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STUDIA UNIVERSITATIS ECONOMICS SERIES
"Vasile Goldiș" Western University of Arad

SUES

2025 - 35(1)

DOI: 10.2478/sues-2025-0002

THE IMPACT OF OWNERSHIP AND FINANCIAL STABILITY ON BANK LIQUIDITY CREATION

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(Received: December 2023; Accepted: April 2024; Published: January 2025)

Abstract: Employing a descriptive approach, this study intends to investigate the causal relationship between financial stability and liquidity creation and the effects of foreign ownership, local ownership, and financial stability on liquidity creation. The research sample included 35 banks listed on the Indonesia Stock Exchange based on a purposive sampling technique (non-random sampling) and the observation period between 2013 and 2020 utilizing quarterly data. According to the Granger causality test results, there is no reciprocal relationship between the creation of liquidity and financial stability. This indicates that the research variables avoid endogeneity problems. Using static panel data analysis, we discovered that neither foreign ownership nor financial stability has any impact on the creation of bank liquidity; however, the interaction between foreign ownership and financial stability has a significant positive impact, suggesting that the interaction between the two could become stronger. The asset-side liquidity creation component is the only one that plays this role. Domestic ownership favors liquidity creation, but there is less of an effect when

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ownership and financial stability are combined. When the creation of liquidity increases, production activities increase, suggesting that economic activity increases. Thus, these findings are useful for regulators and central banks in making economic and banking policies by considering bank ownership and stability.

Keywords: financial stability; liquidity creation; ownership; endogeneity problems; liquidity creation components.

JEL Codes: G20, G21.

1. Introduction

Much research has been done on the variables influencing the quantity of bank liquidity created. Ownership, the economy, and its interaction with bank capital all have a positive impact on the creation of liquidity (Toh and Jia, 2021; Yeddou and Pourroy, 2020; Chaabouni et al., 2018; Berger and Sedunov, 2017; Fungacova et al., 2017; Horváth et al., 2014; Distinguin et al., 2013). According to Casu et al. (2018), higher capital limits how much liquidity banks can offer, and as liquidity rises, banks' risk diminishes. Another aspect is that regulatory intervention hinders liquidity creation (Berger et al., 2016). Fungacova et al. (2017) examined how liquidity creation influences bank failures.

Research into the harmful connection between liquidity creation and financial stability is still ongoing. Berger and Bouwman (2009) found that for small banks, financial stability had a large negative impact on bank liquidity creation, but large banks did not, while medium banks had a positive impact on liquidity creation. Kusi et al. (2021) found no relationship between financial stability and liquidity creation. However, liquidity creation has a large detrimental impact on financial stability Berger et al., (2019), whereas liquidity creation increases significant benefits on financial stability (Gupta and Kashiramka, 2020). Sudarto and Adawiyah (2021) stated that privatized banks created liquidity by providing relatively high credit for long-term investments (42.76% of total assets), but bank stability was maintained. Meanwhile, do the research results show that the benefits of financial stability and the creation of higher liquidity are mutually reinforcing?

The connection between bank ownership, financial stability, and the creation of bank liquidity is still the subject of little empirical study. This study's first novel feature looks at the potential for a dual causal relationship between financial stability and liquidity creation. The second innovative aspect is analyzing the connection between financial stability and foreign ownership as well as their function in creating bank liquidity. This novelty is obtained by synthesizing the findings of previous researchers and testing their accuracy.

The aim of this research is to examine the relationship between liquidity creation and financial stability and examine the effect of the interaction between ownership and

financial stability on liquidity creation. We use the Granger causality test to test whether there is no causal relationship between them. The bi-causal relationship indicates the existence of endogenous and exogenous variables. To overcome the problem of endogeneity, the researcher uses the GMM model, but if it has a one-way relationship, then panel data regression is used. The study was conducted on foreign banks and domestic banks that went public on the Indonesian Stock Exchange.

2. Literature Review

By using relatively liquid liabilities, including transaction deposits and short-term funding, to finance long-term projects, banks create liquidity on both sides of their balance sheets. Financial intermediary activities are illiquid claims against borrowers, and depositors claim liquid to intermediaries. Intermediaries must prepare liquid funds that can be withdrawn by depositors at any time so that the need for bank liquidity increases. The depositor's accumulation of funds allows intermediaries to invest in long-term assets. This allocation of funds provides benefits of economies of scale.

Banks can create liquidity in their off-balance sheet accounts through loans and other comparable claims on liquid assets, according to Kashyap et al. (2002) and Holmström and Tirole (1998). Bryant (1980) and Diamond and Dybvig (1983) claim that when banks use liquid liabilities to finance relatively illiquid assets, they are said to have created liquidity on the balance sheet.

2.1. Determinants of liquidity creation

The factors that influence the formation of liquidity have been determined by numerous scholars. The growth of liquidity at major banks was significantly influenced positively by capital, whereas the rise of liquidity at small banks was significantly impacted negatively by capital, according to Berger and Bouwman (2009). Distinguin et al. (2013) discovered that smaller American banks boosted capital when faced with rising liquidity, whereas larger banks decreased regulatory capital when liquidity increased. Horváth et al. (2014) found that capital adversely influences liquidity creation, whereas liquidity positively influences capital. The first empirical study, by Berger and Sedunov (2017), establishes that the creation of liquidity has an effect on economic growth. How the creation of liquidity affects bank failures was studied by Fungacova et al. (2017).

2.2. Financial stability and liquidity creation relationship

Various studies linking financial stability and liquidity creation need attention. Berger and Bouwman (2009) treat financial stability as an explanatory variable that has a negative impact on liquidity creation. However, Kusi et al. (2021) found no proof of a connection between financial stability and liquidity creation. Several other

studies, including Berger et al. (2019), show a negative effect on financial stability of creating liquidity, whereas Gupta and Kashiramka (2020) have a positive effect. According to regulatory capital studies, the benefits of increased liquidity are traded off against financial stability (high regulatory capital). Do these findings indicate that there is a two-way relationship that influences and is influenced by the benefits of financial stability and increased liquidity creation?

2.3. Ownership and liquidity creation

Ownership has an important role in creating bank liquidity, which has a beneficial and significant impact on creating liquidity (Yeddou and Pourroy, 2020). Foreign investor ownership is typically linked to increased business value, which is probably the outcome of riskier investment practices. According to Boubakri et al. (2013), company risk-taking is positively correlated with foreign ownership. These results support the observation by Chen et al. (2017) that foreign banks increase investment sensitivity. This shows that foreign banks will channel more of their funds into long-term investments or create more liquidity.

Access to superior capital markets, risk diversification, and the capacity to deliver services to multinational clients that are difficult for domestic banks to do are all benefits of foreign ownership. Foreign-owned banks, particularly those from industrialized nations, have access to cutting-edge technology in emerging nations (Berger et al., 2005). According to these traits, it has been found by Bonin et al. (2005), Havrylchyk & Jurzyk (2011), and Laidroo (2015) that foreign-owned banks are more productive and lucrative than domestically-owned banks.

H1a: Bank foreign ownership has a positive effect on the creation of bank liquidity.
H1b: Bank domestic ownership has a positive effect on the creation of bank liquidity.

2.4. Financial stability, ownership, and liquidity creation

Financial institutions' reluctance to spend money on successful business ventures is one sign of financial instability (World Bank, 2016). The capacity of financial institutions to quicken economic processes, according to (Schination (2004), is a sign of stability. Stability should let banks create more liquidity, it is thought. Financial intermediation theory states that banks significantly contribute to the creation of liquidity and that this activity is directly related to financial stability (Bryant, 1980; Diamond and Dybvig, 1983). Exposure to liquidity risk is a bank's inherent quality that serves as a control mechanism and promotes effective financial intermediation (Diamond and Rajan, 2001).

The concept of diversification can be applied in order to reduce risk as well as banking stability, which is determined by the number of sources of liquidity of assets. This relationship has been tested theoretically by Freixas and Holthausen (2005).

This has been proven empirically by Dinger (2009) that during normal times, the amount of liquid assets is small, whereas during a crisis, it is high, and a shortage of overall liquidity in developing nations is less likely when foreign banks are present. (Vazquez and Pablo, 2015) found that, when comparing foreign ownership to local ownership, small, domestically focused banks are significantly more vulnerable to liquidity risk than multinational banks. Research by Toh and Jia (2021) found that the creation of liquidity in foreign banks is positively influenced by market forces and their interactions with ownership, but not in domestic banks.

H2a: The interaction between foreign ownership and financial stability strengthens bank liquidity creation.
H2b: The interaction between domestic ownership and financial stability strengthens bank liquidity creation.

3. Methodology and Empirical Data

Bank balance sheets, profit and loss statements, and macroeconomic statistics are gathered from the websites of the Financial Services Authority (https://www.ojk.go.id), Bank Indonesia (https://www.bi.go.id/id/default.aspx), and the Indonesian Stock Exchange (http://www.bei.co.id). The time frame for the observation was from 2013 to 2020. After removing extreme bank observations from the sample to remove outliers, we are left with 35 banks, consisting of 12 international banks and 23 domestic banks, for a total of 1120 sample quarterly periods.
The sampling method used is purposive sampling; the criteria for determining the sample are as follows:
a. Local and international banks.
b. Banks that did not fail during the study period.
c. The bank has complete financial reports.
d. Research refers to healthy banking, so studies on creating liquidity are limited to banks with positive equity and allocating loans (Fungacova et al., 2017; Horváth et al., 2014; Berger and Bouwman, 2009).

3.1. Operationalization of research variables

From the balance sheet and income statement, the value of the research variables will be calculated. The entire value of bank liquidity creation is measured by the dependent variable in the model created by Berger and Bouwman (2009). Foreign ownership, domestic ownership, and financial stability are the independent factors. The Bank's internal and macro variables serve as the control variables. Foreign and domestic ownership is determined based on the majority.

The correct metric for this study's measurement of liquidity creation is "Cat-NonFat" since, by the underlying premise, liquidity is produced by transforming liquid liabilities into illiquid assets. The approach classifies the balance sheet's accounts into three groups: liquid, semi-liquid, and illiquid (Berger and Bouwman, 2009). Each category is assigned a different weight. This rating is based on how simple, quick, and expensive it is to access liquid funds and meet obligations. The liquidity creation of each bank is calculated using this method. The tally is

$$LC = 0.5 * illiquid\ assets + 0 * semi\ liquid\ assets + 0.5 * liquid\ liabilities + 0 * semi\ liquibd\ liabilities - 0.5 * liquid\ assets - 0.5 * illiquid\ liailities \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad (1)$$

Where:
LC is liquidity creation

The percentage of each company's total ownership is used to determine foreign and domestic ownership. Financial stability is assessed using the z-score model (Boyd et al., 1993), which determines the separation from bank failure.

$$Z_{Score} = \left[\frac{ROA + Cap}{\delta_{ROA}}\right]$$

Where:
ZScore is determined by dividing ROA plus capital by the standard deviation of ROA;
ROA is Earnings Before Interest and Taxes divided by total assets;
Cap is equity divided by total assets;
δ_{ROA} is the standard deviation of ROA for eight quarters.

Given that many studies interpret the financial stability variable as both the dependent variable and an independent variable, a test of Granger causality is conducted to examine hypothesis 1. The Granger causality test indicates that certain variables have a two-way or only one-way relationship. The results of this test will determine the accuracy of the research model used.
This study will also employ the control variables often used in studies on this topic to control for other variables that may alter the association between financial stability and liquidity creation. Control factors to be employed include equity ratio to total assets (Cap), bank liquidity risk proxied by loan-to-deposit ratio (LDR), credit risk by non-performing loan (NPL), control of the size of the bank with LnTA, control company experience using bank age (Age), which are variables that may affect bank

risk. This control variable is also employed by Horváth et al. (2014), Casu et al. (2018), Berger and Bouwman (2009), and Boubakri et al. (2013). In this study, macroeconomic variables such as GDP growth are employed as control variables (Berger and Sedunov, 2017; Boubakri et al., 2013).

3.2. Regression models

We employ multivariate regression to accomplish the research goal by analyzing the impact of ownership and financial stability on liquidity creation. Given changes in ownership structure, a panel framework can help explain the impact of shareholder ownership and financial stability on liquidity creation. We will carry out the analysis in the following stages:

a. Use the following formula to determine and examine how foreign (domestic) ownership and liquidity creation are related. Henceforth, we call Model 1:

$$LC = \beta_0 + \beta_1 Own_{it} + \beta_2 ZScore_{it} + \gamma_i \; BankControl_{it} + \delta_i MacroControl_{it} + \varepsilon_{it} \quad \ldots\ldots\ldots\ldots \quad (2)$$

b. Studying and reviewing how banking financial stability contributes to the creation of liquidity supported by domestic and foreign ownership. What we hereafter refer to as Model 2:

$$LC_{it} = \beta_0 + \beta_1 Own_{it} + \beta_2 ZScore_{it} + \beta_3 ZScore_{it} * Own_{it} + \gamma_i BankControl_{it} + \delta_i MacroControl_{it} + \varepsilon_{it} \quad \ldots\ldots\ldots \quad (3)$$

Where:

Own_{it} is foreign and domestic ownership at the bank i, and time t;

$ZScore*Own_{it}$ is an interaction variable between ownership and financial stability at the bank i and time t;

$BankControl_{it}$ is a bank control variable at the bank i and time t. This variable is proxied by equity to total assets, non-performing loans, loans to deposits, log of normal total assets, and bank age (it is calculated based on the time the bank was established minus the time point during the research period);

$MacroControl_{it}$ is economic control at the bank i and time t as measured by GDP growth.

4. Empirical Results

According to *Table 1*, the values for Granger causality probability were 0.2069 and 0.4849, higher than the crucial threshold of 0.05. This shows that financial stability and liquidity creation do not have a two-way relationship, which means it supports

hypothesis 1. Static panel data regression was therefore employed by the researchers to increase the analysis model's accuracy.

Table 1 Granger Causality Test

Null Hypothesis	F-Statistic	Prob.
ZSCORE does not Granger Cause LC	1.6790	0.2069
LC does not Granger Cause ZSCORE	0.7451	0.4849

Sources: data processed by authors.

Table 2 presents a descriptive study of liquidity creation variables calculated based on *equation 1* in the subsamples of foreign and domestic ownership. The average liquidity creation in total assets for domestic and foreign banks is 30.75% and 28.05%, respectively. Whereas domestic ownership is only 47.56% on average, foreign ownership is 72.54%. Domestic banking stability was 65.5638 and stated to be higher than foreign banking stability of 47.1379. Even while foreign ownership is bigger, it lays less emphasis on creating liquidity and financial stability than domestic ownership. To ensure that the regression findings would be free of bias issues, we made sure there were no outlier values and that the variable's standard deviation was still within the range of the minimum and maximum values.

Table 2 Descriptive Analysis

Variable	Mean	Std. Dev	Min	Max	Obs
Foreign ownership					
LC	0.2805	0.1430	-0.3456	0.6664	384
FOwn	0.7254	0.2096	0.2727	0.9999	384
ZScore	47.1379	46.4639	-0.6515	221.0097	384
ZS*FOwn	33.3191	36.8006	-0.4952	188.0350	384
Cap	0.1947	0.1548	0.0404	0.8904	384
NPL	0.0214	0.0213	0	0.1680	384
LDR	1.0178	0.5441	0.4877	7.4841	384
Size	17.3472	1.7856	11.9813	19.4474	384
Age	3.7638	0.4234	2.9957	4.3041	384
GDP	0.0456	0.0189	-0.0419	0.0557	384
Domestic ownership					
LC	0.3075	0.1187	-0.2062	0.6944	736
Down	0.4756	0.2426	0.0193	0.9994	736
ZScore	65.5639	57.5554	1.1604	282.7667	736
ZS*Down	30.6384	35.6040	0.4584	246.6574	736
Cap	0.1751	0.0873	0.0682	0.7452	736
NPL	0.0234	0.0184	0.0000	0.1093	736
LDR	0.8316	0.2108	0.0078	3.9012	736
Size	16.2076	1.6987	12.915	20.7781	736
Age	3.4835	0.3465	2.9957	4.1589	736

Variable	Mean	Std. Dev	Min	Max	Obs
GDP	0.0456	0.0189	-0.0419	0.0557	736

Sources: data processed by authors.

4.1. Ownership and liquidity creation

From *Table 3*, we know that foreign-owned banks create overall liquidity increasing by an average of 13.38% higher than domestic (12.38%); on the other hand, the increase in total assets each year is much lower (i.e., 5.84% < 10.15%). Since the creation of liquidity has increased more than total asset growth, each bank is performing the task of creating liquidity. Foreign and domestic banks created liquidity, around 34.18% and 40.81% of total assets, respectively. This indicates that domestic banks implement long-term credit policies or credit illiquid assets more aggressively than foreign banks. This means that domestic banks are operating to stimulate economic activity. What's interesting about foreign banks is that under normal circumstances (2016 and 2017), they reduce the creation of liquidity, which indicates that banks are accumulating liquid assets. On the other hand, in 2020 (pandemic COVID-19), foreign banks allocated loans to the real sector, which increased quite a lot, up to 72%, although only offset by an increase in assets of 7%.

Table 3 Liquidity Creation

	TA		Change TA		LC		Change LC		LC/TA	
	FOwn	DOwn	FOwn	DOwn	FOwn	DOwn	FOwn	DOwn	FOwn	DOwn
2013	876	908			304	406			0.3473	(0.4465
2014	951	(1,008)	0.0850↑	0.1059↑	327	420	0.0749↑	0.0358↑	0.3441	0.4167
2015	1,005	1,109	0.0575↑	0.1001↑	352	469	0.0759↑	0.1161↑	0.3501	0.4227
2016	1,010	1,250	0.0044↑	0.1265↑	314	477	-0.1074↓	0.0180↑	0.3111	0.3820
2017	1,056	1,358	0.0461↑	0.0872↑	307	484	-0.0219↓	0.0141↑	0.2908	0.3563
2018	1,095	1,456	0.0369↑	0.0720↑	325	585	0.0599↑	0.2091↑	0.2973	0.4019
2019	1,210	1,598	0.1051↑	0.0976↑	369	618	0.1335↑	0.0559↑	0.3050	0.3867
2020	1,300	1,786	0.0742↑	0.1172↑	636	876	0.7219↑	0.4178↑	0.4889	0.4907
Avg			0.0584↑	0.1015↑			0.1338↑	0.1238↑	0.3418	0.4081

Sources: data processed by authors.

4.2. The Role of foreign ownership and financial stability on liquidity creation

Table 4 reports the role of ownership and financial stability on liquidity creation for the subsample of foreign ownership. *Model 1* is the main model for evaluating the significance of the relationship between variables calculated based on *equation 2*. The results of the test indicate that while the ZScore coefficient and the FOwn coefficient are negative and positive, respectively, both are not significant. This shows evidence for hypothesis 2a but is not significant. Foreign ownership and financial stability, hence, have minimal effect on the creation of liquidity.

Model 2 incorporates the role of the interaction variable between ownership and financial stability, revealing the impact of this variable's strength on the creation of

liquidity. Applying *equation 3* produces a significant positive interaction coefficient between ownership and financial stability of 10%. This indicates that the interplay of foreign ownership and financial stability can enhance liquidity creation, thus accepting hypothesis 3a. Consequently, foreign ownership determines how much of an impact financial stability has on liquidity creation.

Table 4 Regression Results of Financial Stability and Foreign Ownership Variables on Liquidity Creation

Dependent Variable: Liquidity Creation		
	Model 1	Model 2
Independent Variables:		
FOwn	0.0249 (0.3899)	-0.0150 (0.6855)
ZScore	-0.0007 (0.3676)	-0.0066 (0.1565)
ZScore*FOwn		0.0011 (0.0944*)
Bank Control Variables:		
Cap	-0.792855 (0.0000***)	-0.7740 (0.0000***)
NPL	-0.524836 (0.0105**)	-0.5097 (0.0123**)
LDR	0.038663 (0.0000***)	0.0368 (0.0001***)
Size	0.009149 (0.3911)	0.0115 (0.2471)
Age	0.074074 (0.1339)	0.0578 (0.1919)
Macro Control Variable:		
GDP	-0.7221 (0.0003***)	-0.7622 (0.0001***)
Intercept	-0.0210 (0.8956)	0.0278 (0.8522)
Adj R Square	0.4464	0.4553
Obs	384	384

Sources: data processed by authors.
Note: Statistical significance is shown by the superscript asterisks ***, **, and * at the 1%, 5%, and 10% levels, respectively.

The results are under the researchers' expectations of the role of interaction variables that provide guarantees to strengthen liquidity creation. The ZScore*FOwn coefficient is positive 0.0011, and the mean FOwn is 0.7254, economically

strengthening the relationship. This implies that the creation of liquidity will be strengthened by the interaction of foreign ownership and financial stability of 0.0011 × 0.7254 = 0.0008. It implies that foreign ownership's impact on how much liquidity is produced will either be less or stronger depending on foreign ownership and the financial stability variable. In this regression model, the independent variables contribute to each change in the liquidity creation variable by around 46%, as shown by the adjusted R square.

4.3. The Role of domestic ownership and liquidity creation on liquidity creation

The regression results for domestic banks controlling ownership, bank stability, and their relationship to liquidity creation are presented in *Table 5. Model 1* test produces a significant positive domestic ownership coefficient of 1%, which accepts hypothesis 2b, while the positive financial stability coefficient is not significant. The increase in real economic activity is, therefore, influenced by domestic ownership.

Table 5 Regression Results of Financial Stability and Domestic Ownership Variables on Liquidity Creation

Dependent Variable: Liquidity Creation		
	Model 1	Model 2
Independent Variables:		
Down	0.1378 (0.0000***)	0.1175 (0.0001***)
ZScore	0.00004 (0.5226)	-0.0001 (0.3652)
ZS*Down		0.0003 (0.1836)
Bank Control Variables:		
Cap	-0.8986 (0.0000***)	-0.8922 (0.0000***)
NPL	0.2055 (0.3351)	0.2304 (0.2815)
LDR	0.0433 (0.0087***)	0.0410 (0.0132**)
Size	-0.0224 (0.0936*)	-0.0215 (0.1065)
Age	0.3544 (0.0000***)	0.3564 (0.0000***)
Macro Control Variable:		
GDP	-0.4612 (0.0039***)	-0.4516 (0.0048***)
Intercept	-0.4953 (0.0023***)	-0.5050 (0.0019***)

Dependent Variable: Liquidity Creation		
Adj R Square	0.6201	0.6205
Obs	736	736

Sources: data processed by authors.
Note: Statistical significance is shown by the superscript asterisks (***, **, and *) at the 1%, 5%, and 10% levels, respectively.

After entering the interaction variable, the ownership coefficient (DOwn) is positive and significant at 1%, the financial stability coefficient (ZScore) is negative and insignificant, and the interaction variable (ZScore*DOwn) is positive and not significant in *Model 2*. The additional interaction variable increases the contribution of the independent variable relatively small to each change in the liquidity creation variable and is not significant. This indicates that domestic ownership still contributes significantly to the creation of bank liquidity. Domestic ownership does not necessarily determine how much banking system stability contributes to liquidity creation, which means rejecting hypothesis 3b. In this way, domestic ownership plays an important role in creating bank liquidity but not in bank financial stability. This is reinforced by the finding that domestic ownership's liquidity creation is higher than foreign ownership's.

4.4. Control variables

For foreign and domestic banks, the capital coefficient and GDP are negatively significant by 1%, while the LDR has a significant positive impact of 1% on the creation of liquidity in both *model 1* and *model 2*. The NPL coefficient is negatively significant by 5% only for foreign banks. The variables of bank size and age only affect banks with domestic ownership, with a negative significance of 10% and a positive 1%, respectively.

4.5. Liquidity creation component

To confirm the role of interaction variables in bank liquidity creation, we look at the liquidity creation component. Suppose assets or liabilities are the source of this effect. We employ Berger and Bouwman's component measurements (2009) for estimation. *Table 6* lists the two primary components of foreign banks' liquidity creation in assets (LCA) and liabilities (LCLE).
There is no discernible impact from foreign ownership of the parts of assets and liabilities. The asset side component reveals that, in contrast to liabilities, the creation of new liquidity is significantly positively impacted by financial stability by 5%. This indicates that the asset component contributes to the interaction effect of foreign ownership and financial stability on total liquidity creation.

Judging from the interactions per component, we found that the coefficient of the interaction variable (ZScore*FOwn) for both the asset and liability sides is not significant. In other words, there was no discernible impact of the interaction factors on the creation of on-balance-sheet liquidity. Therefore, the effect of interaction factors in enhancing liquidity creation, as discovered in the previous research, cannot be explained by this component.

Table 6 Regression Results of Financial Stability and Foreign Ownership Variables on Liquidity Creation Components

	Model 1 (LC A)	Model 2 (LC A)	Model 1 (LC LE)	Model 2 (LC LE)
Dependent Variable: Liquidity Creation Component				
Independent Variables:				
FOwn	0.0110 (0.4624)	0.0023 (0.9097)	0.0258 (0.2853)	-0.0052 (0.8707)
ZScore	0.0002 (0.0012**)	-0.00002 (0.9296)	-0.0001 (0.6205)	-0.0006 (0.1332)
ZScore*FOwn		0.0003 (0.3621)		0.0008 (0.1567)
Bank Control Variables:				
Cap	-0.4659 (0.0000***)	-0.4732 (0.0000***)	-0.3428 (0.0000***)	-0.3317 (0.0000***)
NPL	-0.3941 (0.0002***)	-0.3859 (0.0004***)	-0.1350 (0.2815)	-0.1133 (0.5336)
LDR	0.0562 (0.0000***)	0.0556 (0.0000***)	-0.0187 (0.0225**)	-0.0199 (0.0159**)
Size	-0.0027 (0.6520)	-0.0030 (0.7803)	0.0138 (0.0309**)	0.0145 (0.0310**)
Age	-0.0144 (0.6189)	-0.0030 (0.9503)	0.0495 (0.0463**)	0.0497 (0.0606*)
Macro Control Variable:				
GDP	0.0474 (0.6360)	0.0596 (0.5709)	-0.8005 (0.0000***)	-0.8206 (0.0000***)
Intercept	0.4214 (0.0000***)	0.3779 (0.0023**)	-0.3346 (0.0000***)	-0.3249 (0.0020**)
Adj R Square	0.4463	0.4069	0.3834	0.3723
Obs	384	384	384	384

Sources: data processed by authors.
Note: Statistical significance is shown by 1%, 5%, and 10% levels, respectively, which are denoted by the superscript asterisks ***, **, and *.

Table 7 reports the creation of liquidity in the asset component and liability component for the domestic ownership subsample. Domestic ownership of the liability and asset components has a 1% and 5% positive impact on the creation of liquidity, respectively. However, financial stability does not significantly affect anything. This finding confirms that domestic ownership of all components, both assets and liabilities, plays a role in creating liquidity.

Regarding the control variable, we observe that it is still relatively the same. They maintain the direction of the relationship and its significance on both its component sides.

Table 7 Regression Results of Financial Stability and Domestic Ownership Variables on Liquidity Creation

	Model 1 (LC_A)	Model 2 (LC_A)	Model 1 (LC_LE)	Model 2 (LC LE)
Dependent Variable: Liquidity Creation Component				
IndependentVariables:				
Down	0.0680 (0.0000***)	0.0430 (0.0065**)	0.0647 (0.0023**)	0.0658 (0.0082**)
ZScore	0.00001 (0.7404)	-0.0002 (0.0098**)	0.00002 (0.7470)	0.00003 (0.8294)
ZScore*Down		0.0004 (0.0023**)		-0.00002 (0.9361)
Bank Control Variables:				
Cap	-0.3235 (0.0000***)	-0.3155 (0.0000***)	-0.5975 (0.0000***)	-0.5978 (0.0000***)
NPL	-0.0538 (0.6397)	-0.0231 (0.8402)	0.1849 (0.3044)	0.1836 (0.3100)
LDR	0.0895 (0.0000***)	0.0867 (0.0000***)	-0.0413 (0.0030**)	-0.0412 (0.0033**)
Size	-0.0178 (0.0133**)	-0.0168 (0.0189**)	0.0018 (0.8734)	0.0017 (0.8766)
Age	0.1148 (0.0016**)	0.1173 (0.0012**)	0.2216 (0.0001**)	0.2214 (0.0001***)
Macro Control Variable:				
GDP	0.0038 (0.9646)	0.0157 (0.8547)	-0.4954 (0.0002**)	-0.4959 (0.0003**)
Intercept	0.1238 (0.1577)	0.1118 (0.1996)	-0.6474 (0.0000***)	-0.6469 (0.0000***)
Adj R Square	0.7637	0.7665	0.6628	0.6623
Obs	736	736	736	736

Sources: data processed by authors.

Note: statistical significance is shown by the superscript asterisks ***, **, and * at the 1%, 5%, and 10% levels, respectively.

4.6. Discussions

The relationship between foreign ownership is positive, and financial stability is negative but does not have a significant effect on liquidity creation. Research findings by Kusi et al. (2021) support that financial stability does not have a significant negative effect, in contrast to the negative effect of Berger and Bouwman (2009) on small banks. In contrast, Toh and Jia (2021) and Kusi et al. (2021) found foreign ownership to have a significant positive effect on liquidity creation.

Researchers found that the interaction of ownership and financial stability has a significant influence on liquidity creation in foreign banks. This indicates that the interplay of foreign ownership and financial stability can enhance liquidity creation. Consequently, foreign ownership determines how much influence financial stability has on liquidity creation. On the contrary, domestic ownership does not necessarily determine how much banking system stability contributes to liquidity creation.

The asset component has a positive effect on the interaction of foreign ownership and financial stability on total liquidity creation; this supports the findings of Berger et al. (2019). This does not apply to domestic ownership, but both the liability and asset components contribute positively to the role of domestic ownership in creating bank liquidity.

The capital effect on the creation of liquidity has produced mixed effects. Because of the possibility of a bank run, the connection between capital and liquidity creation may be unfavorable (Diamond and Dybvig, 1983). This study discovered that the capital ratio has a negative impact on the creation of liquidity, indicating that as capital rises, the production of liquidity declines. This is consistent with the notion that "financial fragility crowds out." Other researchers who hold this viewpoint include Chaabouni al. (2018), Fungacova et al. (2017), Horváth et al. (2014), Casu et al. (2018), Kusi et al. (2021) and Toh (2019). Berger and Bouwman (2009) assert that the only banks that have a negative link are small.

In creating liquidity, foreign ownership considers credit risk (negative NPL) and liquidity risk (positive LDR). When credit risk increases, foreign banks will reduce their liquidity creation. Toh and Jia (2021) and Kusi et al. (2021) state that this relationship is not significant, but these findings support that when public savings increase, banks will increase their liquidity creation, while liquidity risk is in contrast to Toh and Jia (2021). Domestically owned banks only increase liquidity creation when the amount of public savings increases; this is in accordance with the findings of Berger and Bouwman (2009). Size has a significant negative effect on the creation of liquidity; this is in line with the findings of Berger and Bouwman (2009), Berger

et al. (2019), while Toh and Jia (2021) and Kusi et al. (2021) found the opposite relationship.

Domestic ownership of the firm has a 10% substantial negative impact on liquidity creation, which is lost when there is an interaction variable. Toh and Jia (2021) and Díaz and Huang (2017) agree with these findings. A 1% increase in GDP significantly reduces the creation of new liquid assets. This means that economic growth decreases, and liquidity creation increases. This finding is different from Berger and Sedunov (2017) and Díaz and Huang (2017), who found GDP to be positively related.

Only domestic bank size has a substantial negative impact of 10% on liquidity creation, but this is lost when there are interaction variables. These results support the findings of Toh and Jia (2021) and Díaz and Huang (2017). A 1% increase in GDP significantly reduces the creation of new liquid assets, meaning that economic growth decreases and liquidity creation increases. This finding is different from Berger and Sedunov (2017) and Díaz and Huang (2017), who found GDP to be positively related.

5. Conclusions and Future Research

In our research, we found that there is no Granger causal link between financial stability and liquidity creation, either favorably or negatively. That is, they do not influence each other, and the influence of each depends on other variables. Meanwhile, liquidity creation is not influenced by financial stability and foreign ownership. However, bank liquidity creation activities are strengthened by the interaction between financial stability and foreign ownership. This role is only contributed by the asset-side liquidity creation component. In contrast, domestic ownership positively affects liquidity creation, but there is no joint role between ownership and financial stability. Thus, foreign ownership does not play a direct role in creating bank liquidity; on the contrary, domestic ownership plays a significant role.

Our findings showed that financial stability, foreign ownership, domestic ownership, and their interactions contribute to economic activity. In this case, the acceleration or deceleration of the economy depends on ownership and their respective roles. As a result, these findings can serve as a source for regulators seeking to preserve and increase market liquidity.

The significant interaction between foreign ownership and financial stability indicates that foreign banks are still considering funding liquidity. This is indicated by the significant negative relationship between NPL and positive LDR with the creation of liquidity. Drehmann and Nikolaou (2013) define funding liquidity as a bank's ability to settle obligations quickly so that it remains liquid because it is able to complete obligations. On the other hand, domestic banks, in creating liquidity, do

not consider bank stability either directly or indirectly, as shown by the relationship to financial stability, which is not significant, and the interaction is not significant. Does this indicate that there are differences in funding liquidity at foreign and domestic banks? Therefore, further research on liquidity creation needs to consider the factors of funding liquidity and funding liquidity risk.

Acknowledgments
We express our thanks to:
1. Dean of the Faculty of Economics and Business, Jenderal Soedirman University, who has encouraged the process of writing articles until they are sent to journals.
2. Head of the Institute for Research and Community Service, which provides the opportunity to take part in reputable international writing training.

Funding
This research received no specific grant from any funding agency in the public, commercial, or not–for–profit sectors.

Author Contributions
All authors contributed to the study's conception and design. All authors read and approved the final manuscript.
Sudarto: Conceptualization, Methodology, Software, Formal analysis, Investigation, Data curation, Writing – original draft preparation, Writing – review and editing, Visualization, Project administration.
Wiwiek Rabiatul Adawiyah: Methodology, Resources, Writing – reviewing & editing, Supervision, Funding acquisition, Validation,
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Dian Purnomo Jati: Software, Data curation, Writing – reviewing & editing, Project administration.

Disclosure statement
The authors have not any competing financial, professional, or personal interests from other parties.

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