



Analysis of The Basel Iii Liquidity and Minimum Capital Requirements Towards Bank Performance: Evidence From Commercial Banks In Indonesia

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Abstract. This study identifies the impact of the Basel III Net Stable Funding Ratio (NSFR) and Tier 1 Capital Ratio on the performance of KBMI 3 and KBMI 4 commercial banks in Indonesia from 2018 to 2023. Using Return on Assets (ROA) as the performance metric, panel data regression analysis is conducted with additional control variables including Non-Performing Loan (NPL), Inflation, and Gross Domestic Product (GDP). The findings reveal a significant negative impact of NSFR on bank profitability, indicating that an increase in NSFR leads to a decrease in bank performance. Conversely, the Tier 1 Capital Ratio shows a positive association with ROA, suggesting that higher capital buffers improve bank profitability. These results emphasize the importance of equity capital and lower leverage in reducing the cost of funds for banks. A balanced approach is recommended for banks to comply with the NSFR requirement while maintaining profitability.

Keywords: *Basel III Framework, Net Stable Funding Ratio, Tier 1 Capital Ratio, Return on Asset.*

1 Introduction

In 2008, the decline in the value of Mortgage-Backed Securities (MBS) had a significant impact on their volatility and accurate pricing, leading to a liquidity crisis for banks [1][2]. Despite the efforts of the Federal Reserve to provide support, there was insufficient asset value to offset liabilities. The financial crisis was partly due to banks relying heavily on short-term leverage and experiencing maturity mismatches [3][4]. The preference for short-term funding sources was driven by factors such as the attractiveness of short-term debt and the availability of liquidity injections from the Federal Reserve. Banks with aggressive loan growth relied more on short-term funding, exposing them to illiquidity risk.

Investors also preferred assets with short maturities, such as short-term money market funds, as they allowed for quick withdrawal of funds. Banks used these assets as investment vehicles to obtain short-term funding. Additionally, short-term repurchase

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agreements (repos) became a preferred method of short-term financing, further contributing to maturity mismatches [3].

The decline in MBS values and the heavy reliance on short-term funding led to concerns among short-term lenders about borrower creditworthiness [5]. This shortage of short-term funding forced banks to sell assets in a fire sale, exacerbating the crisis. Lehman Brothers, for example, heavily depended on short-term repo markets and was unable to secure daily funding, leading to its collapse.

In response to the crisis, the Basel Committee on Banking Supervision [6] introduced regulatory guidelines, including the Liquidity Coverage Ratio (LCR) and the Net Stable Funding Ratio (NSFR) [6]. The LCR ensures that banks maintain adequate liquidity within 30 days, while the NSFR limits reliance on short-term funding and promotes stable funding sources.

Furthermore, the study examines the Tier 1 Capital Ratio and its components, such as common shares and retained earnings, which contribute to a bank's core capital [7]. The Tier 1 Capital Ratio requirements vary based on bank categorization, with different minimum ratios set for each category.

The implementation of countercyclical policies by Otoritas Jasa Keuangan (OJK) in response to the COVID-19 pandemic becomes crucial to maintaining banking performance, financial system stability, and economic growth. However, the NSFR framework may have a tradeoff between stability and profitability, as it can impact banks' net interest margin and profitability.

The NSFR implementation may affect banks' lending activities and overall business strategies. As banks strive to meet the required stable funding, they may allocate a larger portion of their resources towards low-risk, low-return assets, such as government bonds, at the expense of more profitable lending opportunities [4][8][9]. The Tier 1 Capital Ratio, on the other hand, enhances bank stability but may impede lending growth due to increased capital requirements and associated costs [8][10].

As a result, this study aims to provide a comprehensive analysis of the impact of Basel III regulations, specifically the NSFR and Tier 1 Capital Ratio, on bank performance. It considers the Indonesian banking sector, taking into account different economic conditions and bank asset classes. The findings will contribute valuable insights into the effectiveness of regulatory initiatives and their role in fostering a resilient banking system.

2 Literature Review

2.1 Bank Liquidity

According to Strahan [1], funding liquidity refers to a bank's capacity to acquire funding or generate cash expeditiously. Interwoven with liquidity risk, funding risk encompasses the challenge of effectively financing cash outflows at any given point in time, especially when confronted with depositors' demands for liquidity during

inconvenient periods. Such circumstances may necessitate banks resorting to fire sales to liquidate illiquid assets in order to meet their obligations [11]. While liquidity risk focuses on the asset side of the balance sheet, funding risk, on the other hand, is centered on the liability side [4].

Market liquidity refers to the degree of ease with which assets can be sold in a market, as well as the associated costs [1]. High market liquidity is characterized by prices that closely reflect the present value of assets. After accounting for all transaction costs, for instance, real estate brokers play a significant role in creating market liquidity for houses. According to [4], the liquidity requirements outlined in the Basel III framework do not have a direct focus on market liquidity. However, the regulations may have an indirect impact on market liquidity by potentially changing demand and costs that ultimately influence market liquidity conditions.

2.2 Net Stable Funding Ratio

Net stable funding ratio (NSFR) is a measurement from Basel III liquidity regulation in order to ensure banks have sufficient liquidity resilience of banks by requiring them to fund their activities with stable funding that exceeds the amount required during stress periods within a one-year timeframe. Thus, a bank must limit the funding dependence on short-term wholesale funding in accordance with the BCBS timeline [12]. The NSFR was implemented on OJK's authority on January 1, 2018, for Indonesia's banking industry.

$$NSFR = \frac{\text{Available amount of Stable Funding}}{\text{Required amount of Stable Funding}} \geq 100\%$$

The NSFR numerator quantifies the sources of Available Stable Funding (ASF), assigning a higher weight to sources that are less likely to vanish during stressful market conditions. Among these sources, longer-term wholesale funding, equity, and longer-term liabilities have emerged as consistently dependable options. These funding avenues are recognized for their robustness and resilience. Conversely, deposits and short-term wholesale funding with maturity periods of less than one year are considered less stable, warranting caution when relying on them for financing needs [4]. Wholesale funding is not considered a stable funding source and is assigned a 0% weight.

In a comparable manner, Required Stable Funding (RSF) is determined by weighting the uses of funding sources based on their liquidity. To derive the necessary level of stable funding, balance sheet assets sheet activities are subjected to specific RSF factors. These factors denote the percentage of exposure that requires stable funding, with more liquid assets having lower RSF factors. Cash or cash equivalents do not require any stable funding and have an RSF factor of 0%, while other longer-term assets must be funded at the required RSF factors.

2.3 Tier 1 Capital Ratio

According to Law No. 15 of 2013, in accordance with the international standard of "Global Regulatory Framework for More Resilient Banks and Banking System" in the

Basel III framework, to enhance the quality of banks' capital, adjustments are made to the components and specifications of capital instruments to align with internationally recognized standards. The primary focus for the core capital component (Tier 1) of the bank is to comprise predominantly high-quality capital instruments, including common stocks and retained earnings, which constitute an integral part of the main core capital known as Common Equity Tier 1 [7].

As per regulatory requirements, a minimum Tier 1 Ratio of 6% of Risk-Weighted Assets (RWA) and a common equity Tier 1 of at least 4.5% of RWA must be maintained by the bank, both on a standalone basis and when consolidated with its Subsidiaries. Compliance with these prescribed thresholds ensures a robust capital base, bolstering a bank's financial strength and resilience in the face of potential risks and uncertainties. By upholding these capital adequacy standards, a bank aims to enhance its ability to absorb losses and maintain stability in its operations while meeting the evolving needs and expectations of regulators and stakeholders within the financial industry.

2.4 Return on Asset

Return on Asset (ROA) has emerged as a widely accepted and preferred measure of bank profitability in the literature [13]. This measure is often present in whichever subset of measures is used to evaluate a bank's financial performance. The popularity of ROA can be attributed to several reasons. Firstly, assets directly reflect a bank's income and expense levels, making it a reliable metric for measuring profitability [14]. Secondly, ROA is an indicator of a bank's management capabilities to generate profits using its assets [10]. Thus, ROA has the attributes of a core profitability indicator that is directly linked to a bank's asset base. Therefore, a comprehensive analysis of a bank's NSFR towards financial performance requires the ROA measure to generate a complete and accurate picture.

2.5 Non-Performing Loan

The measurement of Non-Performing Loans (NPLs), denoting the percentage of loans that are in default or significantly overdue, assumes a vital role in financial research. Dietrich et al. (2014) [15], Papadamou et al. (2021) [10], and Sidhu et al. (2022) [9] have extensively incorporated NPLs as a variable of interest, either as an independent or control variable, when investigating various dimensions of bank performance, particularly profitability. By incorporating NPLs into the study analyses, researchers aim to capture the potential impact of loan quality on the overall performance of banks. This approach acknowledges the importance of NPLs as a determinant that can potentially influence a wide range of performance indicators and outcomes within the banking sector [9]. The inclusion of NPLs as a variable contributes to a comprehensive understanding of the intricate dynamics and interconnectedness between loan quality and bank performance.

2.6 Gross Domestic Product

The quantification of an economy's output is commonly assessed through a widely utilized measure known as the gross domestic product (GDP) [13]. GDP serves as a comprehensive indicator designed to gauge the total value of goods and services produced within a specific country over a defined time frame, which may encompass a quarter or a full year. This fundamental concept of GDP, as defined by Papadamou et al. [10], facilitates the evaluation and comparison of economic performance across different countries, providing valuable insights into the overall productivity and economic vitality of a particular nation [16]. By capturing the aggregate value of output, GDP plays a crucial role in analyzing and understanding the fluctuations, trends, and growth patterns within an economy [17].

$$Y = C + I + G + NX$$

2.7 Inflation

In the scope of economics, inflation serves as a metric to gauge the pace at which the average price level undergoes alterations over a given period. This indicator, referred to as the rate of inflation, is characterized as the annual percentage rate of change in the price level, as determined by various measures such as the Consumer Price Index (CPI). By quantifying the average price level relative to a base year, the CPI provides insights into the general price trends and facilitates a comprehensive evaluation of inflationary dynamics.

The concept of the real interest rate, on the other hand, pertains to the annual percentage growth in the purchasing power of a financial asset. It denotes the discrepancy between the nominal interest rate on an asset and the corresponding inflation rate. For instance, consider the scenario where the real purchasing power of deposits experiences a yearly increase of two percent in Alpha and remains stagnant at 0 percent in Beta. Consequently, the real interest rate on deposits would be two percent in Alpha and 0 percent in Beta. According to Frank et al. [16], this relationship can be mathematically expressed through the equation.

2.8 Hypotheses Development

H1: Net Stable Funding Ratio is negatively correlated with Return on Asset.

Within the context of NSFR implementation, banks are faced with the challenge of striking a balance between stability and profitability. Increased stability is achieved by lengthening the maturity of wholesale funding sources, thereby reducing the reliance on short-term funding and enhancing funding stability [6]. However, this shift towards longer-term funding comes at a cost. Short-term funding is typically cheaper than long-term funding, resulting in increased interest expenses for banks as they meet the NSFR requirements [12]. As a consequence, the NSFR implementation has the potential to negatively impact banks' profitability by increasing their interest expenses and reducing their interest income.

Moreover, the NSFR implementation may also affect banks' lending activities and overall business strategies. As banks strive to meet the required stable funding, they

may allocate a larger portion of their resources towards low-risk, low-return assets, such as government bonds, at the expense of more profitable lending opportunities [4][8][9]. This shift in asset composition could further limit banks' ability to generate higher returns on their assets and hinder their profitability.

H2: Tier 1 Capital Ratio is negatively correlated with Return on Asset.

The strategy pursued by banks to bolster their Tier 1 Capital Ratio involves a deliberate effort to reduce the proportion of assets that carry elevated risk-weighted factors. According to the guidelines set forth in the Basel III framework, Tier 1 capital should primarily consist of tangible common equity or subordinated instruments that offer fully discretionary non-cumulative dividends, lack a maturity date, and do not provide any incentives for redemption, such as non-cumulative perpetual preferred shares. It is important to recognize that while the augmentation of the Tier 1 Capital Ratio contributes to enhanced stability within the banking sector [10], it also significantly exerts downward pressure on the ROA.

Furthermore, an increase in the Tier 1 Capital Ratio may bolster the overall stability of banks, but it has been observed that it can have a notable impact on lending growth, as noted by Roulet [8]. The increase in capital requirements can limit and even decline the lending capacity of banks. Since raising Tier 1 capital is typically more expensive than acquiring external funding, the expansion of capital may be viewed as a regulatory tax that disproportionately affects assets assigned higher risk weights or banks that aim to expand their balance sheets through increased credit activities. As a result, achieving the targeted Tier 1 Capital Ratio is expected to entail significant expenses and potentially have implications for reducing a bank's ROA.

3 Research Methodology

3.1 Type of Study

This research will utilize a quantitative data method to further examine financial statements and Net Stable Funding (NSFR) reports from commercial banks that are listed in the Indonesia Stock Exchange (IDX). Afterward, the data will be processed through panel data regression analysis in order to disclose the association between independent, control, and dependent variables that are relevant to this study. There are previous studies that are implemented as a reference for this research, which is listed in Chapter 2.

3.2 Unit of Analysis

This research will analyze the effect of Basel III regulation within NSFR and Tier 1 Capital Ratio on commercial banks' performance, especially towards banks categorized as KBMI 3 and KBMI 4 that are listed in the IDX. The analysis will cover the initial period of NSFR implementation from 2018 to 2023, employing a quarterly basis to provide a comprehensive assessment of the outcomes. The independent variables from bank liquidity and minimum capital regulation from Basel III, which are Net Stable Funding Ratio (NSFR) and Tier 1 Capital Ratio, in addition to bank characteristics in

Asset Size and macroeconomic factors such as Gross Domestic Product and Inflation as control variables are employed in the study. As a result, the dependent variable is Return on Asset (ROA), as a measurement of bank performance. These variables are taken from relevant previous research.

3.3 Population and Sampling Planning

The Indonesia Stock Exchange (IDX) encompasses a total of 48 listed banks, which form the basis of this study. However, for the purpose of this research, the focus is primarily on two specific categories: KBMI 4 and KBMI 3. KBMI 4 consists of only four banks that exhibit a Tier 1 capital exceeding Rp70 trillion, indicating their substantial capitalization. On the other hand, KBMI 3 comprises nine banks with a Tier 1 capital ranging from Rp14 trillion to Rp70 trillion, signifying a relatively lower but still significant level of capitalization.

In addition to categorizing banks based on their Tier 1 capital, the examination of the total asset size of the 12 banks is conducted in relation to the broader commercial banking industry. These 12 banks collectively account for over 65% of the total assets in the industry, as reported in the bank statistics of March 2023 (Otoritas Jasa Keuangan, 2023; Bloomberg Terminal, 2023). This analytical approach enables a comprehensive evaluation of the banks' market positioning and prominence within the industry. Through the comparative analysis of their total assets vis-à-vis the industry's aggregate assets, a comprehensive understanding of their relative scale and influence is attained. This facet significantly enhances the robustness of assessing a bank's ROA, as it takes into account its relative size within the industry context.

Based on the criteria outlined above, the research population is narrowed down to a total sample of 12 commercial banks classified under KBMI 3 and KBMI 4 that are listed on the IDX. These banks are selected based on the availability of publicly accessible financial statements and Net Stable Funding Ratio (NSFR) reports. It is worth noting that PT. Bank Tabungan Negara is excluded from the sample due to the unavailability of a complete NSFR report. The inclusion of these banks ensures a focused analysis of relevant financial data, enabling a comprehensive examination of the impact of Tier 1 capital and NSFR on their performance within the Indonesian banking landscape.

3.4 Data Sources and Collection

This study will rely on secondary data as the primary source of information. The utilization of secondary data entails the analysis of existing datasets that are publicly accessible, including publications from government entities, regulatory bodies, and media sources, among others. The data collection approach in this research will specifically focus on secondary data methods, leveraging public financial statement reports, Net Stable Funding Ratio (NSFR), and minimum capital requirement (Tier 1) reports. These reports can be obtained through various channels, such as the official company or Indonesia Stock Exchange (IDX) websites, as well as professional financial platforms like Bloomberg Terminal. By utilizing this comprehensive set of secondary data sources, the research aims to derive meaningful insights and facilitate a thorough analysis of the subject matter.

4 Result and Discussion

The analysis and results obtained from this study lead to the acceptance of the first hypothesis, which posited a negative correlation between the Basel III NSFR and Return on Asset. Corresponding to this hypothesis, the findings reveal a significant negative impact of NSFR on bank ROA. This implies that an increase in NSFR is associated with a decrease in bank profitability as measured by ROA. Therefore, it can be concluded that NSFR does have a negative relationship with ROA in the context of this study.

On the other hand, the second hypothesis, which proposed a negative correlation between Tier 1 Capital Ratio and ROA, is rejected based on the significance level and positive coefficient observed for Tier 1 Capital Ratio in relation to ROA. The findings indicate that a higher Tier 1 Capital Ratio is associated with an increase in bank profitability, suggesting that banks with stronger capital buffers exhibit improved performance in terms of ROA.

The inclusion of additional control variables contributes to a more nuanced understanding of the determinants of bank profitability. These findings emphasize the importance of considering various factors and variables when analyzing the performance of banks and highlight the need for a comprehensive approach to assessing bank profitability.

4.1 Table

Table 1. Model 1: Regression Model of Independent and Dependent Variables

Dependent Variable: Return on Asset (ROA)	Coefficient <i>t</i>	Prob.	Coefficient <i>t - 1</i>	Prob.
NSFR	-0.0259	0.0000***	-0.0203	0.0000***
TIER1	0.0493	0.0000***	0.0454	0.0002***
<i>R</i> ²	0.7998		0.7898	
Number of observations	252		240	

*Significance level *** p < 0.01, ** p < 0.05, * p < 0.1*

Source: EViews (2023)

Table 2. Model 2: Regression Model of Independent, Control, and Dependent Variables

Dependent Variable: Return on Asset (ROA)	Coefficient <i>t</i>	Prob.	Coefficient <i>t - 1</i>	Prob.
NSFR	-0.0115	0.0012***	-0.0054	0.1535
TIER1	0.0240	0.0096***	0.0233	0.0254**

NPL	-0.3528	0.0000***	-0.2540	0.0000***
INF	0.0808	0.0002***	0.0778	0.0012***
GDP	0.0191	0.0242**	0.0369	0.0000***
R^2	0.8601		0.8480	
Number of observations	252		240	

Source: EViews (2023)

Table 3. Model 3: Regression Model Categorized in the KBMI

Dependent Variable: Return on Asset (ROA)	KBMI 3				KBMI 4			
	Coefficient <i>t</i>	Prob.	Coefficient <i>t - I</i>	Prob.	Coefficient <i>t</i>	Prob.	Coefficient <i>t - I</i>	Prob.
NSFR	-0.0118	0.0069***	-0.0045	0.3096	-0.0136	0.0057***	-0.0084	0.1379
TIER1	0.0191	0.0633*	0.0099	0.3775	0.0579	0.0160**	0.1148	0.0001***
NPL	-0.3189	0.0000***	-0.2651	0.0001***	-0.3604	0.0000***	-0.2170	0.0075***
INF	0.0383	0.1558	0.0435	0.1336	0.1619	0.0000***	0.1421	0.0000***
GDP	0.0430	0.6856	0.0168	0.1197	0.0449	0.0001***	0.0653	0.0000***
R^2	0.7817		0.7807		0.8834		0.8550	
Number of observations	168		160		84		80	

Source: EViews (2023)

4.2 Picture

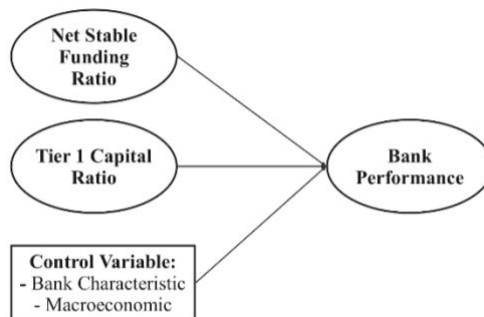


Fig. 1. Research Model

5 Conclusion

The findings of this study correspond to the previous research in regard to the Basel III Net Stable Funding Ratio (NSFR) and Return on Asset (ROA). In which, the result indicates a significant negative impact of NSFR on Indonesian commercial bank performance. This implies that NSFR does not improve profitability, as it results in higher interest expenses and reduced interest income for banks. However, the second findings dispute previous studies that concluded Tier 1 Capital Ratio negatively impacted the banks' performance. This study indicates a result of a positive coefficient and statistical significance for Tier 1 Capital Ratio, indicating that higher levels of capital buffers are associated with improved bank profitability in terms of ROA. This underscores the significance of equity capital and lower leverage in reducing funding costs for banks. By considering additional control variables, the study provides a comprehensive understanding of the factors that influence bank profitability, underscoring the need for a holistic approach when evaluating bank performance and profitability, accounting for various factors and variables.

To meet the Basel III NSFR requirement and strengthen their funding profiles, banks have two main options. The first option involves adjusting their funding mix by extending the duration of funding sources, attracting more customer deposits, and increasing equity capital. However, these measures come at a cost, as long-term debt and equity funding tend to be more expensive, and competition for customer deposits may lead to higher interest rates on savings. As a result, bank profitability may decline, posing a potential risk to the resilience of the banking system. The second option is for banks to reduce the size of their asset base, but this could negatively impact earnings, market share, and overall profitability. Therefore, it is advisable for banks to strike a balanced approach between these two options to effectively meet the new liquidity requirements set by Basel III.

Furthermore, the implementation of the Basel III minimum capital regulation has a significant influence on bank profitability, as measured by Return on Assets (ROA). This regulation aims to enhance the capital resilience of banks and mitigate risks, thereby improving the quality of assets and cost of funds. Based on these findings, this study strongly recommends that banks take the necessary measures to comply with the Tier 1 Capital Regulation mandated by the Otoritas Jasa Keuangan (OJK) to optimize their financial performance and ensure stability within the banking sector.

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