IJBS VOL. 5, NO. 1, JUNE 2022: 56–73 DOI: 10.9744/ijbs.5.1.56–73
E-ISSN 2621-6426

Financial Risk Management in 2020's Recession: Evidence from ASEAN Countries

[1]Andreas Krisvian, [2*]Rofikoh Rokhim
[1,2]Department of Management, Faculty of Economics and Business
Universitas Indonesia, Depok City, 16424, Indonesia
Email: rofikoh.rokhim@ui.ac.id
[*]Corresponding author

Abstract

This study aims to determine the effect of bank financial risk consisting of liquidity risk, credit risk, and other factors on bank stability. This study took samples from 41 openconventional banks in five ASEAN countries that experienced crises, namely Indonesia, Malaysia, the Philippines, Singapore, and Thailand. The analysis methods used in this study are a combination of simultaneous and non-simultaneous GMM and VECM for the data period between Q-4 2015 to Q-3 2020. It covers the period before and during the crisis. This study found a reciprocal effect of the two financial risks on bank stabilityin the long term, an effect of the combined two risks on bank stability in the short term, and other factors that also affect each of the risks and bank stability. The results of this study can provide further knowledge about bank financial risk management that can be useful for reducing the potential for bank bankruptcy during a crisis.

Keywords: Financial Risk Management; Bank Stability; Recession; ASEAN.

1. Introduction

Many countries have felt various negative impacts on the economy due to the Covid-19 pandemic. Since the disease was detected in 2020, it has caused pandemic and economic downturn worldwide. Many countries have announced recessions. A country hit by an economic crisis, which is marked by a recession, has to face a dilemma as its economy must continue without causing the spread of the Covid-19. This condition will be a challenge for banksas financial service providers and intermediaries for economic activities in each country. Despite the "new normal" condition in time like this, banks have to continuously operate by providing financial service needs for the public and to remain competitive as according to Santosa et al. (2018), competitiveness has a direct effect on bank financial performance. Moreover, banks must also be able to adapt by having a good level of stability, considering the essential role of banks in creating conducive business environment in a country.

One way for banks to have good stability is to carry out good financial risk management. By doing so, the bank can cope with a loss due to financial risk well and be prepared to facesimilar risks in the future; in other words, it is a way to adapt sustainably. Banks generally face four financial risks, namely, liquidity risk that can occur when there is a rapid and massive withdrawal of funds by the public or commonly known as bank runs, credit risk which means borrowers of loan funds that do not pay off payments according to the agreed time previously agreed, interest rate risk occurs when interest rate changes occur, and operational risk when a bank has to experience a disaster such as a damaged computer system or a buildingfire, for example. However, according to Ghenimi et al. (2017), liquidity risk and credit risk are the two most essential risks because they are directly related to bank business activities and are the main causes if a bank fails or goes bankrupt.

Financial experts believe that liquidity risk and credit risk are two interrelated risks, which can affect bank stability. Dermine (1986) argues that liquidity risk is a cost that can reduce profits so that failure in terms of loan repayment will cause a decrease in cash inflows and reduce the level of liquidity. Then Ghenimi et al. (2017), through their research on the effect of liquidity risk and credit risk on bank stability in the MENA region, stated that liquidity risk and credit risk simultaneously could significantly affect bank stability. In addition, a similar study was conducted by Imbierowicz and Rauch (2014), who took the subject of research in the form of commercial banks in America, proving that liquidity risk andcredit risk simultaneously affect bank stability or the possibility of banks going bankrupt.

This study took samples in the Southeast Asia or the ASEAN region. Specifically, it

focused on countries that experienced a recession in 2020 due to the worsening economic effects of the Covid-19 pandemic. At least five ASEAN countries are experiencing recession, including the Philippines, Indonesia, Malaysia, Singapore, and Thailand (Aida, 2020; Prayoga, 2020). The ASEAN region was chosen because it is a collection of countries with high state financial prospects and can compete with other regions and the member nations are among the most affected countries by this crisis. For example, based on statistical data from ASEANStatsDataPortal (2021), the main income of ASEAN countries that mostly come from the tourism sector has experienced a significant decrease in number of tourist arrivals, which was as much as 143.5 million in 2019 and to only 26.1 million tourists in 2020.

This research is a relatively new study because no similar research takes samples in the form of ASEAN countries experiencing a recession due to the Covid-19 pandemic. This study took references from previous research by (Ghenimi et al., 2017), which discussed similar topics and research objectives, namely the influence of liquidity risk and credit risk on bank stability. However, this study has differences in terms of the sample selection, data period started from 2015 to 2020, and crisis type; thus, new results and findings might be obtained. In addition, this study also includes an analysis about the long-term effect of risk variables and both of internal-external variables that may also affect liquidity risk, credit risk, and bank stability. Therefore, a more advanced analysis and better understanding about the influence of banking risk on bank stability during a crisis can be achieved, considering the sample period of this study covers the period before and when the pandemic first occurred to prove the relationship among the variables in times of crisis.

The researchers hope that this research can provide benefits in the form of more knowledge about banking risk management to increase bank stability as a form of responding to the challenges of the economic crisis in a sustainable manner. In addition, researchers also hope that this research can be a reference for academics, banking researchers, and the government as a regulator and others.

2. Literature Review

2.1 The Effect between Liquidity Risk and Credit Risk

Experts believe the effect between liquidity and credit risk are two interconnected risks. This effect occurs when there is a change in the value of one of the risks, it will affect the value of the other risk to change.Previous studies by financial experts have also examined and proven the relationship between these two risks. These studies were first conducted by Diamond and Rajan (2005), explaining theoretically that liquidity risk and credit risk in banks are two risks that are simultaneously interconnected. Ejoh et al. (2014) examined the relationship between liquidity risk and credit risk at banks in Nigeria through experimental research on 80 respondents. Later, research by Djebali and Zaghdoudi (2020) examined the threshold effect ofthe two risks by taking research samples in the MENA region and got the results thata negative effect caused by one risk will result in a similar effect on other risks. Therefore, several hypotheses can be formulated as follows:

H_1: There is a reciprocal effect between liquidity risk and credit risk.
H_2: Liquidity risk affects credit risk.
H_3: Credit risk affects liquidity risk.

2.2 Effect of Liquidity Risk and Credit Risk on Bank Stability

Apart from the effect of liquidity risk on credit risk and vice versa, these two risks have been widely proven in research by financial experts as two risks that also play a major role in determining probability. Particularly for a bank going bankrupt or in determining the stability of the bank, including:

1. Ejoh et al. (2014) examined the effect of liquidity risk and credit risk on bank bankruptcy risk in Nigeria;
2. Imbierowicz and Rauch (2014) examined the effect of liquidity risk and credit risk on the probability of a bank experiencing bankruptcy or the probability of default (PD) by taking a sample of banks in the United States;
3. Ghenimi et al. (2017) examined the effect of liquidity risk and credit risk on bank stability in the MENA region;
4. Setiawan and Widiastuti (2019) examined the effect of credit risk and liquidity risk individually or simultaneously on bank stability in Indonesia;
5. Zaghdoudi (2019) examined the effect of credit risk, liquidity risk, and operational risk on bank stability in Tunisia;
6. Djebali and Zaghdoudi (2020) examined the effect of the threshold effect of liquidity risk and credit risk on bank stability in the MENA region.

Therefore, several hypotheses can be formulated as follows:

H_4: Liquidity risk affects bank stability.

H_5: Credit risk affects bank stability.

H_6: The combination of liquidity risk and credit risk affects bank stability.

2.3 Bank's Internal and External Factors Affecting Liquidity Risk, Credit Risk, and Bank Stability

Studies by Ghenimi et al. (2017) determined factors that can also influence liquidity risks, credit risks, and bank stability risk factors originating from financial statements or internal bank conditions and external risk factors derived from a country's macroeconomic conditions. Therefore, hypotheses can be obtained based on the previous studies that have succeeded in proving the relationship between variables or have not succeeded yet because further studies are still needed to prove it.

2.3.1 Lagged Stability Bank (Z-Score (-1))

According to Tan (2016), lagged dependent variable can be used to determine whether the state of the variable influences a dependent variable in the previous period. Results of the research conducted by Ghenimi et al. (2017) have obtained that state that bank stability in a certain period can affect bank stability in the next period.

H_7: Lagged bank stability affects bank stability.

2.3.2 Bank Size

Based on previous research by experts, the size of the bank is said to have a significant influence on liquidity risk, credit risk, and bank stability. Iqbal (2012), in his research, obtained the resultsthat the size of the bank affects liquidity risk positively and significantly. A further research by Ghenimi et al. (2017) proved that bank size has a positive and significant effect on credit risk. In addition, according to Zaghdoudi (2019) and Ghenimi et al. (2017), bank size also had a negative and significant effect on bank stability.

H_8: Bank size affects liquidity risk.

H_9: Bank size affects credit risk.

H_{10}: Bank size affects bank stability.

2.3.3 Return on Assets (ROA)

According to previous research by several experts, ROA has a significant effect on liquidity risk, credit risk, and bank stability. The effect of ROA on liquidity risk was obtained through research and has been proven to have a positive and significant correlation by Farhan Akhtar et al. (2011) and Iqbal (2012). Moreover, Kabir et al. (2015) and Ghenimi et al. (2017) have proven the negative and significant effect of ROA on credit risk. In addition, according to research by Ghenimi et al. (2017) and Setiawan and Widiastuti (2019), ROA had a positive and significant effect on bank stability.

H_{11}: ROA affects liquidity risk.

H_{12}: ROA affects credit risk.

H_{13}: ROA affects bank stability.

2.3.4 Return on Equity (ROE)

Based on several previous studies, ROE is said to influence liquidity risk significantly.This is evidenced by research by Iqbal (2012) and Muharam and Kurnia (2015), who found that ROE had a positive effect and negative effect to liquidity risk, respectively.

H_{14}: ROE affects liquidity risk.

2.3.5 Loan to Asset Ratio (LAR)

Based on a previous study, it has been proven that LAR has a significant effect on credit risk. The study by Kabir et al. (2015) proved a negative and significant effect on the LAR ratio to credit risk.

H_{15}: LAR affects credit risk.

2.3.6 Loan Growth

According to Ghenimi et al. (2017), this loan growth ratio is proven to have a negative and significant effect on bank stability.

H_{16}: Loan growth affects bank stability.

2.3.7 Income Diversification

Kabir et al. (2015) provided results where income diversification had a negative and significant effect on Credit Risk. In addition, research from Srairi (2013) and Ghenimi et al. (2017) provided

a positive and significant effect of income diversification on bank stability.

H_{17}: Income diversification affects credit risk.
H_{18}: Income diversification affects bank stability.

2.3.8 Efficiency

Efficiency is one of the factors of credit risk and is thought to influence bank stability based on previous studies. Research of Ghenimi et al. (2017), showed that efficiency made a negative and significant effect on credit risk and a negative insignificant effect on bank stability. However, further research is needed because of its insignificant effect in previous studies.

H_{19}: Efficiency affects credit risk
H_{20}: Efficiency affects bank stability

2.3.9 Net Interest Margin (NIM)

The bank's net interest income margin (NIM) is a factor of liquidity risk based on several previous studies. Previous research by Muharam and Kurnia (2015) reported that the effect of NIM on the liquidity risk of conventional banks was negative and insignificant. However, because the effect is still not significant, further research is needed that may prove if there is a significant effect on liquidity risk.

H_{21}: NIM affects liquidity risk.

2.3.10 Liquidity Gap

The liquidity gap in its role as a factor of bank risk has been proven only to affect bank liquidity risk. This is supported by research by Muharam and Kurnia (2015), which proved that the liquidity gap could negatively and significantly affect liquidity risk.

H_{22}: Liquidity gap affects liquidity risk.

2.3.11 Capital Adequacy Ratio (CAR)

Based on several previous studies, CAR is proven to have a significant effect on liquidity risk and bank stability. Research by Iqbal (2012) confirmed that CAR had a positive and significant effect on bank stability. Then researches by Ghenimi et al. (2017) and Setiawan and Widiastuti (2019) successfully proved a positive and significant influence of CAR on bank stability.

H_{23}: CAR affects liquidity risk.
H_{24}: CAR affects bank stability.

2.3.12 Economic Crisis 2020 (Recession)

External factors in the form of the economic crisis in previous research by Ghenimi et al. (2017), have an influence on liquidity risk, credit risk, and bank stability, respectively, which are positive and significant (liquidity risk as an inverse measure of liquidity), negative insignificant, and negative signs.

H_{25}: The economic crisis affects liquidity risk.
H_{26}: The economic crisis affects credit risk.
H_{27}: The economic crisis affects bank stability.

2.3.13 Inflation Rate

Previous research by Ghenimi et al. (2017) proved that external factors in the formof inflation rates influenced liquidity risk, credit risk, and bank stability, which are negative significant (liquidity risk as an inverse measure of liquidity positive significance.

H_{28}: Inflation rate affects liquidity risk.
H_{29}: Inflation rate affects credit risk.
H_{30}: Inflation rate affects bank's stability.

2.3.14 Real Gross Domestic Product Growth

Previous research by Ghenimi et al. (2017) proved that external factors in real GDP growth influence liquidity risk, credit risk, and bank stability, which are positively and insignificantly (liquidity risk as an inverse measure of liquidity), negative significant, and negative insignificant.

H_{31}: Real GDP growth affects liquidity risk.
H_{32}: Real GDP growth affects credit risk.
H_{33}: Real GDP growth affects bank stability.

3. Methods

3.1 Econometric Methods

This study used two methods. The first method is the System-Generalized Method of Moments or SYS – GMM by Blundell and Bond (1998) in one stage or one step regression carried out simultaneously and non-simultaneously. This method is used because there is a problem of endogeneity in this study. There is a correlation between the variables and the error term or other factors that are not included in a research equation. This endogeneity generally occurs in simultaneous equations that analyze the influence between reciprocal variables. The GMM method is an estimate of the effect in the short term, seen

through its characteristics where the sample size N must be greater than the research period T to avoid thepotential for autocorrelation problems in the research residuals Asteriou et al. (2021). For this reason, additional estimates are needed using other methods to measure the relationship between variables in the long term.

The second method, Vector Error Correction Model (VECM), serves to assess whether there is a short-term and long-term causal or reciprocal relationship between research variables, both with variables in the same period or with variables in the same period lagged risk variables in the previous period. In addition, the VECM method can also be used as an additional complement to the GMM method to assess the robustness or consistency of research results related to the reciprocal effect of variables and to examine the long-term effect on the relationship between research variables.

3.2 Data

The data in this study are in the form of panel data and include two different types of data, namely data on banking companies and macroeconomic data for a country. The data of banking companies must meet several special criteria, while macroeconomic data in the form of inflation data and Real GDP growth of the countries studied are only a complement to the banking companies' data and do not have any particular criteria. The criteria for the banking companies' data include:

1. Open conventional banks from five countries in ASEAN, consisting of the Philippines, Indonesia, Malaysia, Singapore, and Thailand, experienced a recession in 2020.
2. Banks has made an Initial Public Offering or IPO at least before the fourth quarter of 2015 until the third quarter of 2020.

Based on these criteria, 41 conventional banks were obtained from the Philippines, Indonesia, Malaysia, Singapore, and Thailand.

3.3 Research Variables

Table 1 shows the research variables that contain 15 variables.

Table 1. List of Research Variable

Variables	Equation	Source
Credit Risk	Non – Performing Loans & Impaired Loans/ Gross Loans	(Ghenimi et al., 2017)
Liquidity *	Liquid Assets / Total Assets	(Ghenimi et al., 2017)
Bank Size	Logarithm of Total Assets	(Ghenimi et al., 2017)
ROE	Net Income / Total Equity	(Ghenimi et al., 2017)
ROA	Net Income / Total Assets	(Ghenimi et al., 2017)
LAR	Net Loans / Total Assets	(Ghenimi et al., 2017)
Income Diversification	Non – Interest Income / Total OperatingIncome	(Ghenimi et al., 2017; Srairi, 2013)
Efficiency	Non – Interest Expense / (Revenue –Provision for Loan Losses	(Ghenimi et al., 2017)
NIM	Net Interest Income / Earning Assets	(Ghenimi et al., 2017)
Liquidity Gap	Logarithm of (Total Assets – Total Liabilities)	(Ghenimi et al., 2017)
CAR	Capital Adequacy (Value) / Risk Weighted Assets or Capital Adequacy (Percentage)	(Ghenimi et al., 2017)
Economic Crisis	Value 1 for the period 1st quarter to 3rd quarter of 2020	(Ghenimi et al., 2017)
Inflation Rate	Quarterly Consumer Price Index through interpolation	(Ghenimi et al., 2017)
Real GDP Growth	Real GDP growth per quarter through interpolation	(Ghenimi et al., 2017)
Loan Growth	(Loan (t) – Loan (t-1)) / Loan (t-1)	(Ghenimi et al., 2017)

3.4 Variable Types

The research variables used in the GMM method are divided into four types according to their respective functions, namely Endogenous Variable, Exogenous Variable, Control Variable, and Instrumental Variable. Determination of the variable types for each variable to be used in the research equation using the GMM method can only be done after the regression and after passing the instrumental validity test and

autocorrelation test, which will be discussed further (Adeleye, 2018). In addition, according to Adeleye (2018), in selecting each variable, researchers can only use assumptions based on the results of previous studies and conduct trials and errors until the research equation passes the two statistical tests and only after that the variable types can be determined.

3.4.1 Endogenous Variable

An endogenous variable is a variable that is influenced by other variables. Endogenous variables can consist of the dependent variable and other variables in an equation influenced by other variables either inside or outside the regression equation (Adeleye, 2018; Meo, 2016).

3.4.2 Exogenous Variable

An exogenous variable is a variable that affects other variables or a variable that affects an endogenous variable. The exogenous variable can also be said as an independent variable that affects the dependent variable. Its function in the equation depends on its exogenous level or the extent to which this variable can also be influenced by other variables (Adeleye, 2018; Meo, 2016).

3.4.3 Control Variable

A control variable is a variable whose function is to help explain the effect between endogenous and exogenous variables in an equation. This variable minimizes the possibility of endogenous variables being influenced by error terms or other variables not explained in the equation that may also affect endogenous variables (Adeleye, 2018; Meo, 2016).

3.4.4 Instrumental Variable

The instrumental variable is a variable that affects the dependent variable indirectly through its influence on other variables (Adeleye, 2018; Meo, 2016).

3.5 Research Equation Models

Simultaneous Equation Model 1 (Simultaneous GMM Method):

Equation 1:

$$\text{Credit Risk}_{(i,t)} = C + \beta_1 \text{Credit Risk}_{(i,t-1)} + \beta_2 \text{Liquidity}_{(i,t)} + \sum_{j=1}^{J} \beta_j \text{Bank}^{j}_{(i,t)} + \sum_{l=1}^{L} \beta_l \text{Macroeconomics}^{l}_{(i,t)} + \varepsilon_{(i,t)}$$

$$\text{Liquidity}_{(i,t)} = C + \beta_1 \text{Liquidity}_{(i,t-1)} + \beta_2 \text{Risk Liquidity}_{(i,t)} + \sum_{p=1}^{P} \beta_p \text{Bank}^{P}_{(i,t)} + \sum_{q=1}^{Q} \beta_q \text{Macroeconomics}^{q}_{(i,t)} + \varepsilon_{(i,t)}$$

$*\text{Bank}^{j}_{(i,t)}$ and $\text{Bank}^{P}_{(i,t)}$ represent the bank-specific control variables.

Equation Model 2 (VECM Method):

Equation 1:

$$\text{Credit Risk}_{(i,t)} = \partial_0 + \sum_{i=1}^{m} \text{Credit Risk}_{(i,t-1)} + \sum_{j=1}^{m} \text{Liquidity}_{(i,t-1)} + \varepsilon_{(i,t)}$$

Equation 2:

$$\text{Liquidity}_{(i,t)} = \partial_0 + \sum_{i=1}^{m} \text{Liquidity}_{(i,t-1)} + \sum_{j=1}^{m} \text{Credit Risk}_{(i,t-1)} + \varepsilon_{(i,t)}$$

Non-Simultaneous Equation Model 3 (Non-Simultaneous GMM Method):

$$\text{Stability}_{(i,t)} = \beta_0 + \beta_1 \text{Stability}_{(i,t-1)} + \beta_2 \text{Credit Risk}_{(i,t)} + \beta_3 \text{Liquidity}_{(i,t)} + \beta_4 \text{Credit Risk*Liquidity Risk}_{(i,t)} + \beta_5 \text{ROA}_{(i,t)} + \beta_6 \text{Bank Size}_{(i,t)} + \beta_7 \text{CAR}_{(i,t)} + \beta_8 \text{Loan Growth}_{(i,t)} + \beta_9 \text{Income Diversification}_{(i,t)} + \beta_{10} \text{Efficiency}_{(i,t)} + \beta_{11} \text{Economic Crisis}_{(i,t)} + \beta_{12} \text{Inflation Rate}_{(i,t)} + \beta_{13} \text{Real GDP Growth}_{(i,t)} + \varepsilon_{(i,t)}$$

3.6 Statistic Tests for Equation Model 1 and 3

3.6.1 Autocorrelation Test and Instrumental Validity Test

According to Adeleye (2018), in order for a research equation using the GMM Method to be declared true and accountable, the equation needs to pass the following two statistical tests; the Autocorrelation Test or the Second-Order Serial Correlation or AR (2) Test and Instrumental Validity Test or Hansen Test. These tests are used to assess whether there is an autocorrelation problem in the GMM regression equation and whether the instrumental variables used in the GMM equation are correct and valid. Failure to reject the null hypothesis in this test indicates that the GMM equation does not have an autocorrelation problem and the instrumental variables are well specified. In addition, a special rule in Hansen Test recommends that the p-value be greater than 0.1 and not more than 0.3. This rule exists to avoid the bias of instrumental variables because a p-value that is too large can indicate a problem with the validity of the instrumental variables in the equation. For

example, with a significance level of 5%, H_0 in this test will fail to be rejected if the p-value > 0.05.

H_0: There is no autocorrelation and instrumental validity problem in the equation model.

H_1: There is an autocorrelation and instrumental validity problem in the equation model.

3.7 Reciprocal Effect Test Using VECM Method for Equation Model 2

3.7.1 Wald Test

According to Hossain (2015), the Wald test is used to determine whether there is a short-term reciprocal relationship between the two variables studied. This test assesses the causality of the two variables with each lagged period of the variable. In this study, the short-term effect between variables will only be carried out until the second lagged variable due to the simplicity of the equation. In determining whether there is a causal relationship or not can be seen from the p-value of this chi-square test compared to the significance level of 5%. If the chi-square p-value is less than 0.05, it can be said that there is an influence between one variable on another variable and vice versa.

H_0: There is no short-term reciprocal relationship between the independent variable to the dependent variable.

H_1: There is a short-term reciprocal relationship between the independent variable to the dependent variable.

3.7.2 Error Correction Term Test

According to Hossain (2015), this test is used to determine if there is a long-term causal or reciprocal relationship between the two variables studied. One thing that indicates a long-term reciprocal relationship is the value of the constant C (1), which has a negative coefficient and p-value below the significance level or p-value <0.05.

H_0: There is no long-term reciprocal relationship between the independent variable to the dependent variable.

H_1: There is a long-term reciprocal relationship between the independent variable to the dependent variable.

3.8 Research Framework

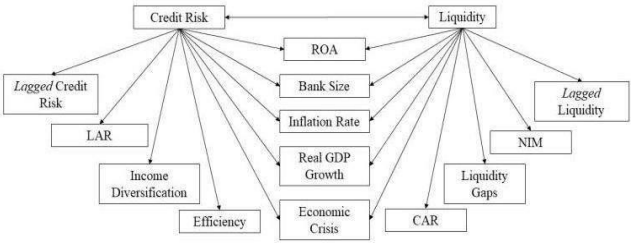

Figure 1. Research Framework for Equation Model 1
Source: Gemini, Chibi, and Amri (2017), reworked (2021)

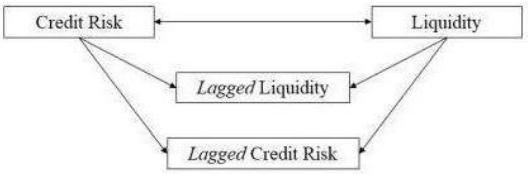

Figure 2. Research Framework for Equation Model 2
Source: Gemini, Chibi, and Amri (2017), reworked (2021)

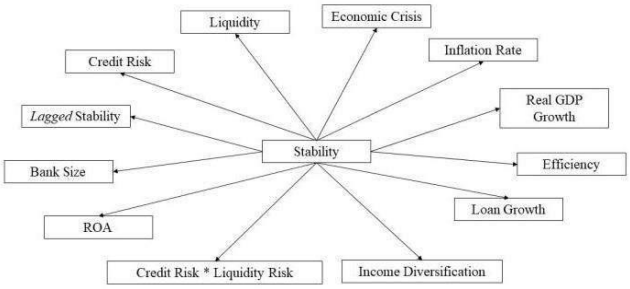

Figure 3. Research Framework for Equation Model 3
Source: Gemini, Chibi, and Amri (2017), reworked (2021)

4. Results

4.1 Research Flow Process

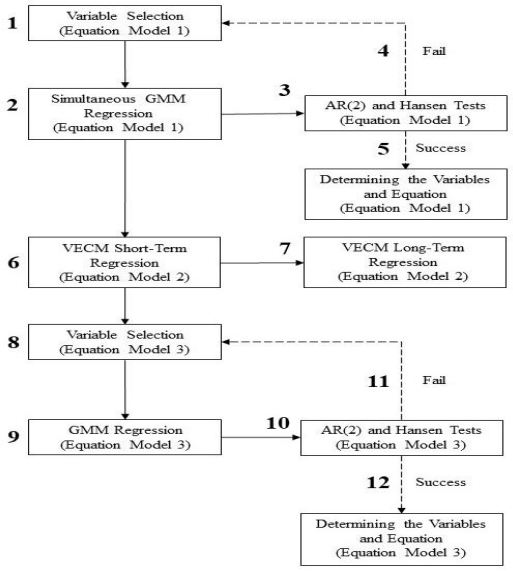

Figure 4. Research Flow Process

4.2 Descriptive Statistics

Table 2 shows the descriptive analysis result.

4.3 Determining the Variables and Equation

The determination of the research variables in each of the equation models below was carried out after regression using the GMM method was carried out by trial and error and until all of them had passed the statistical tests of the Autocorrelation Test and Hansen Test.

4.3.1 Equation Model 1 (Credit Risk as Dependent Variable)

Table 3 shows the determining variables and equation.

Table 2. Descriptive Analysis Result

Variables	Obs	Mean	Std	Min	Max
Credit Risk	820	.0379945	.0626401	.000606	.9967093
Liquidity	820	.845148	.0826934	.4923324	.9921046
Credit Risk* Liquidity Risk	820	.0466144	.0779942	.0006602	1.104852
Stability	820	2.089102	.3419747	.8397949	2.573408
Loan Growth	820	.0150752	.0537166	-.4816903	1.024868
Bank Size	820	7.749768	1.248267	5.768708	10.16072
ROE	820	.0211025	.0333775	-.5705322	.0693776
ROA	820	.0026397	.0044843	-.0765772	.0096758
LAR	820	.6405335	.0790959	.3938296	.8290935
Income Diversification	820	.2570078	.1328385	-.4881947	.876903
Efficiency	820	.5876001	.7863934	-12.8279	7.505943
NIM	820	.0093303	.0043705	-.0013028	.0223358
Liquidity Gap	820	6.849432	1.291122	4.740507	9.320218
CAR	820	.1875515	.0425884	.1003388	.4585
Economic Crisis	820	.15	.3572893	0	1
Inflation Rate	820	2.262712	1.709805	-.9	6.361
Real GDP Growth	820	4.029634	2.232278	-5.6	7.1

* Liquidity risk is measured inversely from the liquidity ratio. For example, if other variables affect liquidity negatively, then those variables affect liquidity risk positively.
** The measure of bank stability (Z-score) in this study is transformed in the form of a logarithm (log) for the reason of data symmetry the same as the previous study by Ghenimi et al. (2017).
*** This variable is a measure that describes if both risks occur at the same time.
**** based on research by Ghenimi et al. (2017), these variables are only used as a general requirement for using the GMM method and to overcome endogeneity problems and will not be used to find the relationship between the influence of variables in two different periods.

Table 3. Determining the Variables and Equation (Equation Model 1: Credit Risk)

Variables	Endogenous	Exogenous	Control	Instrumental
Credit Risk	✓	_	_	_
Credit Risk (-1)	✓	_	_	_
Credit Risk L.(0 2)*	_	_	_	✓
Liquidity	✓	_	_	_
Liquidity L.(0 2)*	_	_	_	✓
Bank Size	_	✓	✓	✓
ROE	_	_	✓	_
ROA	_	✓	✓	✓
LAR	✓	_	_	_
LAR L.(0 2)*	_	_	_	✓
Income Diversification	_	✓	✓	✓
Efficiency	_	_	✓	✓
NIM	_	✓	✓	_
Liquidity Gap	_	✓	✓	✓
CAR	_	✓	✓	✓
Economic Crisis	_	✓	_	✓
Inflation Rate	_	✓	_	✓
Real GDP Growth	_	✓	_	✓

Source: Research results (2021)
*Addition of lag on variables from lag 0 to 1 in order for the equation to pass the statistical tests

Table 4. Determining the Variables and Equation (Equation Model 1: Liquidity)

Variables	Endogenous	Exogenous	Control	Instrumental
Credit Risk	✓	_	_	_
Credit Risk L.(0 4)*	_	_	_	✓
Liquidity	✓	_	_	_
Liquidity (-1)	✓	_	_	_
Liquidity L.(0 4)*	_	_	_	✓
Bank Size	_	✓	✓	✓
ROE	_	_	✓	_
ROA	_	✓	✓	✓
LAR	_	_	_	_
Income Diversification	_	✓	✓	✓
Efficiency	_	_	_	_
NIM	✓	_	_	_
NIM L.(0 4)*	✓	_	_	✓
Liquidity Gap	_	✓	✓	✓
CAR	_	✓	✓	✓
Economic Crisis	_	✓	_	✓
Inflation Rate	_	✓	_	✓
Real GDP Growth	_	✓	_	✓

Source: Research results (2021)

*Addition of lag on variables from lag 0 to 4 in order for the equation to pass the statistical tests

Table 5. Determining the Variables and Equation (Equation Model 3: Stability)

Variables	Endogenous	Exogenous	Control	Instrumental
Stability (Z-Score)	✓	_	_	_
Z-Score (-1)	✓	_	_	_
Z-Score L.(0 1)*	_	_	_	✓
Liquidity L.(0 1)*	✓	_	_	✓
Credit Risk L.(0 1)*	✓	_	_	✓
Credit Risk x Liquidity Risk	_	_	✓	_
ROA	_	✓	✓	✓
Bank Size	_	✓	✓	✓
CAR	_	_	✓	_
Loan Growth	_	✓	✓	✓
Income Diversification	_	✓	✓	✓
Efficiency	_	✓	✓	✓
Inflation Rate	_	✓	_	✓
Real GDP Growth	_	✓	_	✓
Economic Crisis	_	✓	_	✓

Source: Research results (2021)

*Addition of lag on variables from lag 0 to 1 in order for the equation to pass the statistical tests

Table 6. Results of Regression Equation Model 1

Regressors	Credit Risk		Liquidity	
	Coefficient	P-Value	Coefficient	P-Value
Constant	.395113	0.044	.2825527	0.160
Credit Risk	-	-	-.0039533	0.935
Credit Risk (-1)	-.031416	0.871	-	-
Liquidity	-.1079842	0.489	-	-
Liquidity (-1)	-	-	.2105874	0.222
Bank Size	-.0001306	0.983	.4978334	0.037
ROE	-	-	-7.023546	0.146
ROA	-1.418954	0.002	51.55072	0.154
LAR	-.3695847	0.032	-	-
Income Diversification	-.0520581	0.238	-	-
Efficiency	-.0002884	0.899	-	-
NIM	-	-	7.178312	0.041
Liquidity Gap	-	-	-.5229661	0.034
CAR	-	-	.0209607	0.932
Economic Crisis	-.0146928	0.358	.0331348	0.025
Inflation Rate	.0007873	0.778	.0068769	0.263
Real GDP Growth	-.0021592	0.375	.0071369	0.002
AR(2) Test	0.08	0.938	-0.99	0.324
Hansen Test	14.76	0.194	21.96	0.109

Source: Research results (2021)

Table 7. Hypothesis Testing for Simultaneous Equation Model 1

Regressors (HX)	Credit Risk | Acceptable if P-Value < 0,05 | (HX)	Liquidity | Acceptable if P-Value < 0,05 | (HX)
Credit Risk (H3)	-	Unacceptable
Credit Risk (-1) *	-	-
Liquidity (H2)	Unacceptable	-
Liquidity (-1) *	-	-
Bank Size (H9) | (H8)	Unacceptable	Acceptable
ROE (H14)	-	Unacceptable
ROA (H12) | (H11)	Acceptable	Unacceptable
LAR (H15)	Acceptable	-
Income Diversification (H17)	Unacceptable	-
Efficiency (H19)	Unacceptable	-
NIM (H21)	-	Acceptable
Liquidity Gap (H22)	-	Acceptable
CAR (H23)	-	Unacceptable
Economic Crisis (H26) | (H25)	Unacceptable	Acceptable
Inflation Rate (H29) | (H28)	Unacceptable	Unacceptable
Real GDP Growth (H32) | (H31)	Unacceptable	Acceptable

Source: Research results (2021)

Table 8. Results of Regression Equation Model 2 (Short-Term)

Wald Test			
Dependent: Credit Risk Independent: Liquidity			
Statistics Test	Statistics Value	df	P-Value
Chi-square	2.347656	2	0.3092
Dependent: Liquidity Independent: Credit Risk			
Statistics Test	Statistics Value	df	P-Value
Chi-square	11.15976	2	0.0038

Source: Research results (2021)

Table 9. Results of Regression Equation Model 2 (Long-Term)

Error Correction Term Test		
Dependent: Credit Risk Independent: Liquidity	Coefficient	P-Value
C(1)	-0.425641	0.0000
Dependent: Liquidity Independent: Credit Risk	Coefficient	P-Value
C(1)	-0.010486	0.0011

Source: Research results (2021)

Table 10. Results of Regression Equation Model 3

Regressor	Stability (Z-Score)	
	Coefficient	P-Value
Constant	1.039724	0.027
Z-Score(-1)	.49182	0.005
Liquidity	.0307959	0.816
Credit Risk	1.60168	0.043
Credit Risk x Risk Liquidity	-1.485775	0.032
ROA	8.296796	0.031
Bank Size	-.0417272	0.103
CAR	1.592437	0.016
Loan Growth	.0185082	0.775
Income Diversification	.2168817	0.049
Efficiency	.0068571	0.635
Inflation Rate	-.0158928	0.088
Real GDP Growth	-.0030638	0.468
Economic Crisis	-.0258942	0.357
AR(2) Test	1.10	0.273
Hansen Test	5.53	0.237

Table 11. Hypothesis Testing for Non-Simultaneous Equation Model 3

Regressor (HX)	Stability (Z-Score) | Acceptable if P-Value < 0,05 | (HX)
Z-Score (-1) (H7)	Acceptable
Liquidity (H4)	Unacceptable
Credit Risk (H5)	Acceptable
Credit Risk x Liquidity Risk (H6)	Acceptable
ROA (H13)	Acceptable
Bank Size (H10)	Unacceptable
CAR (H24)	Acceptable
Loan Growth (H16)	Unacceptable
Income Diversification (H18)	Acceptable
Efficiency (H20)	Unacceptable
Inflation Rate (H30)	Unacceptable
Real GDP Growth (H33)	Unacceptable
Economic Crisis (H27)	Unacceptable

Source: Research results (2021)

4.3.2 Equation Model 1 (Liquidity as Dependent Variable)

Table 12. Determining the Variables and Equation (Equation Model 1: Liquidity)

Variables	Endogenous	Exogenous	Control	Instrumental
Credit Risk	✓	_	_	_
Credit Risk L.(0 4)*	_	_	_	✓
Liquidity	✓	_	_	_
Liquidity (-1)	✓	_	_	_
Liquidity L.(0 4)*	_	_	_	✓
Bank Size	_	✓	✓	✓
ROE	_	_	✓	_
ROA	_	✓	✓	✓
LAR	_	_	_	_
Income Diversification	_	✓	✓	✓
Efficiency	_	_	_	_
NIM	✓	_	_	_
NIM L.(0 4)*	✓	_	_	✓
Liquidity Gap	_	✓	✓	✓
CAR	_	✓	✓	✓
Economic Crisis	_	✓	_	✓
Inflation Rate	_	✓	_	✓
Real GDP Growth	_	✓	_	✓

Source: Research results (2021)
* Addition of lag on variables from lag 0 to 4 in order for the equation to pass the statistical tests

4.3.3 Equation Model 3 (Stability as Dependent Variable)

Table 13. Determining the Variables and Equation (Equation Model 3: Stability)

Variables	Endogenous	Exogenous	Control	Instrumental
Stability (Z-Score)	✓	_	_	_
Z-Score (-1)	✓	_	_	_
Z-Score L.(0 1)*	_	_	_	✓
Liquidity L.(0 1)*	✓	_	_	✓
Credit Risk L.(0 1)*	✓	_	_	✓
Credit Risk x Liquidity Risk	_	_	✓	_
ROA	_	✓	✓	✓
Bank Size	_	✓	✓	✓
CAR	_	_	✓	_
Loan Growth	_	✓	✓	✓
Income Diversification	_	✓	✓	✓
Efficiency	_	✓	✓	✓
Inflation Rate	_	✓	_	✓
Real GDP Growth	_	✓	_	✓
Economic Crisis	_	✓	_	✓

Source: Research results (2021)
*Addition of lag on variables from lag 0 to 1 in order for the equation to pass the statistical tests

4.4 Results of Equation Model 1

Table 14. Results of Regression Equation Model 1

Regressors	Credit Risk		Liquidity	
	Coefficient	P-Value	Coefficient	P-Value
Constant	.395113	0.044	.2825527	0.160
Credit Risk	-	-	-.0039533	0.935
Credit Risk (-1)	-.031416	0.871	-	-
Liquidity	-.1079842	0.489	-	-
Liquidity (-1)	-	-	.2105874	0.222
Bank Size	-.0001306	0.983	.4978334	0.037
ROE	-	-	-7.023546	0.146
ROA	-1.418954	0.002	51.55072	0.154
LAR	-.3695847	0.032	-	-
Income Diversification	-.0520581	0.238	-	-
Efficiency	-.0002884	0.899	-	-
NIM	-	-	7.178312	0.041
Liquidity Gap	-	-	-.5229661	0.034
CAR	-	-	.0209607	0.932
Economic Crisis	-.0146928	0.358	.0331348	0.025
Inflation Rate	.0007873	0.778	.0068769	0.263
Real GDP Growth	-.0021592	0.375	.0071369	0.002
AR(2) Test	0.08	0.938	-0.99	0.324
Hansen Test	14.76	0.194	21.96	0.109

Source: Research results (2021)

Table 15. Hypothesis Testing for Simultaneous Equation Model 1

Regressors (HX)	Credit Risk | Acceptable if P-Value < 0,05 | (HX)	Liquidity | Acceptable if P-Value < 0,05 | (HX)
Credit Risk (H3)	-	Unacceptable
Credit Risk (-1) *	-	-
Liquidity (H2)	Unacceptable	-
Liquidity (-1) *	-	-
Bank Size (H9) | (H8)	Unacceptable	Acceptable
ROE (H14)	-	Unacceptable
ROA (H12) | (H11)	Acceptable	Unacceptable
LAR (H15)	Acceptable	-
Income Diversification (H17)	Unacceptable	-
Efficiency (H19)	Unacceptable	-
NIM (H21)	-	Acceptable
Liquidity Gap (H22)	-	Acceptable
CAR (H23)	-	Unacceptable
Economic Crisis (H26) | (H25)	Unacceptable	Acceptable
Inflation Rate (H29) | (H28)	Unacceptable	Unacceptable
Real GDP Growth (H32) | (H31)	Unacceptable	Acceptable

Table 15 indicates the values of the AR (2) Test and Hansen's Test for liquidity and credit insignificant values (P-Value > 0,05) and also P-Values of all Hansen Tests show value interval 0,1 to 0,3. This means that the null hypothesis (H0), which states there is no autocorrelation and instrumental validity problem in the Equation Model 1, cannot be rejected, thus, there is no auto correlation and invalid instrumental is found in Equation Model 1.

4.5 Results of Equation Model 2

Table 16. Results of Regression Equation Model 2 (Short-Term)

Wald Test			
Dependent: Credit Risk Independent: Liquidity			
Statistics Test	Statistics Value	df	P-Value
Chi-square	2.347656	2	0.3092
Dependent: Liquidity Independent: Credit Risk			
Statistics Test	Statistics Value	df	P-Value
Chi-square	11.15976	2	0.0038

Source: Research results (2021)

Based on the Wald Test Table 16, it is known that the p-value of the equation with the Credit Risk variable as the dependent variable is greater than the 5% significance level or p-value > 0.05, which is 0.3092. This means that the Liquidity variable does not affect credit risk in the short term. This is different from the p-value of the Liquidity variable as the dependent variable. The p-value is smaller than 0.05 or 0.0038, so it is known that the credit risk variable affects liquidity in the short term. With the influence between variables that are not in line with the two equations where credit risk and liquidity are the dependent variables, there is no reciprocal influence between the two variables. Therefore, the null hypothesis (H0) cannot be rejected, and the alternate hypothesis (H1), which states that there is a reciprocal relationship between liquidity risk (an inverse measure of liquidity) and credit risk, is unacceptable.

Table 17. Results of Regression Equation Model 2 (Long-Term)

Error Correction Term Test		
Dependent: Credit Risk Independent: Liquidity	Coefficient	P-Value
C(1)	-0.425641	0.0000
Dependent: Liquidity Independent: Credit Risk	Coefficient	P-Value
C(1)	-0.010486	0.0011

Source: Research results (2021)

Based on the error correction term test results in Table 17, it is known that the two equations, both credit risk and liquidity as the dependent variable, show a negative coefficient value with a p-value <0.05, which is 0.000 and 0.0011 for the equation, respectively. The credit risk and liquidity as the dependent variable have less than the significance level of 5%. Thus, the null hypothesis (H0) can be rejected, and the alternate hypothesis (H1) states that there is a reciprocal relationship between liquidity risk (an inverse measure of liquidity) and acceptable credit risk.

Table 18. Results of Regression Equation Model 3

Regressor	Stability (Z-Score)	
	Coefficient	P-Value
Constant	1.039724	0.027
Z-Score(-1)	.49182	0.005
Liquidity	.0307959	0.816
Credit Risk	1.60168	0.043
Credit Risk x Risk Liquidity	-1.485775	0.032
ROA	8.296796	0.031
Bank Size	-.0417272	0.103
CAR	1.592437	0.016
Loan Growth	.0185082	0.775
Income Diversification	.2168817	0.049
Efficiency	.0068571	0.635
Inflation Rate	-.0158928	0.088
Real GDP Growth	-.0030638	0.468
Economic Crisis	-.0258942	0.357
AR(2) Test	1.10	0.273
Hansen Test	5.53	0.237

Table 19. Hypothesis Testing for Non-Simultaneous Equation Model 3

Regressor (HX)	Stability (Z-Score) | Acceptable if P-Value < 0,05 | (HX)
Z-Score (-1) (H7)	Acceptable
Liquidity (H4)	Unacceptable
Credit Risk (H5)	Acceptable
Credit Risk x Liquidity Risk (H6)	Acceptable
ROA (H13)	Acceptable
Bank Size (H10)	Unacceptable
CAR (H24)	Acceptable
Loan Growth (H16)	Unacceptable
Income Diversification (H18)	Acceptable
Efficiency (H20)	Unacceptable
Inflation Rate (H30)	Unacceptable
Real GDP Growth (H33)	Unacceptable
Economic Crisis (H27)	Unacceptable

Source: Research results (2021)

Based on the regression results in Table 10, the value of the AR (2) Test and Hansen Test for stability (Z-Score) as the dependent variable show insignificant values (P- Value > 0,05) and also the P-Value of Hansen Test show value interval 0,1 to 0,3. This means that the null hypothesis (H0) which states there is no autocorrelation and instrumental validity problem in the Equation Model 3 cannot be rejected, thus there is no autocorrelation and invalid instrumental is

found in Equation Model 3.

5. Discussion

5.1 Discussion of Equation Model 1

Based on the regression results in Tables 6 and 7, the results between variables are as follows; there is no reciprocal effect between Liquidity Risk (inverse of liquidity) and Credit Risk by previous research by Imbierowicz and Rauch (2014) and Ghenimi et al. (2017), thus H1 is unacceptable. The reciprocal effect of liquidity risk and credit risk in Equation Model 1 is an estimate of the effect in the short term. This suggests that in the short term, banks do not need to take extra precautions againstother risks if the bank is affected by one of the risks of the two banking risks in this study.

Credit risk is significantly influenced by 2 internal bank factors: profitability in the form of return on assets (ROA) and bank loan asset ratio (LAR). The influence between ROA and Credit Risk in this study is supported by previous research by Kabir et al. (2015) and Ghenimi et al. (2017). Also, the effect of LAR on Credit Risk in this study is supported by previous research by Kabir et al. (2015).

Several internal bank factors influence liquidity as an inverse measure of Liquidity Risk. Bank liquidity is significantly influenced by 3 internal factors: Bank Size, NIM, and Liquidity Gaps. The effect of Bank Size on Liquidity in this study is supported by previous research by Iqbal (2012). This study also obtained new findings in the form of the influence of NIM which positively and significantly affects liquidity. The influence between NIM and Liquidity is in line with Ghenimi et al. (2017) research, which also shows a positive directional effect. Moreover, the effect of the Liquidity Gaps on Liquidity in this study is supported by the results of previous research by Muharam and Kurnia (2015).

In addition, the external factors of the bank only significantly affect its liquidity, and there is no significant effect economically on the bank's Credit Risk, which the factors are the Economic Crisis and Real GDP Growth. The effect of the Economic Crisis on bank Liquidity in this study differs from previous studies by Ghenimi et al. (2017). This difference is obtained in terms of direction and significance between the opposite variables. In this study, the Economic Crisis has a positive and significant effect on bank liquidity, in contrast to research by Ghenimi et al. (2017), which resulted in a negative and insignificant effect.

This suggests that the economic crisis in 2020 had a good impact on the liquidity of the banks of 5 ASEAN countries that experienced a recession that year. Public money stored in banks in the form of deposits wasnot used optimally by society as in normal conditions before the pandemic. This is becausethere is a tendency for people to save in times of crisis in anticipation of preparing for all the worst possibilities from the pandemic, thus, bank liquidity conditions increase, which is marked by a decrease in the reference interest rate of each country at that time. Also, Real GDP Growth in this study has a positive and significant effect on bank liquidity as well, in contrast to research by Ghenimi et al. (2017), which got the opposite result.

5.2 Discussion of Equation Model 2

Based on the regression results in Table 8, there is no reciprocal influence between Credit Risk and Liquidity in the short term. This is because the effect between the two variables and their respective dependent variables do not show the same significance. Furthermore, the Liquidity variable in this study is an inverse measure of Liquidity Risk. Therefore, there is no reciprocal effect between Liquidity Risk and Credit Risk. Thus, in the short run, H1 is unacceptable. This result is supported by previous research by Imbierowicz and Rauch (2014) and Ghenimi et al. (2017). They did not find a reciprocal relationship between the two variables in short term as well and this result is consistent with the regression results in the Equation Model 1.

On the contrary, based on the regression results in Table 9, new finding is obtained in a reciprocal influence between Credit Risk and Liquidity Risk in the long term. This is because the influence between the two variables and their respective dependent variables shows the same direction and significance. Therefore, in the long run H1 is acceptable. This result is supported by previous studies by Diamond and Rajan (2005) and Djebali and Zaghdoudi (2020). This suggests that in order to overcome the reciprocal effect of these two banking risks, banks need to overcome liquidity problems and losses on credit risk in an efficient and short time so that they do not impact the emergence of other risks in the long term.

5.3 Discussion of Equation Model 3

Based on the regression results in Tables 10 and 11 above, Bank Stability is positively and significantly affected by Credit Risk. This result is in contrast with previous studies by Ghenimi et al. (2017), Setiawan and Widiastuti (2019), and Zaghdoudi (2019). All of the previous studies stated that there was a negative and significant influence of Credit Risk on Bank Stability. However, although the effect of credit risk in this study is different from previous research, it still can be said to be reasonable and explained logically using the theory of "gambling for resurrection" which is another form of the principle of "high-risk high return" but is carried out when a business is in a risk-affected condition based on research by Imbierowicz and Rauch (2014). Under these conditions, banks that are only affected by credit risk are assumed to provide a response that will instead provide a mitigation effect that can increase its stability. In other words, banks in this study do not perceive credit risk as an obstacle but as an opportunity to increase their stability.

Moreover, the combined effect of Credit Risk and Liquidity Risk (Credit Risk x Liquidity Risk) negatively and significantly affects Bank Stability in this study. This is supported by previous studies by Ejoh et al. (2014), Ghenimi et al. (2017), Zaghdoudi (2019), and Djebali and Zaghdoudi (2020) which also obtained the same results. The Combination of Credit Risk and Liquidity Risk is a condition where the banks are affected by these two risks at once. This suggests that the problem of losses due to the failure of the debtor to repay the loan and accompanied by the inability of the bank to withdraw funds from its assets can make the bank unstable or increase the likelihood of failure in terms of fulfilling its obligations.

In addition, Bank Stability is also influenced by several internal factors. The effect of Z-Score (-1) on Bank Stability obtained in this study is positive and significant. This result is supported by previous research by Ghenimi et al. (2017), which also obtained the same result. This means that banks that are successful in increasing their stability in a certain period will potentially obtain even better stability in the future.

Both of the effects of ROA and CAR on Bank Stability show positive and significant effects. These results are consistent with previous studies by Ghenimi et al. (2017) and Setiawan and Widiastuti (2019), which also obtained the same results; meaning an increase or decrease in the ROA or CAR can increase or decrease the level of bank stability, respectively. Measuring the bank stability using the Z-Score involves the ROA ratio and the amount of capital owned by the bank (CAR) as an indicator that can increase bank stability if both things increase. This is consistent with the results of this study regarding the effect of ROAand CAR, which positively and significantly affect bank stability.

Income Diversification has a positive and significant effect on Bank Stability. This result is the same as previous studies by Srairi (2013) and Ghenimi et al. (2017). This means through income diversification, for example, transaction fees charged to its customers, deposits to other banks, and investments in stocks and bonds can encourage banks to obtain higher stability.

6. Conclusions

The conclusion in this study is as a form of managerial implications that can be carried out by bank management based on each research variable that produces a significant influence on their respective dependent variable from the discussions above, in order to create a safe, productive, and sustainable business environment, including:

1. Prevention of liquidity risk and credit risk can be done by ensuring the bank's investment assets and deposit funds and tightening the risk profile assessment process for prospective debtors;
2. Countermeasures for liquidity risk and credit risk can be done by changing the bank's investment structure to the majority of assets with a short period of time and seeking debtors to repay loans either by refinancing or credit restructuring;
3. Maintaining the bank's stable condition can be done by increasing ROA and CAR in a certain period. This is because banks that succeed in improving their stability in a period will have better stability in the next period;
4. Liquidity risk and credit risk will affect each other in the long term. This means bank must be able to resolve it in a fast and efficienttime to avoid the emergence of other risks in the long term;
5. The application of the theory of "gambling for resurrection" can be applied by banks, to deal with credit risk. However, applying this principle should only be carried out while the bank is not experiencing liquidity problems

because of the higher potential for bankruptcy. Then, simultaneously happened risks can be overcome using the risk- sharing method through merger and acquisition or making large loans to other parties;

6. The role of banks during this crisis can be seen from the impact of the economic crisis to its liquidity. Banks can take advantage of this crisis moment with good liquidity conditions to channel more loan facilities in order to increase their income on bank interest.

Furthermore, the limitation of this study is the data that was successfully obtained only consisted of open conventional banks. It will be better to include closed conventional bank data in the future research. In addition, the research period may be extended to include the period in 2021 or the period in improved conditions after economic crises. However, it all depends on the availability of financial statement data published by all the banks concerned.

References

Adeleye, N. (2018). *Understanding Generalised Method of Moments #gmm #onestepgmm #twostepgmm #yeardummies - YouTube*. Youtube.Com. https://www.youtube.com/watch?v=4D3MKnYQ44E

Aida, N. R. (2020, November 5). *Indonesia Resmi Resesi, Ini yang Perlu Kita Tahu soal Resesi dan Dampaknya Halaman all - Kompas.com*. Kompas.Com. https://www.kompas.com/tren/read/2020/11/05/125200565/indonesia-resmi-resesi-ini-yang-perlu-kita-tahu-soal-resesi-dan-dampaknya?page=all

ASEANStatsDataPortal. (2021). *ASEAN Visitor Arrivals Dashboard | ASEANStatsDataPortal*. https://data.aseanstats.org/dashboard/tourism

Asteriou, D., Pilbeam, K., & Pratiwi, C. E. (2021). Public Debt and Economic Growth: Panel Data Evidence for Asian Countries. *Journal of Economics and Finance*, *45*(2), 270–287. https://doi.org/10.1007/s12197-020-09515-7

Blundell, R., & Bond, S. (1998). Initial Conditions and Moment Restrictions in Dynamic Panel Data Models. *Journal of Econometrics, 87*.

Dermine, J. (1986). Deposit Rates, Credit Rates and Bank Capital the Klein-Monti Model Revisited. *Journal of Banking and Finance, 10.*

Diamond, D. W., & Rajan, R. G. (2005). Liquidity Shortages and Banking Crises. *The Journal of Finance*, *60*(2).

Djebali, N., & Zaghdoudi, K. (2020). Threshold Effects of Liquidity Risk and Credit Risk on Bank Stability in the MENA Region. *Journal of Policy Modeling*, *42*(5), 1049–1063. https://doi.org/10.1016/j.jpolmod.2020.01.013

Ejoh, N., Okpa, I., & Inyang, E. (2014). The Relationship and Effect of Credit and Liquidity Risk on Bank Default Risk among Deposit Money Banks in Nigeria. In *Research Journal of Finance and Accounting www.iiste.org ISSN*, 5(16). www.iiste.org

Farhan Akhtar, M., Ali, K., & Sadaqat, S. (2011). Liquidity Risk Management: A comparative study between Conventional and Islamic Banks of Pakistan. *Interdisciplinary Journal of Research in Business*, *1*(1). http://www.sbp.org.pk/f_links/index.asp

Ghenimi, A., Chaibi, H., & Omri, M. A. B. (2017). The Effects of Liquidity Risk and Credit Risk on Bank Stability: Evidence from the MENA Region. *Borsa Istanbul Review, 17*(4), 238–248). Borsa Istanbul Anonim Sirketi. https://doi.org/10.1016/j.bir.2017.05.002

Hossain, S. (2015). *Panel VECM. Model One. EVIEWS - YouTube*. Youtube.Com. https://www.youtube.com/watch?v=nxlBU48FXis

Imbierowicz, B., & Rauch, C. (2014). The Relationship between Liquidity Risk and Credit Risk in Banks. *Journal of Banking and Finance*, *40*(1), 242–256. https://doi.org/10.1016/j.jbankfin.2013.11.030

Iqbal, A. (2012). Liquidity Risk Management: A Comparative Study between Conventional and Islamic Banks of Pakistan. *Type: Double Blind Peer Reviewed International Research Journal Publisher: Global Journals Inc*, *12*.

Kabir, M. N., Worthington, A., & Gupta, R. (2015). Comparative Credit Risk in Islamic and Conventional Bank. *Pacific Basin Finance Journal*, *34*, 327–353. https://doi.org/10.1016/j.pacfin.2015.06.001

Meo, M. S. A. (2016). *How to Perform Panel GMM, Generalized Methods of Moments (GMM) using stata - YouTube*. Youtube.Com. https://www.youtube.com/watch?v=DWnCjOUZQxM

Muharam, H., & Kurnia, H. P. (2015). Liquidity Risk on Banking Industry: Comparative Study between Islamic Bank and Conventional Bank in Indonesia. *Al-Iqtishad: Journal of Islamic Economics*, *5*(2). https://doi.org/10.15408/aiq.v5i2.2118

Prayoga, F. (2020, August 19). *4 Negara Asean Sudah Resesi, Indonesia Menyusul? : Okezone Economy*. Economy Okezone.

https://economy.okezone.com/read/2020/08/19/20/2264299/4-negara-asean-sudah-resesi-indonesia-menyusul

Santosa, T. W., Samuel, H., &. D. (2018). The Effect of Marketing Capability on Financial Performance with the mediating role of Perceived Sevice Quality and the moderating role of Competitive Intensity. An empirical study on the Banking Sector in Indonesia. *Petra International Journal of Business Studies*, *1*(2), 80–88. https://doi.org/10.9744/ijbs.1.2.80-88

Setiawan, A., & Widiastuti, E. (2019). *The Influence of Credit Risk and Liquidity Risk on Bank Stability* (1st ed., Vol. 5).

Srairi, S. (2013). Ownership Structure and Risk-Taking Behaviour in Conventional and Islamic Banks: Evidence for MENA Countries. *Borsa Istanbul Review*, *13*(4), 115–127. https://doi.org/10.1016/j.bir.2013.10.010

Tan, Y. (2016). The Impacts of Risk and Competition on Bank Profitability in China. *Journal of International Financial Markets, Institutions and Money*, *40*, 85–110. https://doi.org/10.1016/j.intfin.2015.09.003

Zaghdoudi, K. (2019). The Effects of Risks on The Stability of Tunisian Conventional Banks. *Asian Economic and Financial Review*, *9*(3), 389–401. https://doi.org/10.18488/journal.aefr.2019.93.389.40