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The impacts of liquidity creation on banking stability: An empirical research in ASEAN-5

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Abstract

Using both GMM estimation and Bayesian approaches during the period from 2007 to 2021 to examine the impacts of liquidity creation (LC) on bank stability (BS) in a sample of 53 banks across five Southeast Asian countries (ASEAN-5), the author has become a pioneer in conducting the first empirical study applying these two approaches, which provides a broader perspective on the effects of liquidity creation on bank stability. Utilizing CatFat and CatNonFat indexes, the author follows the method of Berger and Bouwman [1] to represent the ability to create liquidity based on a sample of 794 observations from banks in Indonesia, Malaysia, the Philippines, Vietnam, and Thailand. The positive impacts of LC on financial stability revealed by both approaches have contributed important management implications to the banking industry in ASEAN-5 in particular and to emerging and developing economies in general. The research also enriches the literature on the relationship between LC and BS. Not only new empirical insights but also the complex nature of the correlation between bank stability (a critical feature of the banking system) and liquidity creation (a fundamental function) have been revealed. Additionally, the author has identified factors affecting BS in the research sample, which is critically important for the supervision and management of the banking industry in ASEAN. By analyzing the impact of liquidity creation on banks' stability, the author hopes to contribute important implications for banking supervision and management activities in ASEAN, especially in emerging and developing economies.

Keywords: Banking stability, GMM, Liquidity creation, the Bayes method, ASEAN-5.

JEL Classification: G21; G22; G4.

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1. Introduction

A few encouragements for the author to study the role of LC on BS in ASEAN-5 are listed as follows:

Firstly, the stability of the banking system is considered as one of the most important factors influencing economic growth, especially in developing and emerging economies [2]. Above all, the impacts of global crises in the past decades and the recent financial downturn in particular have pointed out that the ability to take excessive risks of a bank is the reason for financial chaos [3]. Therefore, a stable and sustainable banking system is a matter of concern for governments of countries [4].

Secondly, LC and risk transformation are basically functions of banks [1]. Furthermore, Banks always aim to maximize LC to increase profits [3] because highly liquid assets generate lower income. On the other hand, Fidrmuc, et al. [5] argues that LC has a negative impact on BS in which equity capital acts as a buffer to help banks absorb shocks causing asset values decline [6]. Several banks have experience this liquidity shortage due to the contagion effects, resulting in a drop of real economy growth [5]. Thus, the role of LC has become essentially important for the national financial system and economy [7].

Thirdly, the financial system in ASEAN mostly relies on banking institutions [8]. Therefore, banking stability in the region has become one of the top concerns among researchers Gupta and Kashiramka [9]. Noted that heterogeneous development characteristics of the banking system found in ASEAN-5 [10] is another important factor affecting banking stability, the author has provided empirical evidences and profound implications for policymakers to address the above in ASEAN-5.

Fourthly, banking risk is also an issue struggled by many banks in Asia because private sector companies mostly depends on banks via funding sources [4]. In the context that Asian economies are becoming more and more significant during financial globalization [11] higher needs to study the correlation between BS and LC are recognized. LC in banking is necessary, but excessive LC can increase the fragility of the banking sector [7, 9]. Therefore, the role of banks in LC and BS is critically significant in developing countries.

To fill in the academic gap of the literature review on the impacts of LC on BS in ASEAN-5, the author has successfully conducted the study.

Firstly, with the new approach of Berger and Bouwman [1] a variety of LC on aspects have been employed such as LC with bank capital [12] market power [13] competition [14] ownership structure [15] however, liquidity creation in the relation with financial stability is rarely examined except for [16, 17].

Secondly, LC and BS correlation has been tested using both frequency and the Bayesian statistical methods to ensure the reliability of the research results. Acknowledging the differences of the above approaches, the researcher has pointed out a few shortcomings of the frequency statistics method [18]. While scientific conclusions in frequency statistics are drawn without prior information or constant parameters in the Bayesian statistics, parameters are modeled as random variables to accurately describe different aspects of the sample over time and platforms [19]. Using this approach, the author has been recognized as the first researcher to test the impacts of LC on BS in ASEAN-5. Thirdly, the study, with the latest updated research data from 2007 to 2021 of several banks in ASEAN-5, has provided in-depth insights of the effects of LC on BS after the Global Financial Crisis (GFC). The study results of above correlation can be further generalized for policy-making debates with direct implications beneficial for several countries in the region.

This paper is structured into five sections, in which the theoretical background is presented in sections 1 and 2 respectively. Sections 3-4 present the methodology and discuss the research results. Finally, Section 5 presents the conclusions and policy implications.

2. Research Theoretical Basis and Literature Overview

2.1. Liquidity Creation (LC)

Liquidity Creation is providing relatively liquid assets financed by relatively liquid liabilities on the balance sheet [20, 21] or making commitments, loan bonds and other similar off-balance sheet requirements. Banks create liquidity by converting highly liquid assets into illiquid counterparts. Berger and Bouwman [1] proposed a method of measuring liquidity based on the liquidity characteristics of each item classified on and off the balance sheet. Banks create LC through risk-transfer activities to serve the purpose of providing credit to borrowers who cannot access finance from the capital market. At the same time, providing access to payment services for depositors [20, 21]. Banks are encouraged to maximize LC for higher profits and greater values as illiquid assets can generate better returns than liquid assets [3]. When BS is out of balance, LC can cause two side effects, which is one of the top concerns of many banking regulators in the region.

2.2. The impacts of LC on BS

There are mixed results on the relationship between LC and BS in various studies. The “high LC” hypothesis suggests that when a bank’s LC increases above the optimal level, the bankruptcy increases [17]. Banks will lack liquid assets to be able to meet customers' needs of either deposit or withdrawal requests. If banks accept short-term deposits and keep long-term assets in incompatible duration might further suffer financial weaknesses. Liquidity transformation, therefore, causes greater financial fragility [22]. According to the High Liquidity Creation Hypothesis (HLCH), creating liquidity leads to solvency shortage risks. When experiencing a large and sudden outflow of deposits, banks that face illiquidity must sell illiquid assets at low prices, resulting in liquidity risks and the possibility of bankruptcy [23]. In other words, higher liquidity results in lower stability of the bank.

Additionally, LC features the ability of the banks to facilitate local banking transactions among studied economies, thereby supporting macroeconomic development of these nations. From that, lower LC reflects funding management instability, which can be seen via the balance sheet and other signs of trouble. The majority of researchers support the act to increase LC, as they believe that the tendency to raise bank capital relevant to the LC level can help minimize bank risks, eventually reducing the possibility of bankruptcy [6]. In the case that LC decreases, funding for credit cards is limited; thereby, higher risks of bankruptcy and economic recession can be revealed.

Using data from 690 banks of 24 countries during 2000–2014, Islamic banks (IBs) reveal that LC increases bank stability and creates more liquidity per unit of assets in general [16]. Studying a sample of 91 banks commercial banks in India in the period of 2007 - 2019, [17] also shows a positive impact on financial stability; level of the positive LC effects varies depending on the size of the bank. Similar outcomes have been revealed in the research of Duan and Niu [3] on 9,074 commercial banks in the period of 2001-2016 using the fixed effect method (FEM). On the other hand, a negative association between LC and BS has found in different banks of developing countries [15, 24]. Furthermore, Fungacova, et al. [25] Found that LC has a U-shaped impact on banking system-wide risks, which contributes to inconsistent study results on the correlation between LC and BS.

Based on various empirical research results, two opposing hypotheses have been proposed as follows:

Hypothesis 1A: LC has a positive impact on BS or increases the stability of a bank, contrary to with the HLCH.

Hypothesis 1B: LC has a negative effect on BS or increases the instability of a bank, consistent with the HLCH.

3. Research Data and Research Methodology

3.1. Research Data

Research data from ASEAN-5, including Vietnam, Thailand, Indonesia, and Malaysia, have been collected and categorized into different groups: bank-specific data (Bankscope) and related macroeconomic factors (World Bank and IMF). The final research sample includes 53 commercial banks, 795 observations with unbalanced panel data over the period of 2007–2021 (a few banks were excluded from the research database due to heterogeneity or inadequate values during the research period). Indonesia has the highest data proportion (36%), followed by Vietnam and Thailand (21%), Philippines (11%), and Malaysia (11%). The total assets of these 53 chosen banks have accounted for approximately 75% of the total banking assets in ASEAN, ensuring representativeness and liability for the research paper.

3.2. Research Models

Based on the study of Berger, et al. [16] the study proposes the following research model:

$$Z - score_{i,j,t} = \beta_o + \beta_1 * Zscore_{i,j,t-1} + \beta_2 * LC_{i,j,t} + \beta_x X_{i,j,t} + \mu_i + \varepsilon_{i,j,t} \quad (1)$$

Where i and t represent country and time, respectively.

$Z - score_{i,j,t}$ = ln (Z-score) are the dependent variables indicating thestability of bank i country j in year t; $LC_{i,j,t}$ = LC index of bank i, country j in year t; Xijt is a set of control variables, which are specific to bank i in country j in year t such as SIZE, NPL, CAR, CIR, NIM, LIQ and macroeconomic factors of country j in year t (such as GDP, INF); μi is a fixed effect, constant over time but unobservable. However, ε_(i,j,t) is an error quantity, which can be observable. The Z-score has been used to measure BS in many banking and finance-related literatures [26]. A higher Z-score implies higher BS (or lower risk) and vice versa.

Following the three-step process of Berger and Bouwman [1] the study applies “Catfat” and “CatNonfat”to calculate bank LC ability. Categorization has been done in Step 1. All of a bank's on-balance sheet and off-balance sheet activities as liquid, semi-liquid or illiquid are all classified based on the level of convenience, cost and time needed to convert its obligations into liquidity funds (for customers) or to obtain liquidity funds (for banks).

Classified activities were then weighted in Step 1. After that, Liquidity Creation was calculated by combining the activities classified in both Step 1 and Step 2. The third step calculates the bank's LC capability as follows [1, 13].

3.3. Bank-Specific (Variables) and Macro-Economic Variables

In addition, the study considers adding a series of control variables according to the early warning model CAMELS according to Berger, et al. [16] and Dang [27] including the total assets variable (Bank size - SIZE) to control the risks from the loan portfolio of each individual bank, NPL margin acts as a proxy for credit risk; capital adequacy ratio (CAR); cost/income ratio (CIR); net return on the banks’ earning assets (Quality of management - NIM); ratio of current assets to total assets (LIQ). Besides, there are some macroeconomic variables such as annual GDP growth rate (GDP), inflation (INF) to control economic growth, business cycle and institutional effects.

Table 1.
Presents variables in the research model.

Variables	Symbol	Measure	Expectation
Bs	$Z\text{–}score_{i,t}$	$\frac{\mu(ROAA_{c\,t}) + CAR_{i,t}}{\sigma(ROAA_{c\,t})}$	
Lc	LC	$\frac{Liquidity\ Creation}{Total\ assets}\ x100$	-
Bank size	SIZE	Ln(Total assets)	+

Variables	Symbol	Measure	Expectation
Bs	$Z\text{–}score_{i,t}$	$\frac{\mu(ROAA_{c.t}) + CAR_{i,t}}{\sigma(ROAA_{c\ t})}$	
Capital adequacy ratio	CAR	$= \frac{Equity\ Capital}{Total\ risk - weighted\ assets}\ x100$	+
Credit risks	NPL	$CIR = \frac{Total\ cost}{Total\ income}\ x100$	-
Cost/ income ratio	CIR	$CIR = \frac{Total\ cost}{Total\ income}\ x100$	-
Net interest margin ratio	NIM	$\frac{Interest\ income - Interest\ cost}{Total\ assets} x100$	+
Liquidity ratio	LIQ	$\frac{Cash + deposits}{Total\ assets} x100$	+
Economic growth	GDP	$\frac{GDP_t - GDP_{t-1}}{GDP_{t-1}}$	+
Inflation ratio	INF	$\frac{CPI_t - CPI_{t-1}}{CPI_{t-1}}$	-

3.4. Research Methodology

Regarding the estimation model, the author has faced four problems in the process of estimating Equation 1. Firstly, some variables may have a two-way relationship with banking stability variables, leading to endogeneity. Secondly, some fixed effects in μi may be correlated with the independent variables in the model, also leading to endogeneity. Traditional panel data estimation methods such as fixed effect method (FEM) and Random Effect Model (REM) cannot handle endogeneity and serial correlation. The IV-2SLS method requires the identification of appropriate instrumental variables, which are not parts of the model. Tran, et al. [23] argues that the correlation between LC, capital and bank profits always has endogeneity and serial correlation problems in dynamic panel models. All in all, the author decides to apply the two-step System Generalized Method of Moments (SGMM) estimation, in which Arellano-Bond, Hansen, and Sargan statistics are used to validate instrumental variables.

In addition, the study used Bayesian regression to examine the relationship among variables. Bayesian statistics has parameters that are random variables, following the distribution law [28] different from the parameters considered constant in frequency statistics. The highlight of the Bayesian statistical method is that it is based on prior information and combined with the collected data set, which will give more accurate estimates [29]. In addition, the convergence diagnostic of the MCMC chain is used to ensure that the Bayesian inference, based on the Markov Chain Monte Carlo (MCMC) diagnostics sample simulation, is reasonable.

The advantage of the Bayes compared to frequency is the generality of the Bayes which mean not many tests are performed, similar to frequency statistical methods such as testing endogeneity, autocorrelation, etc. Testing the convergence of the MCMC series is done through trace plots (Trace Plot), posterior distribution plots (Histogram), autocorrelation plots (Autocorrelation), kernel density estimation (Density Plot). A trace plot helps trace the historical display of a parameter value across iterations of the series [30]. In addition to graphical convergence testing, it can also be tested through the mean acceptance rate and minimum efficiency. Not only providing the standard error (Standard Deviation) for the regression coefficient, the Bayesian results also distributes parameters of Monte-Carlo Standard Error – MCSE, indicating the robustness of the regression coefficient. Regarding MCMC chains, the closer MCSE approaches 0, the stronger the MCMC chain is found. According to Flegal, et al. [31] if Monte-Carlo Standard Error (MCSE) values is less than 6.5%, the standard deviation is an acceptable level. Less than 5%, this indicator is considered optimal. Miočević, et al. [32] and Nguyen, et al. [33] argued that the disadvantages of frequency statistics can be overcome when MCMC chains converge.

4. Discussion Research Results

4.1. Descriptive Statistics

Table 2 provides a statistics summary on the research variables. The average of CatNonFat/Total Assets and CatFat/Total Assets in ASEAN-5 are 4% and 0.3%, respectively in the period of 2007– 2021. Furthermore, the mean values of ASEAN bank size and SD are 32.23 and 1.42, respectively, revealing large annual differences across banks. The average GDP rate of countries has achieved 4.88% during 2007-2021, 0.3% lower than the GDP growth rate in the period of 2011-2019 [34] probably due to impact of the Covid-19 pandemic. In the first quarter of 2020, Indonesia achieved 3% growth while Malaysia and the Philippines reached 0.7% and 0.2%, respectively [35]. This indicates the serious impacts of Covid-19 on ASEAN economic growth, thereby affecting the entire banking sector in ASEAN.

Table 2.
Descriptive statistics.

Variables	N. of obs.	Average	S.D	Min.	Max.
Z-score	795	20.226	12.706	0.130	90.491
LC1	795	0.317	0.140	-0.265	0.768
LC2	795	4.051	0.702	0.293	5.382
SIZE	795	32.232	1.420	27.194	35.105
CAR	795	4.069	3.773	-1.139	23.115
NPL	795	2.130	5.351	-0.000	31.040
CIR	795	0.333	3.064	0.000	86.302
NIM	795	0.481	1.687	0.000	23.905
LIQ	795	0.207	0.107	0.045	0.610
GDP	795	4.888	2.773	-9.573	8.464
INF	795	4.443	3.013	1.573	9.868

4.2. Correlation Results Between Variables and Multicollinearity

The correlation coefficient matrix is all less than 0.8 [36] and the VIF of the variables is all less than 5 [37] so it can be seen that the problem of multicollinearity is not an important problem (Table 3).

Table 3.
Autocorrelation results.

Variable	Z-score	LC1	LC2	SIZE	CAR	NPL	CIR	NIM	LIQ	GDP	INF	VIF mean
Z-score	1.00											
LC1	0.03	1.00										
LC2	0.03	0.05	1.00									
SIZE	-0.06	0.03	0.02	1.00								
CAR	0.02	-0.01	-0.01	-0.24	1.00							
NPL	-0.08	-0.05	-0.09	-0.01	0.01	1.00						
CIR	-0.06	0.00	-0.04	-0.04	0.01	0.00	1.00					
NIM	0.00	0.06	-0.04	-0.01	0.08	0.05	0.00	1.00				
LIQ	0.15	-0.07	-0.03	-0.02	0.29	-0.08	-0.03	-0.01	1.00			
GDP	0.02	0.00	-0.12	0.04	0.23	0.01	0.02	0.07	0.03	1.00		
INF	-0.07	-0.05	-0.02	-0.01	0.36	0.08	0.02	0.06	0.01	0.01	1.00	1.28

4.3. Regression Results

The research analysis employs two variables representing LC1 liquidity creation (catfat); LC2 (catnonfat) and banking stability (Z-score) according to Table 4A (The SGMM regression) and Table 4B (The Bayesian regression).

Table 4.
A. LC and BS in ASEAN-5 (SGMM results).

Independent variables	SGMM regression			
	Z-score (1- Catfat)		Z-score (2- Catnonfat)	
	Regression coefficient [Standard deviation]	Probability statistics	Regression coefficient [Standard deviation]	Probability statistics
LC1	5.542 [1.456]	0.000***		
LC2			7.814 [0.327]	0.000***
L.Z-score	12.340 [0.008]	0.000***	12.147 [0.005]	0.000***
SIZE	0.558 [0.203]	0.006***	0.659 [0.098]	0.000***
CAR	-0.732 [0.063]	0.000***	-0.433 [0.045]	0.000***
NPL	0.242 [0.007]	0.000***	0.244 [0.015]	0.000***
CIR	-31.194 [0.143]	0.000***	-0.949 [0.192]	0.000***
NIM	-0.335 [0.043]	0.000***	-0.477 [0.034]	0.000***

Independent variables	SGMM regression			
	Z-score (1- Catfat)		Z-score (2- Catnonfat)	
	Regression coefficient [Standard deviation]	Probability statistics	Regression coefficient [Standard deviation]	Probability statistics
LIQ	202.333 [1.609]	0.000***	177.496 [1.074]	0.000***
GDP	-0.263 [0.036]	0.000***	-0.092 [0.037]	0.014***
INF	0.048 [0.015]	0.002***	0.286 [0.019]	0.000***
_cons	-2.34 [2.603]	0.000***	-5.946 [2.603]	0.000***
Number of observations	795		795	
Number of banks	53		53	
Number of groups	125		125	
Number of instruments	87		87	
Wald Test (F statistics)	22.29***		20.87***	
AR(1)	0.023		0.020	
AR(2)	0.296		0.278	
Sargan Test	1.000		0.999	

Note: Table 4A uses Z-score (Stability Bank); LC1 = "catfat" measure scaled by total assets (LC1) as the measure of liquidity creation, LC2="catnonfat" measure scaled by total assets (LC2) as the measure of liquidity creation; SIZE= Bank size; CAR = Capital adequacy ratio; NPL = Non provision ratio ; CIR = Cost to income ratio; NIM = Net Income Marginal; LIQ = Liquid asset to total asset ratio; GDP= GDP growth; INF= inflation rate. There are 2 models, model 1 uses catfat variable; Model 2 uses catnonfat variable as explanatory variable. The estimation method is the two-step GMM dynamic panel estimator with Windmeijer [38] corrected standard errors. The study examines the appropriateness of the instrumental variables used in the Sargan test, Arellano-Bond AR(1) and AR(2) models to see whether first-order autocorrelation and second-order autocorrelation exist. in the model or not. The AR(1) statistics are significant (<0.05) and AR(2) are not significant (>0.1) indicating that there is first-order autocorrelation and no second-order autocorrelation in the model. Sargan/Hansen test (with p-value>0.1) means accepting hypothesis H0, in which hypothesis H0 states that the instrumental variable is exogenous, meaning not correlated with the error of the model. The AR(2) test has p-value>0.1, which means accepting the hypothesis H0. Hypothesis H0 of the AR(2) test is that there is no second-order autocorrelation in the model. Thus, the results of the models show that the tools of the two models are appropriate and there is no autocorrelation phenomenon in the model. ***, indicate significance at 1% respectively

Source: Orbis Bank-focus, World Bank (WB), International monetary fund (IMF).

Table 4A illustrating the two-step SGMM regression results shows a positive association between LC and BS in both models. The regression coefficients with variables LC1 and LC2 are positive and statistically significant at the 1% significance level. For the LC1 variable, it has a positive impact on Z-score with a regression coefficient of 5.542 (standard deviation 1.456); LC2 variable also has a positive impact on Z-score but the level is higher with a coefficient of 7.814 (0.327).

Our findings contrast with those of Berger, et al. [16] that liquidity created by conventional banks increases their risk of bankruptcy. The lagged value of the Z-score is significant in both models. Accordingly, higher Z-score in the previous year results in a rise in Z-score this year up to 12,13% (model 1) and 12,3% (model 2). The finding shows that BS has an impact on each other over the years [9]. Table 4A also shows that control variables such as SIZE, NPL, LIQ, INF have a positive impact on Z-score, the remaining variables such as CAR, CIR, NIM have a negative impact on Z-score and all variables are statistically significant at 1% level. The SGMM regression results show that the Wald-F test is significant at the 1% level, the Sargan test and the AR(2) test give results greater than 5%, showing that the GMM model is not defective, and the variables in the SGMM regression model are all statistically significant at the 1% level.

Table 4B.
LC and BS in ASEAN-5 (The Bayesian results).

Independent variables	Dependent variables			
	(1- Catfat)		(2- Catnonfat)	
	[Standard deviation]	Standard error (MCSE)	Average of parameter series [Standard deviation]	Standard error (MCSE)
LC1 _Var	2.627 [3.216]	0.032		
LC2_Var			0.214 [0.662]	0.006
SIZE	0.122 [0.238]	0.002	0.047 [0.233]	0.002
CAR	0.033 [0.136]	0.001	0.049 [0.135]	0.001

Independent variables	Dependent variables			
	(1- Catfat)		(2- Catnonfat)	
	[Standard deviation]	Standard error (MCSE)	Average of parameter series [Standard deviation]	Standard error (MCSE)
NPL	-0.283 [0.103]	0.001	-0.275 [0.103]	0.001
CIR	-0.227 [0.145]	0.001	-0.227 [0.146]	0.001
NIM	0.676 [0.331]	0.003	0.643 [0.329]	0.003
LIQ	16.138 [4.012]	0.040	16.330 [4.105]	0.042
GDP	0.155 [0.166]	0.001	0.157 [0.167]	0.001
INF	-0.366 [0.157]	0.0016	-0.363 [0.158]	0.001
_cons	14.830 [7.567]	0.0757	15.426 [7.576]	0.075
Average acceptance rate	0.918		0.911	
Minimal effect	0.050		0.050	
Number of observations	795		795	
Number of banks	53		53	

Note: Panel 4B uses Z-score (Stability Bank); the dependent variable is Catfat (columns 2-3) measured as "cat fat" LC on total assets and Catnonfat (columns 4–5) measured as "cat-nonfat" liquidity creation on total assets. Symbols: Z-score (BS); LC1 = "catfat" measure scaled by total assets (LC1) as the measure of LC, LC2="catnonfat" measure scaled by total assets (LC2) as the measure of LC**;** SIZE= Bank size**;** CAR = Capital adequacy ratio; NPL = Non provision ratio; CIR = Cost to income ratio; NIM = Net Income Marginal; LIQ = Liquid asset to total asset ratio; GDP= GDP growth; INF= inflation rate. There are 2 models, model 1 uses catfat variable; Model 2 uses catnonfat variable as explanatory variable.
Source: Orbis Bank-focus, World Bank (WB), International Monetary Fund (IMF).

Table 4B shows that the MCSE standard errors of the MCMC series of parameters are very small decimal numbers (less than 0.1) [39, 40]. Model in Table 4B also show that LC has a positive impact on BS (Z-score), which is similar to research results of Gupta and Kashiramka [17] and Zheng and Cronje [41]. Different from other countries with developed economies in the region, the results perhaps stem from the uneven level of development of banking systems in ASEAN countries. From a policy perspective, limiting LCs in emerging and developing economies seems to be a prudent policy to prevent increased "fragility" across the system. Along with histograms, autocorrelation charts, and kernel density estimates (density plot), the convergence of MCMC series through trace plots has been conducted and diagnosed according to Thach [19]. The trace plots show no signs of non-convergence of the MCMC series. Figures 1 and 2 indicate trace plots that run quickly through the distribution, low autocorrelation is drawn from autocorrelation plots that drop quickly, and the shape of the posterior distributions (histograms) are like distributions identical probability.

As shown in Tables 4A and 4B, consistent direction of liquidity creation (LC1, LC2) impacts on the financial stability index (Z-score) in both GMM and Bayesian methods, in line with Gupta and Kashiramka [17] and Zheng and Cronje [41] but not similar to Berger, et al. [16]. Different levels of banking development among Southeast Asian economies are the main reasons for the above.

5. Conclusions and Policy Implications

This study aims to fill the theoretical gap of the literature review by examining the relationship between LC and BS. Using CatFat and CatNonFat indexes, the author follows the method of Berger and Bouwman [1] to represent the ability to create liquidity by a sample of 794 observations from 53 banks in ASEAN-5 during the period of 2007–2021. Applying both GMM and BAYES methods, the researcher has found that LC has a positive impact on BS via both liquidity measures and approaches.

The study findings and relevant policy implications are listed as below:

Firstly, with the main focus on the latest database of selected banks in ASEAN-5, this empirical research can be generalized to provide in-depth insights related to LC and BS in other countries of the region.

Secondly, applying the Bayesian approach as a pioneer to examine the impacts of LC on BS in ASEAN-5, the author has revealed similar research results, which is rather in line with studies using the SGMM. Bank LC has also increased steadily since 2010 after a brief decline in the post-GFC years [42]. This paper, therefore, has provided important findings to enrich not only the academic literature on the general impacts of LC on BS, but also contribute to the regulatory frameworks for the governance of banking systems.

Thirdly, the research indicates positive impacts of LC on BS in ASEAN-5, enriching the literature review. Not only new empirical insights but the complex nature of the correlation between BS (a critical feature of the banking system) and LC (a fundamental function) has also been revealed. Additionally, the author has found factors affecting BS in the research sample, which is critically important for supervision and management of banking industry in ASEAN, especially in emerging and developing countries.

Due to uneven development across studied countries, the gaps between LC and BS in emerging and developed economies have been recognized asa limit of the research. To address the above, further studies on different scales, types of banks, and banking cultures in various regions are highly recommended in the future for better clarification of LC effects on BS.

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