The impact of liquidity risk, credit risk, and operational risk on financial stability in conventional banks in Jordan

Sawsan Ismail[a*] and Emad Ahmed[b]

[a]Hashemite University, Jordan
[b]World Islamic Science and Education University, Jordan

A B S T R A C T

This study examines the impact of unsystematic financial risk, including liquidity risk, credit risk, and operational risk, on financial stability in conventional banks listed on the Amman Stock Exchange in Jordan. Understanding and managing these risks is crucial for protecting investors, maintaining financial stability, encouraging foreign investment, and strengthening the financial sector in Jordan. The study adopts a descriptive approach to collect and describe data and utilizes cross-sectional panel data over five years from 2016 to 2021 to establish cause-and-effect relationships between study variables, while controlling for other relevant factors that may influence the relationship. The findings suggest that while liquidity risk may not directly impact financial stability, it remains a critical risk factor that requires attention in risk management strategies. Credit risk has a negative impact on financial stability, highlighting the importance of effective credit risk management strategies to maintain a stable financial system. The study finds that operational risk has no direct impact on financial stability. Still, unsystematic operational risks can have significant implications for individual financial institutions and may indirectly affect overall stability. The study underscores the importance of comprehensive risk management strategies to mitigate the negative impact of unsystematic financial risk on financial stability. Future research may consider analyzing the impact of other types of risks on financial stability.

1. Introduction

The financial stability of conventional banks in Jordan is crucial for the overall stability of the country's economy; A stable financial system is a system that is in a condition that can comfortably absorb financial and real economic surprises and shocks. Accordingly, financial risks should be assessed and priced accurately and managed. (Morgan & Pontines, 2014). Unsystematic financial risks, such as liquidity, credit, and operational risks, can significantly impact these banks' stability; therefore, risk management analysis is a crucial task of supervisors and financial analysts. (Moez & Abdelheq, 2020). While banks are regarded as the primary building block of the financial system, the failure of any bank will have a detrimental effect on the economy as a whole, which will cause the financial system to become unstable. To examine the structure and procedure for detecting the issue that the bank may encounter as well as the timing and means of intervention, regulatory agencies in Jordan began to pay close attention to the topic of crisis management; for this, the central bank of Jordan through Banking Supervision Department keep examining and monitoring banks' financial and banking problems, and determining supervisory and financial strength ratios following the applicable laws, rules, and guidelines as well as industry standards, and through initializing a supervisory umbrella for microfinance sector to enhance and develop its vital role and achieve financial stability. Accordingly, as Barik and Pradhan (2021) argue how financial policies have had a favorable impact on economic growth through effective resource allocation, risk management, and efficient capital deployment, this research aims to investigate how unsystematic financial risks affect financial stability in conventional banks in Jordan; by developing the study hypotheses

to test this relationship, examining the related information from bank's financial statement for the period from 2016-2021, taking in consideration that 2020 was a year of covid 19 pandemic and excluding its harming effect to the banking sector by taking it as a control variable.

This research's findings will interest policymakers, regulators, and practitioners in the banking industry, as well as academics studying financial stability and risk management.

The structure of this paper is divided into several sections. The literature relating to the subject matter of the study is analyzed in Section 2. The methodologies used in the research are described in Section 3. The data analysis and findings are presented in section 4, and the study's conclusion is provided in Section 5.

2. Literature Review and Hypotheses Development

2.1 Financial Stability and Financial Performance

Financial stability refers to the ability of the financial system to function effectively and efficiently in the face of shocks and disruptions while maintaining the provision of critical financial services to the economy. Gupta and Kashiramka (2020) define financial stability as the flexible running of the vital elements that make up the financial system. On an individual level, financial stability is reflected in the ability of a financial institution to expedite the economic processes, control risks, and absorb shocks (Gupta & Kashiramka, 2020). Dsouza (2021) explains that financial stability depends on the profitability position, risk of misstatements, and growth. According to Apostolik, Donohue, and Went (2009), financial stability is the degree to which financial institutions and markets can mobilize savings to provide liquidity. Similarly, Nguyen (2021) describes the financial stability of commercial banks as the state in which the system experiences no economic instability. The components of commercial banks work steadily and perform well in the financial intermediation function, limiting payments and transfers of funds to the economy while quickly absorbing economic shocks to prevent the spread of systemic catastrophe.

Financial stability and financial performance are closely related concepts that have been extensively studied in the literature (Mugableh et al., 2023; Latif et al., 2022; Čihák and Hesse, 2010a). Financial performance is commonly measured using indicators such as return on assets (ROA) and returns on equity (ROE). In contrast, financial stability is often assessed using measures such as the Z score for ROA and ROE (Kamran et al., 2019; Morgan & Pontines, 2014).

Previous research has demonstrated a strong link between financial performance and financial stability. For instance, a study by Ali and Oudat (2020) found that banks with high ROA and ROE tend to be more financially stable than those with low-performance measures. Another study by Wanjohi (2013) showed that financial institutions with high profitability ratios are better equipped to absorb shocks and maintain operations during economic downturns. Furthermore, the literature has also explored the relationship between financial risk and financial stability. Čihák and Hesse (2010b) found that higher levels of unsystematic financial risk can lead to lower financial stability, while Kamran et al. (2019) demonstrated that financial risk has a negative impact on the financial stability of Islamic banks.

The literature suggests a clear link between financial performance, financial risk, and financial stability. As such, measures of financial performance can be used to assess the overall financial stability of a company or institution. However, it is important to note that financial stability is a multifaceted concept that requires a comprehensive assessment of various factors, including liquidity, solvency, and risk management practices (Latif et al., 2022; Al-Aboudi, 2022).

It is worth noting that a close relationship exists between unsystematic financial risk and financial performance. This connection can be leveraged to examine the impact of such risks on financial stability.

2.2 Unsystematic financial risk

Kamis (2018) defines financial risk as any risk associated with financing, including financial transactions and the likelihood that shareholders will lose money when they invest in a company with lots of debt. The risk may be split into systematic risk and unsystematic risk. The systematic risk or market risk is a risk that stems from the economic conditions and general market conditions, which are inescapable risks, Whereas the unsystematic risk is a portion of the risk which could be eliminated; this risk is sometimes referred to as a unique risk, residual risk or specific risk (Machdar, 2015).

Hsu and Jang (2008) argue that Unsystematic risk is caused by firm-specific strategies, not factors outside management's control. Thus, investors use unsystematic risk to assess the firm's performance and equity costs. Knowing the factors that correlate to firm-specific (unsystematic) risk can help management make operational and financial decisions to avoid or mitigate a firm's total risk and can impact the reduction of a firm's equity costs.

The main hypothesis to examine the relationship of unsystematic financial risk on financial stability is as follows:

H01: *There is no statistically significant impact at ($P \leq 0.05$) for unsystematic financial risk with its dimensions (Credit Risk, liquidity risk, operational risk) on the financial stability in the Jordanian financial sector.*

To improve this hypothesis, there are sub-hypothesis would be developed.

2.3 Credit Risk

A bank's main line of business and the foundation of its profitability is credit-risky lending. Additionally, it is the main factor influencing a bank's regulatory capital need; exposure to credit risk is a necessary part of what banks do. Thus, it must be managed carefully. To determine credit risk as accurately as possible, the bank must employ all its qualitative and quantitative judgment skills. (Choudhry, 2018). When the bank gives money to a customer, there is an inherent risk of funds not returning, which is the credit risk. Credit risk is the likelihood of an undesirable situation in which the client does not pay back the loan amount. It is primarily a control risk that has to be managed (Hopkin, 2018). Rose and Hudgins (2006) define credit risk as the probability that some of a financial institution's assets, especially its loans, will decline in value and perhaps become worthless. Apostolik et al. (2009) define credit risk as the possible loss a bank would endure if a borrower, also known as the counterparty, fails to meet its commitments and repay the loan's principal and accrued interest, according to the predetermined terms. According to Kamis (2018), credit risk is the risk of potential default by one of the counterparties to a financial transaction. When this happens, the non-defaulting party may suffer a financial loss. Numerous studies have looked at the connection between financial performance and credit risk, Ahmed, El-Halaby, and Soliman (2022), Ekinci and Poyraz (2019), and Ekinci and Poyraz (2019) in their studies find that one of the most significant elements negatively impacting banks' financial performance is credit risk.; thus, this research formulates the following sub-hypothesis for testing:

$H_{01.1}$: *There is no statistically significant impact at (P ≤ 0.05) for Credit Risk on the Financial stability in the Jordanian financial sector.*

2.4 Liquidity Risk

Banking is a long-standing and respectable profession. The art of banking has remained unaffected since the banking industry's beginning. At its essence, there are two principles, asset–liability mismatch and liquidity risk management. (Choudhry, 2018)

Banks make liquidity by converting short-term liquid liabilities into long-term illiquid assets and extending off-balance sheet loan obligations and agreements. Along with risk transformation, Liquidity Creation is the primary reason for the presence of banks (Gupta & Kashiramka, 2020).Apostolik et al. (2009) define liquidity risk as a bank's likely failure to fulfill its financial obligations by the due date. Skoglund and Chen (2015) mentioned that a risk that results from the market or bank-specific occurrences is known as liquidity risk. Therefore, assessing the prospective sources that could reduce cash inflow and raise cash outflow in such circumstances is crucial. For instance, under normal circumstances, deposit volumes and the financial institution's committed lines of credit to other institutions may exhibit exceptional stability. However, in severe liquidity stress, depositors may begin to withdraw funds quickly, and institutions may draw substantial sums from their facilities. At the same time, the bank's counterparties can try to close lines of credit that they have already committed to the bank. The early signal of a banking crisis can be observed from the instability of liquidity risk (Waemustafa & Sukri, 2016). Beja (1972) argues that liquidity could set a solvent bank into insolvency as it must sell its assets far below their value to satisfy its current financial obligations. Therefore, At the center of the latest periods of financial instability and global banking crises run the dilemma of liquidity deficiencies. These liquidity deficiencies produced the failure of many banks, and these failures spilled over to other banks and the real economy. (Gupta & Kashiramka, 2020)

Accordingly, this research formulates the following sub-hypothesis,

$H_{01.2}$: *There is no statistically significant impact at (P ≤ 0.05) for Liquidity Risk on the Financial stability in the Jordanian financial sector.*

2.5 Operational Risk

Banks suffer from operational risk due to the performance of imperfect, outdated, or unsuitable practices in internal banking operations or may be due to external events. (Jahan et al., 2022). Events involving operational risk are a part of operating any business, not just banks. Banks anticipate that operational risk events will occur. Additionally, the complexity of a bank's operations increases the likelihood of substantial operational risk occurrences that could negatively impact the bank's profitability; accordingly, Financial strategies for banks frequently include provisions for operating losses. (Apostolik et al., 2009). Many researchers argue that Operational risk can have a significant impact on financial stability if it leads to the failure of a financial institution or a loss of confidence in the financial system. Therefore, regulators and financial institutions take operational risk management into consideration when assessing and mitigating risks to financial stability, Mazankova and Nemec (2008) and De Jongh, De Jongh, De Jongh, and Van Vuuren (2013) in their studies found that operational risk elements were a major contributor to fueling financial crisis duration and severity, accordingly affecting financial stability; thus, this paper formulates the following sub-hypothesis for testing:

$H_{01.3}$: *There is no statistically significant impact at (P ≤ 0.05) for Operational Risk on the Financial stability in the Jordanian financial sector.*

2.6 Underpinning Theory

Several theories have explored the relationship between unsystematic financial risk and financial stability. One such theory is the trade-off theory, which suggests that firms can trade off financial stability for higher returns by taking on more unsystematic financial risk. The trade-off theory was first proposed by Kraus and Litzenberger (1973) and has been widely studied and debated since then. The theory assumes that the market values firms with higher risk differently and that investors are willing to pay a higher price for firms with higher risk (Modigliani & Miller, 1958).

While some scholars argue that the trade-off theory provides a valuable framework for understanding the relationship between unsystematic financial risk and financial stability, others have criticized it for overlooking agency problems and asymmetric information (Jensen, 1976), and for neglecting the possibility of strategic behavior by firms (Stulz, 1990). More recent research has also suggested that the trade-off theory may not hold under certain conditions, such as when firms face high levels of financial distress (Leland, 1994) or when there are frictions in the capital markets (Myers & Majluf, 1984).

Another theory relevant to the relationship between unsystematic financial risk and financial stability is the pecking order theory. The pecking order theory was first proposed by Myers (1984) and suggested that firms follow a specific order when financing their operations, with internal financing being preferred over external sources. According to this theory, firms will only take on unsystematic financial risk if they have exhausted all other sources of financing.

The pecking order theory has received support from several empirical studies (Shyam-Sunder & Myers, 1999; Frank & Goyal, 2009) and is seen by some scholars as a valuable framework for understanding the financing decisions of firms. However, others have criticized the theory for oversimplifying the financing process and neglecting the role of information asymmetry in financial markets (Barclay & Smith Jr, 1995). Additionally, recent research has suggested that the pecking order theory may not hold under certain conditions, such as when firms have access to cheaper external financing (Fama & French, 2005) or face high financial distress levels (Kim & Ritter, 1999).

Overall, both the trade-off theory and the pecking order theory provide valuable frameworks for understanding the relationship between unsystematic financial risk and financial stability. However, it is essential to recognize their limitations and the conditions under which they may not hold to develop a more nuanced understanding of the factors influencing firms' financing decisions.

3. Research Methodology

This study uses an explanatory research design and employs the survey method to examine the impact of unsystematic financial risk on financial stability in conventional banks in Jordan. While Islamic banks are also part of the banking sector in Jordan, they have been excluded from the study sample due to their different nature of activities, which include adhering to Islamic principles in their financing and investment activities. The exclusion of Islamic banks from the sample is further justified by the fact that their financial risk characteristics may differ from those of conventional banks. However, it is important to note that this exclusion could potentially limit the generalizability of the findings to the entire banking sector, and the potential impact of this limitation should be acknowledged.

The choice of conventional banks as the sample for this study is based on their well-structured nature and governance, which are governed by domestic laws. Additionally, their financial statements are mandatory and publicly announced and listed on the Amman Stock Exchange, making them readily accessible for analysis.

3.1 Variables Measurement

Financial stability is the dependent variable of the study, which was measured using ZROA, which is a widely accepted measure of financial stability in the banking industry (Acharya et al., 2011; Stephen et al., 2016), as follows:

$$ROA_{it} = \frac{ROA_{it} + LEV_{it}}{SDROA_{it}}$$

Among these, ZROA means ROA's Z score, SDROA is the standard deviation of ROA for three years, and LEV is the financial leverage ratio measured as the equity-to-liability ratio.

Using ZROA to measure financial stability allows for a comprehensive and robust assessment of a bank's financial position.

Unsystematic Financial risk is the dependent variable of the study, and measuring unsystematic risk includes the following three types of risk:

1. **Credit Risk** (*CR)* is measured by the ratio of non-performing (bad) loans to gross loans. (Roman, 2021), (Jahan et al., 2022)
2. **Liquidity Risk** (*LR)* is measured by: total current assets/current liabilities. (Alzboon & Muhmad, 2020)
3. **Operational Risk** (*OR)* measured by the total income for the last three years * 15% (Roman, 2021).

Control Variables: To further understand the link between the dependent and independent variables, this study incorporates two control variables;

1. **Bank size** is calculated by taking the rate of change of the bank's total assets. Including bank size as a control variable is a common practice in financial stability and risk studies. For example, a Demirgüç-Kunt and Huizinga (2010) study found that larger banks tend to be more stable and less prone to failure. Similarly, a study by Beck, Demirgüç-Kunt, and Levine (2006) found that bank size is positively correlated with financial development and stability.
2. **The year 2020:** The COVID-19 pandemic has significantly impacted the global economy and financial markets, including the banking sector. Including the year 2020 as a control variable allows you to account for any potential effects of the pandemic on your study's dependent and independent variables. Many articles and reports discuss the impact of COVID-19 on the banking sector, including a report by the World Bank (2021) highlighting the challenges banks faced during the pandemic and the measures they took to mitigate risk.

3.2 Regression Model

The following regression model is used to investigate the hypotheses of the study.

$ZSCORE = \beta_0 + \beta_1 LR + \beta_2 CR + \beta_3 OR + \beta_4 SIZE + \beta_5 COVID19 + \varepsilon$

where:

LR, CR and *OR* are liquidity, credit risk and the operational risk, respectively and *SIZE* is the rate of change of bank total assets.

3.3 Methods of data analysis

The current study employs econometric analysis using panel data in EViews software. Before estimating the study model, multicollinearity is tested, and Breusch-Pagan LM and Hausman tests are conducted to ensure the model's validity. The panel data approach is used to find the relationship between the study variables at different periods, covering the period from 2016 to 2021. The analysis includes descriptive statistics, such as mean, median, minimum, and standard deviation, to describe the data. Additionally, panel regression analysis is employed to test the hypotheses.

4. Results

4.1 Descriptive statistics of the study variables

Table 1
Descriptive Statistics

	Mean	Stdev.	Min	Max
ZSCORE	86.768	63.854	18.248	359.963
LR	1.094	0.109	0.522	1.207
CR	0.060	0.024	0.012	0.113
OR	17.791	0.871	16.747	19.982
SIZE	21.816	0.855	20.672	24.042

ZSCORE: the outcomes of Altman model. LR: liquidity risk. CR: credit risk. OR: operational risk. SIZE: rate of change of bank total assets.

The descriptive statistics presented in the table show that Jordanian commercial banks exhibit varying levels of financial stability. The range of ZSCORE of ROA, which indicates banks' overall financial health, is wide, with values ranging from 18.248 to 359.963. This suggests that some banks may be at a higher risk of financial distress than others. The mean liquidity risk (LR) measure of 1.094 indicates that, on average, banks are solvent, but there are variations among banks, with some having more current liabilities than current liquid assets. The percentage of non-performing loans to general loans varies widely among banks, with some recording percentages exceeding 10%, indicating differences in banks' creditworthiness. The mean operational risk (OR) measurement is around the same level as the overall mean, indicating a similar level of risk across banks. The same is true for bank size, with convergence resulting from the natural relationship between operational risk and banks' total assets.

4.2 Empirical Results

This study conducted multicollinearity, the Breusch-Pagan LM, and Hausman tests before estimating the panel regression model. These tests are necessary for panel data analysis because of their unique characteristics, such as the presence of both time-invariant and time-varying variables. Multicollinearity is tested to ensure that the independent variables included in the model are not highly correlated with each other, which can lead to inaccurate estimation and difficulty in interpreting the coefficients. The Breusch-Pagan LM test is used to check for heteroscedasticity, which is the presence of non-constant variance across the observations. This can lead to biased and inefficient estimates. On the other hand, the Hausman test is used to choose between fixed effects and random effects models, as both have different assumptions and implications for the

regression results. By conducting these tests, the validity and reliability of the panel regression model are ensured, and the results can be interpreted with greater confidence.

The results are shown in Table 2.

Table 2
Multicollinearity, Breusch-pagan LM and Hausman tests

Variables	VIF	LR	CR	OR	SIZE
LR	1.017	1.000			
CR	1.045	-0.010	1.000		
OR	1.004	-0.016	0.020	1.000	
SIZE	1.066	0.129	-0.021	-0.065	1.000
Hypothesis	Berush-Pagan LM Test		Hausman Test		
H0	Chi^2= 68.932 p-value = 0.379		----		
H01	Chi^2= 76.525 p-value = 0.177		----		
H02	Chi^2= 70.995 p-value = 0315		----		
H03	Chi^2= 72.505 p-value = 0.272		----		

The results of correlation coefficients show that there is no multicollinearity problem among independent variables. The researcher noticed that correlation coefficients between all pairs of predictors are less than (± 0.80), indicating no multicollinearity problem in study models. Also, provides the values of VIF indicate a limited issue of multicollinearity. When applying the VIF test to the explanatory variables, we obtained values that do not exceed 5. These results show that multicollinearity is not a problem in study regressions models.

Moreover, Lagrange Multiplier tests are applied for study models that investigate the relationship between financial stability and unsystematic risk; LM test return F values for all hypotheses, with probability more than 0.05; this refers to reject null hypothesis indicates that pooled regression does not fit study model.

Accepting the null hypothesis that pooled regression does fit the study model, there is no need to apply the Hausman test to select the appropriate model from the random effect model and fixed effect model. So, pooled regression was used to test the main and sub-hypotheses.

The outcomes of the main hypothesis and supporting hypotheses are displayed in the tables below. The main hypothesis tests the effect of unsystematic risks with their aggregated dimensions (liquidity risk, credit risk, operational risk) on financial stability, while sub-hypotheses aim to investigate each individual risk's effect on financial stability. In order to enhance the authenticity of the study and accurately capture the relevant factors and alterations that took place during the study period, a dummy variable representing the year in which the coronavirus pandemic occurred has been incorporated into the study model.

4.3 Main hypothesis testing: The effect of unsystematic risks with their aggregated dimensions on financial stability

The relationship between all unsystematic risks (liquidity risk, credit risk, operational risk) and financial stability is represented in the first main model of study and characterized as follows:

$$ZSCORE = \beta_0 + \beta_1 LR + \beta_2 CR + \beta_3 OR + \beta_4 SIZE + \beta_5 COVID19 + \varepsilon \qquad (1)$$

Table 3
Main hypotheses testing results

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LR	70.286	58.968	1.192	0.238
CR	-655.882	101.544	-6.459	0.000
OR	-7.535	3.054	-2.467	0.016
SIZE	-19.528	41.051	-0.476	0.636
@YEAR=2020	-15.809	7.141	-2.214	0.030
C	171.292	46.381	3.693	0.001
R-squared	*0.171*			
Adj R-squared	*0.108*			
F- value	*2.713*			
Sig. F	*0.027*			

Table 3 reports that R Square, the coefficient of determination of about (17.1%) of the variation in financial stability (ZSCORE), is explained by the model. While F-statistic refers to the acceptability of the model from a statistical perspective, and it is a practical test of the model's ability to explain any variation in the dependent variable financial stability. The significance value of the F statistic (2.713) is (Prob F = 0.027) less than 0.05, meaning that the aggregated independent variables' effect is significant.

Additionally, the results of the regression analysis indicate that Liquidity Risk (LR) does not have a meaningful impact on financial stability. The coefficient for LR, which is (70.286), is not statistically significant with a (t=1.192) and a probability value of (prob.t =0.238), which is greater than 0.05. Conversely, Credit Risk (CR) has a statistically significant negative effect on financial stability, with a coefficient of (-655.882), a t-statistic of (t= -6.459), and a probability value of (prob.t =0.000). Similarly, the Operational Risk (OR) also has a significantly negative impact on financial stability, with a coefficient of (-7.535) with (t=2.467, prob.t=0.016).

The variable SIZE is found to have no significant effect, as the corresponding coefficient of (-19.528) is not deemed significant with a t-value of (-0.476) and a probability of (0.636). On the other hand, the variable COVID-19 exhibits a negatively significant effect, as its coefficient of (-15.809) is significant with a t-value of (-2.214) and a probability of (0.030).

The results demonstrate that the impact of (*LR, CR, and COVID-19*) is significant, whereas the rest of the variables do not seem to have any significant impact. Furthermore, the observed significant effects are negative, indicating that an increase in the variables above leads to a decrease in financial stability. This provides evidence of a negative relationship between unsystematic risks and financial stability, which aligns with the expected outcomes.

4.3.1 First sub-hypothesis testing: The effect of liquidity risk on financial stability

The relationship between liquidity risk and financial stability is represented in the second model of study and characterized as follows:

$$ZSCORE = \beta_0 + \beta_1 LR + \beta_2 SIZE + \beta_3 COVID19 + \varepsilon \qquad (2)$$

Table 4
The results of the first sub-hypotheses testing results

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LR	60.783	55.528	1.095	0.278
SIZE	26.047	33.802	0.771	0.444
@YEAR=2020	-23.965	8.160	-2.937	0.005
C	8.146	58.663	0.139	0.890
R-squared	*0.047*			
Adj R-squared	*0.005*			
F- value	*1.123*			
Sig.F	*0.346*			

Table 4 indicates that the coefficient of determination, R Square, explains 4.7% of the variation in financial stability (ZSCORE) as measured by the model.

F-statistic refers to the rejection of the model from a statistical perspective, and it is a useful test of the model's ability to explain any variation in the dependent variable financial stability. The non-significant value of the F statistic (1.123) has a probability (Prob F = 0.346) that exceeds 0.05, indicating that the effect of the independent variables is statistically significant.

Additionally, the regression line coefficients indicate that the Liquidity Ratio (LR) has no significant impact on financial stability, as the coefficient of 60.783 is not statistically significant with a t-value of 1.095 and a probability of 0.278, which is higher than 0.05. Similarly, the Size (SIZE) of the firm has no significant impact, as the coefficient of 26.047 is not statistically significant, with a t-value of 0.771 and a probability of 0.444. On the other hand, the COVID-19 variable has a significantly negative effect on financial stability, as the coefficient of -23.965 is statistically significant with a t-value of -2.937 and a probability of 0.005.

The results indicate no significant impact of (LR) on financial stability. However, the impact of (COVID-19) is significant, with a negative effect on financial stability during the Corona pandemic. The remaining variables do not exhibit any significant impact.

4.3.2 Second sub-hypothesis testing: The effect of credit risk on financial stability

The relationship between credit risk and financial stability is represented in the third model of study and characterized as follows:

$$ZSCORE = \beta_0 + \beta_1 CR + \beta_2 SIZE + \beta_3 COVID19 + \varepsilon \qquad (3)$$

Table 5 indicates that the coefficient of determination, R Square, explains 15.0% of the variation in the financial stability (ZSCORE) through the model.

F-statistic refers to the acceptability of the model from a statistical perspective, and it is a useful test of the model's ability to explain any variation in the dependent variable financial stability. The significance value of the F statistic (3.967) is (Prob F = 0.011) less than 0.05, which means that the effect of independent variables is significant.

Table 5
The results of the second sub-hypotheses testing results

Variable	Coefficient	Std. Error	t-Statistic	Prob.
CR	-617.708	123.169	-5.015	0.000
SIZE	-4.451	38.780	-0.115	0.909
@YEAR=2020	-17.356	6.213	-2.793	0.007
C	110.133	9.597	11.476	0.000
R-squared	0.150			
Adj R-squared	0.111			
F- value	3.967			
Sig.F	0.011			

Additionally, the results of the regression line indicate that the (CR) has a statistically significant negative effect, as evidenced by a coefficient of -617.708 with a t-value of -5.015 and a probability of 0.000. Conversely, the size (SIZE) does not have a significant impact, with a coefficient of -4.451, a t-value of -0.115, and a probability of 0.909. On the other hand, the COVID-19 pandemic (COVID-19) has a statistically significant negative impact, with a coefficient of -17.356, a t-value of -2.793, and a probability of 0.007.

The results demonstrate that CR significantly negatively impacts financial stability, while the effect of COVID-19 is significant. The remaining variables do not seem to have any significant impact. Additionally, the negative impact of COVID-19 on financial stability is as anticipated, implying that the Corona pandemic has decreased financial stability.

4.3.3 Third sub-hypothesis testing: The effect of operational risk on financial stability

The relationship between operational risk and financial stability is represented in the third model of study and characterized as follows:

$$ZSCORE = \beta_0 + \beta_1 OR + \beta_2 SIZE + \beta_3 COVID19 + \varepsilon \tag{3}$$

Table 6
The results of the third sub-hypotheses testing results

Variable	Coefficient	Std. Error	t-Statistic	Prob.
OR	-8.232	4.709	-1.748	0.085
SIZE	24.962	41.308	0.604	0.548
@YEAR=2020	-25.999	9.155	-2.840	0.006
C	220.741	88.509	2.494	0.015
R-squared	0.066			
Adj R-squared	0.024			
F- value	1.592			
Sig.F	0.199			

Table 6 indicates that the coefficient of determination, R Square, explains 6.6% of the variation in financial stability (ZSCORE) through the model.

F-statistic refers to the rejection of the model from a statistical perspective, and it is a useful test of the model's ability to explain any variation in the dependent variable financial stability. The non-significant value of the F statistic (1.592) with a probability value of 0.199, which is greater than 0.05, indicates that the impact of the independent variables is statistically significant.

Additionally, the results of the regression analysis indicate that the (OR) does not have a significant impact on financial stability. The coefficient value of -8.232 is not statistically significant, as evidenced by a t-value of -1.748 and a prob.t of 0.085, which is greater than 0.05. Furthermore, the (SIZE) does not have a significant impact, with a coefficient value of 24.962, a t-value of 0.604, and prob.t of 0.548. On the other hand, the COVID-19 pandemic has a negative and significant effect on financial stability, as indicated by a coefficient value of -25.999 and a t-value of -2.840, with a prob.t of 0.006.

The results indicate that the impact of the operational risk (OR) on financial stability is not significant. On the other hand, the effect of the COVID-19 pandemic on financial stability is notable and shows a negative correlation. The results suggest that financial stability has decreased during the Corona pandemic, which aligns with the expectations. The rest of the variables analyzed do not show any significant effect on financial stability.

5. Conclusion

Based on the study's findings, it is evident that credit and operational risk have a negative impact on financial stability, and effective risk management strategies are essential to mitigate their impact. While liquidity risk may not have a direct impact on financial stability, it remains a critical risk factor that requires attention in risk management strategies. However, it is

important to note that the impact of liquidity risk can vary depending on the circumstances, and further research is needed to provide a more nuanced understanding of its relationship to financial stability.

To promote a stable and resilient financial system, policymakers, financial institutions, and other relevant stakeholders should prioritize managing credit and operational risk while also addressing liquidity risk where applicable. Additionally, future research can explore the impact of other types of risks, such as market risk and systemic risk, on financial stability. Specific research questions can be addressed to provide a more comprehensive understanding of these risks and their relationship to financial stability. Ultimately, a comprehensive risk management strategy is crucial to mitigate the negative impact of unsystematic financial risk on financial stability.

In conclusion, the study highlights the negative impact of credit and operational risk on financial stability, emphasizing the need for effective risk management strategies. While the conclusion suggests that policymakers and financial institutions should focus on managing these risks, it is important to provide specific recommendations for risk management practices. Future research could examine successful risk management strategies that have been implemented in practice, including case studies of financial institutions that have effectively managed credit and operational risk. This would provide valuable insights for policymakers and financial institutions looking to improve their risk management practices and promote a stable financial system. Overall, the study's findings underscore the importance of comprehensive risk management strategies that address a variety of risk factors, including credit and operational risk, in order to maintain financial stability.

References

Acharya, V. V., Amihud, Y., & Litov, L. (2011). Creditor rights and corporate risk-taking. *Journal of financial Economics, 102*(1), 150-166.

Ahmed, H. M., El-Halaby, S. I., & Soliman, H. A. (2022). The consequence of the credit risk on the financial performance in light of COVID-19: Evidence from Islamic versus conventional banks across MEA region. *Future Business Journal, 8*(1), 21.

Al-Aboudi, A. A.-A. K. (2022). Evaluating the financial performance of Iraqi banks through a matrix analysis (performance-importance)-An applied study in a sample of commercial banks listed in. *THE IRAQI MAGAZINJE FOR MANAGERIAL SCIENCES, 18*(74).

Ali, B., & Oudat, M. S. (2020). Financial risk and the financial performance in listed commercial and investment banks in Bahrain bourse. *International Journal of Innovation, Creativity and Change, 13*(12), 160-180.

Alzboon, A. W. S., & Muhmad, S. N. (2020). *Systematic and Unsystematic Risk: Impact to the Stock Return and Dividends in Saudi Arabia.* Paper presented at the Southeast Asia Millenial Conference Proceeding.

Apostolik, R., Donohue, C., & Went, P. (2009). *Foundations of banking risk: an overview of banking, banking risks, and risk-based banking regulation*. John Wiley.

Barclay, M. J., & Smith Jr, C. W. (1995). The maturity structure of corporate debt. *The journal of finance, 50*(2), 609-631.

Barik, R., & Pradhan, A. K. (2021). Does financial inclusion affect financial stability: evidence from BRICS nations? *The Journal of Developing Areas, 55*(1).

Beck, T., Demirgüç-Kunt, A., & Levine, R. (2006). Bank concentration, competition, and crises: First results. *Journal of Banking & Finance, 30*(5), 1581-1603.

Beja, A. (1972). On systematic and unsystematic components of financial risk. *The journal of finance, 27*(1), 37-45.

Choudhry, M. (2018). *An introduction to banking: principles, strategy and risk management*: John Wiley & Sons.

Čihák, M., & Hesse, H. (2010a). Islamic banks and financial stability: An empirical analysis. *Journal of Financial Services Research, 38*, 95-113.

Čihák, M., & Hesse, H. (2010b). Islamic banks and financial stability: An empirical analysis. *Journal of Financial Services Research, 38*(2), 95-113.

De Jongh, E., De Jongh, D., De Jongh, R., & Van Vuuren, G. (2013). A review of operational risk in banks and its role in the financial crisis. *South African Journal of Economic and Management Sciences, 16*(4), 364-382.

Dsouza, S. (2021). Impact of Internal Audit Quality on Financial Stability. *Journal of Commerce and Accounting Research*.

Ekinci, R., & Poyraz, G. (2019). The effect of credit risk on financial performance of deposit banks in Turkey. *Procedia Computer Science, 158*, 979-987.

Fama, E. F., & French, K. R. (2005). Financing decisions: who issues stock? *Journal of financial Economics, 76*(3), 549-582.

Frank, M. Z., & Goyal, V. K. (2009). Capital structure decisions: which factors are reliably important? *Financial management, 38*(1), 1-37.

Gupta, J., & Kashiramka, S. (2020). Financial stability of banks in India: does liquidity creation matter? *Pacific-Basin Finance Journal, 64*, 101439.

Hopkin, P. (2018). *Fundamentals of risk management: understanding, evaluating and implementing effective risk management*: Kogan Page Publishers.

Hsu, L.-T., & Jang, S. (2008). The determinant of the hospitality industry's unsystematic risk: A comparison between hotel and restaurant firms. *International Journal of Hospitality & Tourism Administration, 9*(2), 105-127.

Jahan, N., Iftikhar, S. F., Ahmed, C. S., & Hussain, T. (2022). Risk Management and Its Impact on Banking Sector Performance: Evidence from Pakistan. *Competitive Social Science Research Journal, 3*(2), 354-379.

Jensen, M. C. (1976). Reflections on the State of Accounting Research and the Regulation of Accounting.

Kamis, N. S. (2018). Systematic and Unsystematic Risk Determinants of Liquidity Risk on Manufacturing Industry in North America. *Available at SSRN 3181692*.

Kamran, H. W., Omran, A., & bin Mohamed Arshad, S. B. (2019). Liquidity risk management in banking sector under the shadow of systematic risk and economic dynamics in Pakistan. *Pakistan Journal of Humanities and Social Sciences, 7*(2), 167-183.

Kamran, H. W., Omran, A., & Mohamed-Arshad, S. B. (2019). Risk management, capital adequacy and audit quality for financial stability: Assessment from commercial banks of Pakistan. *Asian Economic and Financial Review, 9*(6), 654-664.

Kim, M., & Ritter, J. R. (1999). Valuing ipos. *Journal of financial Economics, 53*(3), 409-437.

Kraus, A., & Litzenberger, R. H. (1973). A state-preference model of optimal financial leverage. *The journal of finance, 28*(4), 911-922.

Latif, J., Yaqub, M. S., Masood, A., & Rahman, A. (2022). Re-examining the Financial Performance Measures of Commercial Banks in Pakistan. *Pakistan Journal of Social Sciences, 42*(4), 785-798.

Leland, H. E. (1994). Corporate debt value, bond covenants, and optimal capital structure. *The journal of finance, 49*(4), 1213-1252.

Machdar, N. M. (2015). The Effect of Capital Structure, Systematic Risk, and Unsystematic Risk on Stock Return. *Business and Entrepreneurial Review, 14*(2), 149-160.

Mazankova, V., & Nemec, M. (2008). Operational Risk And Its Impacts On Financial Stability. *Occasional Publications-Chapters in Edited Volumes*, 94-104.

Modigliani, F., & Miller, M. H. (1958). The cost of capital, corporation finance and the theory of investment. *The American economic review, 48*(3), 261-297.

Moez, D., & Abdelheq, L. (2020). Does Unsystematic Risk Management Affect The Relationship Between Banks' Performance and The Objectives of Saudi Arabia Economic Vision 2030? *Academy of Accounting and Financial Studies Journal, 24*(4), 1-15.

Morgan, P., & Pontines, V. (2014). Financial stability and financial inclusion.

Mugableh, M. I., Malkawi, E. M., & Hammouri, M. A. (2023). Analyzing the effects of actions followed by the Central Bank of Jordan during COVID-19 pandemic on financial performance of Jordanian banks. *Arab Gulf Journal of Scientific Research*(ahead-of-print).

Myers, S. C. (1984). Capital structure puzzle. In: National Bureau of economic research Cambridge, Mass., USA.

Myers, S. C., & Majluf, N. S. (1984). Corporate financing and investment decisions when firms have information that investors do not have. *Journal of financial Economics, 13*(2), 187-221.

Nguyen, M. S. (2021). Capital adequacy ratio and a bank's financial stability in Vietnam. *Banks and Bank Systems, 16*(4), 61.

Roman, N. A. (2021). The Impact of Unsystematic Risks on Stock Market Return in Jordanian Commercial Banks.

Rose, P. S., & Hudgins, S. C. (2006). *Bank Management and Financial Services*: McGraw-Hill Higher Education.

Shyam-Sunder, L., & Myers, S. C. (1999). Testing static tradeoff against pecking order models of capital structure. *Journal of financial Economics, 51*(2), 219-244.

Stephen, O. O., Apollos, E. A., & JE, A. (2016). The CAMEL rating based assessment of the performance of Nigerian banks in the post consolidation era (2005-2014). *IIARD International Journal of Banking and Finance Research, 2*(2).

Stulz, R. (1990). Managerial discretion and optimal financing policies. *Journal of financial Economics, 26*(1), 3-27.

Waemustafa, W., & Sukri, S. (2016). Systematic and unsystematic risk determinants of liquidity risk between Islamic and conventional banks. *International Journal of Economics and Financial Issues, 6*(4), 1321-1327.

Wanjohi, J. G. (2013). *The effect of financial risk management on the financial performance of commercial banks in Kenya.* University of Nairobi.