction process has a great impact on the business environment. Financial distress prediction (FDP) refers to the method of utilizing statistical models to predict business failure or difficulties in future (Aghdam and Mohammadzadeh, 2016, Idrees and Qayyum, 2018, Chen et al., 2020). First attempt was by (Beaver, 1966), then followed by (Altman, 1968) who works on Beaver's Model drawbacks and produce the first most common Model. Altman model Developed overtime since first use to cover non-manufacturing and private companies. Albeit there are more of the sophisticated model for predicting financial distress, but the Altman model still most common use among them.

A lot of studies utilize Altman to test the soundness of banks as the current study uses Altman model to assess the soundness of Private Iraqi banks and to discover whether such model could be beneficial to predict financial distress in Iraqi private banks. In contrast to local studies in this topic which used to assess the healthy (non-failure) banks only. The current study applies Altman for two groups of banks. The first group comprises failure banks, whereas, the second group represent the non-failure bank. This procedure enables to shad the light on if the model successfully predicts the fall of the failed bank before its collapse, then it is meaningful to predict the future difficulties for the soundbank in the second group.

2. Theoretical Framework

Financial failure or distress has a wide meaning term, and it is ranging from facing difficulties in running the business, insolvency to bankruptcy and stop the business then liquidation (Hadi et al., 2019, Khoja et al., 2019, Kim and Lee, 2020). Thus, such term gains a remarkably attention amongst academics and practitioners, because the effect of business failure extends beyond stakeholders, companies and organization. But may reach to threaten the entire economy of the country (Doumpos and Zopounidis, 2002).

Back to 1930s, studies found that study financial ratios of possible failed firms increasingly benefit in failure predictions when calculating before five years(Altman, 1968). But the first efforts to business failure predictability began by Beaver's works, (Beaver, 1966) applied the univariate model to assess the possibility of firm distress in future as a warning system. The model faces some drawbacks like it

uses separated ratios by allowed to employ one ratio in once time and assign a cut-off for each ratio. Also, the model required massive data to give a sign in short-run. Nonetheless, Beaver's model was the trigger to find more about FDP models. Then (Altman, 1968) after overcomes on Beaver's model drawbacks, Altman presents the Z-score model. His works arise from validating the required ratios and weights, Altman consisting of liquidity, profitability, financial leverage, solvency, by wising multiple discriminant analysis (MDA). The main advantage of the model is by makes decision based on one classifier, which was Z. Regardless MDA model experience some criticism. Nonetheless, it is manifesting meaningful and valuable information (Hillegeist et al., 2004). Moreover, (Carson, 1995)confirm the reasonability of the MDA model in predicting failure possibility when tested some financial distress models. In addition, the Altman model achieves accuracy more than Beaver's model in one-year prediction (Gepp and Kumar, 2012).

Some studies were likely to try to find out the optimal model of FDP, in their study (Mossman et al., 1998), test four commonly used models, they suggested there is no sufficient lonely model, and ignoring any model leading to losing some explanatory power. Indeed, the FDP models accuracy based on two dimensions, which are classification and prediction. From the view of (Gepp and Kumar, 2012), the model with a distinct cut between failure and non-failure have high accuracy, also when the model shows accurate predictability. Actually, such accuracy measures build-up by intensive tests and with new dataset over time. In addition, (Grice and Ingram, 2001) point out that financial ratio and FDP volatile over time, that means they need for more test and discover uncovered samples to support the validity of FDP models.

In 1995, (Altman et al., 1995) revise the model with the cut-off rate (2.67), Altman notice that model accuracy reaches about (94%) is particularly a year before business failure and (72%) before two years. That meaning the MDA still robust after 30 years ago from Altman model first use. Also, Altman remarks that accuracy increases every time the result became near the failure (Altman, 2013). Later, (Li and Rahgozar, 2012) after reviewed Altman general model, the authors noticed that even after 40 years, the model still beneficial in predicting financial failure. (Li and Rahgozar, 2012) apply Altman model on U.S. firms for period 2000-2010. The study covered manufacture and non-manufacture firms; consequently, their findings indicate that general Altman model fairly predict failure, whether in the manufacture or non-manufacture firms in the same level of accuracy. On the other hand, the model predicts financial failure with high accuracy before five years from failure date than before three years

and downwards. (Grice and Ingram, 2001) noted that the Altman model has the ability to identify the financial difficulties besides the bankruptcy. That makes Z-score esteemed as classical instruments for financial distress prediction.

Even though (Sharma and Mayanka, 2013) stated that it is rarely remarking studies with the Altman model in banking studies. Meanwhile, in the banking sector, the first attempt was by (Sinkey, 1977), when conclude that possible to predict financial difficulties in banking institutions if using an appropriate statistical model to deal with available data of those institutions. Sinkey uses multivariate discriminated model base on seven ratios, similar to those ratios used by the Altman model. Whereas (Sharma and Mayanka, 2013) study the soundness of 36 Indian banks (20 public and 16 private) under period 2007-2012, the study indicates a satisfactory benchmarking result for Altman model among Indian banks. Likewise, (Pradhan, 2014) studies the Indian bank sector, the study proves the viability of the Altman model in banking sector besides Neural network model. Moreover, (Parvin et al., 2013) employed Altman model to verify the soundness of state-owned banks versus private counterparts, by comparing tow group, they suggested that state-owned banks perform better than their peers in private sector in Bangladesh.

As a result, to economic collapse in Greece, (Kokkoris and Anagnostopoulou, 2016) attempt to shed light on the four main systemic banks in the banking system of Greece in the for the period 2012-2015, to discover the effect of deteriorating nature of that period of the Greek economy. They notice that after measuring banks performance by Altman model, that main Greek banks suffering from high probability to be solvent in the near future even though with governmental intervention. Similarly, (Bolat, 2017) uses Altman EM model to assess the possibility of Kazakhstani banks failure, and conclude that the Altman model affirms the soundness of 23 under-study Kazakhstani banks for the period 2011-2013. As a result, to state policy that supports the banks after the 2008 financial crises. From another hand, (Zainudin et al., 2019) uses Altman model to analyze Malaysian Islamic banks soundness, their study covers selected Islamic banks with the deferent structure to investigate whether the various structure could affect bank bankruptcy. They found that foreign incorporated banks perform better than domestic banks in term of insolvency and financial stability.

3. Methodology

The study extracts the required data from the Iraq Stock exchange official publications. Where under-study banks announce their periodical financial statements (Balance Sheet and income

statement). The chosen banks were from the private sector. To test the bank soundness, the under-study private banks were separate into two groups, failure banks and non-failure banks. The failure banks were namely (Al- Warka Investment Bank, Dijlah & Furat Bank for Development, Economy Bank for Investment, Elaf Islamic Bank, Trans Iraq Bank for Investment, and United Bank). Whereas, the non-failure banks were namely (Investment Bank of Iraq, Bank of Baghdad, Babylon Bank, Ashur International Bank for Investment, Gulf Commercial Bank, and Kurdistan International Islamic Bank). Remarkably, the period used to study the failed banks was vary, because the failed banks were collapse at different times. That makes the study adopted a different period for each bank. In contrast, the non-failure banks test in unified period for five years from 2009-2013, to be enough to achieve study model.

The general (Z-Score) model of bankruptcy is first tested by (Altman, 1968) for manufacturing companies. The model uses multiple discriminant statistical style instead of traditional fragrance financial ratios like the common analysis. The general (Original) model of Altman as the formula (1):

$$Z = 0.012x_1 + 0.014x_2 + 0.033x_3 + 0.006x_4 + 0.999x_5 \tag{1}$$

Where X1. Working capital/Total assets

X2 = Retained Earnings/Total assets

X3 = Earnings before interest and taxes/total assets

X4= Market value equity/Book value of total debt

X5 = Sales/Total assets

Z = Classifier Value

Regardless that Altman's general model of corporate failure could apply to firms in any condition. But Altman stated that each economy has a differentiated factor which affects the classifier results of General model, which tested essentially for U.S. companies. Moreover, the company type or their sector profile makes it have particular characteristics. Therefore, the current study utilizes the Altman developed Model (EMS). Unlike the original Z-score model, emerging markets model (EMS) modified over 35-years after the original Model in order to fit private and services companies. Which make it suitable for banks. Hence, it takes another form as in Formula (2): (Altman, 2005)

$$EMS = 6.56x_1 + 3.26x_2 + 6.72x_3 + 1.05x_4 + 3.25 \tag{2}$$

Where first-four ratio still without a change in format, the last numerical constant (+3.25) was add by Altman to standardize the model with credit rating due to data nature that used. In the EMS model,

the classifier has a little modification than the general model due to firms type and formula, so it becomes as following ([Altman, 2013](#)):

Table (1): Classifier ranges

Classifier	Condition
Above 2.9	meaning firm in the safe zone.
1.2 to 2.9	gray zone or ignorance zone
1.2 and below	show distressed zone

4. Results and Discussion

As mentioned earlier, the analysis conduct for each group of banks (Failure and non-failure banks), So the result will reveal for each group.

Failure banks: As illustrated in (Table 2), Which show the failed banks. Apparently, the banks, namely (Economy Bank, United Bank, Dijlah & Furat Bank, and Elaf Islamic Bank) show similar behaviour in term of EMS Classifier. Where started from under a safe zone, then going up to the safe zone and fail after that without back to gray or distress zone. Although, it was achieved a positive sign that it performs well in order to leave the distress zone. However, if we back to analyze each bank from those four banks, we never find a sign of economic or legal failure. For Trans Iraq Bank, the matter somewhat differs, the bank starts from a safe zone and fail in a safe zone without reaching gray zone at least. Even though the bank achieves a high EMS score, but the trend was in decline before fail. The Warka Bank was the exception of this group (Figure 1). The bank started in the distress zone (Failure Zone) and still struggled in the distress zone until entire fail. According to its economic indicator at that time, the bank was suffering from mismanagement about bank liquidity. And this implies that the EMS Model predicted the fall of Warka Bank seemingly.

Table (2): Failure bank EMS Classifier Values

Bank \ Year	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Al-Warka Bank	0.82	1.13	0.57	0.36	0.56	1.13	-	-	-	-	-	-	-	-
Economy Bank	-	-	-	-	3.01	2.22	1.94	1.41	1.32	2.28	2.18	3.29	-	-
United Bank	-	-	-	-	0.75	3.38	3.56	3.87	3.71	4.42	4.48	4.59	4.57	-
Dijlah & Furat Bank	-	-	-	-	-	1.65	1.27	2.15	2.76	2.92	4.79	-	-	-

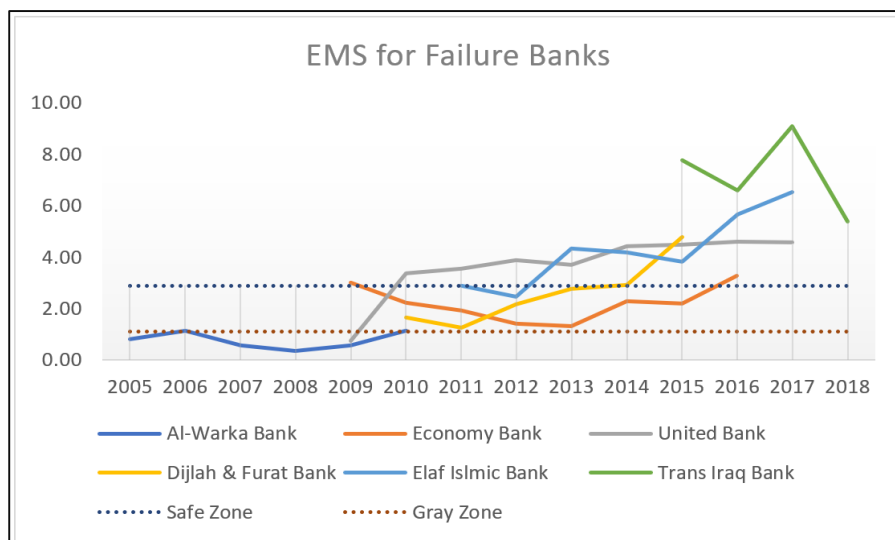|													
Elaf Islmic Bank	-	-	-	-	-	-	2.89	2.46	4.32	4.19	3.83	5.67	6.52	-
Trans Iraq Bank	-	-	-	-	-	-	-	-	-	-	7.78	6.59	9.09	5.40

Source: Prepared by Researchers

Fig.1. Failure bank EMS Classifier trend
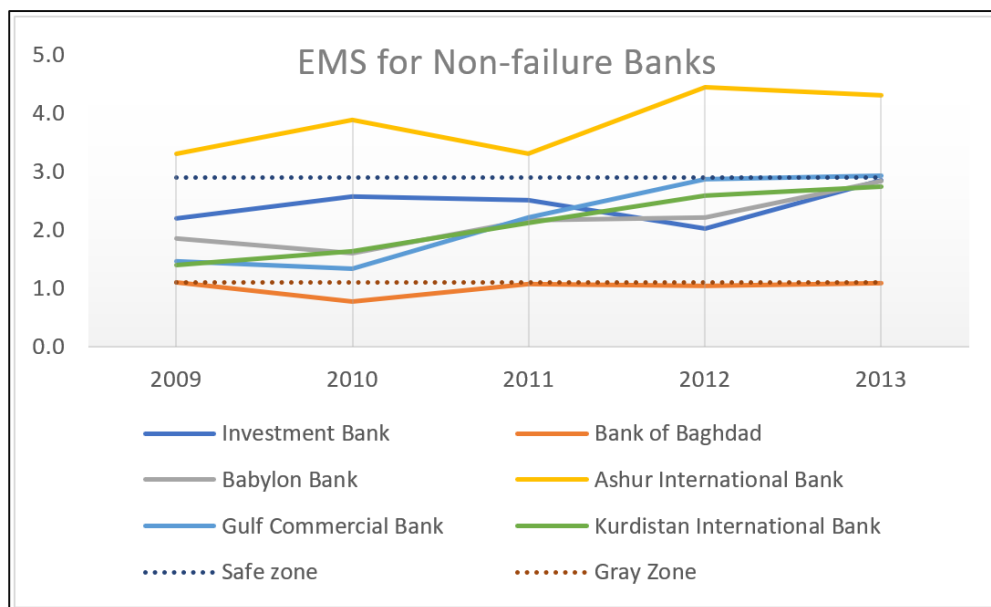
Source: Prepared by Researchers

Non-failure banks: the results of this group illustrated in (Table 3). In spite of the fact that all banks in this group never Experience any solvency or difficulties in their work till now, but it exhibits various behaviours in term of EMS score. Where the banks, namely (Investment Bank, Babylon Bank, Gulf Commercial Bank, Kurdistan International Bank), manifest relatively unified trend by ranging in the grey zone (Fig.2). The trend begins within the grey zone and ends up by tangent the safe zone from underneath without across to it at the end of the period. From another hand, Bank of Baghdad, which considered as oldest bank among Iraqi private banks, exhibit the worst result with regard to classifier Value. Where the bank is about to match the distress zone limit (the lower dotted line) with unobvious reason and keeps moving without change. Meanwhile, Ashur Bank performs well according to EMS results, by keeping moving throughout safe zone without Retreat and continue moving with the slight uptrend.

Moreover, the EMS records show that Failure banks exhibit unstable (except Al-Warka Bank), While, Non-Failure bank was stable, that meaning these banks were doing well even it was achieving non-plausible EMS scores in the study sample period. That maybe gives the EMS model some meaningful results. Although, the model was unable to predict the majority of banks that used in the study (except Al-Warka Bank and Ashur International Bank). Which make it difficult to adopt such a model to predict the probability financial distress of banks in Iraq (Figure 2).

Table (3): Non-failure banks EMS Classifier Values

Bank \ Year	2009	2010	2011	2012	2013
Investment Bank	2.2	2.6	2.5	2.0	2.9
Bank of Baghdad	1.1	0.8	1.1	1.1	1.1
Babylon Bank	1.9	1.6	2.2	2.2	2.8
Ashur International Bank	3.3	3.9	3.3	4.5	4.3
Gulf Commercial Bank	1.5	1.3	2.2	2.9	2.9
Kurdistan International Bank	1.4	1.6	2.1	2.6	2.7

Source: Prepared by Researchers

Fig.2. Non-failure bank EMS Classifier trend

Source: Prepared by Researchers

5. Conclusions and Recommendations

With an unstable economic environment, Iraqi banks still face a lot of difficulties to search for depositors and offering loans to promote economic development. To be a soundbank became a daily challenge for Iraqi private banks. Thus, it should adopt an early warning system to achieve the objective of survival in such an environment. Altman model recognized as one from a well-known financial distress predicting model. Hence, the current study uses this model to test the soundness of Iraqi banks and to stand on whether such a model could be reliable in Iraqi business environment. The study found that after applying the model to failure and non-failure banks, it produced a difficult to interpret results. For failure banks, the model refers that the banks at most did not face difficulties, but at last, it failed. That means the banks did not report a missed financial report about their activities or suffered from a sudden managerial event led it to fail urgently before correcting its situation. In contrast, for the non-failure banks in most of the time were about to show difficulties. This implies such model (Altman EMS) is unsuitable for Private Iraqi banks; consequently it is required to utilize a sophisticated model.

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