The Relationship Between the Creation of Liquidity, Capital and Profitability of Privatized Banks on the Indonesia Stock Exchange

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ABSTRACT
To hedge against liquidity risk, banks can reduce liquidity creation by holding more liquid assets. Since liquid assets tend to yield lower returns than illiquid assets, the creation of liquidity must be positively related to bank profitability.
Indonesia's privatized banks from year to year increase the creation of liquidity. In 2014 amounting to Rp. 832 trillion, in 2020 amounting to Rp. 1.799 trillion which accounts for about 42.76 percent of total assets, an average increase of 13.9 percent higher than the increase in assets (11.83 percent).
Liquidity creation is negatively correlated with profitability, which causes a decrease in profitability. This relationship allows the bank to have difficulty meeting its short-term obligations (default risk increase) which allows bank bankruptcy. This is supported by increasing credit risk causing profitability to decline. Eq_TA is positively correlated with ROA (Retained earnings can strengthen equity) so that banks are healthier. Which further enhances the financial stability of the country. Therefore, banks with higher equity-to-asset ratios are relatively more profitable. This result is important for bank authorities to maintain the capital adequacy ratio.
Keywords: liquidity risk; liquidity creation; liquid assets; illiquid assets; returns; profitability; capital; credit risk.

1. Introduction

The main activity of the bank is taking deposit funds and providing credit to borrowers. These activities are documented in the balance sheet on the liability side and on the asset side. Berger and Bowman (2009) said, taking deposits using the issuance of claims without risk and can be withdrawn at the same value at any time. Granting credit involves extracting costly information about unclear borrowing and extending this credit information.

Banks bring together providers of funds and users of funds. Depositors submit their funds by requiring a certain interest rate and withdrawn funds are available. This means the borrower must surrender the asset. Thus, it requires the commitment of users of funds and banks. Banks rely on the availability of assets that are used to fulfill obligations to deposits, namely in the amount of deposits and interest. According to Bryant (1980), Diamond and Dybvig (1983), banks finance illiquid assets with liquid liabilities, this forms the bank that is visible on the balance sheet. Holmström and Tirole, 1998; Kashyap, Rajan, and Stein, 2002 complement the liquidity formed in the off balance sheet through the issuance of credit commitments and claims against similar liquid funds.

Berger and Bouwman (2009) have developed a technique for measuring bank liquidity creation. This measure has been widely used in research, especially in explaining the consequences of bank liquidity. Fungáčová, Turk, and Weill (2015) find that liquidity increases the likelihood of

bank failure. However, the liquidity creation of a bank is important because it increases economic growth and output (Fidrmuc, Fungáčová, and Weill, 2015; Berger and Sedunov, 2017).

The inherent possibility of bank failure in liquidity creation activities causes banks to be careful in allocating their short-term funds in the form of credit. This allows banks to reduce the allocation of funds in illiquid assets which in turn will reduce bank profits. Goyal (2020) researching on privatized companies found that companies pay high dividends. Thus, banking companies must carry out adequate liquidity creation activities as a determinant of returns.

Berger and Bouwman (2009) find that the creation of additional liquidity will increase the amount of net surplus distributed among stakeholders and the non-bank public. In this way, the creation of liquidity has a positive influence on the value of the bank. Meanwhile, Bordeleau and Graham (2010) found that banks can reduce the risk of illiquidity and the possibility of default by holding more liquid assets. As a result, banks with higher amounts of liquid assets tend to face lower funding costs and higher net income. Following this argument, Tran et al. (2016) show that banks generally have low profitability if they have high liquidity creation and liquidity risk.

On the one hand, the banking industry argues that tighter capital regulations will increase funding costs and reduce liquidity creation, which will lead to lower lending and investment activity in the economy. Therefore, banks tend to experience lower profitability, as a higher capital ratio shifts funding from liquid deposits to less liquid capital, which in turn reduces the capacity of banks to create liquidity. Consistent with this argument, Goddard, et al (2010) found that an increase in capital requirements has a negative impact on bank profitability. Furthermore, Andreou, Philip, and Robejsek (2016) highlight that better bank managers are able to create more liquidity per dollar of assets and take on more risk but reduce liquidity and debt creation during financial crises. This suggests that regulators should incentivize these banks to lend and create liquidity.

1.1 The Research Objectives

- To analyze the liquidity creation of privatized banks in Indonesia
- To analyze the relationship between the creation of liquidity, profitability, capital and credit risk of privatized banks in Indonesia

2. Literature Review

Banks finance illiquid assets with liquid liabilities to create liquidity on the balance sheet (Bryant, 1980; Diamond and Dybvig, 1983). They also carry out off-balance sheet liquidity creation activities (Holmström and Tirole, 1998; Kashyap et al., 2002). Long-term lending using customer deposits is a source of liquidity creation. In other words, there is a mismatch in the financing policy. Banks can also reduce liquidity creation by increasing cash balances through issuing long-term debt. However, banks do not create liquidity when buying securities (liquid liabilities) using customer deposits (liquid assets).

Berger and Bouwman (2009) find that the amount of liquidity created by United States (US) banks increased annually between 1993 and 2003 by $2.8 trillion in 2003. They also reveal that banks create this liquidity through on-balance sheet activities. and off-balance sheet. Fungácová

and Weill (2012) find that in Russia large banks are the biggest contributors to liquidity creation. As a hedge against liquidity risk (due to mismatch of maturities of assets and liabilities), the Bank can reduce liquidity creation by holding more liquid assets. Liquid assets will reduce bank income, this indicates that the relationship between liquidity creation and profitability should be positive. Various findings on the effect of liquidity creation on bank performance have been made.

Berger and Bouwman (2009) conducted an analysis of the correlation between normalized liquidity creation and the profitability of US banks over the period 1993:Q1 to 2003:Q4, the results show a positive relationship for large banks, but negative for medium and small banks. Sahyouni and Wang (2018), Chen et al (2018), Tran et al (2016), Goddard et al. (2010), Molyneux and Thornton (1992) document the negative effect of liquidity creation on bank performance, namely banks that create higher liquidity have lower profitability.

Researchers found mixed results on how liquidity creation affects bank capital. The correlation between the creation of liquidity and capital is positive for large banks and negative for small banks (Berger and Bouwmen, 2009;). While several studies have found that liquidity creation has a negative effect on bank capital (Horváth, Seidler, and Weill, 2014; Casu, di Pietro, and Trujillo-Ponce, 2019). Tran et al (2016) found that the relationship between liquidity and capital creation is positive and bidirectional. This positive two-way relationship is driven by small banks and occurs during non-crisis periods. Increasing capital regulation tends to increase the capacity of banks to create liquidity.

Capital affects bank performance in a number of ways. Berger and Bouwman (2013), found that capital reduces the probability of bank failure. Mehran and Thakor (2011) found that capital is positively related to bank value. We measure capital as the ratio of total equity capital to total gross assets, and we expect a positive relationship between capital and profitability.

Banks not only create liquidity but also change risk (Diamond, 1984; Ramakrishnan and Thakor, 1984). The creation of liquidity increases the risk of bank failure (Fungáčová, Turk, and Weill, 2015), conversely holding more liquid assets reduces the bank's illiquid risk and hence the probability of default (Bordeleau and Graham, 2010). Therefore, it is important to control for credit risk when assessing the effect of liquidity creation on bank profitability. Dietrich and Wanzenried (2014); Bikker and Vervliet (2018) measure credit risk by the ratio of the annual loan loss allowance to total loans and leases. We measure this credit risk using a Non Performing Loan (NPL).

3. Research Metodhology

3.1 Sample and variables
The sample includes all 4 privatized banks with quarterly data for 2014 to 2020. We use quarterly data on the Indonesia Stock Exchange for the period 2014:Q1 to 2020:Q4. We obtained data from the OJK website, our final bank-period sample totaled 112 observations. We use all values in Indonesian Rupiah. This study aims to explore the creation of privatized bank liquidity on the Indonesia Stock Exchange.

The amount of liquidity creation uses the "Cat-nonfat" measure of Berger and Bouwman (2009) written on the company's balance sheet (Bryant, 1980; Diamond and Dybvig, 1983). The calculation steps are as follows;

- Classify the balance sheet in assets, liabilities and equity and off-balance sheet activities into liquid, semi-liquid and illiquid based on the level of convenience, cost and time

required by the bank to fulfill its obligations and provide liquidity to meet the needs of borrowers as well as convenience, cost and time for depositors to get their money back from the bank.

- Weighting each balance sheet account, which has been classified, with -1, 0.1 based on its contribution to the creation or decline of liquidity as defined by the theory of liquidity creation.
- In the third step, adding up all the multiplication results between the number of balance sheet accounts and their weights, illiquid assets are multiplied by 0.5, semi-liquid is multiplied by 0, liquid is multiplied by -0.5; illiquid liabilities are multiplied by -0.5, semi-liquid is multiplied by 0, liquid is multiplied by 0.5; equity multiplied by -0.5, The sum of all combinations is the amount of liquidity created by the bank during the period.

Tabel 3.1. Liquidity classification of bank activities

Assets	Liquidity level	Liability and equity	Liquidity level
Commercial real estate loans	Illiquid (0.5)	Transaction deposits	Liquid (0.5)
Loans to finance agricultural productions	Illiquid (0.5)	Saving deposits	Liquid (0.5)
Commercial and industrial loans	Illiquid (0.5)	Overnight federal funds purchased	Liquid (0.5)
Other loans and lease financing receivables	Illiquid (0.5)	Trading liabilities	Liquid (0.5)
Other real estate owned (OREO)	Illiquid (0.5)	Time deposits	Semiliquid (0)
Customers' liability on acceptances	Illiquid (0.5)	Other borrowed money	Semiliquid (0)
Investment in unconsolidated subsidiaries	Illiquid (0.5)	Liabilities on bankers acceptances	Illiquid (-0.5)
Intangible assets	Illiquid (0.5)	Subordinated debt	Illiquid (-0.5)
Premises	Illiquid (0.5)	Other liabilities	Illiquid (-0.5)
Other assets	Illiquid (0.5)	Equity	Illiquid (-0.5)
Residential real estate loans	Semiiquid (0)		
Consumer loans	Semiliquid (0)		
Loans to depository institutions	Semiliquid (0)		
Loans to state and local governments	Semiliquid (0)		
Loans to foreign governments	Semiliquid (0)		
Cash and due from other institutions	Liquid (-0.5)		
All securities	Liquid (-0.5)		
Trading assets	Liquid (-0.5)		
Fed funds sold	Liquid (-0.5)		

Source: Berger & Bouwman (2009)

3.2 Analytical framework

Calculation of the creation of liquidity using equation (1).

LC = 0.5 * (illiquid assets + liquid liabilities) + 0 * (semi liquid assets + semi liquid liabilities) - 0.5 * (liquid assets + illiquid liabilities) ………………………   (1)

We normalize the measure of liquidity creation by total gross assets to make the measure comparable across banks. To measure bank profitability, we use return on assets (ROA). ROA is calculated as the ratio of earnings before interest and taxes to total assets. We measure capital as the ratio of total equity capital to total gross assets, and it can be seen more clearly in table 3.2. To determine the character of each variable used univariate analysis while the direction and strength of the relationship between variables used correlation analysis.

Table 3.2. Variable definitions

This table defines each variable for the empirical analyses in this study

Variables	Definition
- Profitability	ROA = EBIT/TotaL Assets
- Liquidity creation	LC/TA
- Capital	Equity/Total Assets
- Risk	*NPL (bad credit/total credit)

4. Results

4.1 Liquidity Creation Analysis

Analysis of the liquidity creation of privatized banks is rarely carried out. This study explores how liquidity creation has changed over time. Table 4.1 shows a summary of statistics on the creation of bank liquidity based on the measurement of cat_nonfat on all privatized banks during 2014 to 2020.

Table 4.1. Liquidity creation by privatized banks on the IDX per year from 2014 to 2020 using quarterly data (in trillion rupiah)

	TA	Changes	LC	Changes	LC/TA
2014	1,884	-	832	-	0.4416
2015	2,174	0.1537↑	874	0.0503↑	0.4020
2016	2,485	0.1431↑	1,034	0.1830↑	0.4160
2017	2,776	0.1172↑	1,156	0.1186↑	0.4165
2018	3,108	0.1195↑	1,309	0.1326↑	0.4214
2019	3,413	0.0983↑	1,435	0.0961↑	0.4205
2020	3,679	0.0778↑	1,799	0.2536↑	0.4891
Avg		0.1183↑		0.1390↑	0.4276↑

From table 4.1, we know that the privatized bank creates liquidity from year to year increasing, at the beginning of 2014 amounting to Rp. 832 trillion at the end of the research period Rp. 1.799 trillion overall increased by an average of 13.90%. Likewise, total assets increase every year by an average of 11.83%. The increase in liquidity creation is higher than the increase in total

assets. This indicates that privatized banks are pursuing a more aggressive long-term credit policy or credit for illiquid assets. This means that the bank's risk increases. On average, banks create liquidity around 42.76 percent of total assets.

4.2 Univariate Analysis

To see the research variables as a whole can be seen in table 4.2.

Table 4.2. Creation of Liquidity, capital, credit risk and profitability by private banks on the IDX per year from 2014 to 2020 using quarterly data (in trillion rupiah)

	Profitability (ROA)		LC (LC/TA)		Capital (Eq/TA)		Credit Risk (NPL)	
2014	0.0323		0.4416		0.1207		0.0122	
2015	0.0283	(-0.1239↓)	0.4020	(-0.0897↓)	0.1221	(0.0114 ↑)	0.0124	(0.0142↑)
2016	0.0254	(-0.1021↓)	0.4160	(0.0349↑)	0.1379	(0.1295 ↑)	0.0123	(-0.0065↓)
2017	0.0255	(0.0039↑)	0.4165	(0.0012↑)	0.1369	(-0.0070↓)	0.0140	(0.1395↑)
2018	0.0266	(0.0428↑)	0.4214	(0.0117 ↑)	0.1333	(-0.0265↓)	0.0116	(-0.1763↓)
2019	0.0230	(-0.1346↓)	0.4205	(-0.0020↓)	0.1375	(0.0317 ↑)	0.0140	(0.2130↑)
2020	0.0170	(-0.2632↓)	0.4891	(0.1631↑)	0.1154	(-0.1606↓)	0.0106	(-0.2429↓)
Avg		(-0.0962↓)		(0.0199↑)		(-0.0036↓)		(-0.0098↓)

From year to year during the study period, profitability, liquidity creation, capital, and credit risk fluctuated. On average, all variables tend to decrease except for the creation of liquidity which increases by about 2 percent, the highest decline occurs in bank profitability, which is 10%.

Table 4.3. Descriptive Analysis of Variables ROA, LC_TA, EQ_TA, NPL of privatized banks during the quarterly research period 2014 to 2020.

	ROA	LC_TA	EQ_TA	NPL
Mean		0.025427	0.446573	0.129112	0.012455
Median		0.027200	0.430185	0.138516	0.008500
Maksimum	0.050241	0.809314	0.175380	0.038300
Minimum	0.001300	0.333858	0.049348	0.003630
Std Dev		0.010849	0.079315	0.031320	0.008796
Observation	112	112	112	112

Table 4.3. describes the descriptive analysis of the variables ROA, LC_TA, EQ_TA, NPL of privatized banks as many as 112 observations during the seven years from 2014 to 2020. Overall, the research variables have a standard deviation below the mean value. The liquidity creation (LC_TA) and capital (EQ_TA) variables have a standard deviation below the minimum value, while ROA and NPL are higher than the minimum value. The indication is that the liquidity creation of privatized bank is low risk.

4.3 Correlation Analysis

To assess the relationship between the creation of liquidity, capital, credit risk and bank profitability, statistical correlation between variables is used. The results are as follows:

Table 4.4. Correlation between research variables of profitability, liquidity formation, capital and credit risk of privatized banks during the 2014 to 2020 research period

	Profitability	Liquidity Creation	Capital	Credit Risk
Profitability	1	**-0.5631**	0.6502	-0.6771

Liquidity Creation	-0.5631	1	-0.4486	0.5150
Capital	0.6502	-0.4486	1	-0.6720
Credit Risk	-0.6771	0.5150	-0.6720	1

Table 4.4. reported the correlation between research variables. The variable of creating liquidity has a negative correlation with profitability and capital, positive with credit risk. The negative correlation indicates that liquidity creation increases profitability and capital decreases but credit risk increases.

5. Discussion

According to cat.nonfat, the privatized banks created liquidity of Rp. 832 trillion in 2014 at the end of the research period Rp. 1.799 trillion which accounted for 42.76 percent of their total assets during the study period which is higher than in the MENA bank which is 28.4 percent. When compared to dollars, this liquidity is less than that generated by banks in MENA of US\$5.281 trillion (Sahyouni and Wang, 2018) and US\$2.8 trillion (Berger and Bouwmen, 2009). This study finds that the creation of liquidity is negatively correlated with the financial performance of the bank. These results are similar to those found by Sahyouni and Wang (2019), Chen et al (2018), Tran et al (2016), Goddard et al. (2010), Molyneux and Thornton (1992), this relationship occurs in small banks (Berger and Bouwman, 2009). This indicates that banks with low liquidity creation have high profitability, the higher the liquidity creation the lower the profitability which will increase defaults. This is supported by a negative relationship between credit risk and profitability. This means that credit quality control remains an important issue. These results are in line with the research of Sahyouni and Wang (2018); Tran et al. (2016); Fungáčová et al (2015) that the creation of liquidity increases the risk of bank failure.

The relationship between liquidity and capital creation is positive similar to the findings of Berger and Bouwmen (2009) on large banks; Tran et al (2016) showed a two-way positive relationship in small banks. The indications are that capital regulation tends to increase the capacity of banks to create liquidity. While other studies have found the opposite direction (Horváth, Seidler, and Weill, 2014; Casu et all, 2019), a negative relationship occurs in small banks (Berger and Bouwmen, 2009;).

Another result is that capital has a positive relationship with the bank's financial performance. The capital ratio has a significant positive effect on bank profitability (Sahyouni and Wang, 2019; Mehran and Thakor, 2011). Banks with a higher equity to asset ratio are relatively more profitable. The indication is, the higher the capital, the higher the performance, thus the capital reduces the possibility of bank failure (Berger and Bouwman, 2013).

6. Conclusion

Indonesia's privatized banks from year to year increase the creation of liquidity. In 2014 amounting to Rp. 832 trillion, in 2020 amounting to Rp. 1.799 trillion which accounts for about 42.76 percent of total assets, an average increase of 13.9 percent higher than the increase in assets (11.83 percent).

Liquidity creation is negatively correlated with profitability, which causes a decrease in profitability. This relationship allows the bank to have difficulty meeting its short-term obligations (default risk increase) which allows bank bankruptcy. This is supported by increasing credit risk causing profitability to decline.

Eq_TA is positively correlated with ROA (Retained earnings can strengthen equity) so that banks are healthier. Which further enhances the financial stability of the country. Therefore, banks with higher equity-to-asset ratios are relatively more profitable. This result is important for bank authorities to maintain the certain capital adequacy ratio.

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