Research article

Evaluating the predictive power of Altman, KIDA, and Sherrod Models for financial distress: Evidence from the Iraqi private banking sector (2021–2024)

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ABSTRACT

This study examines the extent to which three popular analytical models accurately predict the risk of financial failure. We applied the Altman Z-Score, KIDA, and SHERROD models to financial data of the Iraqi Private Bank from 2021 to 2024. After conducting relevant financial analyses, the results of each model were examined individually to assess predictive accuracy and identify potential financial vulnerabilities. Our results revealed distinct patterns. The Altman Z-Score indicated a consistent year-to-year decline in its Z-value, signifying declining financial health and rising distress risk—most significantly in 2022. Compared to that, the KIDA model had even more dire data, posting negative readings for the entire period. These repeatedly negative readings triggered alarm bells about the bank's risk of failure that were impossible to ignore. The SHERROD model differed in revealing greater relative stability. It was positively valued in every year tested. This difference highlights the impact of the underlying methodology on the models' sensitivity to financial risk. The principal contribution of this research lies within its multi-model framework. Using multiple analysis tools provides a well-rounded assessment of a bank's financial health that surpasses any model considered independently. Our findings underscore the need for models that accurately reflect the distinct characteristics of the Iraqi banking sector. They suggest developing locally tailored early-warning signs that align with Iraq's economic situation. This approach can empower Iraqi bank decision-makers to anticipate financial crises more effectively and create more robust plans, which is essential for achieving financial success.

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Abstrak

Studi ini menentukan sejauh mana tiga model analitis populer memprediksi risiko kegagalan keuangan. Kami menerapkan model Altman Z-Score, KIDA, dan SHERROD pada data keuangan Bank Swasta Irak dari tahun 2021 hingga 2024. Setelah melakukan rasio keuangan yang relevan, hasil masing-masing model dianalisis secara individual untuk mengukur akurasi prediktif dan menentukan potensi kerentanan keuangan. Hasil kami mengungkapkan pola yang berbeda. Altman Z-Score menunjukkan penurunan nilai Z yang konsisten dari tahun ke tahun, yang menandakan menurunnya kesehatan keuangan dan meningkatnya risiko kesulitan keuangan—paling signifikan pada tahun 2022. Dibandingkan dengan itu, model KIDA memiliki data yang lebih buruk, mencatat pembacaan negatif untuk seluruh periode. Pembacaan negatif yang berulang ini memicu tanda bahaya yang nyata tentang paparan risiko bank terhadap kegagalan. Model SHERROD berbeda karena menunjukkan stabilitas relatif yang lebih besar. Model ini dinilai positif di setiap tahun pengujian. Perbedaan ini menekankan bagaimana metodologi yang mendasari model memengaruhi sensitivitasnya terhadap risiko keuangan. Kontribusi utama penelitian ini terletak pada kerangka kerja multi-modelnya. Penggunaan beberapa alat analisis memberikan penilaian menyeluruh terhadap kesehatan keuangan bank yang melampaui model apa pun yang dipertimbangkan secara independen.

Kata Kunci: Kegagalan Finansial, Skor Z Altman, KIDA, SHERROD

1. Introduction

Multiple definitions exist for financial failure. As Ayvaz & Erkan (2023) describe it, this occurs when a financial institution fails to settle its financial liabilities as they mature. Such a default initiates a progressive deterioration in fiscal health, ultimately culminating in bankruptcy. (Helhel & Mammadli, 2023) defined financial failure as the situation where a company's liabilities exceed its financial reserves, or when a company is unable to meet its due obligations. They also described financial failure as the legal bankruptcy of a company or the accumulation of negative cash flows over a continuous period (Lipi, 2020). Financial failure can be categorized into two types: financial failure with the possibility of meeting obligations, where the institution halts all activities due to continuous losses without making profits, but is still able to settle its obligations; and financial failure with no possibility of meeting obligations, which is characterized by the institution's inability to meet its financial commitments (Yousef, 2013). Among the internal causes of financial failure in financial and banking institutions are poor liquidity management, insufficient working capital, high debt-to-equity ratios, and declining profitability due to weak operational performance (Al-Hamdani & Al-Qattan, 2013). Other causes include a weak financial structure, a lack of cost control, poor corporate governance, resulting in conflicts between management and shareholder interests, unrealistic company strategies, and the negative impact of state policies and regulations on daily operations (Ye Lu et al., 2020).

On the other hand, external causes of financial failure in financial institutions are oil price volatility and direct implications on the Iraqi economy, political and security instability affecting market stability and investor confidence (Al-Rifai, 2017), global economic crises such as inflation, rising interest rates, and economic downturns affecting local economic activity and, consequently, an increased risk of financial failure (Cihangir & Kara, 2014). Intense competition,

leading to price reductions, shrinking market share, and pressure on profit margins, also plays a significant role. Moreover, unforeseen events, such as global health crises and natural disasters, can disrupt operations and increase costs (Kowalski, 2014).

One of the primary indicators of financial distress is a decline in profitability, as evidenced by continuous drops in net profit and return on assets, deterioration in liquidity due to the inability to cover short-term liabilities, and rising debt ratios that exceed acceptable safety thresholds. Furthermore, a decline in market value (e.g., falling stock prices and asset values), as well as delayed debt repayments due to repeated delays in paying interest or installments, is indicative of financial distress (Al-Shaibani, 2017, p. 90). Additional factors include weak capital oversight, declining sales, increased competition from both imported and domestic products, the institution's inability to adopt modern technological methods, and the reliance on traditional methods that are costlier and less efficient (Al-Khayyat, 2014, p. 14). Moreover, the repeated deferral of dues and increased demand for unjustified financial facilities are significant signs of financial trouble (Abdullah & Abadi, 2022). Stages of Financial Failure Prediction: According to Akkar & Khashan (2019), the first stage of financial failure is the incubation stage, where no institution immediately heads toward financial failure. The second stage is the early financial deterioration stage, characterized by declining operating cash flows and decreasing profits (Al-Rakabi, 2022). This is followed by the financial distress stage, where debt levels rise, and the institution finds it increasingly difficult to meet its obligations (Al-Shukr & Hlo, 2022). The next stage is the financial crisis, where a complete failure to meet financial obligations occurs, potentially leading to legal actions. The final stage is bankruptcy or restructuring, which involves the liquidation of assets or financial restructuring under legal supervision (Al-Hamdani, 2013).

Financial institutions utilize several key indicators to predict financial failure. These include liquidity indicators, such as the quick or current ratio, which measure the ability to meet short-term obligations, where a decline signals heightened financial risk and potential debt default (Sherrod, 2020). Profitability is measured through metrics such as return on assets (ROA) and return on equity (ROE), which reflect the institution's ability to generate profits from its assets and capital (Al-Rifai, 2017). Furthermore, the financial structure is assessed through the debt-to-equity ratio, which indicates reliance on debt financing. At the same time, asset efficiency is measured by asset turnover, revealing management's effectiveness in utilizing assets to generate revenue (Sherrod, 2020). Finally, the cash flow indicator evaluates the ability to generate surplus operational cash to meet financial commitments (Al-Jibouuri et al., 2022).

The importance of early financial failure prediction extends to numerous stakeholders. For banks, it is crucial for assessing the risk of loans extended to customers and for determining loan terms (prices, conditions). At the same time, investors use it as a tool to evaluate projects and distinguish between desirable and high-risk investments. Management relies on these indicators to frame strategies for avoiding potential bankruptcy (Marwa, 2021), and governments use predictions as part of their regulatory role to prevent economic crises in both public and private sectors. Additionally, auditors are responsible for incorporating these indicators into their audit process to ensure the accuracy and stability of financial statements (Al-Mershidi, 2018).

2. Theory and hypothesis

Financial forecasting in financial and banking institutions has become one of the most important topics, increasingly considered by many financial institutions and organizations, due to its crucial role in highlighting the adverse effects and financial deterioration on both financial institutions and investors. The interest in this subject began in the 1930s, when a group of researchers used individual financial indicators to predict financial failure in institutions and banks. Over time, this field gained more attention, particularly in the United States starting in the 1960s. High-profile corporate collapses – notably Enron and institutions implicated in the 2008 financial crisis that triggered the 2009 global recession – have spurred research into predictive financial indicators for institutional failure.

Subsequent studies have developed global forecasting models using financial metrics and advanced analytical techniques. Prominent among these are the KIDA, SHERROD, and ALTMAN models, designed to evaluate financial health. Suleiman (2023) uniquely applied both the Sherrod and Kida models to Arab banks, testing their efficacy in identifying at-risk institutions within capital markets. Unlike one-model approaches, this two-method analysis demonstrated the superior accuracy of the Kida model compared to that of Altman's model in bank classification, which tends to deliver fuzzy "grey area" results and complicates decision-making. Suleiman's findings thus confirm the use of multiple models to enhance predictive performance – a course adopted in this study's three-model (Altman, Kida, Sherrod) assessment of Iraq's Private Bank.
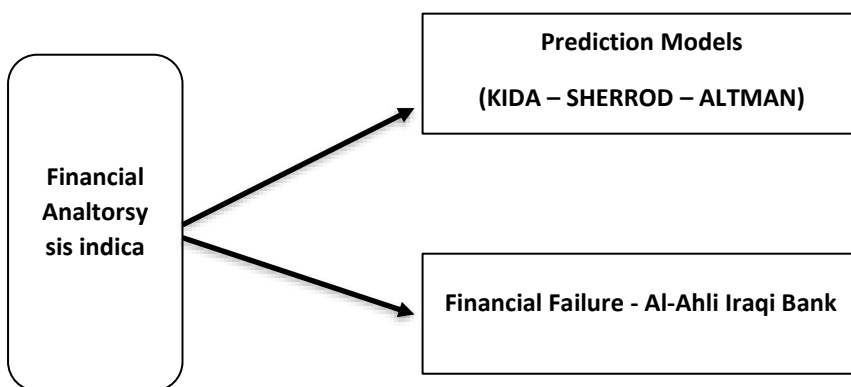

Figure 1. Research model

The research highlights Kida's advantage in generating clear, rapid outcomes versus Altman's borderline-case ambiguities, underscoring the value of model integration in emerging markets. Supporting this methodology, Al-Mutairi's (2024) Sherrod-model analysis of Iraqi private banks (2004–2020) demonstrated that internally generated capital bolsters stability more effectively than borrowing. The study also emphasized the critical role of central bank liquidity policies in maintaining lender profitability below alternative income streams. A second source of validation

comes from Medjoub & Houas (2020), who tested all three models on 30 Amman Stock Exchange-listed firms. The Kida model achieved a prediction accuracy of 66.67%, compared to the less accurate usage of Altman and Sherrod, which was reported on average three years prior to failure. This is a testament to the contextual testing requirements and warrants multi-model validation within the economic environment of Iraq. (see Figure 1).

3. Methods

Multiple financial indicators are employed to predict institutional failure. These metrics evaluate an entity's financial condition, enabling informed, evidence-based financial decisions. This study employs three of the most prominent and important models for financial prediction in financial institutions, namely the Altman Z-Score, KIDA, and Sherrod models. The sample was conducted using annual reports issued by the Iraq Stock Exchange for the Iraqi Private Bank for the period 2021–2024. One of the reasons for selecting this bank is its status as one of the leading banks in the Iraqi market, making it a significant model for studying the impact of banking policies in a changing and emerging economic environment.

Additionally, the Iraqi Private Bank offers a wide range of advanced banking services compared to other Iraqi banks, allowing us to examine performance differences and innovations in banking services. The bank plays a crucial role in community development by providing financial services to individuals and businesses on a large scale, making it a subject of both social and economic importance. Here, the importance of studying the research problem becomes evident.

- Which lies in determining whether the financial failure prediction indicators produce results that align with the reality of financial institutions in Iraq.
- The study also aims to assess the accuracy of the results provided by the three models used for financial failure prediction and their impact on the strategy of the Iraqi Private Bank.

One of the primary objectives of this study is to evaluate the forecasting potential of the three models and to understand how they are utilized, as well as how they contribute to formulating a concise vision for decision-making that aligns with the strategy and goals of the Iraqi Private Bank. Financial forecasting and warning systems are critical guarantee measures for banks, enabling timely action before bankruptcy. These devices enable institutions to undertake preemptive correction measures and make strategic decisions to mitigate financial downturns.

4. Results and implications

4.1. Results

Financial failure prediction is a critical area of financial risk management, driven by institutions' desire to assume a proactive stance towards minimizing distress risks. These models serve as quantitative analytical tools, applying financial data to gauge bankruptcy risk or oncoming financial instability. By enabling proactive action – whether through strategic borrowing, targeted investments, or operational restructuring – they enhance evidence-based decision-making. Methods have evolved historically from mere ratio analysis to sophisticated statistical modeling and the use of AI, with each driven by a single aim: building robust early warning systems that enable timely managerial action to avoid likely losses (Sherrod, 2020).

Table 1. Interpretation of Z Values for Assessing Financial Failure Risks

Interpretation	Z Value
Safe Institution	Z > 2.99
Medium Risk Area	Z < 2.991
High Financial Failure Risk	Z < 1.81

Table 2. Application of the Altman Z-Score Model for the Iraqi Private Bank for the Period (2021 – 2024)

Data	2021	2022	2023	2024
Working Capital	250,000,000	270,000,000	300,000,000	400,000,000
Retained Earnings	57,829,370	50,504,591	180,840,057	255,792,166
Earnings Before Tax	32,411,931	34,829,008	228,985,801	293,924,710
Market Value of Equity	307,500,000	297,000,000	656,100,000	964,305,000
Sales	108,192,268	108,111,830	343,156,956	453,044,267
Total Assets	1,822,137,956	2,412,040,281	3,982,984,863	5,144,232,922
Total Liabilities	1,822,137,956	2,412,040,281	3,982,984,863	5,144,232,922
X1: Working Capital / Total Assets	0.137	0.112	0.075	0.078
X2: Retained Earnings / Total Assets	0.032	0.021	0.045	0.050
X3: Earnings Before Tax / Total Assets	0.018	0.014	0.057	0.057
X4: Market Value of Equity / Total Liabilities	0.168	0.123	0.164	0.187
X5: Sales / Total Assets	0.059	0.045	0.086	0.088
Total	0.414	0.315	0.427	0.460
Z	0.428	0.340	0.525	0.551

Altman Z-Score Model

The Altman Z-Score remains a foundational model for predicting bankruptcy in financial risk analysis. First developed in 1968 by Professor Emeritus of Finance Edward Altman at NYU, the model broke new ground in financial analysis as the initial quantitative diagnostic framework for institutional health analysis. Its underlying assumption constitutes basic assumptions about the distinctive financial characteristics of institutions on the brink of bankruptcy that differ from those of healthy ones. By combining five fundamental financial ratios into a pooled weighted formula, the model generates a Z-score as a numerical estimate of insolvency risk (Saidi & Al-Daragi, 2020). The ratios were selected because they have predictive validity, and empirical studies have upheld the practical application of the model in Iraqi markets through contextual calibration. Tested worldwide (see Table 1 and 2), the Z-score is particularly effective in forecasting financial distress two years prior to failure (Al-Rifaie, 2017).

$Z = 1.2X1 + 1.4X2 + 3.3X3 + 0.6X4 + 1.0 X5$

KIDA Model

The KIDA model, also known as the KIDA Z-Score model or simply the KIDA model, is a quantitative statistical model used in financial analysis. It was introduced in 1981 to assess the financial condition of financial institutions and predict the likelihood of their financial failure or bankruptcy. The KIDA model serves as an early-warning system for investors, creditors, and management by identifying institutions that are at risk of financial distress. It derives five financial ratios from bank statements (balance sheet/income statement) and integrates them into a unified equation's = $\beta_1(NP/TA) + \beta_2(EQ/TA) + \beta_3(CA/CL) + \beta_4(FA/TA) + \beta_5(C/TA)$ Interpretation follows an inverse relationship: Declining Z-values signal escalating bankruptcy risk, while higher values denote financial stability. Empirical validation confirms the model's predictive reliability in Iraqi banking contexts (Al-Binaa & Al-Aziz, 2021).
$$Z = 1.042X1 + 0.427X2 - 0.461X3 - 0.463X4 + 0.271X5$$

Table 3 . Interpretation of Z Values for Assessing Financial Failure Risks

Interpretation	Z Value
High Financial Failure Risk (Potential Bankruptcy)	$Z < 0$
The Bank is Financially Sound	$Z \geq 0$

Table 4 . Kida Model for the Iraqi Private Bank for the Period (2021 – 2024)

Data	2021	2022	2023	2024
Net Profit	26,122,025	27,538,484	190,003,566	25,348,010
Shareholders' Equity	315,862,150	333,266,890	505,090,160	697,504,930
Current Assets	509,121,620	1,259,970,550	1,892,686,240	3,250,302,430
Fixed Assets	1,313,016,336	1,152,069,731	2,090,298,623	1,893,930,492
Total Assets	1,822,137,956	2,412,040,281	3,982,984,863	5,144,232,922
Total Liabilities	1,822,137,956	2,412,040,281	3,982,984,863	5,144,232,922
Current Liabilities	1,506,031,269	2,083,198,286	3,477,894,703	4,446,727,989
Cash	710,746,567	340,407,037	1,832,757,355	1,864,209,530
X1: Net Profit / Total Assets	0.014	0.011	0.048	0.005
X2: Shareholders' Equity / Total Liabilities)	0.173	0.138	0.127	0.136
X3: Current Assets / Current Liabilities	0.338	0.605	0.544	0.731
X4: Fixed Assets / Total Assets	0.721	0.478	0.525	0.368
X5: Cash / Total Assets	0.390	0.141	0.460	0.362
Total	1.636	1.373	1.244	1.602
Z	-0.295	-0.392	-0.265	-0.346

Sherrod Model

According to Yousef (2013), the SHERROD model is considered one of the most important models that financial institutions can use to predict financial failure. It serves as a tool to evaluate credit risks when banks issue loans. The first ratio (X1) represents working capital to

total assets, the second ratio (X2) represents cash assets to total assets, the third ratio (X3) represents shareholders' equity to total assets, the fourth ratio (X4) represents profit before tax to total assets, the fifth ratio (X5) represents total assets to total liabilities, and the final ratio (X6) represents shareholders' equity to fixed assets. Each indicator is assigned a specific weight. According to Al-Rifaie (2017), this model has proven to be highly effective in predicting financial failure, particularly in the Iraqi environment, where it has demonstrated reliability in the financial and banking sectors. According to studies by Al-Murshidi (2018) and Riyadh and Abadi (2022), the accuracy of this model's predictions exceeds 93% in forecasting financial failure within the Iraqi financial sector prior to any risk of early bankruptcy warnings. The model can be measured using the following equation (Al-Hussanawi & Al-Adhari, 2023).

$$Z = 17X1 + 9X2 + 3.5X3 + 20X4 + 1.1X5 + 0.1X6$$

Table 5 . Interpretation of Z Values for Assessing Financial Failure Risks

Interpretation	Z Value
Not at risk of bankruptcy	Z > 25
Low probability of bankruptcy risk	20 < Z < 25
Difficulty predicting bankruptcy risk	5 < Z < 20
Difficulty predicting bankruptcy risk	-5 < Z < 5
High exposure to bankruptcy risk	Z < -5

Table 6. Application of the SHERROD Model for the Iraqi Private Bank for the Period (2021-2024)

Data	2021	2022	2023	2024
Net Working Capital	250,000,000	270,000,000	300,000,000	400,000,000
Cash Assets	710,746,567	340,407,037	1,832,757,355	1,864,209,530
Shareholders' Equity	315,862,150	333,266,890	505,090,160	697,504,930
Earnings Before Tax	32,411,931	34,829,008	228,985,801	293,924,710
Total Assets	1,822,137,956	2,412,040,281	3,982,984,863	5,144,232,922
Total Liabilities	1,822,137,956	2,412,040,281	3,982,984,863	5,144,232,922
Fixed Assets	1,313,016,336	1,152,069,731	2,090,298,623	1,893,930,492
X1: Working Capital / Total Assets	0.137	0.112	0.075	0.078
X2: Cash Assets / Total Assets	0.390	0.141	0.460	0.362
X3: Shareholders' Equity / Total Assets	0.173	0.138	0.127	0.136
X4: Earnings Before Tax / Total Assets	0.018	0.014	0.057	0.057
X5: Total Assets / Total Liabilities	1.000	1.000	1.000	1.000
X6: Shareholders' Equity / Fixed Assets	0.241	0.289	0.242	0.368
Total (X1 – X6)	1.959	1.695	1.961	2.001
Z	7.928	5.064	8.124	7.354

4.2. Discussion

The Altman Z-Score represents a foundational framework for predicting bankruptcy in financial risk management. This model integrates five critical financial ratios (denoted X_1 to X_5), each assigned predetermined coefficients within a multivariate formula to assess insolvency risk quantitatively (Altman, 1968). The result of the first ratio, X1, which represents net working

capital as a percentage of total assets, declined from 0.137 in 2021 to 0.078 in 2024. This indicates a decrease in liquidity in the short term, suggesting the bank's weakness in covering its short-term obligations from current assets, thus increasing operational risks. (X2) Retained earnings to total assets is very weak over the years, from 0.032 in 2021 to 0.050 in 2024. This indicates a decline in accumulated earnings, suggesting negative profitability trends for the bank over time, particularly in a banking environment that requires new capital. (X3) Earnings before interest and taxes (EBIT) to total assets ranged from 0.018 to 0.057, which is relatively low and reflects poor return on assets. The improvement from 2022 to 2023, followed by stabilization in 2024, provides early signs of improved operational performance; however, it is insufficient to enhance the overall situation significantly. (X4) Market value of equity to total liabilities increased from 0.168 in 2021 to 0.187 in 2024, indicating a slight improvement in the financial position's strength. However, the value remains weak, showing that the bank's ability to cover its liabilities with equity remains limited. (X5) Sales to total assets decreased from 0.059 in 2021 to 0.045 in 2024, reflecting a decline in the efficiency of asset utilization in generating revenue. This supports the view that there has been a decrease in operational efficiency or a decline in demand for the bank's services.

The KIDA model represents a critical predictive framework for banking institutions, addressing the fundamental challenge of financial distress – particularly bankruptcy risk – through empirically validated failure forecasting. Therefore, this model enables the possibility of taking preventive measures to minimize losses as much as possible. The model was applied to the Iraqi Private Bank, listed on the Iraq Stock Exchange, for the period from 2021 to 2024, to assess the bank's financial capacity and predict its potential financial failure. The results over the four years of the sample period showed negative values: in 2021, it was (-0.295), in 2022, it was (-0.392), in 2023, it was (-0.268), and finally, in 2024, it was (-0.346). The continued negative values during this period indicate that the Iraqi Private Bank is experiencing an unstable and unfavorable financial reality, suggesting the likelihood of an imbalance between revenues and costs or between assets and liabilities. This indicates that the bank suffers from weakness in its short- and medium-term financial solvency, which may make it more vulnerable to economic shocks.

Regarding the interpretation of the results for the first ratio (X1), which represents the net profit to total assets, the results showed a noticeable decline from 0.014 in 2021 to 0.005 in 2024, indicating an apparent weakness in the bank's profitability. As for the second indicator (X2), which represents the ratio of shareholders' equity to liabilities, it was not within the desired range, fluctuating between 0.127 and 0.173, reflecting that the bank relies heavily on debt financing. The liquidity ratio (X3), which represents the ratio of current assets to current liabilities, showed a gradual improvement during the period, rising from 0.338 in 2021 to 0.731 in 2024, which can be interpreted as a positive response to operational pressures and a move towards improving working capital management. As for (X4), which represents the ratio of fixed assets to total assets, a clear downward trend was observed during the study period. After being (0.721) in 2021, it significantly decreased to (0.368) in 2024, indicating a shift in the bank's asset structure, with the proportion of fixed assets to total assets shrinking, making it appear as a less capital-intensive financial entity over the years. The investment development index (X5) showed fluctuating growth, reaching its highest level in 2023 at 0.460, before slightly declining in 2024. This suggests a trend toward supporting productive assets, but without a clear and stable

development policy. Based on the above, the Iraqi Private Bank faces multiple challenges in its financial structure, most notably declining profitability and a high reliance on debt financing. However, there are positive signs, such as improvements in liquidity and investment activity. Therefore, it is recommended that the bank restructure its operational strategy by enhancing asset utilization efficiency, expanding its capital base, strengthening profitability through revenue diversification, and improving financial and operational risk management.

The Sherrod model was applied as a quantitative tool to predict the financial success or failure of the Iraqi Private Bank during the period from 2021 to 2024, using five key financial indicators (X1 to X5), each with a specific weight in the standard equation that results in a composite index, denoted by (Z), which is used to assess the level of financial stability or risk. The results of the calculations showed the following values for the composite Sherrod coefficient (Z) for each year: 2021: Z = 7.928, indicating apparent financial success. 2022: Z = 5.064, showing an apparent decline and possibly indicating the beginning of issues. 2023: Z = 8.124, representing the best financial situation during the period. 2024: Z = 7.354, showing relative stability and success.

According to the literature on the model, the threshold between financial success and failure varies by study. However, values above 5 to 6 typically indicate financial soundness, while lower values raise concerns. The indicators (X1 to X5) showed the following trends: (X1) Working Capital to Total Assets increased from 0.137 in 2021 to 0.078 in 2024, with a significant decline in 2022. This indicator reflects the bank's ability to cover its short-term obligations with its current assets. The drop in 2022 may indicate liquidity weakness or an accumulation of short-term liabilities. However, the subsequent improvement reflects a move towards resolution. (X2): Total Revenue to Total Assets ranged between 0.362 and 0.460, which are generally strong ratios. This indicator reflects the efficiency of asset utilization in generating revenue. The data show that 2022 achieved the highest efficiency, but this was not reflected in the Z score due to weak performance in other indicators. (X3): The Net Income to Total Assets ratio ranged from 0.136 to 0.173, which are acceptable values in the context of stable financial performance. This is one of the key profitability indicators. The slight decline in 2022 (0.127) partly explains the lower Z score in the same year. (X4): Retained Earnings to Total Assets showed a continuous decline from 0.018 to 0.007, which is a negative trend. This may indicate weak profits or excessive reliance on distributions rather than reinvesting financial surpluses. (X5): Market Value of Shareholders' Equity to Total Liabilities increased from 0.241 in 2021 to 0.368 in 2024, which is a good indicator of strengthening the bank's financial position and reducing reliance on debt. This development supports the general interpretation of financial success in 2023–2024.

5. Conclussion

The results of the Altman Z-Score model showed a gradual decrease in the Z score from 0.551 in 2024 to 0.340 in 2022, indicating a progressive decline in financial stability during this period. All results from the Altman model remained below the minimum threshold (1.8), suggesting that the bank falls within the distress zone for financial failure in all years. The KIDA model yielded negative Z results for all years (ranging from -0.392 to -0.265), indicating chronic financial weakness and inefficiency in achieving the required balance ratios. The SHERROD model recorded very high Z scores (between 5.06 and 8.12), indicating a perfect financial position

according to this model, which contrasts with the results of the other two models. The inconsistency in the results of the models reflects variations in the mathematical methodologies and the weighting of indicators among the three models. The highest positive result in the Altman model was in 2024 (0.551). However, it remained below the safe level, indicating that the bank did not reach a state of financial safety even in the most recent year. The KIDA model reflects a significant impact from the decrease in shareholders' equity and net profit, leading to consistently negative results.

The SHERROD model relies primarily on cash assets, which explains its stable positive results compared to others. Financial analysis, according to Altman and KIDA, indicates a likelihood that the bank may face financial distress in the future unless corrective actions are taken. The results suggest that using only one model to predict financial failure is insufficient; instead, it requires integrating results from multiple models to ensure accurate predictions. The bank should conduct periodic evaluations using multiple financial failure models to avoid reliance on a single model that may provide an inaccurate picture. The bank's working capital should be strengthened to enhance its indicators in the Altman model, thereby increasing financial security. It is recommended to improve net profit and reduce short-term liabilities to enhance the results of the KIDA model specifically. The bank's operational policies should be reviewed to increase asset investment efficiency and achieve higher returns. Restructuring liabilities and strengthening shareholders' equity are crucial steps to exit the financially distressed zone. Senior management is advised to use the results of the SHERROD model as a supportive indicator rather than a substitute, due to its greater reliance on liquidity. A multidimensional analytical approach should be adopted when assessing financial stability, rather than relying on a single figure or year. The research results are recommended as a decision-support tool for the board of directors in formulating financial hedging policies for the upcoming years. Comparing results with other banks within the same sector may help identify the extent of relative deterioration or financial distinction. Journals and researchers are encouraged to update the weights of indicators in global models to fit the local Iraqi banking context.

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