THE IMPACT OF A FIRM'S FINANCIAL CHARACTERISTICS ON FINANCIAL VULNERABILITY: AN APPLIED STUDY IN A SAMPLE OF IRAQI COMMERCIAL BANKS

Fahad Faisal Ghazi

University of Samarra, Samarra, Iraq
*Corresponding author, email: fahad.fa20@uosamarra.edu.iq

doi: 10.17977/um066.v6.i11.2026.2

Keywords
Profitability
Leverage
Financial vulnerability
Z-Score

Abstract
The research aimed to measure the level of financial fragility in a sample of (8) commercial banks listed on the Iraq Stock Exchange, in addition to testing the effect of profitability and financial leverage on the level of financial fragility. It examined the annual financial reports of the banks during the period (2014-2023), and relied on the (Z-Score) index to measure the level of financial fragility. It concluded that (80%) of the banks in the research sample suffer from financial fragility. It also concluded that there is a statistically significant effect of financial leverage on the level of financial fragility, and recommended the necessity of relying on models for predicting financial failure to avoid falling into it, at the forefront of which is the (Z-Score) index due to its ease of use and the accuracy of its results.

1. Introduction

Financial fragility is one of the most important challenges facing companies, especially banks, particularly in economic environments characterized by uncertainty, financial volatility, and economic and political instability. The importance of this issue in the Iraqi environment stems from the fact that the banking sector is one of the most important sectors on which the Iraqi economy is based, as this sector plays an important role in promoting economic stability and improving the development process.

Financial fragility is an early warning bell or initial indicator of the possibility of a bank collapsing or going bankrupt if the necessary measures are not taken to keep it away from the risk of bankruptcy. In general, it means the inability of banks to meet their financial obligations on time as a result of financial instability.

The financial vulnerability of companies varies depending on company characteristics such as size, profitability, financial leverage, and sector type. Similarly, the impact of financial distress and shocks varies depending on the degree of financial vulnerability of the company (Nishi, 2019).

Hence the urgent need to use quantitative models to help predict this phenomenon and test the extent of its variation due to the different characteristics of the company. The (Z-score) model was adopted to measure the level of financial fragility of commercial banks listed on the Iraq Stock Exchange for the period (2015-2023)

1.1. Research Problem

Financial vulnerability serves as an early warning sign of a bank's impending bankruptcy and financial failure. Therefore, it is essential to rely on models that help measure and identify financial vulnerability, enabling management to take measures that can prevent bankruptcy and financial distress when exposed to financial shocks. The problem can be framed through the following questions:

Do the financial characteristics of banks affect the level of financial vulnerability of the commercial banks in the research sample?

This leads to a series of related questions: 1) Does the size of a bank have an impact on the level of financial vulnerability? 2) Does the bank's profitability affect its level of financial vulnerability? 3) Does financial leverage have an effect on the level of financial vulnerability?

1.2. Research Objectives

The research aims to measure the level of financial vulnerability in commercial banks listed on the Iraq Stock Exchange, to show the extent of variation in the level of financial vulnerability as a result of variations in the financial characteristics of the banks in the research sample, and to provide empirical evidence from the reality of the Iraqi environment.

1.3. Importance of the research

The importance of the research stems from the importance of the variables it addresses, as financial fragility is one of the most important phenomena that banks can face. The importance of the research also stems from the importance of the banking sector, which represents the basic pillar in the financial system of the Iraqi economy, and the main cornerstone in operating various economic activities.

1.4. Research Hypothesis

The research is based on a main hypothesis: there is no significant effect or relationship between the financial characteristics and financial vulnerability of the banks in the research sample. A number of sub-hypotheses stem from this main hypothesis: 1) Does bank profitability have no effect on the level of financial vulnerability in the commercial banks in the research sample? 2) Does financial leverage have no effect on the level of financial vulnerability in the commercial banks in the research sample?

1.5. Research Methodology

The research relied on the deductive method in building the theoretical aspect and deducing the theoretical relationships between its variables, and on the quantitative method in measuring the research variables in order to test the hypotheses and reach results.

Time limits: The annual financial reports of the banks included in the research sample for the period (2018-2023). Spatial boundaries: Iraq Stock Exchange.

1.6. Previous Studies

This study used data from the 2021 National Financial Capability Survey (NFCS) to examine the relationship between financial capability and financial vulnerability among consumers with varying banking statuses (kim et al, 2024). The analysis accounted for occupational, health, and other consumer characteristics. The results showed a negative correlation between financial capability and financial vulnerability. The potential negative impact of financial capability was greatest among individuals with full bank accounts, followed by those with limited bank accounts, and then those with no bank accounts. The impact of financial capability factors was greater than the impact of COVID-19 shock factors. These findings suggest that higher levels of both financial capability and financial inclusion may be effective in mitigating the risk of financial vulnerability.

The study by Mahmoud and Muhammad (2023) aimed to measure the size of financial fragility in two Iraqi banks using the (Z-score) model during the period (2011-2020). It adopted the descriptive analytical approach and concluded that the two banks recorded a rise in the financial fragility index during financial crises. It recommended the necessity of adopting the aforementioned index by banks to avoid falling into financial failure, as this index gives an early warning of the bank's impending bankruptcy.

According to a study by Hussein et al. (2022) that examined the relationship between financial efficiency and financial vulnerability in light of financial reporting standards, financial efficiency reduces financial vulnerability during periods of economic crisis.

According to a study by Bialowolsk et al. (2018) financial vulnerability is a fundamental problem affecting individual well-being. Various estimates indicate that between 46 and 59% of American adults are financially vulnerable, and therefore more at risk with regard to their well-being. The results showed that financial vulnerability, on average, has less of an impact on well-being indicators than financial control.

As for the study Aziz and Mahmoud (2021), it aimed to test the effect of the financing structure on the financial fragility of a sample of (10) Iraqi banks for the period (2005-2019), and it concluded that there is a significant positive effect of debt on the financial fragility of the banks in the research sample, and it recommended that banks should apply financial fragility prediction models such as the MEDA model and the z-(score) model .

However, the study by Loayza and Ranciere (2006) linked the estimated short-term effects to indicators of financial fragility (i.e., banking crises and financial volatility). Analyzing the combined effects of depth and financial fragility in classical regression models of cross-sectional data growth, we found that financially fragile countries—those experiencing banking crises or severe financial volatility—tend to exhibit significant negative mediation effects on short-term growth. For more stable countries, this effect is almost negligible.

As for the study Al-Jubouri (2017), it tested the role of financial flexibility in reducing financial fragility in a sample of banks listed on the Iraqi market, for the period (2005-2015), and concluded that there is a statistical effect of flexibility in reducing financial fragility, through increasing the ability to cope with financial shocks and crises.

Iftikhar (2015) focused on studying the role of financial reforms and their components in reducing financial fragility. It examined the financial reports of a sample of (779) banks in (76) different countries, for the period (2001-2005). Its results indicated that supervision, monitoring and regulations are inversely related to financial fragility.

Ashraf et al., (2016) aimed to test the effect of ownership structure on financial fragility. The study was conducted on a sample of (134) banks in the Gulf market, and concluded that there is a negative effect of ownership structure on financial fragility.

1.7. The concept of financial vulnerability and approaches to measuring it

Term Financial Fragility first appeared in 1979 by the researcher Minsky when he was seeking to develop the Keynes model presented in 1936 to reduce variance in periods of financial instability. Financial fragility is the fourth generation of financial crisis, and it is defined as the state of the economy in which the value of investors is very small and does not reflect the real value of their investment projects (Hussein et al., 2022).

According to Schroeder, weak cash flows for the current year in question are one of the most important causes of financial fragility, because exposure to financial and liquidity shocks shakes depositors' confidence, leading to a banking system prone to bankruptcy (Schroeder, 2009).

Financial fragility means that the elements of the balance sheet, including assets and liabilities, become highly affected and sensitive to a number of factors such as interest rates, depreciation, income, and financial characteristics that affect solvency (Tymoigne, 2011).

It is defined as exposure to financial crises and shocks that can ultimately lead to the bank's bankruptcy and financial failure, which negatively impacts market performance, disrupts financial intermediation services, reduces funding and investment, and weakens confidence between investors and the market (Mazlan et al., 2016).

While Al-Atwi described it as an emergency financial crisis that makes the bank unable to meet its financial obligations on time when exposed to financial shocks and changes in external factors (Al-Atwi, 2018).

It can be measured through a set of indicators such as the z-score . According to this indicator, there are three areas in which the company can be classified. If the value of the indicator is less than (1.8), it is considered financially fragile. If it is between (1.81-299), it is considered to be in the gray area, and the company is financially unstable and the possibility of declaring bankruptcy is possible. If the value of the indicator is higher than (3), the company is financially stable (Altman, 2018).

It is measured using the following formula (Hussein et al., 2022; Fielding & Rewilak, 2015).

$$Z = \frac{ROA + E/A}{\sigma(ROA)}$$

- ROA represents the return on assets.
- (E/A) Equity to Total Assets
- σ(ROA) Standard deviation in return on assets

If the value of (Z) exceeds the arithmetic mean, this means that the bank does not suffer from financial fragility. However, if the value is less than the arithmetic mean, this means that the bank suffers from financial fragility.

Sherrod model is one of the most recent models used to predict financial failure. In addition to the relative weights of the differential characteristic coefficients of these factors, it relies on six independent financial indicators given in the following formula (Hamdi et al., 2022).

$$Z = 17X1 + 9X2 + 3.5X3 + 20X4 + 1.2X5 + 0.1X6$$

X1 – Net Working Capital / Total Assets
X2 – Current Assets / Total Assets
X3 – Total Equity / Total Assets
X4 – Net Income / Income Tax / Total Assets
X5 – Total Assets/Total Liabilities
X6 – Total Equity/Total Fixed Assets.

The companies were classified into five categories according to their level of risk.

Table 1. Classification of Financial Vulnerability According to the Sherrod Z-Score Model

T	Z Value	Significance
1	Greater than 25	It is not financially vulnerable and its financial position is good.
2	Between 20–25	It is not exposed to current risks, with the potential for future risks.
3	Greater than 5 and less than 20	Its financial situation is difficult to predict.
4	Less than 5 to −5	It is exposed to financial vulnerability.
5	Less than −5	The organization is financially fragile and highly susceptible to financial failure.

1.8. Causes of financial vulnerability

Financial vulnerability arises as a result of a number of reasons, including (Al-Husseini, 2021): 1) The inefficiency of management in dealing with financial shocks and reducing the effects of distress due to the lack of use of means to predict them. 2) The bank's failure to adhere to a sufficient hedging policy to avoid external shocks and crises. 3) Cash outflows to finance projects that may be unsuccessful, at least in the medium and short term. 4) Government policies that govern the operation of banks. 5) Macroeconomic crises that are sweeping through global markets. 6) While Mohammed and Abdul Kadhim (2025) believe that one of the most important reasons for financial fragility is the bank's bearing of high obligations with low profitability, in addition to the rapid turnover rate of small companies.

1.9. Stages of financial fragility

Until a bank reaches a state of financial fragility, it goes through a series of stages Al-Shaker and Helou (2022): 1) The stage of reduced financial liquidity: This stage occurs when the bank puts its cash liquidity into unproductive, exploited capacity or assets that are slow to turn into cash with weak returns. In this stage, companies are unable to obtain external financing as a result of the high

leverage they have. 2) The working capital deficit stage: This stage occurs when the company's cash flows no longer cover its obligations, its ability to manage its working capital weakens, its market value decreases, and cash flow becomes negative. 3) The stage of financial insolvency: This is the stage in which the bank is unable to pay its obligations. It is a critical stage in its life, and the total liabilities exceed its assets, after which the bank moves towards financial fragility. 4) The stage of financial fragility: This is the stage in which the market value of the bank is less than its obligations, and the bank becomes unable to pay its obligations and moves towards declaring financial bankruptcy and liquidation.

1.10. The impact of profitability and financial leverage on financial vulnerability

According to a study by Abd (2022) conducted on a group of Iraqi banks, it found an inverse relationship between financial leverage and financial fragility. The higher the financial leverage, the lower the financial fragility index. As for the study by Al slehat (2022) conducted on (23) Omani companies, it found an inverse relationship between the financing structure and financial fragility, and recommended the necessity of relying on self-financing sources, i.e., relying on profitability in financing and expansion more than borrowing to reduce financial fragility.

According to the arrangement of funding sources theory, reliance on internal funding sources reduces financial vulnerability. According to the agency theory, reliance on debt increases agency costs and limits management freedom, thus increasing the risk of financial vulnerability. Meanwhile, the barter theory sees reaching an optimal financial structure that balances cost and interest as potentially reducing financial vulnerability (Mohammed, 2026).

2. Method

The research aimed to test the effect of (profitability, financial leverage) on financial fragility, and reviewed the annual financial reports of a sample of (8) private commercial banks listed on the Iraq Stock Exchange, and the independent variables (profitability) were measured through (ROA). (Widiarta, JR, & Dermawan, 2023) , while (financial leverage) was measured through the ratio of total debt to total assets (Astadewi & Suaryana, 2025), while the dependent variable, financial fragility, was measured through the z-score index , in agreement with the study (Hussein, et al., 2022), where fragility was calculated through the following equation:

$$Z = 1.2x1 + 1.4x2 + 3.3x3 + 0.6x4 + 0.999x5$$

Table 2. Calculating the Z-SCORE value

Treatment*weight	the weight	The equation	Factors
	1.2	Working capital / Total assets	X1
	1.4	Retained earnings / Total assets	X2
	3.3	Earnings before interest / Total assets	X3
	0.6	Equity/ Total Liabilities	X4
	0.999	Sales / Total Assets	X5
			the total

Source: Prepared by the researcher based on MacCarthy (2017)

Profitability (ROA) = Net Income / Total Assets
Financial leverage (LAV) = Total debt / Total assets

3. Results and Discussion

3.1. Measuring financial vulnerability in the research sample

Table 3. Measurement of the financial fragility of the banks in the research sample

Bank Name	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	Average
National Bank of Iraq	1.241	1.514	1.628	1.446	1.435	1.167	0.996	0.459	0.360	0.370	1.062
	Financially Fragile	Financially Fragile	Financially Fragile	Financially Fragile	Financially Fragile	Financially Fragile	Financially Fragile	Financially Fragile	Financially Fragile	Financially Fragile	Financially Fragile
Iraqi Commercial Bank	1.245	1.773	1.907	2.109	1.964	1.258	1.489	1.214	1.523	1.747	1.623
	Financially Fragile	Financially Fragile	Financially Fragile	Financially Fragile	Financially Fragile	Financially Fragile	Financially Fragile	Financially Fragile	Financially Fragile	Financially Fragile	Financially Fragile
United Bank for Investment	1.349	2.286	2.125	1.338	1.990	1.446	1.014	0.921	1.181	1.744	1.539
	Financially Fragile	Gray Zone	Gray Zone	Financially Fragile	Gray Zone	Financially Fragile	Financially Fragile	Financially Fragile	Financially Fragile	Financially Fragile	Financially Fragile
Ashur Bank	2.652	2.181	11.853	3.206	1.939	2.343	2.141	1.783	1.426	1.494	3.102
	Gray Zone	Gray Zone	Financially Stable	Financially Stable	Financially Fragile	Gray Zone	Gray Zone	Financially Fragile	Financially Fragile	Financially Fragile	Financially Stable
Iraqi Union Bank	1.175	1.234	1.123	1.223	1.360	1.736	1.675	1.683	1.597	1.617	1.442
	Financially Fragile	Financially Fragile	Financially Fragile	Financially Fragile	Financially Fragile	Financially Fragile	Financially Fragile	Financially Fragile	Financially Fragile	Financially Fragile	Financially Fragile
Al-Mansour Bank for Investment	0.866	0.707	0.654	0.536	0.462	0.436	0.521	0.872	1.105	0.788	0.723
	Financially Fragile	Financially Fragile	Financially Fragile	Financially Fragile	Financially Fragile	Financially Fragile	Financially Fragile	Financially Fragile	Financially Fragile	Financially Fragile	Financially Fragile
Mosul Bank for Development	4.016	3.285	0.868	2.666	2.410	2.460	2.686	0.850	0.880	0.973	2.109
	Financially Stable	Financially Stable	Financially Fragile	Gray Zone	Gray Zone	Gray Zone	Gray Zone	Financially Fragile	Financially Fragile	Financially Fragile	Gray Zone
Bank of Baghdad	0.389	0.411	0.620	0.621	0.559	-0.342	0.473	0.489	0.561	0.527	0.431
	Financially Fragile	Financially Fragile	Financially Fragile	Financially Fragile	Financially Fragile	Financially Fragile	Financially Fragile	Financially Fragile	Financially Fragile	Financially Fragile	Financially Fragile

Source: Prepared by the researcher using Excel

Financial fragility was measured according to the (Z-score) indicator at three levels: (financially fragile), (grey), and (stable). If the value of the (Z-score) of the bank is less than (1.8). It is considered financially fragile, while if the index value is between (1.9-2.99), it is considered to be in the gray area and it is difficult to decide on its evaluation. If the index value is (higher than 3), it is considered financially stable. The total number of observations reached (80) observations (bank-year), where the level of financial fragility was recorded in (66) observations, at (0.82%) of the total observations, while the percentage of financially stable observations did not exceed (7%). As for banks, (6) banks out of the total number of banks were classified as suffering from financial fragility, which means the weakness of the efficiency of financial management in facing financial shocks, especially since Iraq is considered an unstable financial and political environment, especially since the research period covered two important events that affected the economic situation in Iraq, the ISIS wars (2014-2017), and the Corona pandemic (2020-2022). These results are consistent with the study of Hussein et al. (2022) and Mahmoud and Muhammad (2023).

3.2. Description of research variables

Table 4. describes the research variables

Coefficient of variation	highest value	Lowest value	standard deviation	arithmetic mean	The symbol	Variables	Variable type
37.7%	3,700	0.653	0.285	0.754	Z	Financial fragility	Follower
43.7%	0.979	-0.03	0.122	0.278	ROA	Profitability	independent
41.4%	1.33	0.1	0.232	0.56	LAV	leverage	independent

From Table 4, regarding financial fragility, it appears from the table that there is a level of financial failure, due to the low value of (Z) with an arithmetic mean of (0.754), which indicates that the banks in the research sample generally fall into a state of financial fragility. As for profitability, its values ranged between (-) 0.03 and (0.97), with an average of (0.27) and deviation normative (43%) Which It indicates to decrease Contrast and scattering in levels Profitability between Companies. And it reflects this performance close together relatively in Profitability, with some losses that I incurred it Banks during a period Research, as It is clear from Index The negative value was the lowest, while the leverage values ranged from a minimum of 0.01 to a maximum of 1.33, with an average of 0.56 and deviation normative Its value is 0.232, And they differed capacity (41%) These figures reflect differences between banks in their reliance on debt within their financing structures, indicating a variation in financing policies and working capital management practices. It is also evident from the low value of the standard deviation and the coefficient of variation for all variables, which is less than (0.5), the value at which the arithmetic mean can be relied upon if it is not exceeded. These results confirm the reliability of the arithmetic mean of the study variables in accurately representing the total sample.

3.3. Hypothesis testing

"Does bank profitability have no effect on the level of financial vulnerability in the commercial banks included in the research sample?"

Table 5. Profitability Regression Equation on Financial Vulnerability

(Sig .)	Value of (F)	(R2) Average	(R2)	Follower	The Independent
0.641	2.66	0.08	0.092		
(Sig .)	Value of (T)	Regression coefficient (1β)	Constant coefficient (β0)	Financial tyfragili	Profitability
0.641	1.63	0.11 -	1.434		

Table 5 shows that financial fragility cannot be estimated through profitability, as the F- value (2.66) is not statistically significant at a significance level higher than (5%). This indicates that the model as a whole is not statistically valid. The regression coefficient also indicates a negative effect; as profitability increases, the level of fragility decreases. According to the coefficient of determination, profitability explains (0.09) of the variance in financial fragility, but this effect is not significant, as indicated by the T- value of (1.63) at a significance level higher than (5%). This contradicts the study by Parmankulova et al. (2022), which found a statistically significant negative effect of profitability on financial fragility. Profitability is considered one of the most important determinants affecting financial fragility, especially during periods of economic crises and shocks that impact the macroeconomy (Khasawneh et al., 2016). Therefore, the nihilistic research hypothesis can be accepted based on the results shown.

"Does the bank's financial leverage have an effect on the level of financial vulnerability in the commercial banks in the research sample?"

Table 6. Regression Analysis of Financial Leverage on Financial Vulnerability

			(R2)	Follower	The Independent
			(Sig .)	Value of (F)	(R2) Average
0.002	14,547	0.59	0.61	Financial fragility	Profitability
(Sig .)	Value of (T)	Regression coefficient (1β)	Constant coefficient (β0)		

The results shown in Table 6 indicate the model's ability to estimate financial vulnerability. For banks, the research sample Through financial leverage, as evidenced by the significance of the F-value of (14.5) at a significance level of less than (5%), this indicates the overall validity of the model. Furthermore, the effect of financial leverage on financial vulnerability is statistically significant, as demonstrated by the T- value of (3.747) at a significance level of less than 5%. The regression coefficient ($\beta = 0.78$) is positive, indicating that a one-unit increase in the financial leverage ratio leads to a 78- unit increase in the financial vulnerability of the banks in the research sample. This aligns with the study by Al-Husseini (2021), which reached similar results. Another study also indicated that excessive borrowing and high levels of financial leverage can lead to financial distress and undermine long-term sustainability (Abubakar & Anyonje, 2025).

4. Conclusion

The research aimed to measure the level of financial vulnerability in a sample of Iraqi commercial banks, in addition to testing the impact of profitability and financial leverage on financial vulnerability. The research concluded that there is a high percentage of banks included in the sample that suffer from financial fragility, which reflects weak financial management, especially since the banks were exposed to shocks during the period covered by the research, such as the crisis (2014–2016) and the Corona pandemic (2021–2022). In addition, the high leverage ratio and increased reliance on debt for financing were observed, while the level of profitability was similar in most banks. Furthermore, there is a negative impact of profitability on the level of financial vulnerability, but it is not significant, while there was a significant positive impact of financial leverage on financial vulnerability. Based on these results, there is a need for banks to follow strategies to examine the financial situation and predict financial failure continuously in order to avoid falling into it, as well as the need to rely on an indicator such as the Z-Score, which is an early warning for management to avoid bankruptcy problems. Moreover, banks should work on significantly reducing reliance on financial leverage and achieving a better balance between sources of funding to raise the level of financial stability. Banks should also invest financial leverage in a thoughtful manner to contribute to improving financial performance without negatively impacting profitability levels or increasing financial vulnerability. Finally, it is important to strengthen the role of continuous monitoring and follow-up of the profitability index and financial indicators, and to prepare periodic reports that contribute to helping management make efficient and effective financial decisions.

References

Abubakar, A. O., & Anyonje, S. A. (2025). Financial leverage and corporate financial performance: A comprehensive review. *East African Finance Journal, 4*(2), 34–54. https://doi.org/10.59413/eafj/v4.i2.3

Al-Husseini, A. Q. (2022). *Employing the financing structure to reduce financial vulnerability: An applied study in private commercial banks in the Iraq Stock Exchange* [Master's thesis, University of Karbala].

Al Shukr, A. M., & Helou, S. H. (2022). Using cash flow models to predict financial failure and bankruptcy: An applied study in a number of companies listed on the Iraq Stock Exchange. *Al Riyada Journal for Finance and Business*, (4).

Altman, E. I. (2018). A fifty-year retrospective on credit risk models, the Altman Z-score family of models and their applications to financial markets and managerial strategies. *Journal of Credit Risk, 14*(4). https://doi.org/10.-21314/JCR.2018.243

Ashraf, D., Ramady, M., & Albinali, K. (2016). Financial fragility of banks, ownership structure and income diversification: Empirical evidence from the GCC region. *Research in International Business and Finance, 38*, 56–68. https://doi.org/10.1016/j.ribaf.2016.03.010

Fielding, D., & Rewilak, J. (2015). Credit booms, financial fragility and banking crises. *Economics Letters, 136*, 233–236. https://doi.org/10.1016/j.econlet.2015.09.041

Hamid, G. M., Haji, S. M. R., & Omar, K. M. T. (2022). Detecting financial failure using Sherrod model: Evidence from Iraqi Stock Exchange listed banks (2009–2015). *International Journal of Academic Accounting, Finance & Management Research (IJAAFMR), 6*(4), 9–15.

Hussein, A. I., Al-Saqqa, Z. H., & Mahmoud, S. M. (2020). Enhancing financial efficiency under IFRS standards to reduce financial vulnerability: An empirical study of crisis reality in Iraq using data envelopment. *Tikrit Journal of Administrative and Economic Sciences, 16*(Special Issue, Part 1).

Khasawneh, A. Y. (2016). Vulnerability and profitability of MENA banking system: Islamic versus commercial banks. *International Journal of Islamic and Middle Eastern Finance and Management, 9*(4), 454–473. https://-doi.org/10.1108/IMEFM-09-2015-0106

Kim, K. T., Xiao, J. J., & Porto, N. (2024). Financial inclusion, financial capability and financial fragility during COVID-19 pandemic. *International Journal of Bank Marketing, 42*(3), 414–436. https://doi.org/10.1108/IJBM-07-2023-0373

Loayza, N. V., & Ranciere, R. (2006). Financial development, financial fragility, and growth. *Journal of Money, Credit and Banking*, 1051–1076. https://doi.org/10.1353/mcb.2006.0060

MacCarthy, J. (2017). Using Altman Z-score and Beneish M-score models to detect financial fraud and corporate failure: A case study of Enron Corporation. *International Journal of Finance and Accounting, 6*(6), 159–166.

Mahmoud, A. M., & Muhammad, J. H. (2023). Measuring the financial fragility of Iraqi banks: An applied study of a number of Iraqi private commercial banks. *Tikrit Journal of Administrative and Economic Sciences, 19*(63, Part 1), 559–580. https://doi.org/10.25130/tjaes.19.63.1.30

Mohamed, G. M. (2026). The effect of the financial structure on financial fragility: An applied study on companies listed on the Egyptian Stock Exchange. *Raya International Journal of Business Sciences, 5*(16). https://doi.org/-10.6007/IJARBSS/v16-i9/29021

Nishi, H. (2019). An empirical contribution to Minsky's financial fragility: Evidence from non-financial sectors in Japan. *Cambridge Journal of Economics, 43*(3), 585–622. https://doi.org/10.1093/cje/bey031

Parmankulova, I., Issakhova, P., Zhanabayeva, Z., Faizulayev, A., & Orazymbetova, K. (2022). The drivers of financial vulnerability and profitability: Evidence from conventional and Islamic banks in Islamic finance-oriented countries. *Journal of Islamic Accounting and Business Research, 13*(6), 902–919. https://doi.org/10.1108/JIABR-06-2021-0155

Widiarta, J. R., & Dermawan, E. S. (2023). The effect of profitability, firm size, and capital structure on firm value in manufacturing companies. *International Journal of Application on Economics and Business, 1*(4), 2315–2325. https://doi.org/10.24912/ijaeb.v1i4.2315-2325