The Effect of Fintech Loan Distribution, Efficiency, and Liquidity on Bank Profitability

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Abstract
Purpose: This study aims to analyze Fintech loan distribution, Efficiency, and Liquidity on bank profitability. **Methodology**: Data analysis using Multiple Linear Regression random-effects model was carried out on all banks listed on the Indonesia Stock Exchange (IDX). Using a sample of 45 banks, with the 2019-2023 period, data management uses STATA 17. **Results**: The results of the study show that the variable of fintech loan distribution has no influence on profitability. This means that although fintech is rapidly growing in lending distribution, there is no strong evidence that it directly affects bank profits. Furthermore, the efficiency variable has a negative influence on the bank's progitability. This shows that the increase in operating costs affects the bank's revenue and reduces the bank's profitability. Meanwhile, the Liquidity variable shows a significant influence on Profitability. Good liquidity means that the bank has the ability to meet its short-term obligations without problems, which in turn contributes positively to the bank's profits. **Limitations**: The research is limited by the dynamic nature of the fintech and banking industries, where results can change with new technological developments or policies. **Contribution**: This research makes an important contribution to the banking industry by highlighting the need to adapt to fintech developments to maintain profitability. **Novelty**: This study offers new findings that are different from previous studies, especially on the effect of fintech lending on bank profitability.

Keywords: Fintech, Efficiency, Liquidity, Profitability

1. Introduction

The financial sector is one of the core elements and serves as the foundation of a country's economy, functioning as a bridge to achieve sustainable economic growth (Menicucci & Paolucci, 2016). This is due to the fact that a significant portion of the country's investments relies heavily on loans provided by banks (Yuksel & Zengin, 2017). The banking system continues to evolve in various countries, including Indonesia (Hasibuan et al., 2023). Over the past decade, the significant growth of financial technology (Fintech) has introduced new challenges to the stability of the banking sector (Ismanto et al., 2023). The current global financial crisis has indicated that the evaluation of banks heavily depends on their financial health, particularly their capacity to mitigate or exacerbate the effects of financial shocks on the real economy (Lestari et al., 2021). This phenomenon drives banks to ensure financial stability and economic growth by maintaining good profitability (Angori et al., 2019).

High profitability is a key indicator in assessing a bank's financial health, as it reflects the bank's ability to generate profits. Good profitability demonstrates the financial health of a bank, enhancing customer and investor confidence. Financially sound banks can invest in innovation, expand lending, and support productive economic activities. Therefore, increasing profitability is a vital strategic step for the sustainability of the banking sector and the economy (Suu et al., 2020). The net interest margin ratio is an important indicator of profitability, as it often accounts for about 70 to 85% of a bank's total income (Pham Hoang & Vo Thi Kim, 2017). However, a high net interest margin does not always carry a positive connotation, a large margin can indicate low efficiency and a less competitive market condition (Dewi & Triaryati, 2017). Increasing competition within the banking

system can lead to improved efficiency and result in more competitive net interest margins (Ayuni & Rani, 2020). The growth of fintech companies has also led to a decrease in net interest margins, particularly in loan distribution (Ariffandi & Trinugroho, 2022). as fintech lending operates as a financial technology platform that provides loans without involving conventional banking procedures (Tobing & Wijaya, 2020).

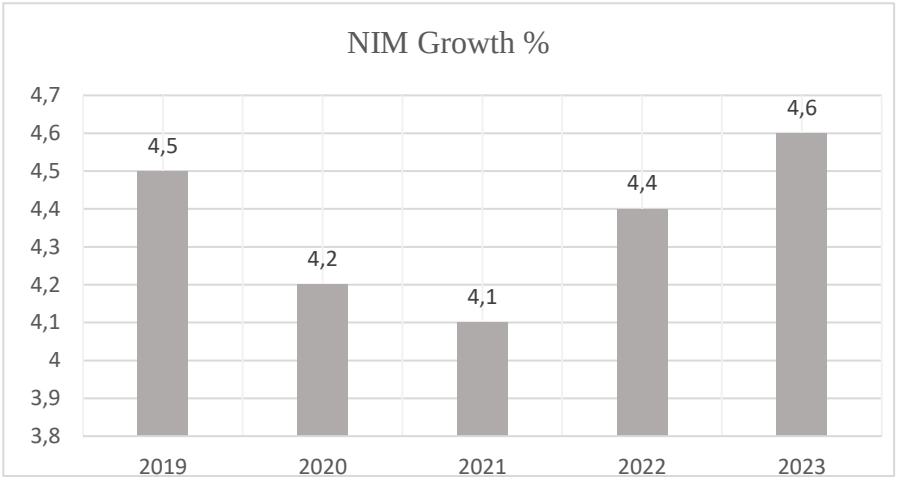


Figure 1: NIM Growth %

Based on Figure 1, the growth of the net interest margin (NIM) in Indonesia from 2019 to 2023 is published by the Financial Services Authority (OJK). In 2019, the NIM was recorded at 4.5%. However, in 2020, it decreased by 0.3 to 4.2%. In 2021, the NIM decreased again by 0.1 to 4.1%, but in 2022, it increased by 0.3 to 4.4%. In 2023, the NIM rose by 0.2 to 4.6%. This condition reflects fluctuations in the net interest margin of the banking sector. This issue motivates the current study to explore the effect of fintech loan distribution on the banking sector in Indonesia (Ariffandi & Trinugroho, 2022). The high NIM of banks in Indonesia is largely due to the prevalence of small business loans. This indicates that the more micro, small, and medium-sized enterprise (MSME) loans a bank holds, the higher its NIM, and fintech is widely utilized by small business actors. This suggests that fintech could help increase bank revenue through high-interest rate margins (Prima, 2024) This statement contrasts with the research conducted by (Ariffandi & Trinugroho, 2022), who found that fintech loan distribution negatively affects bank profitability. This highlights a gap in research findings, thus motivating this study to investigate the effect of fintech loan distribution on profitability, particularly NIM. The issue is explored further to clarify the influence of fintech loan distribution on bank profitability.

Fintech loan distribution refers to loans provided by financial technology (fintech) platforms to borrowers for a specific period. This includes all loans distributed through fintech, whether to individuals or businesses, without involving traditional banking procedures (Tobing & Wijaya, 2020). This ratio is linked to the net interest margin of the banking sector. According to empirical studies, fintech is believed to improve the efficiency of banking governance, but ultimately it reduces the net interest margin earned by banks (Prima, 2024). Thus, it can be interpreted that the larger the amount of loans disbursed by fintech, the lower the net interest margin of banks (Ariffandi & Trinugroho, 2022). This occurs because fintech offers loans with more competitive interest rates and more efficient processes compared to traditional banking companies (Najaf et al., 2021). Previous research (Aditya & Rahmi, 2023) stated that fintech loan distribution has no effect on profitability, while another study (Supriyadi et al., 2023) claimed that fintech loan distribution has a positive effect on profitability.

Efficiency refers to a bank's ability to use available funds with predetermined costs to operate in such a way that it maximizes profitability (net interest margin) for the bank (Zulkifli & Eliza, 2018). The Operational Cost and Operational Expense Ratio (BOPO), according to research by Purba & Triaryati (2018), is an efficient metric for assessing the bank management's ability to evaluate operational costs in relation to operational income. When the BOPO ratio increases, the net interest margin ratio will decrease because the bank becomes less efficient in managing its day-to-day resources (Widana et al., 2021). Conversely, as the BOPO ratio increases, the profitability ratio (net interest margin) will also rise. This is because an increased BOPO indicates better management practices within the bank, making it more efficient in utilizing the available data from the company (P. L. Purba & Triaryati, 2018). This finding differs from that of Zulkifli & Eliza (2018), who stated that this ratio has no effect.

In addition to efficiency, liquidity is a crucial factor influencing the profitability of a bank (net interest margin) (Mukaromah & Supriono, 2020). Liquidity reflects a bank's ability to meet its obligations and assess creditworthiness in relation to funds considered to originate from customers (Dewi & Triaryati, 2017). When the Loan-to-Deposit Ratio (LDR) increases, more funds are used for credit, which can boost the net interest margin. This indicates that liquidity (LDR) has a positive effect (Herawati, 2023). However, according to another study by Mar and Solichah (2022), liquidity (LDR) does not have an effect on profitability (NIM). According to research by Ariffandi & Trinugroho (2022), several factors may influence profitability (net interest margin), such as fintech productivity, efficiency measured using the BOPO ratio, and studies by Briliantoro & Saryadi (2022). One of the most important factors affecting the net interest margin is liquidity in the market, using the LDR ratio. Based on the explanation above, the author is interested in conducting research titled *The Influence of Fintech Loan Distribution, Efficiency, and Liquidity on Profitability*.

2. Literature review and hypothesis/es development

2.1 The theory of signals

The research that examines the effect of fintech loan distribution, efficiency, and liquidity on bank profitability, using Signal Theory, provides an explanation for the reasons companies provide financial report information to external parties (Padmayanti et al., 2019). Signal Theory in this study is used to show how banks respond to the development of fintech as a factor affecting profitability fluctuations (NIM). Meanwhile, BOPO signals important information about profitability (NIM) because the increase in costs and operational expenses leads to a decline in bank profitability. Liquidity (LDR) signals that a decrease in liquidity can lower profitability (NIM). A healthy financial ratio will give a positive sense of security to investors, which in turn can influence the market's perception of the bank. The relevance of Signal Theory in this context is due to the fact that information and signals can influence the actions of existing companies and ultimately affect the profitability of banks (Mukaromah & Supriono, 2020).

2.2 Profitability

Profitability refers to the level of profit achieved by a business over a certain period of time and the productivity of its capital usage, either through direct or indirect methods (Liana Susanto, 2019). A high level of profitability indicates that a bank's financial operations are in good condition. Conversely, profitability or the income generated from profit suggests that the financial performance of management is not as strong in generating profits (Sintya et al., 2024). Profitability reflects an entity's ability to generate revenue in relation to its income, expenses, and costs over a specific period of time (Haris et al., 2024). According to Amalia & Diana (2022), profitability is a significant measure of a company's ability to generate revenue from its operations. A high level of profitability indicates that the bank is in

good condition. On the other hand, profitability or the profit generated indicates that the management's performance in generating profit is not ideal. Determining the profitability threshold is essential to assess whether the company's profit targets have been met (Sintya et al., 2024).

Net interest margin is used to measure the profitability of a bank in the banking industry (Lestari et al., 2021). This statistic makes a significant contribution to the bank's overall income, accounting for about 70–85% of the total revenue generated by the bank. This indicates that most of the bank's profits come from operations related to loan sales and interest-bearing deposits (Pham Hoang & Vo Thi Kim, 2017). When calculating a bank's profitability, net interest margin is an important metric (Firdianto & Sudiyatno, 2024). According to Saputri et al. (2024), net interest margin is the sum of the bank's profits from loan sales and deposit earnings, determining the difference between the profit from sales and the costs paid for sales. A high net interest margin can enhance the bank's stability by increasing its capital and profits, which ultimately boosts the bank's profitability (Hidayat & Rizkianto, 2020). Therefore, a high NIM typically indicates that a bank operates efficiently and is able to generate higher profits from its operational capacity. Management, fintech loan distribution, efficiency, and liquidity can all help achieve this (Ariffandi & Trinugroho, 2022).

2.3 Fintech Loan Distribution and Its Effect on Profitability

Fintech loan distribution refers to the total amount or volume of loans provided by financial technology (fintech) platforms to individual or business borrowers over a specific period. These loans are provided through fintech services. The process is carried out without the involvement of banks, which typically have more complex administrative requirements and longer processing times. With fintech, loans can be accessed more quickly and flexibly (Tobing & Wijaya, 2020). This is also highlighted by Edward et al., (2023) who state that fintech loan distribution is a practical alternative to obtaining funding or loans, especially for those who face difficulties in securing financing from banks. According to Draganov, (2023) fintech loan distribution is a form of financial service that connects lenders and borrowers to make loan agreements through an electronic system using the internet.

Fintech loan distribution also has a significant effect on the net interest margin (NIM). The implementation of fintech by companies can reduce the NIM achieved by banks. This is due to the efficiency generated by fintech companies, which results in a lower interest margin (Prima, 2024). This is also stated by Sari et al., (2023) who mention that increased loan distribution through fintech companies has a negative correlation with Net Interest Margin (NIM). As fintech loan distribution grows, the profits generated by banks will decrease, which means profitability will also decline. In other words, the more widespread fintech loan distribution becomes, the smaller the Net Interest Margin (NIM) earned by banks. This is in line with Tobing & Wijaya, (2020) who state that as fintech loan distribution increases, the Net Interest Margin (NIM) earned by banks from the interest rate differential decreases, thus reducing bank profitability. Similar findings are also noted in studies by (Ariffandi & Trinugroho 2022; Phan et al., 2020; Kowalewski & Pisany 2022) which suggest that the greater the loan distribution by fintech companies, the lower the bank profitability measured by the net interest margin ratio. This happens because fintech offers loans with more competitive interest rates and more efficient processes compared to banking institutions (Najaf et al., 2021). Fintech loan distribution can be measured using the natural logarithm of fintech loans per year (FL) (Ariffandi & Trinugroho, 2022).

H_1: Fintech loan distribution has a negative effect on profitability.

2.4 Efficiency and Its Effect on Profitability

Efficiency refers to the ability of a bank to utilize available funds at a reasonable cost to operate and achieve good profitability (Widana et al., 2021). High efficiency can help banks maximize profits

and minimize expenses (Mar & Solichah, 2022). The Operational Cost and Operating Expense ratio can be used to achieve efficiency (Zulkifli & Eliza, 2018). Efficiency is based on the bank's ability to use its resources effectively and without waste. Therefore, efficient management effects the bank's profitability, meaning that if a bank uses all production factors effectively and profitably, it will enhance profitability (Herlina, Damayanti, 2024). According to Herawati (2023), operational expenses and operational income are used to measure the level of success and management efficiency in utilizing each of the bank's components. The highest efficiency is achieved when compared to a low BOPO ratio. This statistic also serves as an indicator that shows the relationship between a company's operational costs and the operational income generated on a day-to-day basis (Herawati, 2023). Operational Costs and Operating Income, according to Djody Farhanditya & Mawardi (2021), are metrics that show significant efficiencies performed by banks concerning operational costs incurred. As a result, the BOPO ratio effects the profitability of a bank.

According to Rika Widianita (2023), operational profitability and profitability are indicators that show how effective a bank is in running its day-to-day operations, such as credit growth, which serves as the basis for the bank's profitability. The minimum BOPO percentage set by Bank Indonesia is 94%. According to Herlina and Damayanti (2024), operational costs and operational income are metrics used to measure a bank's efficiency by comparing the total operational costs over 12 months with the operational costs incurred in the same period. Based on this ratio, there are several good reasons why banks compare their operational costs with the profits generated from their operations. According to Mahdatika & Shofawati (2022), if operational profitability and profitability increase, the net interest margin will decrease. When operational expenses and operational income improve, the net interest margin also improves. Conversely, if this ratio increases, it indicates that the net interest margin is growing. In other words, operational costs and operating income have a negative effect on the net interest margin. This is supported by research from Ariffandi & Trinugroho (2022), Herawati (2023), and Sinaga & Wahyudi (2023). Bank management becomes more efficient in handling operational costs.

H_2: Efficiency (BOPO) has a negative effect on profitability.

2.5 Liquidity and Its Effect on Profitability

Liquidity refers to a business's ability to settle short-term debts. Banks must be able to meet their obligations to customers whenever they withdraw money from the bank (Herawati, 2023). One measure of a bank's ability to distribute loans to generate interest income from its profitability is liquidity. A common liquidity measure is the Loan to Deposit Ratio (LDR) (Mukaromah & Supriono, 2020). Research by Widay Wijaksana & Sri Harta Mimba (2022) also supports this. The Loan to Deposit Ratio (LDR) can be used to measure the liquidity of a bank. The health of the bank's business can be assessed through this ratio. According to Herawati (2023), the Loan to Deposit Ratio (LDR) indicates that the more money a bank allocates for loans, the greater the interest income it can earn. A strong flow of funds into credit directly effects the increase in Net Interest Margin (NIM), which allows banking to be more profitable. According to Suhendra & Aswat (2024), the Loan to Deposit Ratio (LDR) compares the amount of credit issued to the funds obtained from external sources. The more aggressively a bank manages its liquidity, the larger this ratio will become. However, if this ratio decreases, it indicates that there is still a large amount of idle funds, as more third-party funds are not being used for loans.

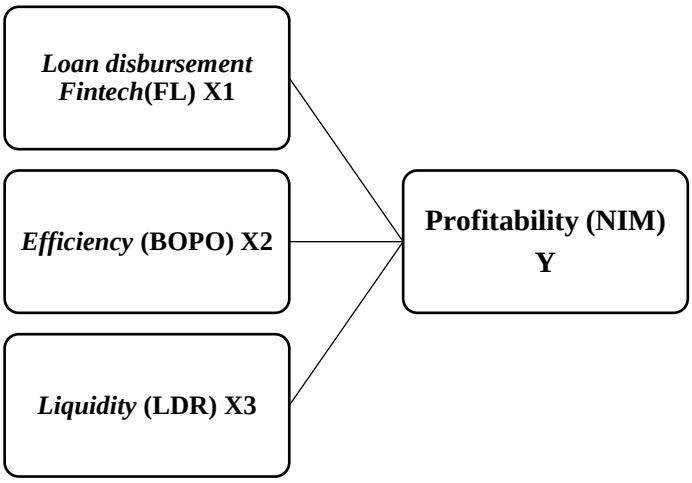
Loan to Deposit Ratio (LDR) is a ratio used to evaluate the extent of a bank's credit and liquidity, according to Rahayu (2024). This ratio measures the composition of the total credit issued relative to the funds received from third parties. The Loan to Deposit Ratio (LDR) is a statistic that shows how much of the bank's deposits are being used to extend loans to consumers (Arse et al., 2024).

Additionally, LDR compares the amount of money gathered from the public to the amount given as loans, as stated by Sitti Masyita & Sarmila (2024). According to Purnasari et al. (2023), the Loan to Deposit Measure (LDR) is a commonly used indicator for assessing bank liquidity, as it compares total loans and deposits in the same period. A higher LDR indicates that a bank is lending out almost all of its available cash, which may result in lower profitability. However, the LDR has a positive effect on Net Interest Margin (NIM), as a higher LDR implies more funds available for lending, which can enhance NIM (Mar & Solichah, 2022). These views align with Herawati (2023) and Sinaga & Wahyudi (2023), further confirming the role of LDR in influencing a bank's profitability and liquidity.

H_3 : Liquidity (LDR) has a positive effect on Profitability.

3. Methodology

he research method used in this study is a quantitative method, conducted on banking companies listed on the Indonesia Stock Exchange (IDX) through banking report data and financial reports available on the website www.ojk.go.id. The data obtained is in the form of financial ratio reports. The population used in this study consists of all banks listed on the Indonesia Stock Exchange (IDX) for 5 years, from 2019 to 2023, totaling 47 banks. The sampling method employed in this study is purposive sampling, aimed at obtaining relevant samples. The criteria for the study include banks that have been consecutively listed from 2019 to 2023. Thus, the sample obtained consists of 45 banks based on the annual report data. The data used are quarterly data, totaling 900 observations. This study uses panel data regression analysis to measure the strength of the linear association (relationship) between two or more variables. The model used in panel data regression is the random effect (RE) method as the estimation technique. The advantage of this method is that it can differentiate individual effects and time effects, and it does not require the assumption that the error component is uncorrelated with the independent variables (Ngabu et al., 2023). Using a Research Framework:



The independent variables in this study are Fintech Loan Distribution (FL), Efficiency (BOPO), and Liquidity (LDR). The dependent variable is the variable that is influenced by the independent variables. The dependent variable in this study is Profitability (net interest margin). Based on the conceptual framework above, this study analyzes Fintech Loan Distribution (FL), Efficiency (BOPO), and Liquidity (LDR) as independent variables. The dependent variable, which is influenced by the independent variables, is Profitability (net interest margin). This is presented in the research as follows:

Variable	Concept	Indicator
Fintech Loan Distribution (FL) (X1)	Fintech loan distribution, measured using FL, with the natural logarithm of fintech loans each year as a proxy (Ariffandi & Trinugroho, 2022).	FL = In(p)
Efficiency (BOPO) (X2)	Efficiency measured using the Operational Cost to Operational Income Ratio (BOPO), used to assess the efficiency and ability of a bank to conduct its operational activities (Sitti Masyita & Sarmila, 2024)	$BOPO = \frac{Operational\ Cost}{Operational\ Income} x100\%$
Liquidity (LDR) (X3)	Liquidity is a parameter of the bank's ability to disburse loans in order to generate interest income, effecting the bank's profitability. Liquidity is measured using the Loan to Deposit Ratio (LDR) (Mukaromah & Supriono, 2020).	$LDR = \frac{Total\ Loans}{Total\ Third - Party\ Funds} x100\%$
Profitability (NIM) (Y)	Profitability is the ratio used to generate income in relation to revenue, costs, and expenses over a certain period. Profitability is measured using the Net Interest Margin (NIM) indicator (Haris et al., 2024).	$NIM = \frac{Net\ Interest\ Income}{Productive\ assets} x100\%$

4. Results and discussion

The objective of this study is to identify the variables that affect the growth of net interest margin (profitability). Profitability (NIM) is the dependent variable in this study, while Fintech Loan Distribution (FL), Efficiency (BOPO), and Liquidity (LDR) are the independent factors. This study uses multiple regression with panel data, employing the random effect (RE) model. The results of the statistical data management are presented in the following descriptive statistics table (Table 1):

4.1 Descriptive Statistics

Descriptive statistical analysis provides an overview or summary of a dataset being studied. Its main purpose is to offer basic information about the patterns, trends, or distribution within the data.

Table 1 Descriptive Statistics

Variable	Obs	Mean	Std. dev	Min	Max
NIM	900	4.639744	2.963111	-4.29	20.68
FL	900	30.4385	.2490616	29.99	30.77
BOPO	900	89.63934	27.87924	25.71	306.48

LDR	900	90.18786	43.20407	8.79	568.87

Data processed using Stata 17 (2024)

Based on Table 1, the descriptive statistics data show a total of 900 observations. For the NIM (Net Interest Margin) variable, the average recorded value is 4.64 with a standard deviation of 2.96, indicating considerable variation. The minimum NIM value is -4.29, indicating a negative value, while the maximum NIM value reaches 20.68. For the FL (Financial Leverage) variable, the average value is 30.44 with a small standard deviation of 0.25, showing relatively high consistency in this data. The minimum FL value is 29.99, and the maximum is 30.77, indicating a narrow range. Next, for the BOPO (Operational Costs to Operational Income) variable, the average value is 89.64 with a relatively large standard deviation of 27.88, indicating significant variation among observations. The minimum BOPO value is 25.71, while the maximum reaches 306.48, suggesting the presence of outliers or extremely high values within the data. Finally, the LDR (Loan to Deposit Ratio) variable has an average of 90.19 with a standard deviation of 43.20, showing considerable variation among LDR values. The minimum value is 8.79, while the maximum reaches 568.87, also indicating the presence of significant outliers. Overall, the data reflect substantial variation in profitability, particularly in the BOPO and LDR variables, which exhibit a very wide range of values.

4.2 Correlation Test

It is a method aimed at finding the relationship or correlation between one variable and another. The research results are closely related to the connection between one variable and another.

Table 2 Correlation Matrix

Variable	NIM	FL	BOPO	LDR
NIM	1.0000			
FL	0.0676	1.0000		
BOPO	-0.2410	-0.0892	1.0000	
LDR	0.3213	0.0561	-0.0903	1.0000

Source: Data processed using Stata 17 (2024)

In Table 2, the results of the correlation matrix test indicate that the variables with a positive relationship to profitability are fintech loan distribution, with a value of 0.0676, and LDR, with a value of 0.3213, both serving as independent variables. Additionally, there is a negative correlation between bank performance and the independent variable BOPO, with a value of -0.2410.

4.3 Panel Data Regression Analysis

In panel data analysis, the following model is used:

$NIM_{it} = c + b1\ FL_{it} + b2\ BOPO_{it} + b3\ LDR_{it} + e$

Where it is used to predict the NIM of a company at a specific time (it). NIM is the dependent variable, expressed as a function of several factors: Fintech loan distribution (LF), BOPO, and LDR, along with a random error term (e). LF, BOPO, and LDR are the independent variables, each with respective regression coefficients (b1, b2, b3) that indicate their influence on NIM, and (a) represents the constant term.

NIM	Coefficient	Std. err.	z	P>|z|
FL	.3793266	.3684378	1.03	0.303
BOPO	-.0224308	.0032998	-6.80	0.000
LDR	.0206033	.0021242	9.70	0.000
_cons	-6.753875	11.23676	-0.60	0.548

Source: Data processed using Stata 17 (2024)

Based on the panel data regression analysis test above, the regression equation is as follows:

Y = -6.753875 + 0.3793266 FL – 0.0224308 BOPO + 0.0206033 LDR

The constant value of 0.3793266 for LF indicates that each 1% increase in fintech loan distribution will raise the bank's Net Interest Margin (NIM) by 37.93%, assuming other variables remain constant. This demonstrates a positive relationship between fintech loan distribution and the bank's NIM. The constant value of -0.0224308 for BOPO indicates that each 1% increase in the BOPO variable will decrease the bank's NIM by 2.24%, showing a negative relationship between BOPO and the bank's NIM. The constant value of 0.0206033 for the LDR variable indicates that each 1% increase in LDR will increase the bank's NIM by 2.06%.

4.4 Hypothesis Testing

The t-test results for the FL variable show a t-value of 1.03, which is less than the t-table value of 1.96, with a positive value and a probability of 0.303, which is greater than the alpha value of 0.05. This means that the FL variable does not have a significant effect. The t-test results for the BOPO variable show a t-value of -6.80, which is greater than the t-table value of 1.96, with a negative value and a probability of 0.000, which is smaller than the alpha value of 0.05. This means that the BOPO variable has a negative and significant effect. For the LDR variable, the t-value is 9.70, which is greater than the t-table value of 1.96, with a positive value and a probability of 0.000, which is smaller than the alpha value of 0.05. This means that the LDR variable has a positive and significant effect. Meanwhile, for the constant (_cons), the t-value is -0.60, which is less than the t-table value of 1.96, with a negative value and a probability of 0.548, which is greater than the alpha value of 0.05. This means that the constant does not have a significant effect.

4.5 The effect of fintech loan distribution on profitability.

In this study, the distribution of fintech loans, measured using FL, has no effect on the Net Interest Margin (NIM). This suggests that the distribution of fintech loans does not lead to a decrease in bank profitability, as shown in the data presented in Figure 1 on the growth of Net Interest Margin. This occurs due to differences in target markets. The number of Small and Medium Enterprises (SMEs) represents a niche market that can be penetrated by fintech companies. The reason is that many SMEs have not yet accessed financing facilities from banks (Aprita, 2021). Meanwhile, the primary market segment for banks is typically focused on larger customers or individuals who are already well-served by banks. Therefore, the distribution of fintech loans does not significantly effect bank profitability, as measured by NIM. Thus, fintech and banks can actually operate in different segments without directly competing with each other (Sinaga & Wahyudi, 2023). These findings align with research by (R. B. Purba & Amrul, 2018) which found that the distribution of fintech loans does not affect Net Interest Margin because fintech has not yet significantly reduced operational costs in banking.

4.6 The effect of efficiency on profitability

Efficiency is the bank's ability to utilize its funds with the costs incurred to operate its capital in order to achieve bank profitability (Widana et al., 2021). The results of this study on the Efficiency variable, measured using BOPO (Operational Costs and Operating Income), reflect that bank efficiency has a negative effect on Net Interest Margin, meaning that H2 is accepted. When BOPO is high, it indicates that operational costs relative to operating income are also high, which in turn reduces the net profit margin (Herawati, 2023). This makes sense because banks that are less efficient in their operations will spend more income to cover operational costs, thus reducing profitability as measured by the net interest margin (Sinaga & Wahyudi, 2023). A lower BOPO ratio indicates that bank management is working more effectively, as they are utilizing available resources more efficiently (Suhendra & Aswat, 2024). When operational costs rise without being matched by adequate operating income, it will significantly erode the bank's profitability. The decrease in profitability leads to a decline in Net Interest Margin, which is a key indicator of a bank's performance in generating income from lending activities. A bank with a high BOPO ratio may face increased expenses for things like administration, labor, and maintenance, while, on the other hand, income from credit interest is unable to cover these costs.

4.7 The effect of liquidity on profitability

Liquidity is a ratio that compares loans to deposits, often used to assess a bank's liquidity. The results of this study on the liquidity ratio, measured using the Loan-to-Deposit Ratio (LDR), show a positive effect on Net Interest Margin, which is in line with the findings of (Herawati, 2023) and (Sinaga & Wahyudi, 2023). When the Loan-to-Deposit Ratio (LDR) increases, the bank disburses more loans and earns more interest income, while the interest costs on deposits remain relatively constant (Mar & Solichah, 2022). Thus, an increase in LDR is often correlated with a rise in Net Interest Margin, as the bank generates more from its productive assets (loans), while the burden on liabilities (deposits) does not change significantly. Proper management of the Loan-to-Deposit Ratio allows the bank to increase profitability without significantly adding to interest expenses, thus enhancing the overall performance of the bank. This is consistent with the findings of (Purnasari et al., 2023) which state that LDR has a positive effect, the more funds the bank disburses, the higher its interest income.

5. Conclusion

5.1 Conclusion

The conclusion of this study indicates that the distribution of fintech loans, measured using FL, does not have a significant effect on Net Interest Margin (NIM). This may be due to factors such as the interest rates offered or the market segment targeted by fintech, which may not yet contribute significantly to the bank's profitability as reflected in the NIM. In other words, despite the rapid development of fintech, its effect on bank profitability, particularly NIM, is not yet significantly visible.

On the other hand, the results of this study also show that efficiency, measured through the ratio of Operating Costs to Operating Income (BOPO), negatively affects NIM. This indicates that the higher the operating costs incurred by the bank, the lower the net interest margin it can generate. This emphasizes the importance of efficient cost management for banks to maintain and improve profitability. Banks that fail to control their operating costs effectively will experience a decline in net income from lending activities.

Liquidity, measured through the Loan-to-Deposit Ratio (LDR), has a positive effect on NIM. An increase in LDR reflects a higher distribution of credit by the bank, which is closely related to an increase in interest income. When more funds are channeled into loans, the bank can generate more interest income from its productive assets. Therefore, an increase in LDR can ultimately contribute to the improvement of NIM.

5.2 Limitation

Based on the research findings, the recommendations that can be made to improve the bank's efficiency or ability to achieve optimal results include the following. Optimization of Collaboration with Fintech: The bank needs to establish closer partnerships with Fintech companies to expand the

reach of loan distribution, thereby enhancing efficiency and profitability. Additionally, Operational Efficiency through Digitization: The bank must continue to drive the digitization of internal processes to reduce operational costs and improve efficiency. Proactive and Adaptive Liquidity Management can help the bank maintain an optimal balance between liquid assets and profitability. By implementing these recommendations, the bank can enhance its operational efficiency, which will ultimately contribute to sustainable profitability growth.

5.3 Suggestion

The recommendation from this research is for financial institutions to leverage fintech in order to reduce operational costs in borrower selection, with the aim of optimizing and increasing the Net Interest Margin (NIM) and encouraging profitability growth. Additionally, banks should improve operational efficiency by lowering the BOPO (Operational Costs to Operational Income) ratio, thus reducing cost burdens and enhancing financial performance. Better management of the Loan-to-Deposit Ratio (LDR) is also needed to ensure more productive loan distribution without increasing the interest burden, enabling banks to continue improving their profitability. For readers and future researchers, it is recommended to extend the research period, use more varied sampling methods, consider fintech regulations, and add other control variables to enhance the updates on findings.

Acknowledgment

I would like to express my gratitude to all parties who have provided support and contributed to this research. My sincere thanks go to the Management Department of the Universitas Islam Nahdlatul Ulama Jepara for their moral and intellectual support throughout the development of this research. The financial and non-financial support provided has been invaluable in completing this study. I also extend my thanks to all those who have contributed, both directly and indirectly.

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