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The relationship between loan growth, risk, and bank performance: Evidence from Indonesia

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Abstract

The crucial role of the banking sector is as an intermediary to give loans or lending to boost a country's economy. Along with advances in technology and digital transformation, lending has become increasingly easier. However, this condition allows for whatever loan growth to affect bank risk or performance. This research investigates the influence of loan growth on risk and bank performance in Indonesia between 2018-2022. The sample for this study consists of all conventional banks in Indonesia. There were 150 data observations from 30 banks in Indonesia. The analysis results indicate that loan growth significantly affects NPL negatively, meaning that loan growth leads to a decrease in NPL. Stringent loan filtering processes, efficient bank risk management programs, and good inspection and supervision can limit the bank's risks associated with loan expansion. Additionally, loan growth negatively and significantly impacts bank performance, especially profitability, indicating that ROA and ROE decline in banks experiencing loan growth. The banking sector needs to be extremely cautious in its loan growth, which can threaten its performance. Moreover, banks should consider maintaining the bank's equity adequacy ratio alongside active loan growth.

Keywords: Loans growth; risk; bank performance; profitability; Indonesia

1. Introduction

Banks, as a form of financial institution, play a crucial role, especially in a country's economy. The primary activities of banks involve gathering funds in the form of savings and channeling them into loans or credit. Banks offer various types of credit to meet the needs of the public. Acting as financial intermediaries, banks facilitate the distribution of credit. Banks act as intermediaries with various stakeholders, enabling them to participate in the country's economic growth directly. Bhowmik and Sarker (2021) assert that through the provision of credit or loans, banks can aid the economy by fostering growth in various sectors, including agriculture, infrastructure, industry, and improving living standards.

Indonesia Services Authority (*otoritas jasa keuangan-OJK*) defines commercial banks as banks that conduct conventional and/or Sharia-based banking activities, providing services in payment transactions. The primary activities of commercial banks involve disbursing funds in the form of loans/credits and gathering funds in deposits. According to law (*undang-undang-UU*) no. 7 year 1992 concerning banking, commercial banks are required to have confidence in the ability and willingness of borrowers to repay their debts as agreed upon when granting credit. In Indonesia, commercial banks have experienced significant development in line with economic dynamics and technological advancements. Their role in supporting Indonesia's economic growth involves financing strategic

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sectors and providing financial support to businesses. They are also responsible for improving the standard of living for the community (Ghoniyah and Hartono, 2020). Despite economic fluctuations and increasing competition, conventional banks in Indonesia continue to adapt to changes and strive to enhance competitiveness to support economic growth. One of their efforts is leveraging technology and the digital economy (Riyanto *et al.*, 2018).

There are several reasons why banks seek to increase their lending activities. Firstly, it benefits the bank by expanding market share, increasing revenue, and enhancing overall business performance (Bhowmik and Sarker, 2021). Secondly, credit does help banks expand their operations, generate profits, and drive economic growth. Moreover, the digitization of banking facilitates easier lending processes for banks. This digitization is supported by the presence of financial technology (Fintech). It has implications for credit distribution, as potential borrowers no longer need to visit a physical branch but can apply for loans conveniently from anywhere (Rehman *et al.*, 2023). With its technological advancements, Fintech simplifies risk analysis processes, thereby reducing the time between loan application and disbursement.

The development of banking credit in the era of digitalization reflects a profound transformation in how banks provide financial services. This development is driven by the emergence of BigTech and Fintech competitors offering digital lending, which has grown rapidly in recent years (Beck *et al.*, 2022; Cornelli *et al.*, 2021; Daud *et al.*, 2022; Kowalewski and Pisany, 2022; Murinde *et al.*, 2022). Digital technology has enabled adopting efficient automation processes in credit risk assessment and portfolio management. With online platforms and mobile banking applications, credit applications have become easier, faster, and more transparent for customers. The ability to collect and analyze data in real-time also enables banks to provide more personalized and tailored credit offers. This development marks a positive step towards a more inclusive, responsive, and efficient credit system that supports the financial needs of society.

However, if credit extension is done aggressively, the business cycle within banks can become unstable and lead to poor bank performance (Dang, 2019). Dell'Ariccia and Marquez (2006) suggest that when there's an increase in credit demand from the public, banks may perceive filtering as less critical, resulting in a decline in credit standards. Thus, banks tend to loosen their credit requirements so the public can quickly obtain bank loans. This condition is dangerous as it can lead to a decline in bank risk and performance due to overly aggressive and less cautious credit policies. Risks that are not appropriately managed can cause credit failure or significant losses due to market fluctuations (Wu and Wang, 2024). This situation can threaten the financial stability of banks. Figure 1. below present NPL value and ratio NPL to total credit in Indonesia between 2019-2022. The column in Figure 1 represents the NPL ratio and row of banking NPL values.

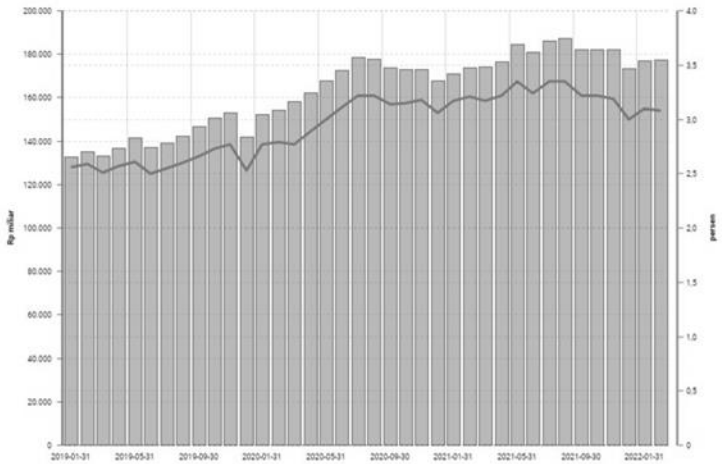

Figure 1. Non-performing loans (NPL) growth data between 2019-2022. Source: (databoks, 2023)

Bank risk-taking in the banking sector refers to strategic and operational decisions involving uncertainty tolerance to achieve specific goals, such as increasing profitability, efficiency, and competitiveness. Risk-taking is a central element in bank management because key banking activities,

such as providing credit and investment, inherently contain credit, market, liquidity, and operational risks (Batten and Vo, 2019). Usually, bank risk-taking can be measured based on credit risk, such as NPL (Bui *et al.*, 2023). Next, the financial performance of banking reflects the level of success in evaluating and measuring each of its activities, whether in fundraising, fund allocation, or other operational activities. Financial performance is measured by profitability, such as ROA (Nguyen *et al.*, 2023) and ROE (Nguyen-Thi-Huong *et al.*, 2023). Banks that decide to pursue credit growth will undoubtedly affect their financial performance.

Several studies and literature suggest that there isn't always a clear correlation between credit growth, risk, and bank performance. Some research indicates that significant credit growth may lower bank performance, with certain caveats. Stiroh and Strahan (2003) reveal that credit growth can reduce liquidity and credit risk for banks that have reached certain economies of scale. Meanwhile, research by Jiménez *et al.* (2006) shows that banks expanding their credit portfolios tend to have lower credit risk bank performance if this diversification is done efficiently. Dang (2019) also explains that short- and long-term lending expansions by banks lead to better profitability, balanced with ROA and ROE. These research findings contradict most studies that typically state that an increase in bank credit is accompanied by increased risk and worsened ROA (Bhowmik and Sarker, 2021; Fahlenbrach *et al.*, 2018; Kashif *et al.*, 2016).

This research aims to determine whether loan growth will impact credit risk and the performance of conventional banks in Indonesia. Hopefully, these results will have implications for policyholders, including stakeholders, regulators, and consumers. The research results will help stakeholders determine whether encouraging loan growth is the right step, specifically on risk-taking and bank performance. With the results of this research, regulators can make policies relevant to the conditions that occur. Meanwhile, for consumers, the results of this research will be their assessment of the actual condition of the bank when they try to increase the amount of loan growth.

2. Literature review and hypothesis development

Agency theory

Agency Theory describes how conflicts may arise between organizational principals and agents. Jensen and Meckling (2019) argue that agency theory suggests that agency is the bond between agents and principals, which forms the basis of a firm and its activities. Agency theory can explain the positive relationship between loan growth and bank risk when CEOs strive to maximize bank revenue during their tenure. However, if loan disbursement increases excessively, it can reduce liquidity and increase NPLs in the future.

Considering the impact of credit growth on bank performance, as discussed earlier, adjusting credit growth plays a crucial role in achieving optimal returns while minimizing potential risks. This adjustment not only involves bank decision-making and strategic management but also bank owners. In other words, owners must increase agency costs to control decisions that may harm shareholders. Thus, agency costs will help enhance the bank's and shareholders' value in the long run (Thiongo *et al.*, 2016).

Loans growth, risk, and bank performance

Credit or loans are the primary revenue-generating activities for banks (Bhowmik and Sarker, 2021). In banking, credit refers to the financial facility a bank provides to its customers. The concept of credit involves providing funds or loans to borrowers with an agreement to repay the borrowed amount along with interest within a specified period. Banks extend credit to support economic activities by providing capital to individuals, businesses, or institutions needing additional funds (Tongtong and Renzeng, 2021). The credit application process involves credit risk assessment, where banks evaluate the borrower's ability to repay the loan based on credit profiles and financial conditions. This concept encompasses various types of credit, such as consumer, investment, and corporate, each with specific purposes and characteristics. In practice, credit is a vital instrument that drives economic growth and plays a strategic role in banking functions. Banks that are more risk-tolerant tend to provide credit to customer segments with a higher risk profile or invest in risky assets so that they have the potential to offer higher returns (Carbó-Valverde *et al.*, 2020). In contrast, banks with a conservative approach prioritize low-risk assets to maintain financial stability (Feng and Yu, 2024).

With the increase in credit growth, credit risk also increases, given the potential increase in the number of borrowers and credit transactions (Bhowmik and Sarker, 2021). Consequently, the likelihood of Non-Performing Loans (NPLs) occurring may increase due to the possibility of borrowers being unable to meet their payment obligations, leading to defaults. NPLs are a bank standard calculated based on defaulted loans against total loans. The higher the NPL, the greater the risk of loss for the bank. In their research, Nguyen Thi Minh (2015) revealed that the NPL value increases when the credit growth rate rises. When banks expand credit disbursement aggressively, there is a risk that some borrowers may struggle to repay their loans. This situation can lead to a surge in NPLs, marking assets that do not generate income and can burden the bank's financial health. Several studies in developing countries, such as those by Kashif *et al.* (2016), have shown that excessive credit growth leads to many non-performing loans in banks. External factors such as changes in economic conditions or market situations can also negatively impact credit risk.

Furthermore, increasing bank credit can increase bank risk by impacting bank profitability (Al-Khouri and Arouri, 2016). Profitability describes a company's ability to generate profit or earnings. Profitability is measured using ROA, and ROE provides a measure of the effectiveness of a company's management because it indicates the profit generated from sales and investment earnings (Wijayanti, 2020). ROA measures how much a bank uses all its assets to generate profit after tax, while ROE measures how much a bank uses equity. When banks experience rapid credit growth, there is a potential increase in credit risk, which can adversely affect asset quality and lead to a rise in Non-Performing Loans (NPLs). This negative impact can directly affect ROA, considering that ROA is calculated as the ratio between net income and total bank assets. An increase in NPLs can result in additional financial burdens through provisions for credit losses, which can reduce the bank's net income (Baradwaj *et al.*, 2014; Messai and Jouini, 2013). However, increasing credit activities also can boost interest income and credit costs (Bhowmik and Sarker, 2021; Karkowska, 2020). If credit management is conducted efficiently and credit risk can be minimized, this growth can increase net income and, consequently, enhance ROA.

Hypothesis development

Some arguments also say that increasing loan growth can decrease bank risk if the efforts are balanced with suitable risk management methods (Wu *et al.*, 2022) so that the risk of NPLs resulting from an increase in the level of loan growth will be more controlled (Bhowmik and Sarker, 2021). Another argument in line with this theory is that banks with good capital mobilization capabilities can manage risk more effectively (Amador *et al.*, 2013). Therefore, this hypothesis we suggest that:

H1. Loan growth is negatively correlated with bank risk

Even though there is a potential increase in bank performance from loan growth, many studies also believe that loan growth harms bank performance, especially profitability (Jordà *et al.*, 2013; Miller and Noulas, 1997; Molyneux and Thornton, 1992). Uncontrolled or poorly managed credit growth can increase credit risk, reducing profitability. Makri et al. (2014) found a negative relationship between ROA and credit risk in their research. Suggests that an increase in credit risk indirectly due to credit growth will decrease ROA and vice versa.

Fahlenbrach *et al.* (2018) also found that high credit growth in a given year would be ineffective in the third year thereafter, as evidenced by a decline in ROA. Indeed, in the short term, increasing loan growth will encourage company performance through increasing interest income (Wu *et al.*, 2022). But in the long term, this will pose risks for successor managers and shareholders (Saunders *et al.*, 1990). Providing credit without considering its quality will lead to future losses, ultimately reducing bank performance and profitability. Therefore, in this hypothesis, we assume that:

H2. Loan growth is negatively correlated with bank performance

3 Method

Data and variable

This research examines the influence of loan growth on bank risk and performance in Indonesia from 2018 to 2022. All the data gathered from this study is hand-collected by research from annual

report banks. The sample we used is all conventional banks operating in Indonesia. The sample criteria for this research are as follows:

- Public and commercial banks are registered with the financial service authority (*Otoritas Jasa Keuangan-OJK*) and have complete financial reports.
- Demonstrating positive credit growth.

This study measured the bank loan growth rate using LOANG following (Bouvatier and Lepetit, 2008). LOANG itself represents the annual growth rate of total bank loans. We utilize LOANG determined as follows:

$$LOANG = (LOAN_{i,t} + LOAN_{t-1})/LOAN_{t-1} \ldots (1)$$

Explanation:
i = bank, t = time period (year), and LOANG = loans growth.

Next, we go to the independent variable that we used. First, we measured using non-performing loans (NPLs) like others studied, especially on credit risk (Bhowmik and Sarker, 2021; Wu *et al.*, 2022). NPLs represent loans that have deteriorated and are unable or unwilling to be repaid by customers within a specified period. Second, we measured bank performance using two proxies: bank profitability is ROA and ROE. ROA is measured of bank profitability calculated as net income over assets, while ROE is measured as net income over equity following research by (Nguyen-Thi-Huong *et al.*, 2023; Nguyen *et al.*, 2023). The study includes control variables such as Bank Size and BOPO. Bank size reflects the size of the bank measured by the natural logarithm of total assets, as studied by (Wu *et al.*, 2022). Last, the operating expenses to income ratio, or BOPO, is a dimension used in the banking sector to assess efficiency (Wiadnyani and Artini, 2023).

Analysis method

To see the impact between loan growth on risk and bank performance, we use an economics strategy explained by the model in Equations 2 and 3:

$$Risk_{it} = \beta_0 + \beta_1 LG_{it} + X_{it} + e_{it} \ldots (2)$$

$$Performance_{it} = \beta_0 + \beta_1 LG_{it} + X_{it} + e_{it} \ldots (3)$$

Risk is representing bank risk using NPLs as a proxy. LG is our primary explanatory variable of loan growth using the proxy LOANG we discussed. Then, the performance represents bank performance using two proxies' profitability, ROA and ROE. Last, the X symbol is two control variables used in this study (Size and BOPO). After a model estimation test, these two equations will be tested with fixed effect regression models robust standards error.

4 Results and discussion

Descriptive analysis

We display Table 1 below, as a result of descriptive statistics, to provide a general description of the research data. Several points can be drawn from these results: firstly, the number of observations for each variable is the same, namely 150. Second, the LOANG variable has a mean of 0.12 and a standard deviation of 0.15. These results reflect loan growth of around 12%, and variations tend to be high, with a maximum value of 1.63 and a minimum of 0.01. The three NPL variables show an average non-performing loan of around 2.47%, with a standard deviation of 1.49, a minimum value of 0.21, and a maximum value of 11.68. These two variables have a reasonably controlled data distribution.

Meanwhile, the two bank performance variables are ROA and ROE. Each has a mean value of 1.86 and 12.17. With reasonably moderate data variations in ROA, a standard deviation of 1.49 is shown. The data variation is quite large in ROE, demonstrated by a standard deviation value of 1.14.

Table 1. Descriptive statistics

Variable	Obs	Mean	Std. Dev	Min	Max
LOANG	150	0.12	0.15	0.01	1.63
NPL	150	2.47	1.49	0.21	11.68
ROA	150	1.86	1.14	-3.87	3.87
ROE	150	12.17	7.39	-20.69	27.55
SIZE	150	7.34	0.79	4.17	9.27
BOPO	150	80.36	12.89	41.61	151.26

Results analysis

Model estimation tests consist of Pooled Least Squares (PLS), Fixed Effect Model (FEM), and Random Effect Model (REM). Meanwhile, estimation method tests include the Chow, Lagrange Multiplier, and Hausman Test. All these tests are conducted to determine which model suits this study. Table 2. below shows the results of the model and estimation method tests.

Table 2. Regression model and method

Dependent variables	Chow test	Lagrange multiplier test	Hausman test	Description
NPL	0.0000	0.0000	0.0096	FEM
ROA	0.0000	0.0000	0.0004	FEM
ROE	0.0000	0.0000	0.0030	FEM

Based on the results from Table 2. Indicating that all three variables are suitable for using the Fixed Effect Model (FEM) because this model can provide more accurate estimates by considering the individual heterogeneity of panel data.

Table 3. Regression results

Variables	(1) FE	(2) FE	(3) FE
	NPL	ROA	ROE
LOANG	**-1.1601****	**-0.9707****	**-6.2621*****
	(0.5605)	**(0.4299)**	**(2.3758)**
Bank size	**0.4346*****	0.0363	**1.4719*****
	(0.0723)	(0.0451)	**(0.3148)**
BOPO	**0.0758*****	**-0.0767*****	**-0.4536*****
	(0.0143)	**(0.0061)**	**(0.0281)**
Constant	**-6.6666*****	**7.8773*****	**38.5750*****
	(1.4946)	**(0.6868)**	**(3.8091)**
Observation	150	150	150
Prob>F	**0.0000*****	**0.0000*****	**0.0000*****
R-squared	0.3969	0.8102	0.7640

Notes: All this regression uses a fixed effect robust least square model. Column (1) is estimated using equation 2. Then column (2) and (3) using equation 3. Column (1) investigates between loans growth and bank risk. While columns (2) and (3) test between loans growth and bank performance. This ***1%, **5%, *10% present confidence level.

Table 3 shows the main regression result, from which we can conclude several things. Firstly, the coefficient of determination (R2) test is conducted to see how much influence the independent variables have on the dependent variable. It can be observed that, for the dependent variable NPL, the R-squared value is 0.3969 or 39.69%, meaning that other unexamined variables influence 60.31%. The variable ROA has an R-squared value of 0.8102 or 81.02%, indicating that other unexamined variables influence 18.98%. The variable ROE has an R-squared value of 0.7640 or 76.40%, meaning that other unexamined variables influence 23.60%.

Secondly, the T-test (partial) is conducted to see how much influence the independent variables have on the dependent variable partially. The dependent variable LOANG has a significant negative effect on NPL and ROA at a 5% significance level and on ROE at a 1% significance level. The control variable is the bank's size, which has a significant positive effect on NPL and ROE. However, the bank

size does not have a significant effect on ROA. The control variable, BOPO, has a considerable positive impact on NPL and a significant adverse effect on ROA and ROE at a 1% significance level.

Thirdly, the F-test is conducted to see how the independent variables collectively influence the dependent variable. The prob>F value of 0.0000 or <0.01 indicates that loan growth significantly and positively affects NPL, ROA, and ROE at a 1% significance level.

Discussion

The regression results indicate that loan growth negatively affects non-performing loans (NPL). This result suggests an inverse relationship, wherein loan growth leads to a decrease in NPL. These results are consistent with the research conducted by (Foos *et al.*, 2010; Hess *et al.*, 2009; Wu *et al.*, 2022). This condition can happen because good loan management is realized from fair loan assessment and disbursement so as to reduce the NPL value (Amador *et al.*, 2013; Bhowmik and Sarker, 2021).

In Indonesia, the existence of BI checking or the financial information service system, which provides an individual's credit history, is used by banks as an analytical tool when granting loans. Through regulations that set the maximum NPL limit at 5%, Bank Indonesia requires banks to exercise caution when granting credit. Financial service authority regulation (*Peraturan Otoritas Jasa Keuangan-POJK*) No. 42/POJK.03/2017 states that every bank must conduct a credit analysis by assessing the credit repayment of prospective borrowers, including the 5Cs: Character, Capacity, Capital, Collateral, and Conditions of the economy. Implementing this OJK regulation also suggests that banks cannot indiscriminately grant credit to their prospective borrowers. Analysis needs to be conducted to avoid credit problems in the future. Therefore, from this explanation, loan growth, assuming that the disbursed or provided credit is of high quality, targeted accurately, and subject to strict filtration, will decrease non-performing loans or NPLs. Realizing a good banking NPL control process, one of which is by increasing loan interest rates (Wu *et al.*, 2022). These results mean that our H1 in this study is accepted.

Next, we discuss loan growth, demonstrating a significant negative influence on profitability measured through ROA and ROE. This result implies that the return on assets and equity, or ROA and ROE, will decrease in banks with loan growth. This result aligns with the findings of Fahlenbrach *et al.* (2018) and Sukmawati and Purbawangsa (2016), indicating that high loan growth leads to poor performance with low return on assets (ROA) and increased loan loss reserves. Furthermore, Foos *et al.* (2010) and Amador *et al.* (2013) also provide evidence that excessive loan growth negatively impacts bank profitability by tending to increase the loan loss reserve ratio, which also elevates bank costs.

Several factors contribute to how uncontrolled loan growth can negatively affect profitability, including high credit risk, weak credit assessment processes, high loan loss provisioning costs, increased interest expenses, and imbalanced income with risk. Greater credit risk from loan growth can reduce banks' profitability (Le, 2020). ROA may decline because the profits generated from assets funded by loan growth are not proportionate to the risks and costs involved in the process. Rapid and uncontrolled loan growth can increase credit risk. If a company extends loans to borrowers with insufficient collateral or if credit risk management is ineffective, the likelihood of non-performing loans or defaults increases. With increased credit risk, the company may need to allocate more funds to provisions for losses due to non-performing loans. This condition can reduce the actual net income generated from the assets held. An increase in credit growth without corresponding prudence will not yield optimal income. Based on these results, our H2 is also accepted.

5. Conclusion

This research examined the influence of loan growth on bank risk and performance. The banks used in this study are commercial banks registered with the financial services authority (*Otoritas Jasa Keuangan-OJK*) from 2018 to 2022, with the sample criteria being only conventional banks that experienced favorable loan growth. There were 150 data points from 30 banks in Indonesia.

The results indicate that loan growth has a significant negative effect on NPL. This result shows that loan growth can decrease risk because of good credit prudently. Additionally, new collectability from newly provided credits supports this result. In line with previous results, loan growth also significantly negatively affects profitability, measured by ROA and ROE. Indicates that providing loans that are too massive will reduce bank performance.

Despite loan growth reducing NPL value, we must notice that this condition harms bank performance. Banks must have effective control systems so that when their credit growth increases, it does not decrease bank profitability. Banks can be more selective in extending credit by conducting thorough analyses and prioritizing prudential principles. Banks need to have competent credit analysts to mitigate risks in the future. Banks should have confidence based on in-depth analysis of the intentions, capabilities, and ability of borrowers to repay the credit or financing that has been previously approved.

Through financial service authority (*Peraturan Otoritas Jasa Keuangan-POJK*) Nomor 42/POJK.03/2017 regarding the Obligation of Formulating and Implementing Credit Policies or Financing Policies (*Kebijakan Persetujuan Kredit atau Pembiayaan-KPB*) of Commercial Banks, are deemed crucial as they serve as guidelines for conducting healthy and profitable credit or financing activities for banks. In this regard, banks should follow two guiding principles when formulating KPB. First, banks must be capable of overseeing the entire credit or financing portfolio and establishing standards in the individual credit or financing granting process. Second, banks must have standards or measures containing elements of internal supervision at all stages of the credit or financing granting process.

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