The effect of systematic and unsystematic determinants on loan (financing) to deposit ratio in Indonesian banking

Mohammad Iqbal Irfany[1], Muhammad Fikra Yafi Ulhaqqi
Faculty of Economics and Management, IPB University, Indonesia[1&2]
iqbal.irfany@apps.ipb.ac.id

Abstract
Purpose: This study compares the determinants of liquidity of Islamic Banks (IBs) and Conventional Banks (CBs) based on the loan-to-deposit ratio (LDR) and financing-to-deposit ratio (FDR) between 2016 and 2020.
Research Methodology: The data analysis technique used was panel data regression.
Results: The results show Economic growth has a positive effect on banking liquidity risk, while non-performing loans (financing) have a negative effect on banking liquidity risk.
Limitations: The frame time in this research was 2016-2020 which, before Bank Syariah Mandiri, Bank Rakyat Indonesia (BRI) Syariah, and Bank Negara Indonesia (BNI) Syariah merged into Bank Syariah Indonesia.
Contribution: This study can be used as a reference for preparing or perfecting regulations that can be bolder in expanding credit (financing). Commercial banks are expected to be able to manage liquidity so that the liquidity ratio is not less than or exceeds the tolerance limit, especially for CBs, and are used as evaluation material for the performance of IBs, especially CBs.
Novelty: Several previous studies conducted separate analyses of the determinants of LDR and FDR in one type of commercial bank and showed contradictory results. This research did not conduct separate analyses in one type of bank but combined the determinants so that they could cause liquidity risk by measuring LDR on BUK and FDR on BUS to discuss these conflicting findings.
Keywords: *Islamic banks, conventional banks, loan to deposit ratio, non-performing loan, economic growth*
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1. Introduction
The banking industry is vital to a country's economic growth because it mobilizes financial resources. Bank financial institutions function as mediators (intermediaries) between units that own funds (surplus units) and those that require funds (deficit units). A bank extends credit to third-party monies collected in various deposits such as accounts (Bhegawati & Utama, 2020). The development of the Islamic banking industry accelerated with the issuance of Law Number 10 of 1998 regarding the dual banking system. This policy is an opportunity for the banking industry to carry out its functions based on two principles, namely conventional and Sharia, whose operational activities include providing services in payment traffic using conventional or Sharia systems. Activities include raising funds, channelling funds, and offering other financial services.

Based on Law Number 21 of 2008, Conventional Banks (CBs) are banks whose operational activities are carried out conventionally and can be categorized into CBs and Rural Banks. Islamic Banks (IBs)

are banks whose operational activities are based on Sharia principles, and can be categorized into Islamic banks (IBs), Islamic Business Units, and Islamic Rural Banks. The existence of IBs is a financial solution for people who want to conduct financial transactions under Islamic law. In carrying out activities, Islamic banking should always be in the corridor of Sharia under the Decree of the Indonesian Ulema Council Number Kep-98/MUI/III/2001, which states that IBs must maintain operational compliance with Sharia principles. Therefore, the management structure of Islamic banking includes a Sharia Supervisory Board as a form of supervision of IBs compliance with Sharia principles.

The operational basis difference between IBs and CBs fosters competition (Fitria, 2015). This competition has various effects on the development of the banking industry. Banks seek to improve their competitive strength as an outcome of competition. Islamic banking coexists with conventional banking in many countries to provide financial services. While Islamic banking varies from conventional banking in that Islamic principles guide it, both are financial intermediaries that route cash from savers or depositors and require funds. IBs can also face liquidity risk in the same way as CBs, through a mismatch between the maturity of sources of funds (short-term) and the use of funds or financing (long-term).

Banks are exposed to liquidity risk if they are unable to request payments or sell assets in their portfolios when necessary (Ruozi, Ferrari, Ruozi, & Ferrari, 2013). These conditions result in the bank being unable to respond to emergencies, and possibly cause solvency and bankruptcy problems. Arena (2008) claims that improper liquidity management can lead to bankruptcy and risk of default. Improper liquidity management can also result in bankruptcy risk because, in a severe scenario, a bank must sell its assets to fulfil its obligations. Effective liquidity risk management ensures banks meet their cash flow obligations and other necessities (Mohamad, Mohamad, & Samsudin, 2013). According to financial intermediation theory, liquidity risk management is vital for managing liquidity risk because banks are the primary source of liquidity creation in the economy (Allen & Santomero, 1997).

The global financial crisis of 2008 affected the Indonesian economy, caused by the failure of the United States Central Bank to manage the disbursement of housing loans to the public, resulting in subprime mortgages. This event decreased the level of public trust in financial institutions, resulting in a liquidity shortage because people withdrew their funds from banks (Raharjo, 2020). This condition is in line with the opinion of Purnomolastu (2016), who states that banks perform their role as intermediary institutions based on the community's trust (agent of trust). This trust is based on the stakeholders' objectives to gain benefits from the activities they conduct. Therefore, to anticipate the consequences of liquidity risk, banks must pay attention to the determinants of financial risk, both systematically and nonsystematically. Previous literature found several systematic and non-systematic determinants that affect the liquidity risk of IBs (Hussain, Kijkasiwat, Ijaz, & Deari, 2022). Non-systematic factors, namely, bank size, non-performing loans, profitability, and capital adequacy, are those that banks can manage directly. Systematic factors such as economic growth can only be managed after a while, but banks must be prepared to face liquidity problems caused by these factors.

Developments in the banking industry play a vital role in liquidity (Ichsan 2013). Bank Indonesia Regulation Number 17/11/PBI/2015 states that the tolerance limit for the LDR and FDR ratio is 78–92 per cent. From 2016 to 2020, several non-ideal conditions were found in CBs and BUS liquidity, as reflected in the LDR and FDR ratios, as shown in Table 1.

Table 1. Loan to Deposit Ratio (LDR) CBs dan Financing to Deposit Ratio (FDR) IBs in Indonesia from 2016 to 2020

Year	LDR CBs (%)	FDR IBs (%)
2016	90,70	85,99
2017	90,04	79,61
2018	94,78	77,92
2019	94,43	77,91

	2020	82,54	76,36

Source: OJK (2023)

Table 1 compares the ratio levels of LDR and FDR IBs from 2016 to 2020. The LDR ratio of CBs reached 94.78 per cent in 2018 and 94.43 per cent in 2019, which was above the tolerance limit of 92 per cent. Banks are less liquid because they require more assets to finance their loans. Simultaneously, the percentage of FDR IBs in Indonesia continues to decline significantly. This decrease indicates that bank funds were not used for financing expansion. In 2018-2020, the decline in the FDR ratio for IBs reached below the tolerance limit for the FDR ratio, which is 78 per cent. Excess and lack of liquidity affect banks, such as opportunities for liquidity risk to occur (Deky, 2016).

A CBs LDR ratio that exceeds its tolerance limit creates the possibility that a bank will not be able to meet its maturing obligations. Illiquid assets can cause financial crises (Siahaan and Asandimitra 2016). IBs FDR ratios that are less than the tolerance limit of the ratio provide the possibility for banks to have significant idle funds. In addition, excess liquidity indicates that the bank's liquidity management of asset and liability portfolios is not optimal (Wuryandani, Ginting, Iskandar, & Sitompul, 2014). Therefore, this study aims to determine the development of banking liquidity risk in Indonesia and analyze the determinants of systematic and nonsystematic liquidity risk in Indonesian banking.

2. Literature review

2.1. Liquidity Risk Measurement System Using LDR (FDR)
Banks play a central role in economic progress by providing liquidity through illiquid assets (Wang 2002). According to Van Horne and Wachowicz (2005), while banks are guarantors of liquidity, they can also face risks because creating high liquidity can lead to the risk of liquidating illiquid assets to meet customer demands. Therefore, banks must manage liquidity and other risks in order to stay in business. Existing literature provides several ways for banks to manage liquidity risk. Banks can store liquidity reserves or issue securities to fulfil depositor withdrawals. Banks can also take advantage of interbank loans or sources of funds from the central bank for the same purpose.

Based on Bank Indonesia Regulation Number 13/1/PBI/2011 regarding the Soundness Rating of Commercial Banks, each commercial bank must assess its soundness level through a risk approach (Risk-based Bank Rating), individually or integrated. Banks must maintain soundness through prudent risk management in their operational activities. Based on the Bank Indonesia Regulation Number 11/25//PBI/2009 amendment to Bank Indonesia Regulation Number 5/8/PBI/2003 concerning the Implementation of Risk Management for Commercial Banks, CBs are required to implement Risk Management, which includes eight risks: credit, market, liquidity, operational, legal, reputation, strategic, and compliance. Meanwhile, IBs are required to implement Risk Management for at least four types of risk, as stipulated in the previous arrangement for banks with low business size and complexity: credit, market, liquidity, and operational risks. This study focuses on liquidity risks.

Liquidity risk occurs when a bank cannot pay its obligations because it is unable to finance the smooth running of daily operations. Banks have many assets, but cannot liquidate them over time (Murphy, 2008). One of the ratios that can be used to measure liquidity risk in CBs is the Loan to Deposit Ratio (LDR) in IBs, also known as the Financing to Deposit Ratio (FDR). The higher the LDR and FDR ratios, the lower the bank's liquidity given the more significant assets required for credit funding (Dendawijaya, 2005). This means that the bank will need help to fulfil its short-term or maturing obligations. According to Bank Indonesia Regulation Number 17/11/PBI/2015, the amount and size specified in the calculation of the minimum reserve requirement, namely, the ratio of LDR to FDR, is the lower limit at 78 per cent and the upper limit at 92 per cent.

2.2. The Effect of NPL (NPF) on LDR (FDR)
According to Hussain et al. (2022), there are two determinants of liquidity risk: nonsystematic (bank-specific) and systematic (macroeconomic). According to Hussain et al. (2022), there are several non-systematic liquidity risk determinants: non-performing loans (NPL and NPF), bank size (BS), bank

capital adequacy ratio (CAR), and profitability ratio (ROA). Non-performing loans harm actual economic activity, and consequently, profits and liquidity (Sharma, 2005). Other empirical studies also show that NPL is significantly related to liquidity risk (Auronen 2003). The high ratio of NPL to NPF indicates poor financing management, which causes delays in business acceleration and high reserves (reducing current profit) that banks must form. According to Arisandi (2008), a higher ratio of NPL to NPF indicates that banks need to be more professional in managing lending and financing, and the level of risk in providing credit and financing is relatively high. A large number of non-performing loans will result in banks not channelling their funds to reduce bank soundness (Putri & Suryantini, 2017). Thus, consistent with Arisandi (2008), the following hypothesis is formulated:

H_1: NPL negatively affects LDR.
H_2: NPF has a negative effect on FDR.

2.3. The Effect of Bank Size on LDR (FDR)

Another determinant is bank size, which is measured by a bank's total assets. Ahmed, Ahmed, and Naqvi (2011) tested a sample of 6 IBs in Pakistan from 2006 to 2009 and concluded that bank size directly affects liquidity risk. Bank size contributes to its liquidity level because it affects its ability to raise funds from external sources and external financing costs (Chen et al., 2018). The size of the bank, marked by the number of assets owned by the bank, has a greater chance of bearing this risk. Risks are borne, such as a significant number of obligations that must be paid immediately before maturity. Bank size (BS) has a negative effect on liquidity risk because the more significant the bank, the more assets it has; thus, there is no need to worry about maturing expenses (Kasmir 2018). Thus, consistent with Kasmir (2018), the following hypothesis was formulated:

H_3: BS has a negative effect on LDR.
H_4: BS has a negative effect on FDR.

2.4. The Effect of CAR on LDR (FDR)

The capital adequacy ratio (CAR) is also seen as the primary determinant of liquidity risk in banking (Jedidia & Hamza, 2015). Specifically, CAR enables banks to absorb losses, maintain banking system stability, and protect depositors (Cantor 2001). Al-Khouri (2012) argues that CAR determines a bank's financial strength. If banks can make payments to depositors on demand and still have sufficient funds for loans, they will be financially strong. In addition to financial strength, the CAR determines a bank's growth ability. IBs with a high CAR tend to grow and have low liquidity risk (Abusharba, Triyuwono, Ismail, & Rahman, 2013). Ongore and Kusa (2013) argue that CAR displays the internal potential of a bank and controls the situation during a crisis. Banks can change their liquidity by changing their funding mix (Raghavan 2003). From one point of view, capital adequacy promotes optimal risk-sharing and limits reckless risk-taking. CAR also reduces the likelihood of bankruptcy and ultimately limits the cost of financial distress (Caggiano and Calice, 2011). Thus, consistent with Abusharba et al. (2013), the following hypothesis is formulated:

H_5: CAR has a negative effect on LDR.
H_6: CAR has a negative effect on FDR.

2.5. The Effect of ROA on LDR (FDR)

Profit is the primary goal of the operational activities carried out by a company, including banking. Two main ratios are typically used to measure bank profitability: return on assets (ROA). According to Dendawijaya (2005), the ratio of Return on Assets (ROA) is a component of profitability used to measure the effectiveness of banking operations in generating profit (profit). An increase in a bank's ROA ratio improves its effectiveness in managing assets to generate profits (Wijaya, 2019). Information related to profit in banking is beneficial for internal and external parties, because it can be used as a basis for decision-making and evaluating company performance. According to Harianto (2017), the use of ROA to measure banking performance is appropriate, because it can measure the overall ability of bank management to create profits. According to Islam and Chowdhury (2009), most bank liquidity is influenced by profitability. Thus, consistent with the evidence of Islam and Chowdhury (2009), the following hypothesis is formulated:

H_7: ROA has a positive effect on the LDR.
H_8: ROA has a positive effect on FDR.

2.6. The Effect of GDP on LDR (FDR)

Khan, Scheule, and Wu (2017) show that banks took less risk during the global financial crisis when their funding liquidity risk decreased. Failure to comply with deposit withdrawals, either due to the inability to sell liquid assets immediately or to purchase bank liabilities when needed, can tarnish the credibility of a bank's ability to manage its liquidity risk (Abdul-Rahman, Sulaiman, & Said, 2018). Much of the literature over the last quarter century has linked finance to the real economy, usually focusing on international comparisons. Choon, Hooi, Murthi, Yi, and Shven (2013) found a positive effect of GDP on banking liquidity. Analysis of Malaysian IBs. Berger and Sedunov (2017) find that bank liquidity creation is significantly positively related to actual economic output, both statistically and economically. Thus, consistent with Choon et al. (2013), the following hypothesis is formulated:

H_9: GDP has a positive effect on the LDR.

H_{10}: GDP has a positive effect on FDR.

3. Research methodology

This study uses annual secondary data for 2016–2020, which was before Bank Syariah Mandiri, Bank Rakyat Indonesia (BRI) Syariah, and Bank Negara Indonesia (BNI) Syariah merged into Bank Syariah Indonesia. Thus, the analyses become objective because of the disregard transformation in the Indonesian Islamic banking industry. The data come from the CEIC, bank financial reports, and OJK banking financial reports. This study also used complementary data from the relevant literature, journals, books, and reports.

To determine the sample of CBs and IBs, this study used a non-probability sampling method using purposive sampling, with the following criteria: First, CBs and IBs are commercial banks registered with the OJK that publish annual financial reports from 2016 to 2020. Second, CBs that did not carry out Sharia financing activities were selected. Third, CBs that have total asset value equal to IBs based on bank regulations include Commercial Banks for Business Activities (BUKU) 2 to 3 under OJK Regulation Number 6/POJK.03/2016, namely commercial banks with core capital of 1 to 30 trillion rupiahs. This category is used so that the sample is balanced and more accurate, considering that the highest total IBs core capital is only 10.052 trillion rupiahs owned by Bank Syariah Mandiri and included in the BUKU 3 bank. Present the materials, methods, survey, and questionnaire used in the study. The author/s should explain whether this study is experimental, review study, simulation based, or survey based. Discuss the software and hardware used in this study with their respective brand names. All research conditions, assumptions, and theories were followed. This section should be sufficiently easy for readers to repeat the study under similar conditions.

3.1 Panel Data Regression

Data analysis and processing were performed using quantitative methods. Panel data regression analysis was used for the quantitative analysis. Based on FDR and LDR, panel data regression analysis was used to determine the liquidity risk determinants of IBs and CBs in Indonesia. According to Baltagi (2005), panel data are observational data on many individuals in a certain period and have a double subscript (multiple indices) on the variable that shows the dimensions of the time series and cross section. According to Gujarati (2004), several assumptions must be met when using this model, including that the data must be normally distributed, that there is no perfect linear relationship between independent variables (multicollinearity), and that there is no correlation between residuals (autocorrelation) and constant variance values (homoscedasticity). The models used in this study were as follows:

$$LDR_{it} = \beta_0 + \beta_1(BS)_{it} + \beta_2(NPL)_{it} + \beta_3(CAR)_{it} + \beta_4(ROA)_{it} + \beta_5(GDP)_{it} + \varepsilon_{it} \quad (1)$$

$$FDR_{it} = \beta_0 + \beta_1(BS)_{it} + \beta_2(NPF)_{it} + \beta_3(CAR)_{it} + \beta_4(ROA)_{it} + \beta_5(GDP)_{it} + \varepsilon_{it} \quad (2)$$

Note:

LDR	= Loan to Deposit Ratio (%)
FDR	= Financing to Deposit Ratio (%)
NPF	= Non-Performing Financing (%)
NPL	= Non-Performing Loan (%)
CAR	= Capital Adequacy Ratio (%)

BS	= Bank Size (Million Rupiahs)
ROA	= Return on Asset (%)
GDP	= Gross Domestic Product (%)
$\beta 0$	= Intercept
$\beta 1,…,\beta 5$	= Slop
εit	= Error term
i	= Individual-i
t	= Time period-t

4. Results and discussions

4.1. Identification of Banking Liquidity Risk Development in Indonnesia

Liquidity risk is explained through the LDR and FDR ratios, which are proxies for liquidity, to measure a bank's ability to carry out the intermediary function and fulfil its short-term or maturity obligations.

Table 2. Descriptive statistics

Systematic Variables in Indonesian Banking					
Variabel	N	Min	Mean	SD	Max
GDP	5	-2.06551	3.646184	3.193513	5.174292
Non-Sistematic Variables in Indonesian Banking					
Variabel	N	Min	Mean	SD	Max
LDR/LQR	40	63.94	99.462	29.46992	195.55
BS	40	12.80	16.97933	1.313882	18.65
NPL/NPF	40	0	1.55575	1.254862	4.97
CAR	40	12.34	22.547	8.348221	49.44
ROA	40	-8.09	1.60875	2.880864	13.58
Conventional Banking Non-Systematic Variables					
Variabel	N	Min	Mean	SD	Max
LDR	40	76.87	114.7775	34.54511	195.55
BS	40	12.80	17.07784	1.56634	18.57
NPL	40	0	1.23075	0.931749	4.2
CAR	40	13.34	22.167	6.962823	45.94
ROA	40	-0.28	1.44475	1.066499	4.56
Sharia Banking Non-Systematic Variables					
Variabel	N	Min	Mean	SD	Max
FDR	40	63.94	84.1465	9.203161	98.73
BS	40	15.42	16.8808	32176631	18.65
NPF	40	0.01	1.88075	1.450831	4.97
CAR	40	12.34	22.927	9.612256	49.44
ROA	40	-8.09	1.77275	3.952084	13.58

Source: CEIC data, bank financial reports, and OJK banking financial reports (2023)

Table 3. Variable correlation

Banking in Indonesia						
Variabel	LDR	BS	NPL	CAR	ROA	GDP
LDR	1					
BS	-0.19086	1				
NPL	-0.46336	0.108393	1			
CAR	0.164387	-0.44826	-0.44202	1		
ROA	0.132018	-0.20852	-0.50342	0.508078	1	
GDP	0.150451	-0.10018	0.065274	-0.30611	0.02786	1
Conventional Banking in Indonesia						
Variabel	LDR	BS	NPL	CAR	ROA	GDP
LDR	1					
BS	-0.35208	1				

Variabel	LDR	BS	NPL	CAR	ROA	GDP
NPL	-0.62831	0.218263	1			
CAR	0.254744	-0.44881	-0.36429	1		
ROA	0.515455	-0.55441	-0.4089	0.41774	1	
GDP	0.166777	-0.07394	-0.02543	-0.44742	0.151168	1
Sharia Banking in Indonesia						
Variabel	LDR	BS	NPL	CAR	ROA	GDP
LDR	1					
BS	-0.60214	1				
NPL	-0.32026	0.14835	1			
CAR	0.368367	-0.46798	-0.52129	1		
ROA	0.243745	-0.14562	-0.59115	0.566542	1	
GDP	0.343676	-0.13449	0.129967	-0.21102	8.21E-05	1

Source: CEIC data, bank financial reports, and OJK banking financial reports (2023)

Based on the Bank Indonesia Regulations (PBI), a good bank's LDR is 78%–92 per cent. Based on the information in Table 2, FDR on IBs illustrates a better implementation of the intermediary function with an average value within the tolerance limit range. In addition, conventional and Sharia banking have available capital capacity to handle non-performing loans, as seen from the mean variable CAR, which is not significantly different. The mean ROA value indicates that the bank obtains lower profits than the risks it faces.
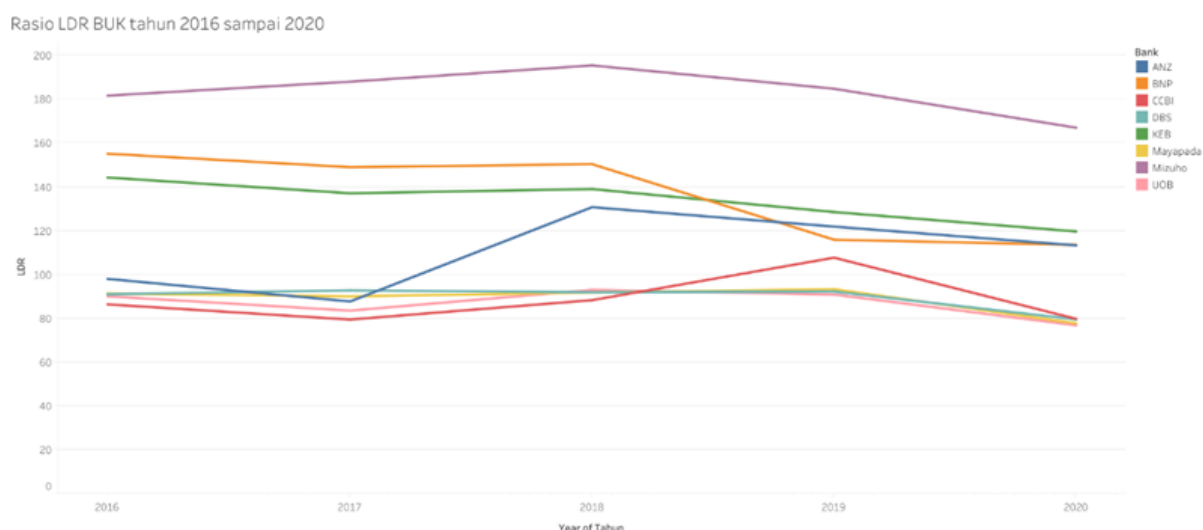

Figure 1. CBs LDR ratio from 2016 to 2020
Source: Financial reports of each CBs from 2016 to 2020 (2023)

Figure 3 shows the fluctuations in the LDR ratios for the eight CBs during the study period. Most CBs indicated that they experienced liquidity problems because their LDR ratios exceeded the upper tolerance limit of 92 per cent. The LDR variable had an average value of 114.77 per cent. A high LDR value makes it possible for banks to face the risk of being unable to pay off their short-term obligations. Illiquid assets can cause banks to face a financial crisis, leading to a decrease in soundness. Bank UOB in 2020 had the lowest LDR ratio value of 76.87 per cent, and Mizuho Bank in 2018 had the highest LDR of 195.55 per cent. The fluctuations in the LDR ratio at Mizuho Bank from 2016 to 2020 were above the 92% tolerance limit, indicating that bank liquidity was at risk.
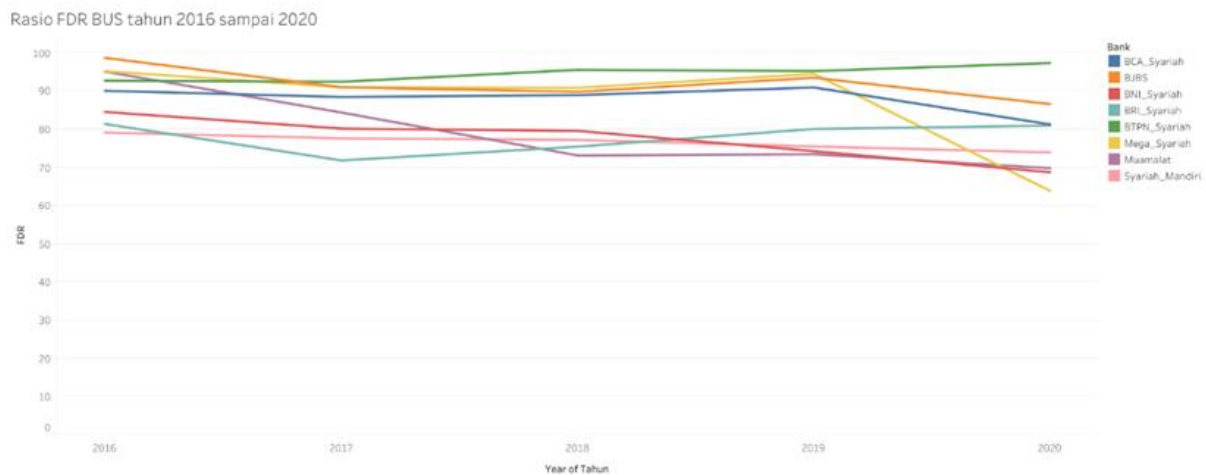
Figure 4. IBs FDR ratio from 2016 to 2020
Source: Financial reports of each CBs from 2016 to 2020 (2023)

Based on Figure 4, during the study period, Bank Syariah Mandiri and BNI Syariah continued to experience a decrease in FDR ratio. However, the FDR variable was generally within the tolerance limits, with an average of 84.27 percent. This value indicates that IBs carry out their intermediary function properly, and that IBs liquidity is healthy. In several periods, there were FDR values that were less than or exceeded the standard FDR limit; namely, Bank Mega Syariah in 2020 had the lowest FDR value of 63.94 percent, and Bank BJB Syariah in 2016 had the highest FDR value of 98.73 percent. At Bank Syariah Mandiri, the FDR ratio continuously decreased from 2016 to 2020. This means that there has been a decrease in the implementation of the bank's intermediary function, and an increase in idle funds.

4.2. Determinants of Banking Liquidity Risk in Indonesia

Table 5 shows the factors that significantly influence respondents' income and business profits after financing. The data processing results show an R-square of 0.681 for income after financing, meaning that 68.1% of the variation in the value of income after financing can be explained by each explanatory variable in the model, while the other variables explain the rest. The R-square value for profit after financing is 0.352, meaning that 35.2% of the variation in profit after financing can be explained by each explanatory variable in the model, while the other variables explain the rest.

Table 4. Panel data regression estimation results

Variable	Fixed Effect Model			Random Effect Model		
	Combined Banking	Sharia Banking	Conven. Banking	Combined Banking	Sharia Banking	Conven. Banking
GDP	1.738***	1.039*	2.335**	1.845***	1.073**	2.353***
	(6.371)	(2.736)	(3.6623)	(6.316)	(2.917)	(3.748)
BS	-12.388*	-14.259*	-4.371	-8.673*	-4.790**	-3.375
	(-2.459)	(-2.567)	(-0.531)	(-2.313)	(-3.043)	(-0.658)
NPL(NPF)	-5.676**	-4.456**	-6.843**	-5.697**	-1.647	-7.228***
	(-2.868)	(-3.265)	(-3.452)	(-2.920)	(-1.602)	(-3.636)
CAR	0.533*	0.556*	0.629	0.495*	0.169	0.650
	(2.266)	(2.429)	(1.710)	(2.125)	(1.030)	(1.779)
ROA	-1.150*	-1.434*	3.050	-1.115*	-0.310	3.499

	(-2.635)	(-2.420)	(1.184)	(-2.473)	(-0.718)	(1.480)
C				239.49***	160.86***	153.26
				(3.934)	(5.660)	(1.679)
Hausmann Test	prob: 0.3434	prob: 0.9387	prob: 0.03517	prob: 0.3434	prob: 0.9387	prob: 0.03517
N	80	40	40	80	40	40
Adjusted R-Sq	0.34267	0.2926	0.43784	0.42128	0.41614	0.50884

*, **, *** implies statistical significance at 10%, 5% and 1% levels respectively
Source: R Studio (2023)

The first and second hypotheses, the negative relationship between the ratio of NPL and NPF to LDR and FDR, indicate that an increase in non-performing loans/financing to total credit/financing will decrease the amount of credit/financing disbursed. NPL and NPF reflect the ability of bank management to manage the collectibility of disbursed, non-performing loans/financing. This is consistent with studies showing that banks must bear losses in their operational activities because of significant problems with loans/financing (Ramadhani & Indriani, 2016). An increase in NPL and NPF causes banks to lose opportunities to earn income from disbursed credit/financing, and banks must increase the provision of productive asset reserves to anticipate capital resilience in the event of problematic loans/financing. The decrease in income caused by non-performing credit or financing reduces the source of funds for channeling credit or financing.

From the estimation results, the third and fourth hypotheses show that the ROA variable does not partially affect the LDR of CBs in Indonesia and that ROA negatively affects the FDR of IBs in Indonesia. The Return on Assets (ROA) ratio describes a bank's profitability. ROA has a negative effect on FDR, which indicates that a smaller income level ratio (ROA) will not affect the decrease in lending or financing but will have an impact on decreasing the level of liquidity of financing distribution (Somantri & Sukmana, 2019). IBs must improve their performance by expanding their lending (financing), particularly in the real sector. Moreover, CBs, as seen in the LDR, do not affect the ROA.

From the estimation results, the fifth and sixth hypotheses show that BS does not partially affect the LDR of CBs in Indonesia, and BS negatively affects the FDR of IBs in Indonesia. The high liquidity of the bank indicates that the LDR and FDR levels are decreasing because many funds are not allocated in the form of financing but are used to offset their obligations to meet the demands of depositors who want to withdraw the money that has been used by the bank to provide financing (Dendawijaya, 2005). The results of this study are reinforced by Arfiyanti and Pertiwi (2020), who state that the low LDR of banks is caused by fear of bad loans; therefore, excess assets are more likely to be placed in safer instruments with definite benefits, namely Bank Indonesia Certificates (SBI), and the purchase of government bonds that have relatively high interest rates and low risk.

From the estimation results, the seventh and eighth hypotheses show that, partially, the CAR variable has no effect on the CBs LDR and has a positive effect on IBs FDR. The relationship between CAR and LDR can be seen in the indications of lending problems that do not significantly affect capital. Banks do not distribute funds to maintain the health of minimum capital according to predetermined limits or to avoid the risk of bad credit (Fadillah & Aji, 2018). However, the IBs in this study could maintain minimum capital health and continue to distribute funds.

The ninth and tenth hypotheses show that the economic growth calculated from the expenditure side, one of which is an increase in the investment and consumption variables, has a positive effect on lending (financing), LDR, and FDR. Economic growth can increase liquidity, so that banks can extend their credit. The analysis results showed that economic growth had a positive relationship with LDR and FDR.

5. Conclusions

From 2016 to 2020, the development of the financial ratios of CBs and IBs has been quite good. Regarding liquidity, FDR at IBs shows better conditions, with an average within the tolerance range of 78 to 92%, compared with LDR at CBs. Based on the estimation of the determinants of banking liquidity risk in Indonesia, economic growth as a systematic variable has a positive effect on the loan-to-deposit ratio, while NPLs (financing) as a non-systematic variable have a negative effect on the loan-to-deposit ratio. Large banks tend to place excess assets in safer instruments with definite profits,, so that bank size and profitability ratios have a negative effect on IBs liquidity risk and have no effect on CBs liquidity risk. Unlike CBs, which do not extend credit to maintain capital adequacy, IBs can manage capital adequacy and continue to distribute financing to positively affect liquidity risk.

5.1. Recommendations

Regulators can use this as a reference for preparing or perfecting regulations that can be bolder in expanding credit (financing). Commercial banks are expected to be able to manage liquidity so that the liquidity ratio is not less than or exceeds the tolerance limit, especially for CBs, and are used as evaluation material for the performance of IBs, especially CBs. As was found in the results of the study, low income due to the tendency of banks to place excess assets in safer instruments with definite profits causes a decrease in their ability to expand credit (financing), especially in the real sector. It is recommended that future researchers use the latest timeframe and add systematic variables, such as inflation and reference interest rates, based on the BI 7-day Repo Rate, considering that only one systematic variable is listed.

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