Systematic Literature Review: CAR, LDR, NIM and NPL on Banking Profitability in Indonesia

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ABSTRACT

This study aims to analyze the effect of financial ratios such as Capital Adequacy Ratio (CAR), Non-Performing Loan (NPL), Loan to Deposit Ratio (LDR), and Net Interest Margin (NIM) on Return on Assets (ROA) in the Indonesian banking sector. This study uses the Systematic Literature Review (SLR) method with the PRISMA approach to ensure transparency and replication of the study. The data used was taken from various journals published between 2019 and 2024 through the Google Scholar and Scopus databases. The conclusion of this study confirms that Capital Adequacy Ratio (CAR), Loan to Deposit Ratio (LDR), and Net Interest Margin (NIM) generally have a positive impact on Return on Assets (ROA). Conversely, a Non-Performing Loan (NPL) has a negative impact on Return on Assets (ROA). However, in terms of significant influence, Capital Adequacy Ratio (CAR), Non-Performing Loan (NPL), Loan to Deposit Ratio (LDR), and Net Interest Margin (NIM) have varying significant influences on Return on Assets (ROA) depending on the internal and external conditions of the bank.

Keywords: *Capital Adequacy Ratio, Loan to Deposit Ratio, Net Interest Margin, Non-Performing Loan, Return on Assets*

1. INTRODUCTION

In recent years, the Indonesian banking industry has faced significant challenges along with global and domestic economic developments. Post-COVID-19 pandemic, the banking sector in Indonesia has adapted to various policy changes and structural challenges, including adjustments to the shift in the digital economy and geopolitical uncertainty that affects global macroeconomic conditions. Amid these conditions, key financial factors such as Capital Adequacy Ratio (CAR), Non-Performing Loan (NPL), Loan to Deposit Ratio (LDR), and Net Interest Margin (NIM) have become important determinants in measuring banking profitability. Banking profitability itself is the main indicator for assessing the success of bank operations in the long term and its ability to survive economic uncertainty.

According to the Financial Services Authority (OJK), Indonesia's banking Capital Adequacy Ratio (CAR) stood at 27.41% as of December 2023, reflecting strong capitalization and significantly exceeding the average CAR of other countries, which is below 20%. The CAR slightly decreased to 26.22% in May 2024 but still indicates a solid capital position. In terms of intermediation, banking loans grew by 10.38% year-on-year (yoy), from IDR 6.24 trillion in December 2022 to IDR 7.090 trillion in December 2023. By May 2024, loan growth reached 12.15% yoy, amounting to IDR 7.376 trillion. However, the growth of Third-Party Funds (DPK) was slower, at only 3.73% yoy in December 2023, increasing to 8.63% yoy in May 2024, reaching IDR 8.699 trillion. This disparity in the growth rates of loans and DPK is reflected in the Loan-to-Deposit Ratio (LDR), which increased from 78.8% in December 2022 to 83.5% in December 2023.

Bank profitability also showed a positive trend. The Net Interest Margin (NIM) increased from 4.70% in November 2022 to 4.83% in November 2023, while Return on Assets (ROA) rose from 2.47% to 2.72% over the same period. Asset quality remained stable, with the gross Non-Performing Loan (NPL) ratio decreasing from 2.43% in September 2023 to 2.34% in May 2024.

Although these indicators demonstrate strong performance, Indonesian banks must remain vigilant against challenges such as global economic uncertainty, market volatility, and changes in monetary policy that could affect the industry's stability and growth. Therefore, continuous monitoring and effective management of these financial ratios are essential to maintaining the health of the national banking sector.

CAR, or capital adequacy ratio, is one of the indicators used to evaluate the level of financial security of a bank in absorbing the risk of loss. The higher the CAR, the stronger the bank's capital position, which is important in maintaining the stability of the banking system. Research by Shendy Amalia et al. (2020) shows that CAR has a positive and significant effect on ROA, indicating that the higher the capital a bank possesses, the greater its ability to generate profits from its assets.

NPL is another indicator that is often associated with credit risk, where high NPL indicates a high number of non-performing loans that can reduce bank profitability due to increased provision burdens (Mas'ud & Hasibuan, 2023). Muhammad Mufarodi et al. (2023) explain that a high NPL ratio will have a negative impact on ROA.

In addition, LDR, which reflects the bank's ability to mobilize funds to be channeled into credit, also plays a crucial role. An LDR that is too low indicates excess liquidity, while an LDR that is too high can increase liquidity risk (Santoso & Pratama, 2022). Research by Deny Arif et al. (2019) found that LDR has a positive and significant effect on ROA, where banks that can optimize funds for loans are more likely to increase profitability.

Meanwhile, NIM, which measures the bank's efficiency in obtaining net interest income from lending and fundraising activities, is also closely related to profitability. A high NIM generally indicates that the bank is able to manage interest margins effectively, which has implications for a higher level of profitability (Hidayat et al., 2023). Studies by Rizka Faza Bellananda et al. (2020) and Sochib Setya Fetri Liyundira et al. (2023) found that NIM has a significant effect on ROA. Banks with higher NIM are better able to maximize net interest income, which in turn enhances overall profitability.

Given the importance of these factors, this study aims to analyze the influence of CAR, NPL, LDR, and NIM on banking profitability in Indonesia. This study will also consider the latest developments in the banking sector that are facing global and domestic challenges, especially in order to improve operational efficiency and maintain stable financial performance.

2. LITERATURE REVIEW

Banking financial ratios commonly used in publications include various performance and financial health metrics, such as the Capital Adequacy Ratio (CAR), which indicates the adequacy of a bank's capital in bearing risks, and Non-Performing Loan (NPL), which measures credit quality through the percentage of non-performing loans. In addition, the Net Interest Margin (NIM) assesses the bank's efficiency in generating interest income from productive assets, while the Loan to Deposit Ratio (LDR) measures the bank's liquidity capability in channeling third-party funds as credit. Return on Assets (ROA) and Return on Equity (ROE) measure the bank's effectiveness in generating profits from its assets and capital, which assesses the bank's overall profitability. On the other hand, the Operating Expense to Operating Income (BOPO) ratio indicates the bank's operational efficiency, where a low BOPO indicates better operational performance. Liquidity ratios are also considered to assess the bank's ability to meet its short-term obligations, which is an important indicator in maintaining banking stability amidst financial risks.

Capital Adequacy Ratio (CAR)

The Capital Adequacy Ratio (CAR) is a capital adequacy ratio that shows the bank's ability to bear the risk of loss from its operational activities. CAR describes the resilience of the bank's capital in covering potential losses, thereby maintaining financial stability (Salim et al., 2021). According to Bank Indonesia Circular Letter No. 13/24/DPNP/2011, banks must consider the Minimum Capital Provision Obligation for Commercial Banks when calculating capital adequacy. In addition, banks must link capital adequacy to the bank's risk profile when assessing capital adequacy. Bank Indonesia requires banks to maintain a minimum CAR to ensure financial stability. For instance, Indonesian banks are mandated to maintain a CAR of at least 8% of risk-weighted assets (Weny Juniarti, 2021).

The capital that must be provided to anticipate bank risk is proportional to the level of risk. The Capital Adequacy Ratio (CAR) is a comparison of bank capital to risk-weighted assets. CAR shows how much of the bank's total assets contain risks financed from its own capital. The amount of bank credit will increase if there is sufficient capital. Based on Attachment I of BI Circular Letter No. 13/24/DPNP/2011 dated October 25, 2011, CAR is formulated as follows:

$$CAR = \frac{\text{Bank Capital}}{\text{Risk-Weighted Assets}} \times 100\%$$

Loan to Deposit Ratio (LDR)

Bank liquidity is the ability of a bank to meet its short-term obligations, including the possibility of withdrawal of deposits by depositors or the credit needs of the community. Liquidity ratios such as the Loan to Deposit Ratio (LDR) are used to measure a bank's capacity to manage current assets to meet these obligations, which can provide an indication of the bank's financial stability (Kasmir, 2018). LDR is the ratio between all credits provided by the bank and funds received by the bank. The higher this ratio, the lower the liquidity capacity of the bank concerned. A high LDR indicates that a bank heavily relies on loans for liquidity, which can pose a liquidity risk if too many depositors withdraw their funds simultaneously. Conversely, a low LDR may indicate that the bank is not effectively utilizing its deposits to generate income through loans (Aura Salsabila et al., 2022). Based on Bank Indonesia Circular Letter No. 13/DPNP dated October 25, 2011, the amount of LDR can be formulated as follows:

$$LDR = \frac{\text{Total Loans Granted}}{\text{Total Third-Party Funds}} \times 100\%$$

Net Interest Margin (NIM)

Net Interest Margin (NIM) is a ratio that measures a bank's ability to generate income from the difference between interest income and interest costs on productive assets. High NIM indicates the effectiveness of managing interest income relative to interest costs (Susilo, 2023). The Financial Services Authority in Indonesia mandates that the NIM ratio must be at least 5% to ensure adequate profitability (Juliana Lady et al., 2021). A higher NIM indicates better management of earning assets, leading to increased profitability and reduced risk of financial stress (Meiske Wenno et al., 2019). The higher the NIM value, the more

effective the bank is in placing its productive assets in the form of credit. Based on Bank Indonesia Circular Letter No. 13/24/DPNP dated October 25, 2011, the amount of Net Interest Margin (NIM) can be formulated as follows:

$$NIM = \frac{\text{Interest Income}}{\text{Earning Assets}} \times 100\%$$

Non Performing Loan (NPL)

Non- Performing Loans (NPL) is a ratio that shows non-performing loans that are not paid by debtors on schedule. This ratio measures the bank's ability to manage credit risks that arise from loan distribution (Wahyudi et al.,al., 2020). Bank Indonesia has established a maximum NPL standard of 5%, where a bank's solidity rating may be negatively impacted (Gregorius Paulus Tahu et al., 2023). High NPL levels indicate inadequate loan approval procedures and poor credit monitoring, which can destabilize the banking sector (Apriani Simatupang et al., 2024). The higher this ratio, the smaller the profit obtained by the bank. The amount of NPL is formulated as follows:

$$NPL = \frac{\text{Non-Performing Loans}}{\text{Total Loans}} \times 100\%$$

Return On Asset (ROA)

Return on Assets (ROA) is a ratio that shows the bank's ability to generate profits from its assets. High ROA indicates efficiency in managing assets to generate profits (Ningsih, 2020). The higher the ROA value of a bank, the higher the level of profit achieved by the bank and the better the position of the bank from the use of its assets. Higher ROA indicates better financial performance, as it reflects a higher return on the assets utilized by the company (Ilma Nurinfiaa, 2020). In the banking sector, a high ROA demonstrates effective and efficient operations, enabling banks to expand their business activities (Lisa Polimpung et al., 2019). ROA is calculated using the following formula:

$$ROA = \frac{\text{Pre-Tax Profit}}{\text{Total Assets}} \times 100\%$$

3. RESEARCH METHOD

The research method used is a systematic literature review. By using the Preferred Reporting Items for Systematic Reviews and Meta-analyses (PRISMA) 2020, the author ensures that the systematic literature review is transparent, replicable, and scientifically adequate (Page et al., 2021). The author uses the ScienceDirect, Google Scholar, and Scopus search databases to search for journal articles. Using the keywords CAR, LDR, NIM, NPL, and ROA, the inclusion criteria for the selected journals are as follows:(a) journal articles in English and Indonesian published between 2019 and 2024; (b) research discussing CAR, LDR, NIM, and NPL against banking profitability in Indonesia; and (c) original research. Data analysis was carried out with content analysis that facilitates understanding by analyzing the contents of each journal and literature reference. Figure 1 below shows the flowchart of the PRISMA 2020 search method.
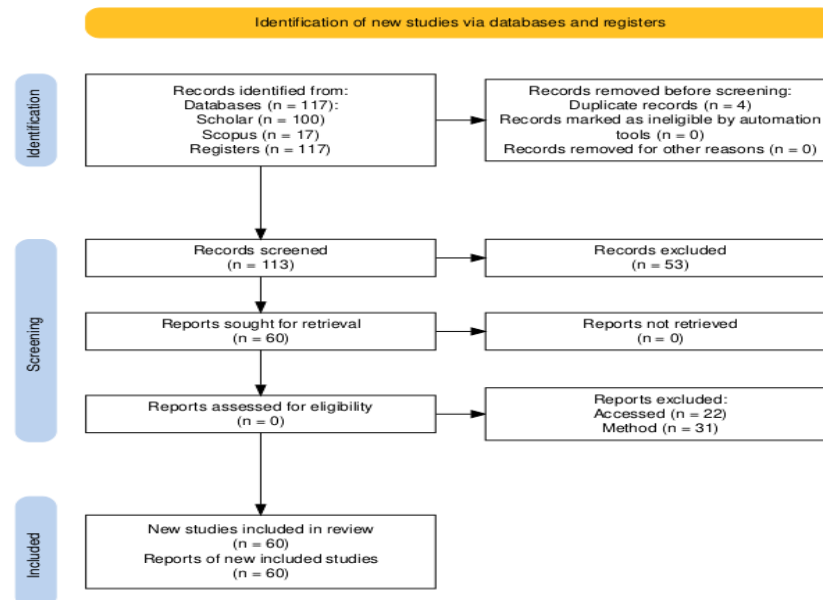
Figure 1. Flowchart of PRIMA 2020 search method

4. RESULTS AND DISCUSSION

4. 1 RESULTS

The author conducted an analysis using the VOSviewer application to conduct initial screening and review that can help the initial search for articles and to see the accuracy and suitability of the scope and research questions. Based on the keywords discussed in the article, the visualization is shown in the image below. Based on the image below, it shows that the keyword "return on asset" on the bank is a keyword that still needs to be discussed further.

VOSviewer bibliometric mapping was done around the results of searching articles on Perish/Harzing software exported in RIS (Research Information Systems) format, then inputted and analyzed using VOSviewer software. The results are as follows:
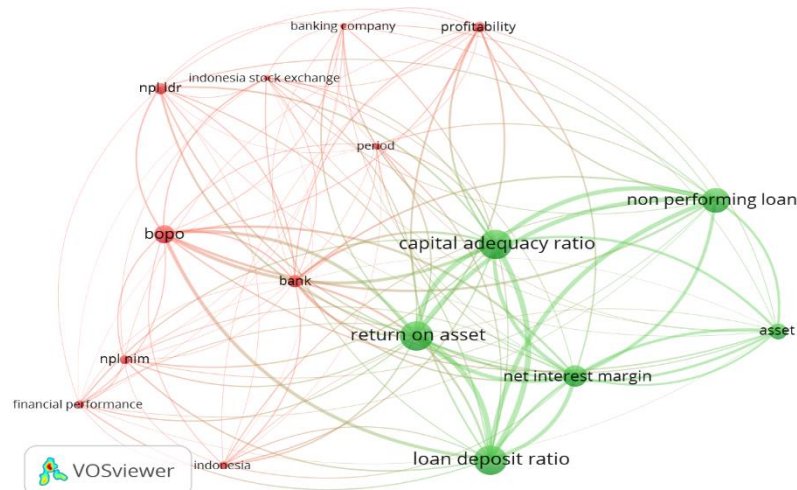

Figure 2. Visualization results with the VosViewer application

The visualization results of the VOSviewer software related to the map of research developments around the influence of CAR, NPL, LDR, and NIM on banking profitability in Indonesia are

2 clusters and 16 topic items in the mapping, including the following:

● Cluster 1 consists of 15 topics, namely: bank, banking company, BOPO, financial performance, Indonesia, Indonesia Stock Exchange, NPL-LDR, NPL-NIM, period, profitability

● Cluster 2 consists of 6 topics, namely: assets, capital adequacy ratio, loan deposit ratio, net interest margin, non-performing loans, and return on assets.

Here is an explanation of the image based on color:

Green nodes and lines: These relate to strongly related financial performance metrics, including factors such as "capital adequacy ratio," "return on assets" (ROA), "loan deposit ratio," "net interest margin," and "non-performing loans." These elements tend to have a strong relationship to overall bank performance. The thicker and more prominent the connecting lines (edges), the stronger the relationship between the terms.

Red nodes and lines: These indicate less robust financial metrics such as "bopo" (operating expenses to operating income) and "NPL-LDR" (non-performing loan to deposit ratio), etc. The red color indicates that these elements may have a negative impact on financial performance or efficiency.

Thickness of connecting lines: Shows the strength of the relationship between the terms. For example, a thick green line between "return on assets" and "capital adequacy ratio" indicates a strong correlation or relationship between these two metrics.

Node size: Indicates the importance or frequency of the term in the analyzed dataset. Larger nodes such as "capital adequacy ratio" and "return on assets" are more central to the analyzed financial performance.

Potential Bias: Red nodes indicate that elements such as BOPO have a negative impact on efficiency but are discussed less frequently compared to green elements, which are more commonly the focus of research.

To ensure accurate interpretation and reduce bias in research, the following steps can be taken:

a. Implementation of Systematic Literature Review (SLR) Techniques:

Use protocols such as PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) to ensure transparency in the screening and selection of literature (Rizki et al., 2021).

b. Neutral Bibliometric Analysis:

Validate the results of analysis from VOS viewer using other tools such as CiteSpace or Biblioshiny to avoid technical bias from a single software (Ahmad R., 2020).

4.2 DISCUSSION

According to the explanation above, the discussion in the study concentrating on company financial management is:

4.2.1 The influence of the Capital Adequacy Ratio (CAR) on bank profitability with the Return On Asset (ROA) ratio

The influence of the Capital Adequacy Ratio (CAR) on bank profitability as measured by Return on Assets (ROA) is one of the important topics in the banking industry. Several studies related to CAR on ROA can be summarized as follows.

Table 1 | Results of CAR Research on ROA

No	Article Author Name	Research result
1	Deny Yudiantoro et al. (2024)	CAR has a positive and significant effect on ROA
2	Shendy Amalia et al. (2020)	CAR has a positive and significant effect on ROA
3	Sochib Setya Fetri Liyundira et al. (2023)	CAR has a positive and significant effect on ROA
4	Muhammad Mufarodi et al. (2023)	CAR has a positive and significant effect on ROA
5	Sri Utami Permata et al. (2022)	CAR has a positive and significant effect on ROA
6	Rizky Meydina et al. (2024)	CAR has a positive and significant effect on ROA
7	(2024)	CAR has a positive and significant effect on ROA
8	Presilia Fenti Anggraini et al. (2023)	CAR has a positive effect and does not have a significant effect on ROA
9	Ilma Nurinfiaa et al. (2020)	CAR has a positive effect and does not have a significant effect on ROA

No	Article Author Name	Research result
10	(2024)	CAR has a positive effect and does not have a significant effect on ROA
11	Gregory Paulus Tahu et al. (2023)	CAR has a positive effect and does not have a significant effect on ROA
12	Widyastuti Murtiningrum et al. (2024)	CAR has a positive effect and does not have a significant effect on ROA

Source: Data Processed (2025)

A total of 7 studies stated that CAR has a significant effect on ROA, while 5 studies stated that CAR does not have a significant effect on ROA. Research by Shendy Amalia et al. (2020) shows that CAR has a positive and significant effect on ROA, indicating that the higher the capital owned by a bank, the greater its ability to generate profits from its assets. Similar results were found by Deny Yudiantoro et al. (2024), who also emphasized that CAR plays an important role in increasing bank profitability. However, another study by Presilia Fenti Anggraini et al. (2023) stated that CAR does not have a significant effect on ROA, highlighting that the amount of capital owned by a bank does not always have a direct impact on the bank's ability to generate profits. In some cases, as found by Sri Utami Permata et al. (2022), CAR still shows a significant impact on ROA, strengthening the role of capital in maintaining bank stability and profitability. On the other hand, Ilma Nurinfiaa et al. (2020) found that CAR did not show a significant effect on ROA, underlining that other factors such as operational efficiency and risk management also play an important role in profitability.

4.2.2 The effect of Non Performing Loan (NPL) on bank profitability with Return On Asset (ROA) ratio

Non-Performing Loan (NPL) is one of the important indicators in assessing credit risk experienced by banks and has a significant impact on banking profitability as measured by Return on Assets (ROA). When NPL increases, banks must provide more reserves for credit losses, which in turn increases operating expenses and depresses bank profits.

Table 2 | Results of NPL Research on ROA

No	Article Author Name	Research result
1	Herman Karamoy et al. (2020)	NPL has a negative and significant effect on ROA
2	Deny Arif et al. (2019)	NPL has a negative and significant effect on ROA
3	Rizka Faza Bellananda et al. (2020)	NPL has a negative and significant effect on ROA
4	Shendy Amalia et al. (2020)	NPL has a negative and significant effect on ROA
5	Muhammad Mufarodi et al. (2023)	NPL has a negative and significant effect on ROA
6	Ni Komang et al. (2020)	NPL has a negative and significant effect on ROA
7	(2024)	NPL has a negative and significant effect on ROA
8	Presilia Fenti Anggraini et al. (2023)	NPL has a negative effect and does not have a significant effect on ROA
9	(2024)	NPL has a negative effect and does not have a significant effect on ROA
10	Sri Utami Permata et al. (2022)	NPL has a negative effect and does not have a significant effect on ROA
11	Gregory Paulus Tahu et al. (2023)	NPL has a negative effect and does not have a significant effect on ROA
12	(2021)	NPL has a negative effect and does not have a significant effect on ROA
13	Widyastuti Murtiningrum et al. (2024)	NPL has a negative effect and does not have a significant effect on ROA

Source: Data Processed (2025)

There are 7 studies stating that NPL has a significant effect on ROA, while 6 studies state that NPL does not have a significant effect on ROA. Several studies have shown that NPL has a significant negative effect on ROA, for example, studies by Herman Karamoy et al. (2020), Shendy Amalia et al. (2020), and Deny Arif et al. (2019), all of which found that high NPL significantly reduces ROA in the Indonesian banking sector.

Other studies, such as those conducted by Rizka Faza Bellananda et al. (2020), state that although NPL has a negative effect on ROA, this effect can be mitigated by other factors such as bank size and operational risk management. In a broader context, Muhammad Mufarodi et al. (2023) also emphasize that a high NPL ratio will have a negative impact on a bank's ability to generate profits, especially in an environment full of economic uncertainty.

Overall, there is a strong consensus among researchers that effective NPL management is critical to maintaining and improving bank profitability, particularly as measured by ROA.

4.2.3 The influence of the Loan to Deposit Ratio (LDR) on bank profitability with the Return on Asset (ROA) ratio

Loan to Deposit Ratio (LDR) reflects the bank's ability to mobilize savings funds to be distributed as credit. Several studies related to LDR on ROA can be summarized as follows:

Table 3 | Results of LDR Research on ROA

No	Article Author Name	Research result
1	Deny Arif et al. (2019)	LDR has a positive and significant influence on ROA
2	Shendy Amalia et al. (2020)	LDR has a positive and significant influence on ROA
3	Sochib Setya Fetri Liyundira et al. (2023)	LDR has a positive and significant influence on ROA
4	Annisa Lianadewi et al. (2024)	LDR has a positive and significant influence on ROA
5	(2024)	LDR has a positive and significant influence on ROA
6	Muhammad Mufarodi et al. (2023)	LDR has a positive and significant influence on ROA
7	Ni Komang et al. (2020)	LDR has a positive and significant influence on ROA
8	Muhammad Rifansa et al. (2021)	LDR has a positive and significant influence on ROA
9	(2024)	LDR has a positive and significant influence on ROA
10	Ilma Nurinfiaa et al. (2020)	LDR has a positive influence and does not have a significant effect on ROA.
11	(2019)	LDR has a positive influence and does not have a significant effect on ROA.
12	Presilia Fenti Anggraini et al. (2023)	LDR has a positive influence and does not have a significant effect on ROA.
13	Sri Utami Permata et al. (2022)	LDR has a positive influence and does not have a significant effect on ROA.
14	(2024)	LDR has a positive influence and does not have a significant effect on ROA.
15	Gregory Paulus Tahu et al. (2023)	LDR has a positive influence and does not have a significant effect on ROA.

Source: Data Processed (2025)

A total of 9 studies stated that the Loan to Deposit Ratio (LDR) has a significant effect on Return on Assets (ROA), while 6 studies stated that LDR does not have a significant effect on ROA. Several studies have shown that LDR can have a significant effect on ROA, depending on the balance between liquidity and profitability. For example, a study by Deny Arif et al. (2019) found that LDR has a positive and significant effect on ROA, where banks that are able to optimize funds for credit are more likely to increase profitability. In addition, studies by Shendy Amalia et al. (2020) and Sochib Setya Fetri Liyundira et al. (2023) also concluded that LDR has a significant positive impact on ROA, supporting the argument that efficient use of funds can increase net interest income.

However, the impact of LDR on ROA is not always consistent. Other studies, such as those conducted by Ilma Nurinfiaa (2020) and Intan Purnama et al. (2019), found that LDR had no significant effect on ROA, especially when liquidity risk was the main concern. Research by Annisa Lianadewi et al. (2024) even showed that LDR could have a positive impact in some cases but was not always partially significant in regression testing.

This variation suggests that the effect of LDR on bank profitability is highly dependent on internal and external contexts, including the bank's risk management policies and broader market conditions.

4.2.4 The effect of Net Interest Margin (NIM) on bank profitability with Return On Asset (ROA) ratio

Net Interest Margin (NIM) is one of the main indicators that affect bank profitability, which is measured through Return on Assets (ROA). NIM reflects the bank's efficiency in generating net interest income from credit and fundraising activities.

Table 4 | Results of NIM Research on ROA

No	Article Author Name	Research result
1	Herman Karamoy et al. (2020)	NIM has a positive and significant effect on ROA
2	Shendy Amalia et al. (2020)	NIM has a positive and significant effect on ROA
3	Rizka Faza Bellananda et al. (2020)	NIM has a positive and significant effect on ROA
4	Sochib Setya Fetri Liyundira et al. (2023)	NIM has a positive and significant effect on ROA
5	Ni Komang et al. (2020)	NIM has a positive and significant effect on ROA
6	(2021)	NIM has a positive and significant effect on ROA
7	Muhammad Rifansa et al. (2021)	NIM has a positive and significant effect on ROA
8	Widyastuti Murtiningrum et al. (2024)	NIM has a positive and significant effect on ROA
9	Deny Yudiantoro et al. (2024)	NIM has a positive effect and does not have a significant effect on ROA
10	(2024)	NIM has a positive effect and does not have a significant effect on ROA

Source: Data Processed (2025)

8 studies state that NIM has a significant effect on ROA, while 2 studies state that NIM does not have a significant effect on ROA. In general, studies show that NIM has a positive and significant effect on ROA. For example, a study by Herman Karamoy et al. (2020) found that NIM has a significant impact on increasing bank profitability. Another study by Shendy Amalia et al. (2020) also supports this finding, where NIM contributes positively to ROA because banks with higher NIM are able to manage interest margins effectively.

In addition, studies by Rizka Faza Bellananda et al. (2020) and Sochib Setya Fetri Liyundira et al. (2023) also found that NIM has a significant effect on ROA. Banks with higher NIM are better able to maximize net interest income, which in turn increases overall profitability. However, there are several studies that show variations in the effect of NIM on ROA. Research by Deny Yudiantoro et al. (2024) and I Made Kelvin Indra Setiawan et al. (2024) indicates that although NIM has a positive effect, the effect is not always significant in some banks depending on risk management and market conditions.

Other studies, such as those conducted by Nuraini Wulandari (2021), also confirm that NIM has a positive and significant impact on ROA, strengthening the argument that banks that are able to manage interest margins well will tend to have better financial performance. Thus, although most studies conclude that NIM plays an important role in increasing bank profitability, the significance of its influence may vary based on the operational context and financial management strategy of the bank.

4.2.5 The influence of CAR, NPL, LDR and NIM on bank profitability with the Return On Asset (ROA) ratio

The influence of Capital Adequacy Ratio (CAR), Non-Performing Loan (NPL), Loan to Deposit Ratio (LDR), and Net Interest Margin (NIM) on bank profitability, as measured by Return on Assets (ROA), has been widely studied in the financial literature. CAR plays an important role in maintaining bank capital stability, which allows banks to better absorb risks. Research by Deny Yudiantoro et al. (2024) shows that CAR has a positive and significant effect on ROA, indicating that banks with adequate capital are better able to generate profitability. However, these results are not always consistent across studies, such as the study by Ilma Nurinfiaa (2020), which found that CAR does not always significantly affect ROA in banks with high credit risk.

On the other hand, NPL, or non-performing loan ratio, generally has a negative effect on ROA, because an increase in NPL reflects an increase in credit risk that affects the bank's financial performance. Research by Muhammad Kadafi et al. (2021) and Wahyu Subono et al. (2020) confirmed that NPL has a significant negative impact on ROA, indicating that high non-performing loans reduce bank profitability. LDR, which reflects the efficiency of using funds for credit, provides mixed results. A study by Deny Arif et al. (2019) showed that LDR has a significant positive effect on ROA, meaning that banks that are able to optimize deposit funds for credit are better able to increase profitability. However, these results are not always significant, as found in the research of Ilma Nurinfiaa (2020) and Sochib Setya Fetri Liyundira et al. (2023), which stated that LDR does not always affect ROA, especially in conditions of high liquidity risk.

Finally, NIM consistently shows a significant positive effect on ROA. Banks that are able to manage interest margins well tend to achieve higher levels of profitability. Research by Shendy Amalia et al. (2020) and Rizka Faza Bellananda et al. (2020) confirmed that NIM has a strong positive impact on ROA, because increasing net interest income helps improve the bank's financial performance. Thus, although CAR, NPL, LDR, and NIM all affect ROA, their effects depend on the internal and external conditions faced by each bank.

5. CONCLUSION

The conclusion is that CAR, LDR, and NIM generally have a positive impact on ROA, indicating that the capital adequacy ratio, loans to deposits, and interest margin efficiency support increased profitability. Conversely, NPL has a negative impact because it reflects high credit risk that suppresses profits. However, in terms of significant influence, CAR, NPL, LDR, and NIM have a significant influence that varies on bank profitability as measured by ROA depending on the liquidity conditions in each bank.

6. LIMITATION AND IMPLICATION

6.1 Limitation

This study mainly uses the discussion of articles with specific financial ratios—Capital Adequacy Ratio (CAR), Loan to Deposit Ratio (LDR), Non-Performing Loans (NPL), and Net Interest Margin (NIM)—to assess profitability (ROA) in Indonesian banking. However, there are limitations related to sample diversity and potential bias due to the selection of certain financial variables. Although these ratios are important indicators, the results may not be fully generalized across different types of banks or in different economic contexts due to differences in risk management and external conditions affecting each bank.

6.2 Implication

The results of the study provide valuable insights into how key financial ratios correlate with profitability, which can serve as a basis for improving operational efficiency and credit risk management strategies. The banking sector can leverage these

findings to develop policies that focus on optimal loan-to-deposit ratios and better non-performing loan management in order to achieve sustainable profitability despite economic volatility. For further research, it is suggested that researchers consider deepening the study on the significant influence of Capital Adequacy Ratio (CAR), Non-Performing Loan (NPL), Loan to Deposit Ratio (LDR), and Net Interest Margin (NIM) on bank profitability as measured by Return on Assets (ROA). Thus, further research is expected to provide deeper and more relevant insights for the banking sector in Indonesia.

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