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The Influence Of Digitalization, Bank Specifications, And Macroeconomics On Indonesia's Bank Performance

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Abstract: This research aims to determine and analyse the effect of digitalisation, bank specifications, and macroeconomics on the performance of banks listed on the Indonesia Stock Exchange in the 2018-2022 period. Independent variables in this study include digitalisation, bank size, capital adequacy ratio, loan-to-asset ratio, loan-to-deposit ratio, nonperforming loans, Inflation, and gross domestic product. The dependent variable is financial performance measured using Return on Assets and Return on Equity. To analyse the data, this study uses the Eviews 12 program to analyse multiple linear regression. The study's results indicate that digitalisation, bank size, capital adequacy ratio, and loan-to-deposit ratio positively and significantly affect financial performance. Meanwhile, loan-to-asset ratios and nonperforming loans negatively and significantly affect a bank's financial performance. In contrast, Inflation and gross domestic product do not affect bank financial performance.
Keywords: Bank; Bank Specifications; Digitalisation; Financial Performance; Macroeconomics.

Abstrak: Penelitian ini bertujuan untuk mengetahui dan menganalisis pengaruh digitalisasi, spesifikasi bank, dan ekonomi makro terhadap kinerja bank yang terdaftar di Bursa Efek Indonesia periode 2018-2022. Variabel independen dalam penelitian ini meliputi digitalisasi, ukuran bank, rasio kecukupan modal, rasio pinjaman terhadap aset, rasio pinjaman terhadap deposito, kredit bermasalah, inflasi, dan produk domestik bruto. Variabel dependen adalah kinerja keuangan yang diukur dengan menggunakan pengembalian atas aset dan pengembalian atas ekuitas. Untuk menganalisis data, penelitian ini menggunakan program Eviews 12 untuk menganalisis regresi linier berganda. Hasil penelitian menunjukkan bahwa digitalisasi, ukuran bank, rasio kecukupan modal, dan rasio kredit terhadap simpanan berpengaruh positif dan signifikan terhadap kinerja keuangan bank. Sementara itu, rasio kredit terhadap aset dan kredit bermasalah berpengaruh negatif dan signifikan terhadap kinerja keuangan bank. Sedangkan inflasi dan produk domestik bruto tidak berpengaruh terhadap kinerja keuangan bank.
Kata Kunci: Bank; Spesifikasi Bank; Digitalisasi; Kinerja Keuangan; Makroekonomi.

INTRODUCTION

Profitability is used to measure a bank's ability to make a profit. Every bank decision must be considered about the impact it will have on bank profitability (Doku et al., 2019). (Jayasena et al., 2023), in their study, used Return on Assets (ROA) and Return on Equity (ROE) ratios as profitability indicators to assess the financial performance of commercial banks in Sri Lanka. The results of their study show that both ratios are valid measurements and can describe the bank's ability to generate profits.

This research uses ROA and ROE as indicators to determine bank performance. The main objective of bank operations is to achieve a high or maximum level of profitability. ROA is a profitability ratio used to measure the company's ability to generate profits. Meanwhile, ROE is the ratio between net income and total equity (Shenurti et al., 2022).

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In the context of banking companies, Return on Assets (ROA) provides an overview of the efficiency and productivity of banks in generating profits from the amount of assets owned. ROA measures how effective banks are in managing their assets to generate profits. The higher the ROA value, the more efficiently the bank utilises its assets to generate profits (Theiri & Hadoussa, 2023). Return on Equity (ROE) can be used as a benchmark for the efficient use of internal capital that is operationalised in banking companies. ROE measures how much the bank can generate profits for investors based on the capital invested.

The COVID-19 pandemic in 2020 is a driving force in banking digitalisation. Conditions that create mobility restrictions limit the community's activities. With digitalisation, people can carry out a variety of transactions, even in pandemic conditions. The pandemic has further encouraged banking digitalisation because transactions can be done anytime and anywhere (Bank Indonesia, 2022).

The increase in digitalisation can be seen in its effect on banks' financial performance. Based on research from (Zhou et al., 2021) and (Forcadell et al., 2020), digitalisation in banks can be measured using a combination of digital technologies, such as internet banking, mobile banking, cloud computing, big data, artificial intelligence, blockchain, QR payments, and e-money.

Research results by Theiri & Hadoussa (2023) show that digitalisation has a significant positive effect on profitability, reflected in ROA and ROE. Other research by (Coryanata et al., 2023) shows different results that digitalisation has a negative effect on ROA in the banking industry. The development of digitalisation through investments made by banks can increase profitability, financial innovation and develop risk control (Theiri, 2023). Not only digitalisation but there are other factors commonly used to assess its impact on financial performance in banks, such as bank specifications and economic growth. Bank specifications that can be used are bank size, capital ratio, loan ratio, liquidity ratio, and nonperforming loans.

Research by (Theiri & Hadoussa, 2023) also shows that bank size positively influences bank profitability. The larger the size of a bank, the greater its capacity and the more innovative it is in doing business to increase profitability. Capital ratio or capital adequacy ratio (CAR) reflects bank capital adequacy to bear the risk of asset losses (Al Zaidanin & Al Zaidanin, 2021). The loan-to-asset ratio (LTA) or debt-to-asset ratio (DAR) measures how much of the company's assets are financed by debt (Kaddumi & Kilani, 2021). This shows that decreased corporate debt supports increased bank profitability (Saputra & Setiawan, 2023). Liquidity looks at the bank's ability to meet its short-term obligations (Kaddumi & Kilani, 2021). The liquidity ratio that can be used to measure bank liquidity is the loan-to-deposit ratio (LDR). The greater the public funds channelled by the bank, the more the profit potential will increase (Kaddumi & Kilani, 2021). Nonperforming loans measure how much nonperforming loans the bank has. A decreasing nonperforming loan will increase the bank's profitability due to the income earned by the bank through interest, instalments, and guarantees (Theiri & Hadoussa, 2023).

The banking system issues have worsened due to declining GDP and rising Inflation (Gazi et al., 2022). Profitability in any company or organisation, especially banks, is affected not only by their internal business environment but also by the external environment in various ways (Jahan, 2020). Due to the direct and indirect relationship between the financial crisis and the world economy, there is an impact on each country. Research by (Theiri & Hadoussa, 2023) also explains that economic growth can be measured through Inflation and gross domestic product (GDP), which are included in external factors. In their research, (Theiri & Hadoussa, 2023) explained that Inflation and GDP do not affect bank profitability.

Another study by (Yuan et al., 2022) also explained that the inflation rate and GDP are included in macroeconomic variables; in this study, the Inflation Rate and GDP were positive and significant to ROA.

Considering the phenomena and background previously discussed, the researchers aim to conduct a study titled "The Influence of Bank Size on Bank Performance: The Influence of Digitalization, Bank Specifications, and Macroeconomics on Indonesia's Bank Performance". The outcomes of earlier research projects are combined in one study by (Theiri & Hadoussa, 2023) by adopting digital variables, bank specifications and macroeconomics as independent variables and profitability as the dependent variable. However, due to the limited information on banks' digital measurements in Indonesia, a measurement approach refers to other articles. This study's novelty is adding another measurement approach to the digitalisation variable, building upon previous research conducted by (Coryanata et al., 2023). Researching to determine the factors that can maximise bank performance is essential.

THEORETICAL REVIEW

Financial performance can be defined as a representation of the bank's financial conditions analysed using financial analysis tools to determine the shortcomings and achievements achieved by the bank (Esomar & Christianity, 2021). Financial performance refers to the act of carrying out financial activities and the extent to which the bank's financial targets have been achieved. The value of the bank's financial performance allows one to assess its performance and see its strengths and weaknesses.

Profitability is a measurement to assess a company's ability to generate profits (Diana Nabella et al., 2022). It is one of the critical elements in evaluating bank performance, showing profits compared to asset investment, equity, or sales. Increasing profitability is crucial for banks; high profitability can provide sufficient resources for company development.

Assessment of bank financial performance with a profitability approach can be measured using return on assets (ROA), return on equity (ROE) and net interest margin (NIM) (Hacini et al., 2021). (Krakah & Ameyaw, 2020) state that the best measurement of bank profitability is using ROA because it is not affected by large equity multipliers such as ROE (Horobet et al., 2021). Return on asset is a ratio that shows how much the company's ability to convert borrowings into profits (Dao & Nguyen, 2020). ROA is a measurement that looks at the bank's ability to generate profits through existing assets (Pratami, 2021). ROA indicates the bank's efficiency in using assets to generate profits. ROA is measured by dividing net income by total assets (Theiri & Hadoussa, 2023).

ROE is one of the most preferred measures to assess the financial performance of banks (Rumaly, 2023). ROE is the company's profit compared to the total shareholders' equity invested or contained in the balance sheet (Ongore & Kusa, 2013). ROE is used to measure the company's performance in allocating capital in a company (Bancel et al., 2013). ROE is measured by dividing net income by total equity (Theiri & Hadoussa, 2023).

This research was conducted concerning research by (Theiri & Hadoussa, 2023) entitled "Digitisation effects on banks' financial performance: the case of an African Country" using dependent variables, namely ROA and ROE, as well as independent variables, namely digitisation, bank size, capital adequacy ratio, loan to asset ratio, loan to deposit ratio, nonperforming loans, Inflation, and gross domestic product. Another study used as a reference is research by (Coryanata et al., 2023) entitled "Digitalisation of banking

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and financial performance of banking companies", using the independent variable, namely ROA, and the dependent variable, banking digitisation.

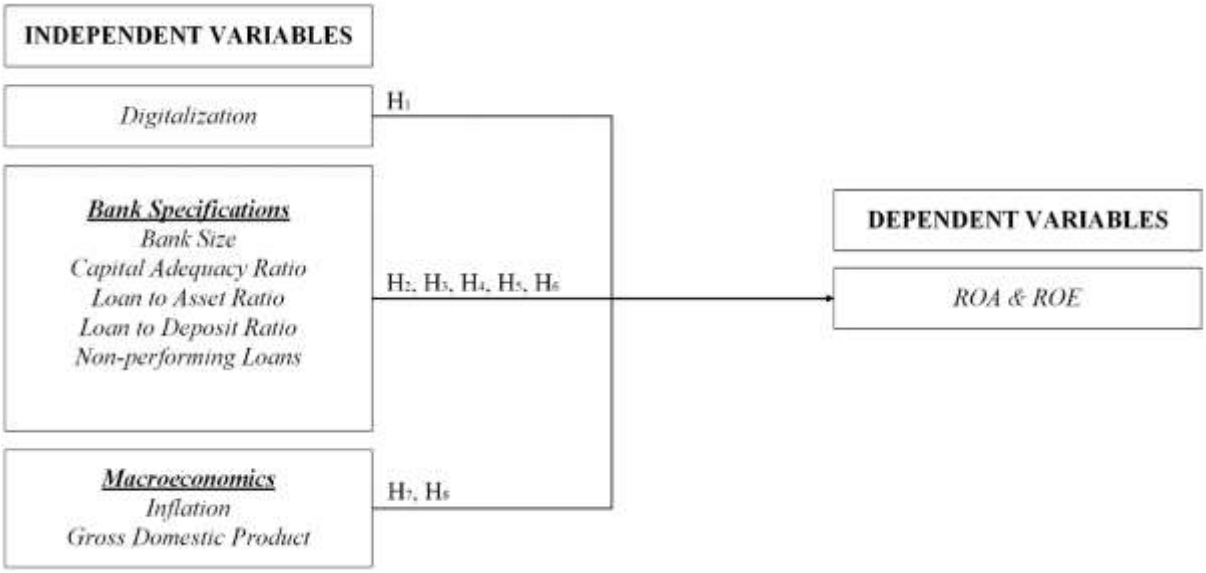

Figure 1. Research Model
Source: processed by the author (2024)

Digitalisation converts information into a digital format, resulting in objects, images, sounds, documents, or signals (Harchekar, 2018). Digitalisation in this research was measured by measuring several digital technology criteria, such as mobile banking, internet banking, cloud computing, data management, artificial intelligence, blockchain, QR payment and e-money. Each criterion is measured on a nominal scale; if it does not use digital technology, it is rated 0; if it uses digital technology, it is rated 1 (Coryanata et al., 2023). Research conducted by Chen et al. (2021) suggests that investment in digital technology can improve bank performance. With banks presenting innovations, it can make it easier for users to use banks for daily activities. Payments that can be made anywhere online certainly benefit customers, so bank profitability can increase due to the birth of innovation and the convenience obtained. This is supported by research (Theiri & Alareeni, 2023) & (Bousrih, 2023).

Different results were shown in research by (Coryanata et al., 2023) that digitalisation significantly negatively affects bank financial performance as measured by ROA. According to research by (Coryanata et al., 2023) & (Nguyen-Thi-Huang et al., 2023), the high costs incurred for digital transformation in banks can reduce profitability if there are still problems with the transformation. It takes careful preparation and minimal errors to prepare good digital tools for users because they involve customer confidence in using digital services. In addition, digitalisation needs to be accompanied by digital products that solve problems, meet customer needs, and are ready to compete with services offered by competitors. Based on the discussion above, the following hypothesis is proposed:

H1: Digitalisation has a significant effect on bank financial performance.

Bank size is defined as the size of the bank, which is reflected by the total assets owned by the bank (Tharu & Shreastha, 2019). Bank size is used to see how big a bank is through

the total assets owned by the bank (Tharu & Shreastha, 2019). Bank size is the natural logarithm form of a bank's total assets owned by the bank (Supiyadi, 2023).

Previous research by (Theiri & Hadoussa, 2023) showed that bank size significantly positively affects profitability. Research by (Gupta & Mahakud, 2020) shows that bank size also positively affects return on equity (ROE). This may be because larger banks are more profitable.

Another study by Supiyadi (2023) shows that bank size does not affect ROA. A theory suggests that the larger the size of a bank, the greater its capacity and the more innovative it is in doing business to increase profitability (Theiri & Hadoussa, 2023). The larger the size of the bank, the greater the bank's efficiency in its operations, which can affect its profitability. Based on the discussion above, the following hypothesis is proposed:

H2: Bank size has a significant effect on bank financial performance.

Capital adequacy ratio is a ratio that shows the adequacy of capital required by the bank. The results of research by (Theiri & Hadoussa, 2023), (Tharu & Shreastha, 2019), (Natufe & Evbayiro-Osagie, 2023) show that CAR has a significant positive effect on bank's financial performance. According to research by (Al Zaidanin & Al Zaidanin, 2021), an increase in CAR will be accompanied by increased profitability due to higher bank profits. An increase in CAR signifies increased mitigation of the risk of loss experienced by the bank; sufficient CAR can bear losses from unexpected events and economic factors. This action can increase profitability because public and investor confidence is maintained through banks that have sufficient capital to bear losses that may occur. Having significant capital can also allow the bank to allocate capital for operational activities that support the increase in bank income (Alnajjar, 2021).

Different research results were found by (Antwi, 2019), (Naveenan et al., 2023) (Alnajjar, 2021), which found that CAR has a significant negative effect on a bank's profitability. According to research (Alnajjar, 2021), high CAR can cause a decrease in profitability because it is not utilised or becomes unproductive idle funds. CAR in the form of capital deposited by the bank is not channelled into credit, which can increase profitability. However, it is stored in large amounts, so the potential for profit through lending can decrease. Based on the discussion above, the following hypothesis is proposed:

H3: Capital adequacy ratio has a significant effect on bank financial performance.

Loan-to-asset ratio (LTA) evaluates the percentage of loans sourced from bank assets (Alta'ani, 2020). LTA is the proportion of total assets banks invest in loans (Kalimashi et al., 2022). It assesses the bank's reliance on external sources for investment financing (Kaddumi & Kilani, 2021). LTA is measured by dividing total loans by assets (Theiri & Hadoussa, 2023).

The research results by (Kalimashi et al., 2022) show that LTA has a significant positive effect on ROE but has no effect on ROA. The results of research by (Sathyamoorthi et al., 2020), which examined the financial performance of banks in Botswana, showed that LTA had a significant positive effect on ROA. A positive relationship indicates that a large LTA ratio can influence banks to earn higher profits through interest income (Sathyamoorthi et al., 2020). Based on the discussion above, the following hypothesis is proposed:

H4: Loan to-asset ratio significantly affects a bank's financial performance.

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The loan-to-deposit ratio (LDR) measures a bank's liquidity condition. A bank is vital if it has good liquidity conditions (Rezina et al., 2020). The LDR indicates a bank's ability to manage its loans and deposits. LDR measures the efficiency of management and control of credit and deposit processes (Zaidanin & Zaidanin, 2021). LDR is measured by dividing total loans granted by total funds from third parties (Theiri & Hadoussa, 2023).

Research by (Theiri & Hadoussa, 2023) shows that LDR significantly positively affects ROA. This means that the greater the public funds channelled by the bank, the more the bank's potential for profit will increase (Puspitasari et al., 2021). The higher the credit disbursed, the higher the level of lending risk, which can increase the level of nonperforming loans. However, the high distribution of deposits into loans will lead to higher profit margins earned from loan interest (Zaidanin & Zaidanin, 2021).

Research by (Akande & Salawu, 2019) which examines financial performance in banks in Nigeria, shows the results of LDR has a significant negative effect on ROE. The same results were shown in research by (Adegboyega, 2023), which showed the results of LDR had a significant adverse effect on ROE. This can be caused by the small amount of lending that can make investors withdraw their capital due to the small amount of credit disbursed (Adegboyega, 2023). Based on the discussion above, the following hypothesis is proposed:

H5: Loan to deposit ratio significantly affects a bank's financial performance.

The nonperforming loan ratio is a warning indicator of the amount of nonperforming loans disbursed by the bank (Zaidanin & Zaidanin, 2021). Research conducted by (Theiri & Hadoussa, 2023) shows that nonperforming loans (NPL) have a significant adverse effect on ROA but do not affect ROE. This means decreasing nonperforming loans will increase bank profitability due to banks' income through interest, instalments, and guarantees (Theiri & Hadoussa, 2023). Conversely, high NPLs will decrease ROA due to the loss of opportunity to generate profits through lending (Saleh & Paz, 2023). According to research conducted by (Natufe & Evbayiro-Osagie, 2023), by taking sources from the sector from 2010 to 2021 in Nigeria, it is evident that the nonperforming loan ratio (NPL) has a negative and statistically significant relationship with return on equity (ROE).

The same results were found in research by (Karim et al., 2023) & (Korankye et al. 2022), which found that npl has a significant negative effect on bank performance. An increase in bank profitability can be caused by a decrease in the nonperforming loan ratio that prevents banks from making a profit. Loans disbursed by banks to debtors are expected to earn additional profits from the interest determined and agreed upon by both parties. However, debtors who do not pay loans according to time and agreement make the bank lose the potential to earn profits, so its profitability decreases. Based on the discussion above, the following hypothesis is proposed:

H6: Nonperforming loans have a significant effect on bank financial performance.

Inflation increases interest rates. Higher interest rates provide more opportunities for banks to build profit margins. At the same time, the cost of funds also rises, which can reduce profits. Balancing those two competing forces (Batsinda & Shukla, 2019). Therefore, it is important to study the impact of Inflation on ROA, ROE, and net income to determine banks' profitability (Jeevita et al., 2019).

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Research conducted by (Theiri & Hadoussa, 2023) shows that Inflation does not affect ROA. The results of research by (Almansour et al., 2021) also show that Inflation does not affect ROA, which examines the effect of Inflation on the performance of banks in Jordan and suggests the result that Inflation has a significant negative effect on ROE. High prices, not followed by an increase in income that adjusts to Inflation, make people need funds to save. The increase in prices will have an impact on the difficulties experienced by customers in credit payments, which will decrease bank profitability (Batayneh et al., 2021). Based on the discussion above, the following hypothesis is proposed:

H7: Inflation has a significant effect on bank financial performance.

Economic growth is measured by gross domestic product per capita. It represents differences in factors that can be omitted from the regression and affects bank profitability, including banking opportunity mix and regulation. Economic growth can be measured in nominal or inflation-adjusted real terms. The annual growth rate of GDP is also used to control economic growth's impact (Ali et al., 2022).

Research conducted by (Yuan et al., 2022) states that GDP has a positive and significant effect on ROA, while GDP has a significant positive effect on ROE. Another study by (Abdullahi & Yusuf, 2022) suggests that external factors significantly positively affect financial performance (ROA and ROE) in Jaiz banks. Inflation and interest rates are known not to affect bank financial performance.

Other research explains that GDP growth has a positive impact on ROA and ROE (Indriastuti & Muharram, 2021), demonstrated by using a sample of bank data that has been listed on the Indonesia Stock Exchange (BEI), with complete financial reports available for each bank for the years 2009 through 2013. Based on the discussion above, the following hypothesis is proposed:

H8: Gross Domestic Product has a significant effect on bank financial performance.

METHODS

The study utilised secondary data from the banks' annual reports on the Indonesia Stock Exchange. These reports were accessed through the Indonesia Stock Exchange and respective company websites. As for the independent variable, Digitalization uses a nominal scale: 0 for banks not using digital technology and 1 for banks not using digital technology. Measurement of usage is seen from several components, such as internet banking, mobile banking, cloud computing, big data, artificial intelligence, blockchain, QR payment and e-money. This study's data consists of financial statements and annual reports of banks listed on the Indonesia Stock Exchange from 2018-2022. The data panel model uses panel data regression, namely common, fixed, and random effects. The data was processed and tested using Eviews 12 software. The variables and measurements used are listed in the table below:

Table 1. Operational Definition of Research Variables

Variables	Measurements	Sources
Dependent variable		
Financial performance		
Return On Assets		

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Return On Equity	$\frac{\text{Net Income}}{\text{Total Assets}}$ $\frac{\text{Net income}}{\text{total equity}}$	(Al Zaidanin & Al Zaidanin, 2021) (Theiri & Hadoussa, 2023)
Independent variables		
Digitalisation Index Digital Banking	$\frac{\text{Number of items applied}}{\text{Number of items (8 items based on the application of digital technology)}}$	(Coryanata et al., 2023)
Bank Specificities		(Nizam et al., 2019)
Bank Size	Ln Total assets	
Capital Adequacy Ratio	$\frac{\text{Modal}}{\text{ATMR}}$	(Al Zaidanin & Al Zaidanin, 2021)
Loan to Asset Ratio	$\frac{\text{Total debt}}{\text{Total assets}}$	(Nizam et al., 2019)
Loan to Deposit Ratio	$\frac{\text{Total credit}}{\text{Total deposit}}$	(Nizam et al., 2019)
Nonperforming Loans	$\frac{\text{Nonperforming loans}}{\text{total loans}}$	(Abdelaziz et al., 2022)
Economic variables		
Inflation	$\frac{CPI_{x+1} - CPI_x}{CPI_x}$	(Theiri & Hadoussa, 2023)
Gross Domestic Product	$\frac{GDP_t - GDP_{t-1}}{GDP_{t-1}}$	(Theiri & Hadoussa, 2023)

Note: processed by researchers from various sources (2024)

Regression analysis using panel data is used to evaluate the independent variable with the dependent variable in situations where multiple companies are present and the time frame is set. The following is the methodical formulation of panel data regression analysis:

$$ROA = \alpha_1 + \beta_1(DIGITAL) + \beta_2(SIZE) + \beta_3(CAR) + \beta_4(LTA) + \beta_5(LDR) + \beta_6(NPL) + \beta_7(INF) + \beta_8(GDP) + €\ldots\ldots(1)$$

$$ROE = \alpha_2 + \beta_1(DIGITAL) + \beta_2(SIZE) + \beta_3(CAR) + \beta_4(LTA) + \beta_5(LDR) + \beta_6(NPL) + \beta_7(INF) + \beta_8(GDP) + €\ldots\ldots(2)$$

The variables involved in this analysis include the coefficient of constant (α), the regression coefficient (β), and the error rate (€). The key factors being examined are DIGITAL (digitalisation), SIZE (bank size), CAR (capital adequacy ratio), LTA (loan to asset ratio), LDR (loan to deposit ratio), NPL (nonperforming loan), INF (Inflation), and GDP (gross domestic product). These variables analyse the relationships and trends within the banking sector and broader economic conditions.

The data collection method uses secondary data from the banks' annual reports on the Indonesia Stock Exchange through the Indonesia Stock Exchange website and related company websites. This study's data consists of financial statements and annual reports of banks listed on the Indonesia Stock Exchange from 2018-2022. The data panel model uses panel data regression, namely standard, fixed, and random effects. Data is processed and tested using Eviews 12 software. The sample withdrawal method used is purposive sampling, which is based on specific criteria in the population. The criteria that will be used as samples in this study are as follows:

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Table 2. Purposive Sampling

Description	Total
Number of conventional banks that have been listed on the Indonesia Stock Exchange for the period 2018-2022	47
Deducted:	(3)
Islamic banking listed on the Indonesia Stock Exchange for the period 2018-2022	
Banking companies that have just IPO after 2018	(4)
Regional development banks listed on the Indonesia Stock Exchange for the period 2018-2022	(3)
Banks that present financial information using currencies other than Rupiah as the reporting unit.	(1)
Conventional banking with incomplete data in its annual financial statements	(1)
The number of companies that are not eligible to be sampled	(1)
Number of Research Samples	34
Number of Observation Years 2018 - 2022	5
Total Research Data	170

RESULTS

The descriptive statistical analysis in this study provides an overview of the research variables. To interpret the results of the descriptive statistics, it is necessary to examine the achieved values for the mean, median, maximum, minimum, and standard deviation. These results are presented in **Table 3**, as shown below:

Table 3. Statistic Descriptive

Statistik	ROA	ROE	DIGITAL	SIZE	CAR	LTA	LDR	NPL	INF	GDP
Mean	0.008	0.033	0.591	31.353	0.332	0.558	0.878	0.016	0.029	0.034
Median	0.008	0.041	0.625	30.892	0.242	0.582	0.829	0.012	0.027	0.050
Maximum	0.147	0.956	1.000	35.228	2.883	0.949	3.550	0.099	0.0055	0.053
Minimum	- 0.158	- 0.890	0.000	27.222	0.111	0.000	0.123	- 0.033	0.016	0.020
Std. Dev.	0.028	0.163	0.291	1.896	0.319	0.156	0.371	0.014	0.013	0.028
Observations	170	170	170	170	170	170	170	170	170	170

Note: Generated using Eviews 12 software, analysed by the author (2024)

Table 3 reveals that the ROA variable exhibited values from -0.158 to 0.147, with a mean value of 0.008 and a standard deviation of 0.028. The negative minimum value suggests that some companies experienced losses, while the positive maximum value indicates that others could generate positive returns on their assets. The relatively low average ROA and high standard deviation imply that the profitability of the companies in the sample varies considerably.

ROE variable exhibited values from -0.890 to 0.956, with a mean value of 0.033 and a standard deviation of 0.163. The negative minimum value suggests that some companies experienced losses, while the positive maximum value indicates that others could generate substantial returns on their equity. The low average ROE and high standard deviation imply that the companies' ability to generate returns on equity investments is quite diverse.

Regarding the independent variables, the DIGITAL variable exhibited values spanning from 0.000 to 1.000, with a mean value of 0.591 and a standard deviation of 0.291. While some companies still need to implement digitalisation, most sample companies have.

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The relatively high standard deviation suggests that the level of digital adoption varies across the companies.

The SIZE variable exhibited values from 27.220 to 35.220, with a mean value of 31.350 and a standard deviation of 1.896897. This implies that the companies in the sample range from small to large, with the average being in the medium-sized category. The high standard deviation indicates that the size of the companies is quite diverse.

CAR variable exhibited values from 0.111 to 2.883, with a mean value of 0.332 and a standard deviation of 0.319. This suggests that the companies have varying degrees of capital adequacy, with some having very high capital ratios and others relatively low. The high standard deviation implies that capital adequacy is heterogeneous across the sample.

LTA variable exhibited values from 0.000 to 0.949, with a mean value of 0.558 and a standard deviation of 0.156. This indicates that the loan levels of the companies in the sample range from very low to nearly fully leveraged, with the average being moderately leveraged. The relatively high standard deviation suggests that the loan levels vary considerably across the companies.

LDR variable exhibited values spanning from 0.123 to 3.550, with an average of 0.878 and a standard deviation of 0.371. This implies that the companies have varying liquidity, with some having very high liquidity ratios and others relatively low. The high standard deviation suggests that liquidity levels vary across the sample.

The NPL variable exhibited values from -0.033 to 0.099, with a mean value of 0.016 and a standard deviation of 0.014. This indicates that the companies' nonperforming loan levels range from negative to moderately high, with the average being relatively low. The standard deviation suggests that NPL levels vary to some extent across the sample.

The INF variable exhibited values spanning from 0.016 to 0.0055, with a mean value of 0.029 and a standard deviation of 0.013. This implies that the companies' inflation levels vary considerably, ranging from relatively low to very high, with the average being in the moderate range. The high standard deviation suggests that inflation levels were heterogeneous across the sample period.

GDP variable exhibited values from -0.020 to 0.053, with a mean value of 0.034 and a standard deviation of 0.028. This indicates that the gross domestic product growth rates experienced by the companies ranged from slightly negative to moderately positive, with the average being in the low to moderate positive range. The standard deviation suggests that GDP growth rates varied to some extent across the sample period.

Model Selection Test. The research data testing method uses three types of panel data regression: common effect, fixed effect, and random effect. Next, the Chow Test, Hausman Test, and Lagrange Multiplier Test are required to ascertain which model is best suitable for interpreting the research findings.

Table 4. Chow Test ROA model

Effect Test	Statistic	d.f	Prob
Cross-section F	2.990	(33,128)	0.000
Cross-section Chi-Square	97.151	33	0.000

Note: Generated using Eviews 12 software, analysed by the author (2024)

Table 4 reveals that the Chow test results indicate that the cross-sectional chi-square value of 0.000 is statistically significant, as it is less than the 0.050 significance level. This

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suggests that a fixed effects model (FEM) is the most appropriate model for the data. Consequently, a Hausman test was conducted to assess the model choice further.

Table 5. Hausman Test ROA Model

Test Summary	Chi-Sq. Statistic	Chi-Sq d.f	Prob.
Cross-section random	0.000	8	1.000

Note: Generated using Eviews 12 software, analysed by the author (2024)

Table 5 reveals that the Hausman Test results acquired the prob value. Given that the cross-sectional random of 1.000 exceeds the significance level of 0.050, the Random Effect Model (REM) is the optimal choice. Because the Random Effect Model (REM) model was chosen, the Lagrange Multiplier test must be performed.

Table 6. Lagrange Multiplier Test ROA Model

Test Summary	Cross-section	Test Hypothesis Time	Both
Breusch-Pagan	20.88 (0.000)	1.840 (0.174)	22.72 (0.000)

Note: Generated using Eviews 12 software, analysed by the author (2024)

Table 6 reveals that the results of the Lagrange Multiplier Test show that the Random Effect model is a better fit for this research than the Common Effect model because the prob value is obtained, and the Breusch-Pagan probability value of 0.000 is smaller than the 0.05 significance level. Thus, the Random Effect model was used to conduct the subsequent study.

Table 7. Chow Test ROE Model

Effect Test	Statistic	d.f	Prob
Cross-section F	2.131	(33.120)	0.001
Cross-section Chi-Square	74.456	33	0.000

Note: Generated using Eviews 12 software, analysed by the author (2024)

Table 7 reveals that the Chow test results indicate that the cross-sectional chi-square value of 0.000 is statistically significant, as it is less than the 0.05 significance level. This suggests that a fixed effects model (FEM) is the most appropriate model for the data. Consequently, a Hausman test was conducted to assess the model choice further.

Table 8. Hausman Test ROE Model

Test Summary	Chi-Sq. Statistic	Chi-Sq d.f	Prob.
Cross-section random	0.000	8	1.000

Note: Generated using Eviews 12 software, analysed by the author (2024)

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Table 8 reveals that the Hausman Test results acquired the worth value. Given that the cross-sectional random of 1.000 exceeds the significance level of 0.050, the Random Effect Model (REM) is the optimal choice. Because the Random Effect Model (REM) model was chosen, the Lagrange Multiplier test must be performed.

Table 9. Lagrange Multiplier Test ROE Model

Test Summary	Cross-section	Test Hypothesis Time	Both
Breusch-Pagan	9.618 (0.001)	2.177 (0.140)	11.79 (0.000)

Note: Generated using Eviews 12 software, analysed by the author (2024)

Table 9 shows the results of the Lagrange Multiplier Test; the Random Effect model is a better fit for this research than the Common Effect model because the prob value is obtained, and the Breusch-Pagan probability value of 0.000 is smaller than the 0.050 significance level. Thus, the Random Effect model was used to conduct the subsequent study.

Regression Test. The T-test was conducted to determine the effect of independent variables (Digital, Bank Size, Capital Adequacy Ratio, Loan assets ratio, Loan deposit ratio, Nonperforming Loans, Inflation, Gross Domestic Product) individually in influencing the dependent variable (Return on Assets and Return on Equity).

Table 10. Result T Test ROA Model

Variable	Coefficient	Prob.	Conclusion
c	-0.095	0.152	No significant effect
DIGITAL	0.014	0.221	No significant effect
SIZE	0.002	0.242	No significant effect
CAR	-0.024	0.034	It has a significant adverse effect
LTA	0.011	0.554	No significant effect
LDR	0.023	0.007	It has a significant adverse effect
NPL	-0.297	0.045	It has a significant adverse effect
INF	-0.000	0.670	No significant effect
GDP	0.074	0.325	No significant effect

Note: Generated using Eviews 12 software, analysed by the author (2024)

Table 10 reveals the impact of various factors on bank financial performance, as measured by return on assets (ROA). Digitalisation and bank size were found to have no significant influence on ROA, as indicated by their respective p-values of 0.221 and 0.242, both exceeding the 0.050 significance level. Capital adequacy ratio was found to have a significant negative impact on ROA, with a coefficient of -0.024 and a p-value of 0.034, less than 0.05. While the loan-to-asset ratio did not show a significant effect (coefficient of 0.011, p-value of 0.554), the loan-to-deposit ratio had a significant positive impact on ROA (coefficient of 0.023, p-value of 0.007). Nonperforming loans were also found to significantly negatively affect ROA (coefficient of -0.297, p-value of 0.045). Neither Inflation (coefficient of -0.000, p-value of 0.670) nor gross domestic product (coefficient of 0.074, p-value of 0.325) exhibited a statistically significant impact on ROA.

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ROA = -0.095 + 0.014 DIGITAL + 0.002 SIZE + -0.024 CAR + 0.011 LTA + 0.023 LDR - 0.297 NPL -0.000 INF + 0.074 GDP + Ɛ……...……..…(3)

Table 11. Result T Test ROE Model

Variable	Coefficient	Prob.	Conclusion
c	-0.486	0.182	No significant effect
DIGITAL	0.093	0.166	No significant effect
SIZE	0.093	0.281	No significant effect
CAR	-0.093	0.010	It has a significant adverse effect
LTA	0.048	0.644	No significant effect
LDR	0.131	0.009	It has a significant adverse effect
NPL	-2.108	0.014	It has a significant negative effect
INF	-0.000	0.934	No significant effect
GDP	0.231	0.609	No significant effect

Note: Generated using Eviews 12 software, analysed by the author (2024)

Table 11 reveals that the impact of digitalisation on bank financial performance, as measured by the ROE variable, was not statistically significant. The digitalisation coefficient was 0.093 with a p-value of 0.166, exceeding the 0.050 significance level. Similarly, bank size was also found to have no significant influence on ROE, with a coefficient of 0.093 and a p-value of 0.281. In contrast, the capital adequacy ratio was determined to be a significant factor, with a coefficient of -0.093 and a p-value of 0.010, suggesting it is an essential driver of a bank's financial performance. However, the loan-to-asset ratio did not emerge as a significant predictor of ROE, registering a coefficient of 0.048 and a p-value of 0.644.

Conversely, the loan-to-deposit ratio was significant, with a coefficient of 0.131 and a p-value of 0.009. Nonperforming loans were observed to have a significant negative impact on ROE, with a coefficient of -2.108 and a p-value of 0.014. Regarding macroeconomic variables, neither Inflation nor GDP growth were found to have a statistically significant effect on bank financial performance as measured by ROE.

ROE = -0.486 + 0.093 DIGITAL + 0.012 SIZE -0.170 CAR + 0.048 LTA + 0.131 LDR - 2.108 NPL -0.000 INF + 0.231 GDP + Ɛ……...(4)

The F test was used in this study to assess the impact of independent variables (Digital, Bank Size, Capital Adequacy Ratio, Loan assets ratio, Loan deposit ratio, Nonperforming Loans, Inflation, Gross Domestic Product) simultaneously on the dependent variable (Return on Assets and Return on Equity). The primary goal of this F-test is to ascertain whether the research regression model is feasible.

Table 12. Result F Test ROA Model

Dependent Variable	F-Statistic	Probability
ROA	4.126	0.000

Note: Generated using Eviews 12 software, analysed by the author (2024)

Table 12 displays the findings from the F Statistical Test with the ROA variable. The independent variable affects the dependent variable since the F-statistic value is 4.126, with a probability value 0.000.

Table 13. Result F Test ROE Model

Dependent Variable	F-Statistic	Probability
ROA	3.667	0.000

Note: Generated using Eviews 12 software, analysed by the author (2024)

Table 13 displays the findings from the F Statistical Test with the ROE variable. The independent variable affects the dependent variable since the F-statistic value is 3.667, with a probability value 0.000.

Table 14. Coefficient of Determination ROA Model

R- Squared	0.569
Adjusted R-Square	0.431

Note: Generated using Eviews 12 software, analysed by the author (2024)

Table 14 displays the findings. The value of the Adjusted R Square is 0.431, or 43.130 per cent, meaning that the variables of digitalisation, bank size, capital adequacy ratio, loan-to-asset ratio, loan-to-deposit ratio, nonperforming loans, Inflation, and gross domestic product can explain the variation in bank performance variables by 43.130 per cent. In contrast, the remaining 56.870 per cent is explained by other variables not used in this study.

Table 15. Coefficient of Determination ROE Model

R- Squared	0.518
Adjusted R-Square	0.364

Note: Generated using Eviews 12 software, analysed by the author (2024)

Table 15 displays the findings; the value of the Adjusted R Square is 0.364 or 36.4700 per cent, meaning that the variables of digitalisation, bank size, capital adequacy ratio, loan-to-asset ratio, loan-to-deposit ratio, nonperforming loans, Inflation, gross domestic product can explain the variation in bank performance variables by 36.470 per cent. The remaining 63.530 per cent is explained by other variables not used in this study.

DISCUSSION

The Influence of Digitalization on Bank Performance. According to the first model's statistical test results, which used ROA as the dependent variable, digitalisation has a positive but insignificant effect on ROA. ROE is the dependent variable in the second model statistical test, and the results indicate that digitalisation has a positive but insignificant effect on ROE. The existence of digitalisation can help banks increase their company's profitability. Digitalisation helps banks make services more efficient, reduce business operating costs, and expand markets (Ky et al., 2021; Theiri & Alareeni, 2023). In this era, users want easy and fast services in transactions and fulfilling needs through digital products offered by banks. Therefore, banks can increase digitalisation services to increase bank profitability, as found in research by (Theiri & Alareeni, 2023) & Bousrih (2023).

These two models revealed that digitalisation has a positive but insignificant on bank performance. Thus, digitalisation does not affect bank performance. H1 is rejected since it is impossible to assess the direct impact of digitalisation as a tool for enhancing bank

operations on financial performance; instead, the study's findings are consistent with research by (Huang, 2023) & (Niemand et al., 2021).

The Influence of Bank Size on Bank Performance. According to the first model's statistical test results, which used ROA as the dependent variable, Bank Size has a positive but insignificant effect on ROA. ROE is the dependent variable in the second model statistical test, and the results indicate that Bank Size has a positive but insignificant effect on ROE. It is determined from the two models that bank performance is unaffected by bank size. Our findings suggest that more than bank size is needed to be a reliable indicator of performance in the Indonesian banking sector. This is essential information for investors seeking to allocate capital in this market. At the same time, larger banks might seem like a safer bet due to their perceived stability and resources (Rini Syahril Fauziah & Fadhilah, 2022).

In other words, bank size does not appear to be a significant determinant of financial performance, as measured by ROA, for the banks included in this study (Fadhli & Ali, 2021). The research results from (Fadhli & Ali, 2021) found an inverse but statistically insignificant relationship between bank size and financial performance of Kuwaiti banks from 2008-2018. This indicates that bank size has no meaningful effect on financial results in the Kuwaiti banking sector during the period analysed. However, previous research conducted by (Theiri & Hadoussa, 2023) found different results, where bank size negatively affects financial performance.

The Influence of Capital Adequacy Ratio on Bank Performance. The Capital Adequacy Ratio has a significant and negative impact on ROA, according to the statistical test findings of the first model, with ROA as the dependent variable. The Capital Adequacy Ratio significantly reduces ROE, according to the findings of the second model statistical test, which used ROE as the dependent variable. It is evident from both models that the Capital Adequacy Ratio significantly has a negative effect on bank performance. High capital adequacy can hurt bank profitability because idle funds do not become productive tools to increase bank profitability. The capital can be allocated to credit, one of the bank's most essential activities to earn profits. However, capital that is harboured high enough will eliminate the bank's potential to earn profits through lending. The results of this study are in line with research by (Antwi, 2019), (Naveenan et al., 2023), (Alnajjar, 2021).

This study has different results from research conducted by (Theiri & Hadoussa, 2023), (Tharu & Shreastha, 2019), (Natufe & Evbayiro-Osagie, 2023), which found a significant positive effect between CAR and bank performance. High CAR can lead to increased profitability due to the public and investor confidence gained by banks to mitigate the risk of losses that may occur. On the other hand, high CAR can reduce the potential profit the bank may obtain due to the high amount of idle funds. It can be concluded in this study that, statistically, CAR has a significant effect on bank performance, so H_3 is accepted.

The Influence of Loan to Asset Ratio (LTA) on Bank Performance. According to the first model's statistical test results, which used ROA as the dependent variable, the Loan Asset Ratio has a positive but insignificant effect on ROA. ROE is the dependent variable in the second model statistical test, and the results indicate that Loan Asset Ratio has a positive but insignificant effect on ROE. It is determined from the two models that bank performance is unaffected by the Loan to Asset Ratio. The statistical test results of the first model with ROA as the dependent variable show that the Loan Asset Ratio does not affect ROA. The statistical test results of the second model with ROE as the dependent variable show that the Loan Asset Ratio does not affect ROE. The results showed that the ratio of loans to assets does not significantly impact the financial performance of banks, as measured

by ROA and ROE. Our findings suggest that more than the loan-to-asset ratio (LTA) alone is needed to be a reliable indicator of performance in the Indonesian banking sector. This is essential information for investors seeking to allocate capital in this market. Higher LTA might traditionally be seen as a sign of aggressive growth and potentially higher returns, but our study reveals that LTA does not significantly influence profitability (Barra & Ruggiero, 2023). This is in line with the results of research (Pal, 2022), showing that Indian manufacturing companies in this study did not use high levels of debt to raise funds. Loan to asset ratio, used as a proxy for liquidity, was found to have a positive but insignificant relationship with financial performance (ROA & ROE).

The Influence of Loan to Deposit Ratio (LDR) on Bank Performance. According to the first model's statistical test results, which used ROA as the dependent variable, the Loan to Deposit Ratio positively and significantly affects ROA. ROE is the dependent variable in the second model statistical test, and the results indicate that the Loan Deposit Ratio has a positive and significant effect on ROE. The first model's statistical test results, which used ROA as the dependent variable, demonstrate that the Loan Deposit Ratio significantly and favourably affects ROA. The statistical test results of the second model with ROE as the dependent variable show that the Loan Deposit Ratio has a positive and significant effect on ROE. The two models show that Loan to Deposit Ratio has a significant positive effect on Bank Performance. Our research indicates a significant positive relationship between the loan-to-deposit ratio (LDR) and the financial performance of Indonesian banks, as measured by ROA and ROE. This finding aligns with the traditional view that a higher LDR, signifying a greater focus on lending activities, leads to increased profitability. A higher loan-to-deposit ratio may indicate a bank's ability to effectively leverage its deposit base to generate returns (Karadayi, 2023).

The results showed that the loan-to-deposit ratio significantly and positively impacts bank financial performance as measured by ROA and ROE. These results align with research (Theiri & Hadoussa, 2023), which shows that the ratio has a significant effect on ROA but no effect on ROE. Another research by (Karadayi, 2023) found that the loan-to-deposit ratio significantly and positively affected return on assets (ROA).

The Influence of Nonperforming Loans (NPL) on Bank Performance. According to the first model's statistical test results, which used ROA as the dependent variable, nonperforming loans significantly and negatively affect ROA. According to the second model's statistical test results, which use ROE as the dependent variable, nonperforming loans significantly and negatively affect ROE. Based on the two models, the financial performance of banks is significantly and negatively impacted by nonperforming loans. Based on the study's results, increased NPLs will decrease bank profits. Conversely, a decrease in NPLs will affect the increase in bank profits.

The results of this study are in line with research by (Natufe & Evbayiro-Osagi 2023), (Karim et al., 2023), (and Korankye et al., 2022), which found that NPLs have a significant adverse effect on bank performance. High NPLs indicate that the funds channelled to debtors have not been returned to the bank, coupled with interest as additional funds that benefit the bank, so bank profitability decreases. Conversely, suppose the credit channelled by the bank has minimal problems and is returned according to the time and agreement. In that case, the bank benefits from the interest earned, thereby increasing the bank's profitability. It can be concluded from the results of this study that NPL has a significant effect on bank performance, so H_6 is accepted.

The Influence of Inflation on Bank Performance. According to the first model's statistical test results, which use ROA as the dependent variable, Inflation does not affect

ROA. According to the second model's statistical test results, which use ROE as the dependent variable, Inflation does not affect ROE. From both models, it is found that Inflation does not affect Bank Performance. Our findings suggest that Inflation alone is not a reliable indicator of performance in the Indonesian banking sector. Countries with stable and relatively minor Inflation may be considered safer because they are perceived to have stability and a lower level of risk. Investors who want to minimise risk in their investments may prefer countries with stable Inflation.

The results of this study indicate that Inflation does not have a statistically significant effect on bank ROA and ROE. In line with (Visita, 2019) and (Kirer Silva Lecuna & Caliskan, 2020), which found that Inflation does not affect Bank Performance, this finding challenges the traditional assumption that Inflation automatically weakens bank profitability. The Indonesian banking sector has demonstrated resilience to Inflation, suggesting that factors beyond Inflation play a significant role in bank performance.

The Influence of Gross Domestic Product (GDP) on Bank Performance. According to the first model's statistical test results, which use ROA as the dependent variable, GDP does not affect ROA. According to the second model's statistical test results, which use GDP as the dependent variable, GDP does not affect ROE. From both models, it is found that Gross Domestic Product does not affect Bank Performance. Our findings suggest that more than GDP is needed to measure the performance of the Indonesian banking sector. This suggests that factors specific to the Indonesian banking sector affect bank performance beyond economic growth.

In line with research conducted (Pradhan & Shrestha, 2018), the impact of bank-specific and macroeconomic variables on the performance of Nepalese commercial banks from 2011 to 2016. The study explains that there is a positive relationship between GDP but has no specific influence on the financial performance of banks. Similar to the findings of (Pradhan & Shrestha, 2018) on Nepalese commercial banks, GDP growth may not directly translate to improved bank profitability (ROA & ROE) in Indonesia. This suggests that factors specific to each banking sector, beyond overall economic growth, might significantly influence bank performance.

CONCLUSION

This study concluded that digitalisation does not affect bank financial performance. The same result is shown by bank size, which does not affect financial performance. Different results are shown by the capital adequacy ratio, which affects the financial performance of banks. Other variables, namely the loan-to-asset ratio, do not affect the bank's financial performance. The loan-to-deposit ratio affects the financial performance of the bank. The same results are shown by nonperforming loans that affect the financial performance of banks. Macroeconomic variables such as Inflation do not affect bank financial performance, and gross domestic product does not affect bank financial performance.

Limitation. Based on the research results, this study has several limitations: The period in this study is limited to only five years, namely from 2018 to 2022; several banks needed more financial statement data during the observation period. There still needs to be more banks on the Indonesia Stock Exchange (IDX) that have completed financial performance reports regularly every year for the last five years.

Implication. Researchers hope that the results of this study can provide benefits and be applied to academics, financial managers, and investors. For academics, this research can

be a reference to support further research by considering the variables of return on assets (ROA) and return on equity (ROE) as factors that affect the banking financial smoothness ratio. For financial managers, this study suggests reducing unproductive operating costs, maintaining an adequate level of capital adequacy, and maintaining the ratio of loans to deposits at the optimal level to maximise bank profitability as measured by ROA and ROE. In addition, financial managers also need to consider increasing the bank's corporate value by financing more profitable investment projects in the future.

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