

## The Impact of Credit and Liquidity Risks on Banking Stability (An Applied Study of Jordanian Commercial Banks)

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### Abstract

The aim of the study was to determine the effect of credit risk, as measured by the ratio of non-performing loans to total loans, and liquidity risk, as measured by the ratio of cash assets to total assets, on the assessment of the capital adequacy ratio. stability of commercial banks. For the purposes of the study, an appropriate descriptive analytical method was used, and the study population consisted of thirteen Jordanian commercial banks listed on the Amman Stock Exchange. All Jordanian commercial banks (a comprehensive survey) are required to provide all the necessary data to measure the variables of the current study between 2016 and 2020.

The most notable findings of this study are as follows: There is a statistically significant effect of credit risk on banking stability in Jordanian commercial banks at the level of (0.05). In addition, the correlation coefficient (R) between credit risk and financial stability in Jordanian commercial banks is moderate at 32.1%.

**Keywords:** Credit Risk, Liquidity Risk, Banking Stability, Jordanian Commercial Banks.

### Introduction

Due to its crucial role in preserving the financial stability of the economic system as a whole, the banking sector is the backbone of the economy of any nation. However, banks may face numerous risks, the impact of which varies from bank to bank based on the precautions and procedures taken by the bank in accordance with the strategy developed by its departments and decision-makers. Liquidity and credit risks are among the most significant factors affecting the performance of these banks, so we find that each bank has a specialized risk management division that helps to ensure the institution's long-term viability (Zarir and Hammouri, 2016). Since the banking sector is considered one of the most important sectors in the state's financial system, which is strongly linked to the stability of the banking sector, we find that countries

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strive to maintain their banking stability by bolstering the financial strength and ability of banks to face the various forms of risks they may face, and by minimizing the effects of successive financial, political, and economic crises (Al-Damy and Habi, 2011).

### **Credit and liquidity risks**

The purpose of bank credit is to help commercial banks achieve their objectives. Good loans are the bank's most profitable assets, so they account for the majority of their operating income. Loans control the majority of banks' existing assets and generate the majority of their operating income. The greatest obstacle confronting bank credit is the problem of bank credit risk, as these risks work against this credit achieving its goals (Abu Khazana, 2017). Since liquidity expresses the bank's ability to meet its financial obligations, which mainly consist of meeting withdrawal requests from deposits and meeting borrowers' requests to meet the needs of society, it is of great importance to the activity of banks. Moreover, liquidity is a relative issue with two variables: the first variable is liquid assets, and the second variable is depositors' withdrawals and credit requests. (Abu Shula, 2020). In general, banks are exposed to numerous risks, including credit and liquidity risks, as a result of the nature of their various activities. Therefore, the bank's management must effectively manage these risks, as they impact the bank's net income and the market value of the shareholders' market rights. Consequently, bank value and banking stability. Existence of risks, particularly credit and liquidity risks, causes fluctuation and fluctuation in the returns of credit portfolios within a bank, as measured by the variance between actual and planned results. Therefore, banks today place a premium on risk management to ensure their continued existence and stability by avoiding insolvency (Al-Jabri, 2017).

The issue of cash management is one of the topics associated with commercial banks, as their business model is dependent on the cash flow of their clients. The bank's adequate liquidity enables it to meet its obligations and satisfy the fundamental needs of its clients. Given the importance of liquidity in commercial banks, local and international banking laws require commercial banks to maintain minimum liquidity ratios that allow the bank to invest and utilize its financial resources appropriately, as well as maximize profits and attain financial stability. To maintain liquidity with banks, there must be a framework that governs its management and identifies risks to its financial stability posed by liquidity (Al-Sarhan, 2019).

According to Theeb (2012), the risks of credit and liquidity are intertwined; therefore, banks must investigate the accuracy of client testing and take adequate guarantees to mitigate these risks; the central bank plays an important role in mitigating credit and liquidity risks by applying control tools to them and regulating their performance in a way that ensures the security of their financial positions and prevents them from failing.

### **The concept of bank credit risk**

Credit risk is one of the most important risks that banks face in their relationships with clients. It relates to the possibility that the client will be unable to pay on time and according to the terms of the credit contract. Commercial banks are exposed to credit risk in virtually all of their operations. Because its relationship with its clients is a creditor-debtor relationship, regardless of how contracts and transactions may be labeled (Widajatun & Wahyu, 2019).

Credit risk is defined as the change in net asset value resulting from a change in the debtor's expected ability to timely fulfill its contractual obligations to the lender (Bahat & Darzi, 2019). It is defined by Marzouk (2020) as the client's failure to pay. It is also the change in the net asset value resulting from a change in the debtor's ability to timely fulfill its contractual obligations to the lender (Bhat & Darzi, 2019). The researcher believes that credit risk refers to the situation in which a borrower from commercial banks is unable to meet his payment obligations or delays payment, thereby affecting the bank's revenues. These threats may be present or forthcoming. There are numerous credit risk types and classifications, the most important of which are outlined below.

1. Default risk is the risk associated with the inability of borrowers to pay their obligations to the bank when they are due (Othman, 2013).
2. Country risk refers to the possibility of incurring a loss as a result of doing business with a country that is experiencing poor economic or political conditions, or as a result of a foreign government defaulting on its bonds or other obligations; these risks result from political and economic turmoil. (Gizaw et al., 2015)
3. Settlement risk is the risk related to the settlement of cash flows and financial assets (Bessis, 2013).

Credit risks vary according to the diversity of their origins, and as a result, their primary categories can be summarized as follows: (Titman, Keowan, & Mertin, 2011)

1. Client risk: i.e., risks associated with the company's activities, management, and operational performance.
2. Industry risk is associated with the company's industry and the quality of its products.
3. Liquidity risk: the possibility of a client defaulting after receiving credit, resulting in his inability to repay the loan's principal and interest.
4. Foreign exchange rate fluctuation risk occurs when credit is extended in a foreign currency whose exchange rate against the local currency fluctuates continuously.

### **The concept of liquidity risk**

Liquidity in its absolute sense refers to cash (cash money), whereas liquidity "in its technical sense" refers to the ability of an asset to be converted into cash quickly and without incurring losses, given that the objective of maintaining liquid assets is to meet obligations that are due for performance now or in the near future, it is impossible to determine the liquidity of a bank or an individual apart from the entitlements of its obligations (Abu Shula, 2020).

According to Marozva (2015), there is no globally accepted or agreed-upon definition of liquidity due to the fact that the concept of liquidity derives from various economic perspectives. Liquidity is defined as the ease with which securities can be traded or with which financing can be obtained for trading securities. The amount of liquidity that must be maintained by the bank or the banking system as a whole is one of the primary difficulties in managing the bank, as the increase in liquidity means that the bank forfeits profits that could have been earned if those liquid funds had been employed or that the bank is not fulfilling its duty to the fullest extent in motivating or supporting the needs of the national economy (Al-Ghafod and Mazika, 2016).

As a result of the expansion of the banking system's activities and the services it offers, their separation from the primary activities for which they were established, the emergence of new products on the financial markets, such as future contracts and financial derivatives, and the entry of new competitors into the financial markets, the bank now faces new risks (Chen et al., 2018). Given that deposits of all types constitute (90%) of commercial banks' total liabilities, there are numerous determinants that influence the liquidity of commercial banks in relation to liquidity risks.

Consequently, the withdrawal of these deposits is the primary cause of liquidity risk, and there are several factors that contribute to the withdrawal of deposits, including the deterioration of banking services and the state's economic situation, in addition to clients' reluctance to save in banks. Together, these factors are the primary determinants of liquidity risk (Chen et al., 2018). Liquidity risk is represented by the situation that arises in the bank, which is either there is a lack of liquidity, that is, the cash assets in the bank are insufficient to meet the bank's requirements and obligations, and this poses a significant problem for the bank, or there is an excess of liquidity, as if the bank resorts to maintaining rates of cash liquidity that are greater than the percentage required of it. This is reflected in the volume of deposits invested by the bank and, consequently, in the volume of return earned by investing these funds in excess of its need for liquidity (Al-Ghafod and Mazika, 2016).

Rose & Hudgins (2010) define liquidity risk as the risks a bank faces due to a lack of client trust or an unexpected increase in cash demand, as the bank faces a number of liquidity problems that force it to borrow from the central bank, which is a negative indicator that affects the bank's management on two fronts. The cost of the loan may be high due to the high interest rates imposed on it or its effect on the bank's reputation in its market-based banking environment.

Liquidity risk is defined by Ouma (2015) as the risk that a bank will be unable to meet its obligations on time without incurring unacceptable losses. It is defined as a situation in which the bank is unable to meet all depositors' requests, in whole or in part, for a certain period, and that liquidity risks not only affect the bank's performance but also its reputation, and that insufficient liquidity causes a decline in depositor confidence, which results in a loss of opportunity (Hakimi, 2017). According to the researcher, the general concept of liquidity risk is the inadequacy of a bank's liquidity to meet its normal operating requirements in order to meet its obligations to its clients or conduct its daily banking operations.

Liquidity risks may be represented by the situation that arises in the bank, which is either a lack of liquidity, meaning that the cash assets in the bank are insufficient to respond to the bank's requirements and obligations, and this represents a real problem for the bank, or there is an excess of liquidity, as if the bank resorts to maintaining cash liquidity rates greater than the required ratio, it allows it to meet any emergency obligations that the bank may face or even its operational obligations, and this is reflected in the volume of deposits invested by the bank, and

therefore on the volume of return achieved from the process of investing these funds in excess of its need for liquidity.

### **The concept of banking stability**

Banking stability reflects ability of institutions of the banking system to absorb the negative shocks of the economy, which is why supervisory and regulatory authorities pay close attention to it and strive to establish it at the level of all the institutions that comprise the banking system. Theoretically sufficient to attain stability (Adoun, 2020). Due to its crucial role in achieving financial stability in other sectors, banking stability is of vital importance to the economy of any nation. Due to the increasing emergence of crises resulting from political, social, and economic instability, there has been a growing interest in it over the past decade in the context of the nature of economic policies, as it has become the preoccupation of policymakers and decision-makers on a global scale and has occupied a position of particular importance (Musa and Ghoneim, 2019).

In addition to the risks of economic and financial policies, the banking system may be exposed to risks due to its inherent weaknesses, its inability to absorb negative shocks in the local or international economic environment, or the growth of risks in sectors borrowing from the banking sector. Therefore, compromising banking and financial stability will directly impact economic stability (Odoun, 2020). In the majority of economies, banking stability is central to the Central Bank's interests and one of its primary objectives. To achieve this objective, the Central Bank strives to improve the sector's performance in accordance with international standards and maintains a constant desire to control and supervise the component parts of this apparatus (Odoun, 2020). Banking stability is defined as the ability of central banks to formulate monetary policies and effectively control institutions and the banking sector in order to achieve their obligations without support or obstacles. As for banking instability, it is defined as a significant and unusual decrease in the value of assets, where the liquidation of its assets is less than what it owns in deposits, and in this case, the bank is insolvent. This is measured by the comparison between assets and liabilities, excluding reserves and capital (Khair El-Din, 2020).

### **Previous studies**

There are many previous studies that examined the impact of credit and liquidity risks on the stability of banks. Where the **Hafez (2021)** study aimed to determine the effect of

applying banking controls on banking stability during the time period (2008–2018). applied to a sample of (19) countries in the Middle East and North Africa region, which included (25) central banks, and was based on the descriptive (inductive) approach. In the process of conducting the statistical analysis, the researcher relied on the method of analyzing fixed plate models, and the independent variables of banking controls represented in (capital adequacy requirements, liquidity, legal reserve, financial leverage, provisioning policy) were measured. And its impact on banking stability as a dependent variable represented by (total banking stability index, Z-SCORE banking stability index). The results of the study showed that there is a significant impact of the application of banking controls on the stability of the banking sector in the countries of the Middle East and North Africa, and that there is a positive significant impact of the legal requirements. Reserve in the macro bank stability index. The results also showed a negative impact of the provisioning policy on the overall banking stability index.

**Marzouk (2020) study** aims to determine the impact of liquidity risks and credit risks on financial performance, as the study population was represented by all Egyptian and Saudi banks. The study sample consisted of nine banks listed on the Egyptian Stock Exchange and twelve banks listed on the Saudi Stock Exchange, and the study was conducted during the time period (2010-2019). The study concluded that there is a statistically significant effect of liquidity and credit risks on the financial performance of Egyptian and Saudi commercial banks.

**Al-Sarhan (2019)** conducted a study aimed to identify the impact of liquidity risk on the financial stability of commercial banks in Jordan, based on the analytical descriptive approach and the use of the random effect model in data analysis by measuring the independent variable represented by liquidity risk and its impact on financial stability. The dependent variable is represented by (Z-SCORE). The study sample consisted of ten Jordanian banks listed on the Amman Stock Exchange. The results of the study showed that there is a significant and negative effect of the excess liquidity risks on the financial stability of the Jordanian commercial banks, and the results also showed that there is no significant effect of the liquidity deficit on the financial stability of the Jordanian commercial banks. Jordanian commercial banks.

**Siddiq & Al-Gamal's (2020)** study aims to determine the relationship between credit risk and capital adequacy with banking hedging for Islamic and conventional banks in Yemen. A sample of four conventional banks and three Islamic banks was used during the period (2012-

2017). The descriptive analytical approach was relied upon. The results of the study showed that there is a statistical relationship between credit risk and bank hedging, and a strong statistical relationship between capital adequacy and bank hedging. In addition to the existence of a negative relationship between the credit risk of conventional banks and bank hedging, there is a statistically significant relationship between the credit risk and bank hedging of Islamic banks.

**Saeed & Zahid's (2016)** conducted a study aimed to analyze the impact of credit risk on the profitability of five large British commercial banks, to measure profitability, the indicators of return on equity and return on assets were adopted. To measure credit risk, indicators of the non-performing loans ratio and the non-performing capital adequacy ratio were adopted. Multiple statistical analyzes were conducted on the bank's data from 2007 to 2015 to cover the period of the financial crisis. It was found that the indicators of credit risk have a positive relationship with the profitability of banks, and the results revealed that the size of the bank, financial leverage and growth were positively related to each other, and the banks achieved profitability after the financial crisis. They have learned how to deal with credit risk over the years..

**Jiang's (2014)** conducted a study aimed To determine the ability of banks to achieve banking stability in China, and relied on measuring the correlation between the study indicators using VAR (value at risk) by measuring the dimensions of banks' stability through non-performing loans and their impact on macroeconomic indicators (gross domestic product, exchange rate, interest rate, and money supply). ). The results of the study showed a strong relationship between non-performing loans and economic indicators, in addition to a clear effect between banking stability and China's foreign relations.

### **Ruziqa, (2013) study**

This study aims to determine the impact of credit and liquidity risks on the financial performance of banks in Indonesia. Banks' financial performance is measured by return on assets, return on equity and net interest margin. Credit risk was measured on the basis of non-performing loans ratio, and liquidity risk was measured on the basis of liquidity ratio. Moreover, this study also measured the bank's capital and the effect of bank size on its financial performance. The results showed that credit risk has a significant negative impact on return on assets and return on equity, while it was found that the liquidity ratio has a significant positive



impact on return on assets and return on equity. Bank capital is positively important on return on assets, return on equity, equity and national investment fund.

## **Problem Statement**

In light of the foregoing, the study's problem can be formulated as the following primary question: Do credit and liquidity risks have an effect on the banking stability of Jordanian commercial banks?

## **The importance of the study**

The significance of the study lies in determining the theoretical and practical impact of these risks on banking stability, as well as their reality in the examined commercial banks, and this significance can be highlighted as follows:

1. Scientific importance: Given the importance of the banking sector to the national economy, as well as the issue of credit risk and liquidity risk and their impact on the banking stability of Jordanian commercial banks, which is one of the topics of interest to academics and professionals, especially in light of the financial crisis and the deterioration of their conditions, it is hoped that this study will provide commercial banks with useful results and recommendations.
2. Practical Importance: Examining the Impact of Credit and Liquidity Risks on the Banking Stability of Jordanian Commercial Banks This study provides commercial bank decision makers and the Jordanian economy with crucial information regarding the existence of a relationship between credit and liquidity risks and their impact on banking stability.

## **Objectives**

This study's primary objective is to investigate the impact of credit risk and liquidity risk on the banking stability of Jordanian commercial banks in order to assist decision makers in managing these banks by planning and making timely decisions.

## **Study framework**

As shown in Figure (1), the study employed a set of independent and dependent variables, which were placed within their conceptual framework.

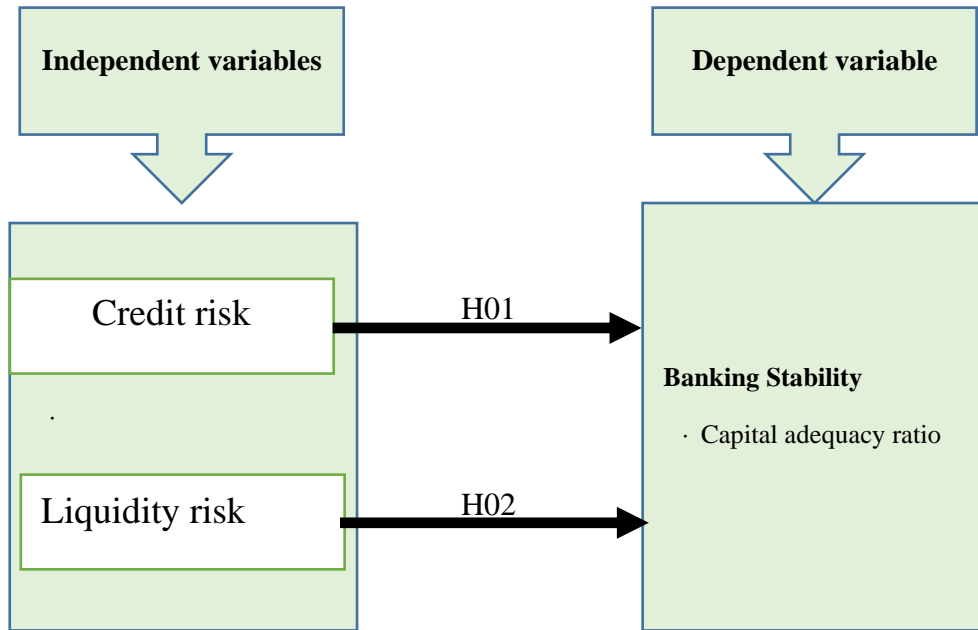


Figure 1: Study model

## Study hypotheses

The main hypothesis: There is no statistically significant effect of credit risk and liquidity risk on the banking stability of Jordanian commercial banks. The following sub-hypotheses are derived from the main hypothesis:

**Ho.1:** There is no statistically significant effect at the level of significance ( $\alpha \leq 0.05$ ) for credit risk on the banking stability of Jordanian commercial banks.

**Ho.2:** There is no statistically significant effect at the level of significance ( $\alpha \leq 0.05$ ) for liquidity risk on the banking stability of Jordanian commercial banks.

## Methodology

This study depends on the descriptive approach, which accurately shapes the phenomena in quantitative and qualitative terms. Quantitative expressions provide a numerical description of the amount or magnitude of a phenomena, leading to conclusions or generalizations that facilitate comprehension of the phenomenon or problem's reality (Salkind, 2019). The inferential (analytical) approach was utilized because it seeks to draw inferences about society and is concerned with analyzing the data to predict or extrapolate what the numbers mean and understanding their statistical function, interpretation, and description more broadly than the

descriptive approach due to the advantages it offers in identifying community phenomena. It is concerned with the various tests of importance to test hypotheses in order to determine the validity with which it can be said that the data refer to some conclusions or results, and the task of interpretation focuses primarily on inferential analysis (i.e., inference and deduction of conclusions) (Swan, 2018).

### Population and sample size

The study population consisted of 13 Jordanian commercial banks listed on the Amman Stock Exchange, as shown in Figure (2). To select the study sample, all Jordanian commercial banks were subjected to a comprehensive survey to collect all the data required to measure the variables of the current study from 2016 to 2020.

JCBK	ARBK
AJIB	THBK
ABCO	BOJX
JOKB	EXFB
INVB	AHLI
SGBJ	CABK
	UBSI

**Figure 2: Commercial banks in Jordan**

*Source: (Central Bank report for the year 2021).*

### Study tool

The study tool was used to collect the necessary data on the independent variable: credit risk, which was measured by the ratio of non-performing loans to total loans. liquidity risk, which is measured by the ratio of cash assets to total assets; The dependent variable was banking stability, which was measured by the capital adequacy ratio. The financial statements issued on the official website of the Amman Stock Exchange from 2016 to 2020 were the primary tool for data collection, which are shown in Table No. (1).

**Table 1: Study variables and measurement methods**

Variable	Type	Measuring Method	Source
Credit Risk	independent	Ratio of non-performing loans to total loans	(Siddiq, & Al-Gamal, 2020).
Liquidity Risk		The ratio of cash assets to total assets	(Al-Sarhan, 2019)
Banking Stability	dependent	Capital Adequacy Ratio	(Jiang, 2014)

## Data analysis

### Normal distribution test:

Parametric statistics come closest to determining the effect value because they are appropriate to the nature of the data. However, it is a condition of parametric statistics that the data be distributed normally and that their observations in the society from which they were drawn follow a normal distribution (Al-Binaa, 2017). The value of the (K-S) (K-S Test) was derived to validate that the collected data exhibits a normal distribution. The (Sig) value of the data must be more than (0.05) and the number of observations must be greater than (50) for this test to have a normal distribution (Doane & Seward, 2015).

**Table (2): Normal distribution of data based on the (K-S) test**

Variables	Credit Risk	Liquidity Risk	Banking Stability
N	65	65	65
Kolmogorov-Smirnov (K-S)	0.560	0.817	0.962
Sig	0.912	0.516	0.313

Table (2), indicates that the data distribution was normal in terms of (Sig) value, which carries values greater than (0.05) for all study variables.

### Appropriateness of the statistical methods used:

Multi-collinearity indicates the occurrence of a strong and statistically significant correlation between two or more independent variables, and it is regarded as one of the most significant negative consequences of linearity among the independent variables. This results in the regression coefficients' lack of independence, as well as their lack of dependability. This condition is confirmed by examining the correlation matrix between the independent variables to determine if there are no linear pairs between them if the correlation coefficients are less than 0.80 (Gujarati et al., 2017).

**Table 3: Pearson's Matrix**

Variable	Credit Risk	Liquidity Risk
Credit Risk	1	0.074
Liquidity Risk	0.074	1

It is evident from Table (3) that the correlation coefficient between credit risk and liquidity risk is 0.074, which indicates that it is eligible for statistical analysis because it is less than 0.80.

1. Using the Variance Inflation Factor (VIF) for each of the independent variables, it is possible to determine that there is no linearity if the VIF is less than 5. By dividing 1 by the inflation factor (VIF), the acceptable variation (Tolerance) can be calculated. If its value is less than 1 but larger than 0.2, it shows a lack of linearity (Hair et al., 2018).

**Table 4: Multi-collinearity test's results**

Variable	Credit Risk	Liquidity Risk
VIF	1.021	1.021
(1/VIF)	0.979	0.979

Table (4) indicate that the value of VIF is less than 5, and the value of the permissible coefficient of variation is greater than 0.2 and did not exceed 1, as this is an indication that there is no problem of linearity.

### **Descriptive statistics results**

The arithmetic mean, standard deviation, and highest and lowest values were extracted to describe the study variables during the study period from 2016–2020, and the results were as follows:

### **Descriptive statistics for credit risk**

**Table (5): Descriptive statistics for credit risks for the period (2016-2020)**

Years	Minimum	Maximum	Mean	Std. Deviation	N
2016	0.019	0.123	0.0691	0.02803	13
2017	0.021	0.121	0.0650	0.02582	13
2018	0.025	0.132	0.0738	0.02819	13
2019	0.017	0.126	0.0740	0.02692	13

2020	0.019	0.125	0.0803	0.03106	13
<b>General indicator</b>	<b>0.017</b>	<b>0.132</b>	<b>0.0724</b>	<b>0.02766</b>	<b>65</b>

Table (5) indicates that the arithmetic average of credit risk during the period (2016–2020) amounted to 0.0724. With a standard deviation of 0.02766, the highest value was 0.132, belonging to the Jordanian Commercial Bank in 2018, and the lowest, 0.017, belonged to the Arab Jordan Investment Bank in 2019.

### Descriptive statistics for liquidity risk:

**Table (6): Descriptive statistics on liquidity risks from 2016 to 2020**

Years	Minimum	Maximum	Mean	Std. Deviation	N
2016	0.128	0.320	0.2068	0.05320	13
2017	0.130	0.275	0.1992	0.04765	13
2018	0.114	0.285	0.1863	0.04815	13
2019	0.078	0.288	0.1783	0.05894	13
2020	0.126	0.309	0.1797	0.05488	13
<b>General indicator</b>	<b>0.078</b>	<b>0.320</b>	<b>0.1900</b>	<b>0.05229</b>	<b>65</b>

Table (6) indicate that the mean of liquidity risk during the period (2016–2020) was 0.19, with a standard deviation of 0.05229, the highest value of 0.320 belonging to the Bank (Jordan) in 2016 and the lowest value of 0.078 belonging to the Bank (Jordan Commercial) in 2019.

### Descriptive statistics for banking stability:

**Table (7): Descriptive statistics of bank asset stability for the period (2016–2020).**

Years	Minimum	Maximum	Mean	Std. Deviation	N
2016	0.133	0.226	0.1682	0.02845	13
2017	0.129	0.194	0.1606	0.02127	13
2018	0.115	0.196	0.1547	0.01891	13
2019	0.112	0.201	0.1656	0.02502	13
2020	0.114	0.201	0.1656	0.02439	13
<b>General indicator</b>	<b>0.112</b>	<b>0.226</b>	<b>0.1629</b>	<b>0.02358</b>	<b>65</b>

According to Table (7), the arithmetic average of the dependent variable, financial stability, measured (by capital adequacy ratio) for the period (2016-2020), was 0.1629. The greatest value (0.226) belonged to Societe Generale Bank in 2016, and the lowest value (0.112) belonged to the Commercial Bank of Jordan in 2019.

### Test hypotheses

This part of the study deals with the process of analyzing and testing the main hypothesis using multiple linear regression and the mathematical equation for it is  $(Y=a+b_1x_1+b_2x_2+e)$ . Multiple linear regression is used to predict changes in the dependent variable that are affected by two or more independent variables. The sub-hypotheses were analyzed using simple linear regression and the mathematical equation is  $(Y=a+b_1x+e)$  and simple linear regression is used as a predictor to the change of the dependent variable affected by one independent variable where:

$Y$ : dependent variable

$a$ : (constant) or (intercept)

$b_1 = y$  regression on the 1<sup>st</sup> independent vari.  $b_2 = y$  regression on the 2<sup>nd</sup> independent vari.

$X_1 = 1^{st}$  independent vari.

$X_2 = 2^{nd}$  independent vari.

$e =$  random error

### The result of the main hypothesis test:

**Ho.1:** There is no statistical significance effect at the level of significance ( $\alpha \leq 0.05$ ) for credit risk on the banking stability of Jordanian commercial banks. the hypothesis was tested by applying the Multiple Linear Regression test, which answers the main question in the study problem.

**Table (8): Results of testing the impact of credit risk and liquidity risk on banking stability.**

Dependent variable	Statement	Unstandardized		Standardized	T value	T. sig
		Coefficients	Coefficients	Coefficients		
		B	S.D.	$\beta$		
	Constant	0.203	0.012		16.970	0.00
Banking Stability	Credit Risk	-0.254	0.099	-0.298	-2.567	*0.013
	Liquidity Risk	-0.116	0.052	-0.259	-2.226	*0.030
R	R <sup>2</sup>	Adj R <sup>2</sup>		F value	F.Sig	
0.411	0.169	0.142		6.315	*0.003	
Sig at ( $\alpha \leq 0.05$ )*						
F value=(3017)	DF=2/62					T value = $\pm$ (1.998)
banking stability = 0.203-0.298 $\times$ credit risk – 0.259 $\times$ liquidity risk						

Table (8) findings for this hypothesis model, which is indicated by the presence of a set of independent variable dimensions (credit risk and liquidity risk) and one dependent variable (banking stability). The following table shows that the correlation coefficient  $R = 41.1\%$ , indicating the existence of a medium relationship between credit risk, liquidity risk, and financial stability in Jordanian commercial banks. The table also shows that credit risk and liquidity risk have a statistically significant effect on the banking stability of Jordanian commercial banks, with a value of (F.Sig) less than 0.05. The calculated (F) value of 6.315, which is greater than the tabular value of 3.17, which also represents the significance of this model at a degree of freedom of 2/62, and the interpretation coefficient  $R^2 = 0.169$ , indicate that credit risk and liquidity risk explain 16.9% of the variance in Jordanian commercial banks' banking stability.

According to the transaction table results for this hypothesis, the value of the beta coefficient of credit risk was  $\beta = 0.298$  and in the opposite direction, and the calculated (T) value is -2.567, which is greater than its tabular value of -1.998 at the level of significance of  $\text{Sig} = 0.013$ , which is significant. The beta coefficient of liquidity risk was  $\beta = 0.259$ , and the estimated T value is -2.226, which is more than its tabular value of -1.998 at the level of significance  $\text{Sig} = 0.030$ , which is significant. Based on the foregoing, we cannot accept the null hypothesis (HO), and we adopt the alternative hypothesis (Ha), which states that credit risk and liquidity risk have a statistically significant effect on the financial stability of Jordanian commercial banks at the level ( $\alpha \leq 0.05$ ). According to the mathematical equation provided in Table (8), a one-degree drop in credit risk leads to a 2980 rise in banking stability at Jordanian commercial banks, while a one-degree decrease in liquidity risk leads to a 2590 gain in banking stability at Jordanian commercial banks.

***HO.1.1: There is no statistically significant effect at the ( $\alpha \leq 0.05$ ) level of credit risk on the banking stability of Jordanian commercial banks.***



**Table (9): impact of credit risk on banking stability**

D.V	Statement	Unstandardized		Standardized	T value	T. sig
		Coefficients		Coefficients		
		B	S.D.	β		
Banking	Constant	0.183	0.008		23.321	0.00
Stability	Credit Risk	-0.273	0.102	-0.321	-2.688	*0.009
R	R <sup>2</sup>	Adj R <sup>2</sup>		F value	F.Sig	
<b>0.321</b>	<b>0.103</b>	<b>0.089</b>		<b>7.224</b>	<b>*0.009</b>	
Sig at ( $\alpha \leq 0.05$ )*						
F value=(3017)		DF=64		T value = ± (1.998)		
banking stability = 0.183-0.321 × credit risk						

Table (9) displays the statistical test findings for this hypothesis model, which has one independent variable (credit risk) and one dependent variable (banking stability). The correlation coefficient  $R = 32.1\%$  in the preceding table demonstrates the existence of a medium-sized association between credit risk and banking stability in Jordanian commercial banks. The table shows that there is a statistically significant effect of credit risk in the dependent variable (banking stability), as indicated by the value of (T.Sig), which is 0.009, which is less than 0.05, and also by the calculated T value, which is -2.688, which is higher than the tabular value of -1.998, which also shows the significance of this model at one degree of freedom. Credit risks explain 10.3% of the variation in banking stability with Jordanian commercial banks, according to the interpretation coefficient  $R^2 = 0.103$ .

Based on the foregoing, we cannot accept the null hypothesis (H<sub>0</sub>), and we adopt the alternative hypothesis (H<sub>a</sub>), which states: There is a statistically significant influence of credit risk on the financial stability of Jordanian commercial banks at the level ( $\alpha \leq 0.05$ ). According to the mathematical equation provided in Table (9), a drop in credit risk is accompanied by a rise in banking stability, however the influence of the credit risk variable is difficult to explain through the B coefficient of 0.183. When the coefficient is calculated after using the standard distribution (Z-Scores) for both variables: the dependent and independent variables, the coefficient is equal to the value of the correlation coefficient between both variables, which is called Beta, that is used to predict the standard value of the dependent variable through the standard values of the independent variable, where the value of Beta is 0.321 and I. This suggests that a one-degree decrease in the independent variable credit risk is accompanied by a 0.321 rise in banking stability.

**HO.1.2: There is no statistically significant effect at the ( $\alpha \leq 0.05$ ) level of liquidity risk on the banking stability of Jordanian commercial banks.**

**Table (10): impact of liquidity risk on banking stability**

D.V.	Statement	Unstandardized		Standardized	T value	T. sig
		Coefficients		Coefficients		
		B	S.D.	$\beta$		
Banking	Constant	0.187	0.011		17.577	0.00
Stability	liquidity risk	-0.127	0.054	0.285	-2.355	*0.022
R	R <sup>2</sup>	Adj R <sup>2</sup>	F value	F.Sig		
0.285	0.081	0.066	5.548	*0.022		
Sig at ( $\alpha \leq 0.05$ )*						
F value=(3017)		DF=64		T value = $\pm$ (1.998)		
banking stability = 0.187-0.285 $\times$ credit risk						

Table (10) displays the statistical test findings for this hypothesis model, which has one independent variable (liquidity risk) and one dependent variable (banking stability). The correlation coefficient  $R = 28.5\%$  in the above table reveals a weak association between credit risk and banking stability in Jordanian commercial banks. And the table shows that there is a statistically significant effect of liquidity risk on the dependent variable (banking stability), as indicated by the value of (T.Sig), which is less than 0.05, and also by the calculated T value, which is 2.355, which is greater than its tabular value of -1.998, which also represents the significance of this model at one degree of freedom. Liquidity risks explain 8.1% of the variation in banking stability at Jordanian commercial banks, according to the interpretation coefficient  $R^2 = 0.081$ .

Based on the foregoing, we cannot accept the null hypothesis (HO), and we support the alternative hypothesis (Ha), which states that there is a statistically significant influence of liquidity risk on the financial stability of Jordanian commercial banks at the level ( $\alpha \leq 0.05$ ). As a result, it is difficult to explain the influence of the liquidity risk variable through a coefficient (B) of 0.187, according to the mathematical equation provided in Table (10), which suggests that a drop in liquidity risk is accompanied by an improvement in banking stability. Based on the normative values of the independent variable, beta is used to predict the normative value of the dependent variable. In this situation, Beta is 0.285 and the direction is backwards, implying that the risk of the independent variable decreases by 0.285 while banking stability increases.

## Results

This study was carried out to determine the impact of credit and liquidity risks on banking stability through an applied study on Jordanian commercial banks and after statistical treatment of the data collected through disclosures and annual financial reports for banks, which contain the corporate governance report in the banking sector in addition to the financial reports through which performance is measured for the period 2016 to 2020. The existence of the independent variables (credit and liquidity risks) and one dependent variable (banking stability) in the statistical test of this hypothesis model indicates a statistically significant effect of credit risk and liquidity risk on stability at the level ( $\alpha \leq 0.05$ ). The correlation coefficient (R) in banking with Jordanian commercial banks was 41.1%, and there was a medium-sized association between credit risk, liquidity risk, and banking stability.

The results of testing this hypothesis also revealed that there is an inverse relationship between credit risk and banking stability on the one hand and liquidity risk and banking stability on the other, as it was discovered that a one-degree decrease in credit risk leads to an increase in banking stability in Jordanian commercial banks, while a one-degree decrease in liquidity risk leads to an increase in banking stability in Jordanian commercial banks. As a result, the null hypothesis was rejected, and the alternative hypothesis was accepted: there is a statistically significant influence of credit risk and liquidity risk on the financial stability of Jordanian commercial banks at the level of significance ( $\alpha \leq 0.05$ ).

### 1. The result of the first sub-hypothesis:

The results of the statistical test of the first sub-hypothesis show that credit risk has a statistically significant effect on the banking stability of Jordanian commercial banks at the level ( $\alpha \leq 0.05$ ). In Jordanian commercial banks, the correlation coefficient (R) was 32.1%, indicating a medium association between credit risk and banking stability. The results of testing this hypothesis revealed that there is an inverse link between credit risk and banking stability, with a one-degree decrease in credit risk resulting in a 0.321 gain in banking stability in Jordanian commercial banks.

### 2. The result of the second sub-hypothesis:

The results of the statistical test of the second sub-hypothesis, show that liquidity risk has a statistically significant effect on the banking stability of Jordanian commercial banks at

the level ( $\alpha \leq 0.05$ ). Jordanian commercial banks have a modest association between liquidity risk and banking stability, with a correlation coefficient (R) of 28.5%. The testing of this hypothesis revealed that there is an inverse link between liquidity risk and banking stability, with a one-degree decrease in liquidity risk resulting in a 0.285 rise in banking stability in Jordanian commercial banks.

## Conclusions

The analysis concluded that credit risk and liquidity risk have a statistically significant effect on Jordanian commercial banks' banking stability at the level of significance ( $\alpha \leq 0.05$ ). The findings of this study agreed with those of (Marzouk, 2020), (Al-Sarhan, 2019), (Siddiq & Al-Gamal, 2020), and (Ruziqa, 2013).

## Recommendations

Based on the results of this study, the researcher recommends the following:

1. The importance of activating the role of Jordanian banks in overall economic activity with the backing of the Central Bank of Jordan, resulting in the development of Jordanian banks in credit providing, particularly to the private sector.
2. The need for Jordanian commercial banks to improve their implementation of sound credit standards in order to prevent or eliminate credit risks that the banking sector as a whole may face.
3. The need for Jordanian commercial banks to focus on liquidity risks, as well as the effective use of current liquidity management techniques, and the Central Bank of Jordan should encourage Jordanian banks to increase their investment in risky assets.
4. The need for Jordanian banks to work together to achieve credit policy conformity with the general orientation of national economic policy and to activate the harmony between banks and the state in order to contribute to the state's economic development ambitions.
5. The need for Jordanian banks to concentrate on developing clear methodology for assessing the quality of credit supplied to customers based on account activity and debt repayment consistency.

## References

- Abu Shula, Shatha Jamal (2020), The Impact of Liquidity Risk on the Financial Performance of Jordanian Commercial Banks, Unpublished Master's Thesis, College of Economics and Administrative Sciences, Al al-Bayt University, Mafraq, Jordan.
- Adoun, Nasser Dadi (2020), Banking stability and the mechanisms for achieving it: A comparative study of two banks in Algeria using the Z-Zvore method, Journal of the Economist, 12(7), 122-139.
- Al-Ghafoud, Mukhtar Abd al-Salam and Amazika, Faraj Ahmed (2016), determinants of liquidity risk in commercial banks: a field study on the Jumhouria Bank, Zelten branch, Journal of Economic and Political Sciences, (7), 24-57.
- Al-Jabri, Khaled Muhammad (2017), Credit Risk Management in Yemeni Commercial Banks, Al-Qalam Journal for Humanities and Applied Sciences, (4)7, 261-282.
- Al-Sarhan, Layali Ahmed (2019), The Impact of Liquidity Risk on the Financial Stability of Commercial Banks in Jordan, Unpublished Master's Thesis, College of Economics and Administrative Sciences, Al al-Bayt University, Mafraq, Jordan.
- Bahat, S; Darzi, M. (2019). Effect of Weather Changes on the Credit Risk in Agricultural Microfinance: An Indian Perspective. Productivity, (59)4, 413-423.
- Bessis, (2013). Risk Management Guideline for Derivatives, Mc Graw-Hill, New York.
- Bo, Jiang, (2014). Financial Stability of Banking System in China. PHD theses, Nottingham Trent university. 10(10), 3387-3409.
- Chen, Yi-Kai & Shen, Chung-Hua & Kao, Lanfeng & Yeh, Chuan-Yi. (2018). Bank Liquidity Risk and Performance. Review of Pacific Basin Financial Markets and Policies. (40)21, 180-189.
- Doane, D.P. and Seward, L.E. (2015). Applied Statistics in Business and Economics, (5<sup>rd</sup> ed). McGraw-Hill/Irwin.
- Gizaw, M., Kebede, M., & Selvaraj, S. (2015). The Impact of Credit Risk on Profitability Performance of Commercial Banks in Ethiopia. African Journal of Business Management. 9 (2) 59-66.

- Gujarati D, Porter, D, and Gunasekar, S. (2017). Basic Econometrics (5<sup>th</sup>ed). USA, New York: The Mc Graw- Hill Gunasekar.
- Hafez, Hatem Abdel-Bar (2021), The impact of applying banking controls on banking stability: An applied study on the countries of the Middle East and North Africa, unpublished master's thesis, Ain Shams University.
- Hair, J, F, Black, W. C, Babin, B. J, Anderson, R, E, and Tatham, R, L.(2018). Multivariate Data Analysis (8<sup>th</sup>ed): Cengage Learning EMEA.
- Hakimi, Abedelaziz (2017). Liquidity Risk and Banks, Business and Economic Research, (7)1, 162-177.
- Khair El-Din, Mahmoud Majed (2020), The Impact of Quantitative Monetary Policy Tools on the Stability of the Jordanian Banking Sector, Unpublished Master's Thesis, College of Economics and Administrative Sciences, Yarmouk University, Irbid, Jordan.
- Marozva, Godfrey. (2015). Liquidity Bank Performance, International Business and Economic Research Journal, 14(3), 66-74.
- Marzouk, Abdel Aziz Ali (2020), The impact of liquidity risk and credit risk on the financial performance of commercial banks: a comparative study between banks listed on the Egyptian and Saudi stock exchanges, Journal of Contemporary Business Studies, (10), 205-254.
- Musa, Sondos and Ghoneim, Alaa Attia (2019), The quantitative tools of monetary policy and their role in achieving banking stability: an analytical study of a sample of Iraqi banks 2004-2017, Journal of the College of Education for Girls for Human Sciences, (13)5, 323-354.
- Othman, Muhammad Daoud (2013), Credit Management and Analysis, and its Risks, (1st Edition), Dar Al-Fikr, Amman, Jordan.
- Ouma, Tom. (2015). Effects of Liquidity Risk on Profitability of Commercial Banks in Kenya, MBA project, University Bank of Nairobi.
- Rose, peter & Hudgins, Sylvia. (2010). Bank Management and Financial Services, (4<sup>th</sup> ed), Mc-Grow, Hill Companies.

- Ruziqa, A. (2013). The Impact of Credit and Liquidity Risk on Bank Financial Performance. International Journal of Economic Policy in Emerging Economies, 6(2), 93-106.
- Saeed, M. S., & Zahid, N. (2016). The Impact of Credit Risk on Profitability of the Commercial Banks. Journal of Business & Financial Affairs, (5), 192-198.
- Salkind, Neil J. (2019). Exploring Research (9<sup>th</sup>ed). Upper Saddle River, New Jersey, NJ: Pearson India, Inc.
- Sawan, Faraj Muhammad (2018), Research Methods: Introduction to Research Methods and How to Prepare Research, 1st Edition, Mandi Al Maaref Foundation, Lebanon: Beirut.
- Siddiq, A., & Al-Gamal, E. (2020). Impact of Credit Risk and Capital Adequacy on Islamic and Conventional Banking Hedging. International Journal of Research, Volume (8), issue (10), 2394-3629.
- Theeb, Susan (2012), Credit Management, (1st Edition), Dar Al-Fikr Publishers, Amman, Jordan.
- Titman, Sheridan; Keowan, J. Arther and Mertin D. John (2011). Financial Management: Principles and Applications, (11<sup>th</sup>ed), Pearson.
- Widajatun, Vi Wahyu, I. (2019). The Impact of Credit, Liquidity, Operational and M Risks on Return on Asset. Global Business & Management Research, (11)1, 335-340.