Bank-Specific Determinants and Non-Performing Loans of Indonesian Banks: Does Governance Matter?

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Abstract

Research aim: The study aims to analyse the influence of bank-specific determinants on Indonesian banks' non-performing loans (NPLs) with the addition of governance mechanisms.

Design/ Methodology/ Approach: The study uses a fixed-effect panel data regression model with data from 43 banks listed on the Indonesian Stock Exchange (IDX) over the period of 2018 to 2023, and from 258 panel data units. Documentation is used as a data collection technique, and panel data regression analysis is used for analysis.

Research finding: The study results indicate that the loan-to-deposit ratio (LDR) positively affects NPLs, while bank size has a negative effect. The number of independent commissioners predicts NPLs in a positive direction, while the composition of independent commissioners does the opposite.

Theoretical contribution/Originality: This study highlights the diverse findings in prior research regarding the relationship between bank-specific characteristics and NPLs. It incorporates good corporate governance (GCG) as a variable to evaluate its influence on NPLs within the Indonesian banking sector.

Practitioner/Policy implication: The study has implications on the importance of increasing the role of the independent commissioners, who can oversee a supervisory mechanism that includes managing NPLs.

Research limitation: This study only examines the NPLs of Indonesian banks from 2018 to 2023, with data sources from financial and annual reports. Future researchers can examine broader datasets and conduct qualitative analysis. In addition, GCG measurement can be studied more broadly by analysing the gender diversity, educational background, and expertise of directors and commissioners, and linking it to ownership structure.

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1. Introduction

The banking sector is a vital pillar of financial intermediation, playing a key role in fostering economic growth and development (Akhter, 2023). As one of the most essential industries within a nation's economy, it has evolved in scope and complexity through technological advancements (Nasir, Oktaviani & Andriyani, 2022). However, non-performing loans (NPLs) pose a significant challenge, which can potentially trigger banking crises (Nwafor & Nwafor, 2023). These loans represent a substantial credit risk for the banking industry (Shala, Toçi & Mustafa, 2022). The issue of NPLs has been further aggravated by the economic disruptions caused by the Covid-19 pandemic (Apergis, 2022).

Several factors significantly influence the NPLs of a bank, including specific bank characteristics and macroeconomic conditions (Syed, 2021). Return on assets (ROA) and return on equity (ROE) have been found to impact NPL levels (Kjosevski & Petkovski, 2021). Petkovski, Kjosevski and Jovanovski (2021) find that ROE and gross loan growth are specific determinants of total NPLs, while Apergis (2022) reports that ROA is a significant determinant of NPLs, with a positive and significant impact during the pandemic. Other studies also show that ROA has a positive effect (e.g., Alnabulsi, Kozarević & Hakimi, 2022). In addition, Küçük (2022) and Tatarici, Kubinschi and Barnea (2020) find that ROA negatively influences NPLs. Similarly, other studies highlight ROA as a significant negative determinant of NPLs (Bayar, 2019; Ferreira, 2022). In Indonesia, ROA has been found to negatively affects NPLs (Stefano & Dewi, 2022).

Previous studies have identified varying relationships between capital adequacy ratio (CAR) and NPLs. The capital factor has a concave relationship with NPLs, with higher capital initially leading to increased NPLs (Hajja, 2020). Romdhane and Kenzari (2020) find a positive relationship between CAR and NPLs for Tunisia. Other studies, such as Küçük (2022), Tatarici, Kubinschi and Barnea (2020), and Trung (2022), report that CAR has a significant negative impact on NPLs. However, others find that CAR does not significantly affect NPLs (Alnabulsi, Kozarević & Hakimi, 2022; Khan et al., 2020). For Indonesia, Stefano and Dewi (2022) report that CAR has an insignificant effect on NPLs.

Leverage is also a significant factor of NPLs. Previous studies indicate inconsistent results. Leverage has been found positively impacted NPLs (J. M. Lee et al., 2022). Conversely, Blanco et al. (2024) and Trung (2022) find that it has a negative effect. Another bank characteristic that impacts NPLs is the loan-to-deposit ratio (LDR). Conflicting findings exist regarding

LDR. In emerging market economies, the LDR has been found to exert a positive influence (Bayar, 2019), while other studies suggest it negatively impacts NPLs (Nasir, Oktaviani & Andriyani, 2022). In Vietnam, LDR shows no significant relationship with NPLs (Trung, 2022), as is the case in Indonesia (Stefano & Dewi, 2022). As for bank size, Twairesh (2024) reports that it positively impacts NPLs, whereas Fajar and Umanto (2017) find no significant effect.

This study highlights the diverse findings in prior research regarding the relationship between bank-specific characteristics and NPLs, and incorporates good corporate governance (GCG) as a variable to evaluate its influence within the Indonesian banking sector. Corporate governance issues have prompted varied responses globally, with growing academic interest observed in Indonesia (Wahyudin & Solikhah, 2017). Effective GCG implementation usually helps reduce NPL risks through strengthening supervision, transparency, and risk management. GCG elements, such as the role of the board of commissioners (in terms of its independence and diversity), will be tested in this study to determine its impact on NPLs.

The findings emphasise the essential role of corporate governance in the banking sector, particularly in enhancing credit quality (Fiador & Sarpong-Kumankoma, 2021). In developing economies, the governance index is a significant negative predictor of NPLs (Büyükoglu, Sit & Eksi, 2021). Other studies incorporating country-level governance variables have also identified a negative impact on NPLs (Y. Y. Lee et al., 2020). Another study by Sadaa et al. (2023) provides feedback and a map that regulators and decision-makers can use to improve the effectiveness of corporate governance practices in NPL control.

The research context is banking in Indonesia, which has regional characteristics in Southeast Asia. Banking regulatory policies in Indonesia are regulated by the Financial Services Authority and Bank Indonesia to maintain financial stability, protect consumers, and encourage sustainable economic growth. The governance implementation in Indonesia adopts a two-tier board system with two boards with different functions and responsibilities: the board of commissioners (supervisory board) and the board of directors (management board).

2. Literature Review

The magnitude of NPLs is crucial for banking stability, as a high NPL ratio can deteriorate asset quality and impair a bank's capacity to lend to the real economy (Pirgaip & Uysal, 2023). Drawing on lessons from previous financial crises, an elevated level of NPLs is alarming, and highlights the necessity for well-planned, long-term policies to restore the financial sector (Shala, Toçi & Mustafa, 2022). NPLs generate uncertainty and diminish

banks' willingness and ability to lend, adversely affecting sector activity.

The banking stability theory states that the banking system's health is highly dependent on credit risk management and institutional structure. High NPLs reflect systemic risks that can cause financial instability. According to Uhde and Heimeshoff (2009), governance, credit concentration, and efficiency are the determinants of bank NPLs. Financial risk management frameworks state that NPLs result from failures in credit risk assessment, debtor monitoring, and portfolio diversification. Banks with poor risk management systems tend to experience an accumulation of NPLs (Louzis, Vouldis & Metaxas, 2012). Another framework used is moral hazard theory, according to which undercapitalised banks tend to engage in high-risk lending with minimal screening, leading to high levels of problematic loans (Akhter, 2023).

NPLs are a warning sign indicating potential threats to a country's economy (Akhter, 2023). After the 2008 financial crisis, NPLs on European banks' balance sheets surged, significantly reducing their lending capacity and slowing economic activity across the continent (Thornton & Di Tommaso, 2021). As such, analysing NPLs is essential. High NPL levels on a bank's balance sheet can negatively impact the health of the banking system and its ability to lend to the real economy through three primary channels. First, high NPLs diminish bank profitability. Second, NPLs carry higher risk weight, leading to increased capital requirements. Managing large volumes of NPLs can also divert crucial managerial resources from core activities and more profitable endeavours (Huljak et al., 2022).

Previous studies find that using only macroeconomic or banking industry-specific variables as regressors can lead to incorrect conclusions (Umar & Sun, 2018). Bank-specific factors are more sensitive than macroeconomic factors concerning NPL levels (Alnabulsi, Kozarević & Hakimi, 2022). Additionally, the Covid-19 pandemic delayed NPLs due to loan moratoriums, as seen in Bosnia and Herzegovina (Zunić, Kozarić & Dzelihodzić, 2021). Hardiyanti and Aziz (2021) concur that the pandemic significantly impacted NPLs as an external factor. Regarding macroeconomic factors, higher GDP growth, lower inflation, and lower debt strongly predict future reduced NPL ratios (Staehr & Uusküla, 2021). In Poland's banking sector, GDP positively affected NPLs (Bukowski & Kosztowniak, 2022). Even though GDP had a significant negative effect, inflation did not show a significant impact (Gashi, 2021). Similarly, in Malaysia, inflation had no significant impact on NPLs (Kepli et al., 2021). In European Union countries, GDP growth negatively and significantly determined NPLs, while inflation did not have a significant effect (Ciukaj & Kil, 2020).

The determinants of NPL have been widely studied based on select frameworks, such as bank stability theory, risk management framework, and moral hazard theory (Akhter, 2023; Louzis, Vouldis & Metaxas, 2012;

Uhde & Heimeshoff, 2009). Bank-specific determinants and governance are factors that can affect the level of bank NPLs in addition to macroeconomic factors (Bukowski & Kosztowniak, 2022; Staehr & Uusküla, 2021). This study analyses the effect of bank-specific determinants (ROA, ROE, leverage, LDR, CAR and size) on NPLs. The following analysis is to test the impact of GCG mechanisms on bank NPLs in Indonesia.

Previous studies indicate interesting results. ROA and ROE have a close relationship with the level of NPLs because both reflect the financial performance and efficiency of the bank. Empirical evidence shows that ROA and ROE impact NPL levels (Kjosevski & Petkovski, 2021). Additionally, Petkovski, Kjosevski and Jovanovski (2021) state that ROE is a specific determinant of total NPLs. Erdas and Ezanoglu (2022) reveal that lagged NPLs and ROE exhibit a significant positive correlation with current NPL levels. Pancotto, ap Gwilym and Williams (2024), meanwhile, state that ROE has a positive and significant impact on NPLs. ROA is a significant determinant of NPLs, with a positive and significant impact found during the pandemic (Alnabulsi, Kozarević & Hakimi, 2022; Apergis, 2022). Other studies find that ROA negatively influences NPLs (Bayar, 2019; Ferreira, 2022; Küçük, 2022; Stefano & Dewi, 2022; Tatarici, Kubinschi & Barnea, 2020; Twairesh, 2024).

Leverage can affect a bank's NPL level. Good leverage is critical to maintaining the bank's asset quality and financial stability, and for controlling the level of NPLs. The leverage ratio, which compares debt to net equity, indicates a company's level of debt and financial stability. A high leverage ratio signals increased debt risk, and during economic downturns, companies may face difficulties repaying their debts, potentially causing a ripple effect throughout the financial system (Chaochao, 2023). Empirical evidence indicates a negative effect of leverage on NPLs (Blanco et al., 2024).

LDR significantly influences NPLs because this ratio reflects how much funds collected from deposits are used for credit financing. The balance in LDR is crucial to ensure operational efficiency while maintaining credit quality. Previous findings on the impact of LDR are inconsistent, with some studies suggesting a negative relationship with NPLs (Nasir, Oktaviani & Andriyani, 2022). In emerging market economies, LDR has a positive effect (Bayar, 2019). In Vietnam, LDR shows no significant connection to NPLs (Trung, 2022), with similar results observed in Indonesia (Stefano & Dewi, 2022).

CAR also significantly impacts the level of NPLs. Adequate CAR helps strengthen banking stability and reduces exposure to credit risk. However, high CAR does not always guarantee low NPL. Erdas and Ezanoglu (2022) show that CAR has a negative association with NPLs, which is also reported in other studies (Küçük, 2022; Tatarici, Kubinschi & Barnea, 2020; Trung, 2022). On the other hand, Romdhane and Kenzari (2020) and Twairesh

(2024a) find a positive relationship between CAR and NPLs, while Alnabulsi, Kozarević and Hakimi (2022), Khan, Siddique and Sarwar (2020), and Stefano and Dewi (2022) find that CAR does not significantly affect NPLs.

Bank size impacts NPLs depending on bank characteristics, economic environment, and risk management strategies. Several studies have shown that bank size positively impacts NPLs, meaning that the larger the bank, the higher the likelihood of NPLs due to wider risk exposure (Twairesh, 2024). However, other studies find no significant relationship between bank size and NPLs, indicating that other factors, such as risk management, regulation, and economic conditions are more critical (Fajar & Umanto, 2017). Thus, the following hypotheses are developed:

H_{1a} ROA is positive and significantly impacts the NPLs of Indonesian banks
H_{1b} ROE is positive and significantly impacts the NPLs of Indonesian banks
H_{1c} Leverage is positive and significantly impacts the NPLs of Indonesian banks
H_{1d} LDR is positive and significantly impacts the NPLs of Indonesian banks
H_{1e} CAR is positive and significantly impacts the NPLs of Indonesian banks
H_{1f} Bank size is positive and significantly impacts the NPLs of Indonesian banks

This study introduces GCG as a new variable. The results highlight the critical role of corporate governance in the banking sector, particularly in improving credit quality (Fiador & Sarpong-Kumankoma, 2021). In developing economies, the governance index is a significant negative determinant of NPLs (Büyükoglu, Sit & Eksi, 2021). Factors such as a large board with diverse expertise, a high percentage of non-executive members, and the dual role of the CEO as board chair contribute to better loan quality in banks (Kartika et al., 2022). Moreover, as reflected by the shares pledged as collateral by directors of lending firms, corporate governance positively influences NPLs (J. M. Lee et al., 2022). Other researchers have also added country governance variables, finding a negative effect on NPLs (Y. Y. Lee et al., 2020). Thus, the following hypotheses are developed:

H_{2a} Board meeting significantly impacts the NPLs of Indonesian banks
H_{2b} Commissioners meeting significantly impact the NPLs of Indonesian banks
H_{2c} Independent commissioner's size significantly impacts the NPLs of Indonesian banks
H_{2d} The proportion of independent commissioners' members significantly impacts the NPLs of Indonesian banks
H_{2e} The proportion of female commissioners' members significantly impacts the NPLs of Indonesian banks
H_{2f} The quality of GCG significantly impacts the NPLs of Indonesian banks

3. Methodology

This quantitative research focuses on banks listed on the Indonesian Stock Exchange (IDX). The study seeks to examine how specific bank factors and GCG influence NPLs. A panel dataset of 258 units was gathered, covering a six-year period from 2018 to 2023. As of December 31, 2023, IDX data indicated 43 publicly listed banks. Banks were selected as samples for this study with the availability of the required data during the observation period.

The dependent variable in this study is NPLs, assessed using the log natural of gross NPLs. The independent variables include specific bank characteristics and GCG mechanisms. Bank-specific characteristics are represented by ROA, ROE, leverage, LDR, CAR, and total assets. GCG is measured through the frequency of board of directors' meetings, the frequency of commissioners' meetings, the number of commissioners, the number and composition of independent commissioners, the number and composition of women commissioners, and GCG self-assessment scores. Table 1 shows the measurement of the research variables.

Table 1: Research Variable Measurements

Variables	Definition and measurement	Abbreviation	Data source
Dependent variable			
NPLs	Gross NPLs: A ratio that shows the total non-performing loans (substandard, doubtful, and bad) to the total credit distributed by the bank, without deducting loss reserves	Gross NPLs	Annual report
Independent variables			
Bank-specific determinants	Return on assets: Net income divided by average total assets over two periods	ROA	Annual report
	Return on equity: Net income divided by average equity over two periods	ROE	Annual report
	Leverage: Total debt compared to equity	Leverage	Annual report
	Loan-to-deposit ratio: Total credit given divided by total third-party funds	LDR	Annual report
	Capital adequacy ratio: Bank capital divided by risk-weighted assets	CAR	Annual report
	Bank size: Total assets of the bank	size	Annual report

Variables	Definition and measurement	Abbreviation	Data source
GCG mechanism	Board meetings: The number of board meetings each year	board_ meeting	Annual report
	Commissioners meeting: The number of commissioners' meetings each year	com_meeting	Annual report
	Independent commissioners' size: The number of independent commissioners	indcom_size	Annual report
	Independent commissioners' ratio: The ratio of independent commissioners to total commissioners	indcomm_ percentage	Annual report
	Women's commissioners' ratio: The ratio of women commissioners to total commissioners	womancom_ percentage	Annual report
	Score of GCG: Score for self-assessment of GCG practices	score_GCG	Annual report

Data for this study was collected through documentation, utilising financial and annual reports obtained from multiple sources, such as the IDX website, bank websites, and other relevant channels. Panel data regression analysis was employed for data analysis, beginning with selecting the optimal model among ordinary least squares (OLS), fixed effects (FE), and random effects (RE). The Breusch-Pagan Lagrange multiplier test shows that the RE model is more accurate than the OLS model, with a probability value > chibar2 of 0.0000. The Hausman test results confirm that the FE model is more precise than the RE model, with a prob value > chi2 of 0.0000. Classical assumption tests were also conducted, including checks for autocorrelation and heteroscedasticity. The robustness test was conducted using net NPL as a measure of NPL with the same independent variables. The analysis was carried out using STATA version 17.0. The regression model is:

$$Gross\ NPL = a + \beta1ROA + \beta2ROE + \beta3Lev + \beta4LDR + \beta5CAR + \beta6Size + \beta7\ board\_meeting + \beta8com\_meeting + \beta9indcom\_size + \beta10indcomm\_percentage + \beta11womancom\_percentage + \beta12Score$$

where Gross NPLs represents gross non-performing loans, ROA is return on assets, ROE is return on equity, Lev is leverage, LDR is loan to deposit ratio, CAR is capital adequacy ratio, Size is size of bank (asset), board_meeting is board meeting, com_meeting is commissioners meeting, indcom_size is the number of independent commissioners, indcomm_percentage is the composition of independent commissioners, womancom_percentage is the composition of woman commissioners, and Score_GCG is GCG (self-assessment) scores.

4. Empirical Analysis

4.1 Description of variables

Figure 1 depicts the trends in Indonesian banking NPLs from 2018 to 2023, covering the periods before, during, and after the Covid-19 pandemic. NPLs are represented by both gross and net NPLs. A sharp increase in NPLs occurred at the onset of the pandemic, as the banking sector in Indonesia faced significant disruptions, leading to a downturn in financing activities and a steep economic decline. NPLs peaked in 2020 amid the uncontrolled spread of the virus. However, with improved pandemic management by the government and authorities in 2021, the banking sector began to stabilise, and economic activity gradually recovered. Despite this progress, NPL levels in 2020 remained notably higher than pre-pandemic levels, with gross NPLs at 3.88% compared to 3.76% in 2019. By 2023, NPLs had declined significantly, with gross NPLs falling to 2.85%.

Figure 1 also describes the profitability of Indonesian banks from 2018 to 2023 (measured by ROA and ROE). ROA and ROE decreased in 2020 and 2021 and then increased in 2022 and 2023. ROA was 1.00 in 2018, decreased to -0.01 in 2021, and performed at 0.85 in 2022 and 1.17 in 2023. ROE was 5.44 in 2018, decreased to 0.56 in 2020, and increased dramatically to 4.54 in 2022 and 5.48 in 2023.

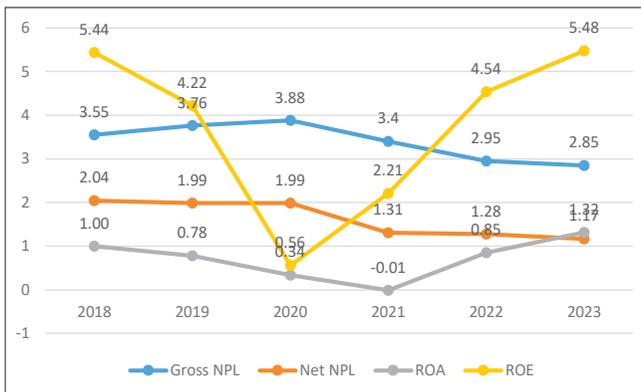**Figure 1: NPLs and Profitability of Indonesian Banks from 2018-2023**

Figure 2 shows the conditions of bank-specific determinants of Indonesian banks from 2018 to 2023. The leverage of Indonesian banks is stable from 2018 to 2023, from 81.85 to 78.58. LDR decreased from 90.18 in 2018 to 80.35 in 2021, then increased to 93.88 in 2022 and 107.47 in 2023. CAR increased from 23.42 in 2018 to 43.12 in 2022. The LDR and CAR of

Indonesian banks generally indicate good performance after the Covid-19 pandemic in 2020–2021. The specific data of the bank-specific determinants of Indonesian banks from 2018 to 2023 are shown in Table 2.

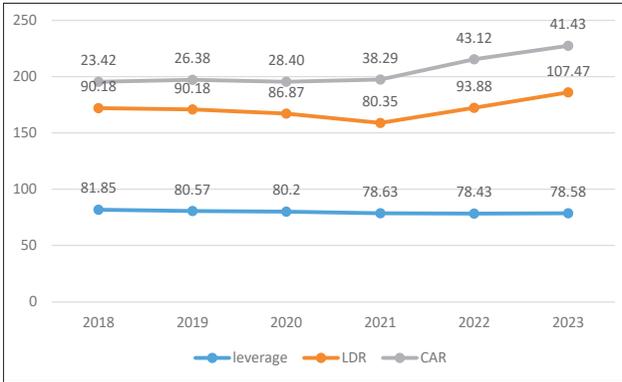**Figure 2: Bank-specific Determinants of Indonesian Banks from 2018–2023**

Table 2: Research Variable Descriptive Statistics

Research variables	Mean	Std. dev.	Minimum	Maximum
Gross NPLs	3.40	2.637352	0	22.27
ROA	0.71	2.689610794	-15.89	5.16
ROE	3.59	17.95422798	-95.44	84.61
Leverage	79.71	13.54242323	7.49	154.83
LDR	91.49	46.33064403	12.35	527.91
CAR	33.51	30.04005684	9.01	283.88
size	190206138.59	398233628.80	664673	2174219449.00
board_meeting	33.10	34.369891	4	282
com_meeting	12.67	12.867326	2	63
indcom_size	2.74	1.235149165	1	7
indcomm_percentage	60.75	36.2480915	25	100
womancom_percentage	14.77	17.13293622	0	66.67
score_GCG	3.90	0.519577219	2	5

4.2 *Results of analysis of the impact of bank-specific determinants and GCG on NPLs of Indonesian banks*

Table 3 presents the correlation coefficients among the research variables. All correlation coefficients are below 0.8, indicating no significant correlation within the research model. This conclusion is further validated by Table 4, where the average variance inflation factor (VIF) score is below 5, confirming the absence of multicollinearity among the variables.

Table 3: Matrix Correlation

	gross_npl	board_meeting	indcom_size	com_meeting	score_GCG	indcomm_percentage	womancom_percentage	lnsize	ROA	ROE	Leverage	lnLDR	CAR
gross_NPL	1												
board_meeting	0.0046	1											
indcom_size	0.0042	0.2576	1										
com_meeting	0.0802	0.4465	0.5074	1									
score_GCG	-0.3516	0.1296	0.2737	0.2028	1								
indcomm_percentage	-0.0434	-0.0355	0.0279	0.0794	-0.0303	1							
womancom_percentage	-0.0345	-0.0712	-0.1257	-0.2325	0.0255	0.0448	1						
lnsize	-0.2094	0.3686	0.7110	0.4799	0.4166	0.0243	-0.1506	1					
ROA	-0.2534	0.0094	0.1428	0.1266	0.232	0.0612	-0.0674	0.3323	1				
ROE	-0.3409	0.0693	0.1569	0.1187	0.2707	0.0305	-0.0735	0.3914	0.6666	1			
Leverage	0.0191	0.1533	0.1982	0.1508	0.0279	0.0051	0.1112	0.379	0.0168	0.1181	1		
lnLDR	0.1072	0.0216	0.0265	0.0422	0.0249	-0.0183	-0.1486	-0.1121	0.0448	-0.0296	-0.4733	1	
CAR	-0.0605	-0.1263	-0.2249	-0.1747	-0.0691	-0.0025	-0.0295	-0.3997	-0.0766	-0.1268	-0.7748	0.389	1

Table 4: Correlation Test Results

Variables	VIF	1/VIF
ROE	1.97	0.506809
ROA	1.9	0.526872
Leverage	2.94	0.339587
lnLDR	1.35	0.740845
CAR	2.63	0.380074
lnsize	3.71	0.26984
board_meeting	1.37	0.731832
com_meeting	1.88	0.532705
indcom_size	3.14	0.318329
indcomm_percentage	1.05	0.956761
womancom_percentage	6.35	0.157557
score_GCG	1.29	0.773732
VIF means	2.81	

The Wooldridge test results indicate no autocorrelation in the research model, as evidenced by a probability value of 0.0000 and an F-value of 36.641. Similarly, the modified Wald test for heteroscedasticity confirms its absence, with a probability value of 0.0000. In the panel data multiple regression analysis using the Breusch-Pagan Lagrange multiplier test, the FE model is more suitable than the OLS model, with a prob value > chibar2 of 0.0000 and a chibar2 of 69.45.

Table 5 presents the results of the fixed effects panel data regression analysis. Only size and LDR are bank-specific determinant measurements that significantly influence NPLs. The p-value of size is 0.003, and the coefficient is -1.83854. It means that size hurts NPLs. The p-value of LDR is 0.013, and the coefficient is 1.604122. LDR has a positive impact on NPLs. Other results show that commissioner size has a p-value of 0.043 and a coefficient of 0.316383. This means that the number of commissioners positively influences the NPLs of Indonesian banks. On the contrary, the coefficient of indcomm_percentage is -0.00371, with the p-value being 0.072. So, the composition of independent commissioners negatively affects the NPLs of Indonesian banks.

The results of the robustness test are presented in Table 6. The test was conducted using net NPL as a measurement of NPL with the same independent variables. The results of the analysis show that LDR is a significant predictor in influencing the level of NPL of banks in Indonesia. Meanwhile, the GCG score as an indicator of GCG is proven to have a significant effect on NPL.

Table 5: Results of Fixed-effect Panel Data Regression Analysis

lnGross_NPL	Coef.	Robust std. err.	t	P>t	[95% conf.	interval]
ROA	0.099975	0.097071	1.03	0.309	-0.09592	0.295871
ROE	-0.0156	0.016065	-0.97	0.337	-0.04802	0.016816
Leverage	0.031037	0.019983	1.55	0.128	-0.00929	0.071364
lnLDR	1.604122	0.616088	2.6	0.013**	0.360806	2.847437
CAR	0.009133	0.007258	1.26	0.215	-0.00551	0.02378
lnsize	-1.83854	0.586856	-3.13	0.003***	-3.02287	-0.65422
board_meeting	0.013338	0.008251	1.62	0.113	-0.00331	0.029988
com_meeting	0.017277	0.020374	0.85	0.401	-0.02384	0.058394
indcom_size	0.316383	0.151597	2.09	0.043**	0.010448	0.622319
indcomm_percentage	-0.00371	0.002009	-1.85	0.072*	-0.00776	0.000346
womancom_ percentage	-0.03437	0.041847	-0.82	0.416	-0.11882	0.050077
score_GCG	-0.55465	0.824556	-0.67	0.505	-2.21867	1.109368
_cons	26.65887	7.251769	3.68	0.001	12.0242	41.29353
F-value	10.13					
Prob > F	0.0000***					

Note: * Indicates significance at 10%, ** indicates significance at 5%, and *** indicates significance at 1%.

Table 6: Results of the Robustness Test

lnNett_NPL	Coef.	Robust std. err.	t	P>t	[95% conf.	interval]
ROA	-0.0672432	0.0451942	-1.49	0.138	-0.1562619	0.0217755
ROE	-0.0121221	0.0067217	-1.8	0.073*	-0.0253618	0.0011176
Leverage	-0.0130511	0.0106026	-1.23	0.220	-0.033935	0.0078329
lnLDR	0.0067674	0.0024515	2.76	0.006***	0.0019387	0.011596
CAR	-0.0203475	0.0048643	-4.18	0.000***	-0.0299287	-0.0107663
lnsize	-4.14E-10	3.20E-10	-1.3	0.196	-1.04E-09	2.16E-10
board_meeting	-0.0006328	0.0028619	-0.22	0.825	-0.0062699	0.0050043
com_meeting	0.0117334	0.0088845	1.32	0.188	-0.0057664	0.0292333
indcom_size	-0.0693225	0.0996444	-0.7	0.487	-0.2655914	0.1269465
indcomm_ percentage	-0.0024614	0.002427	-1.01	0.312	-0.007242	0.0023191
womancom_ percentage	-0.0047369	0.0053594	-0.88	0.378	-0.0152933	0.0058195

lnNett_NPL	Coef.	Robust std. err.	t	P>t	[95% conf.	interval]
score_GCG	-0.6504754	0.1857696	-3.5	0.001***	-1.016385	-0.2845661
_cons	5.722316	1.258367	4.55	0.000	3.243718	8.200915
F-value	6.10					
Prob > F	0.0000***					

Note: * Indicates significance at 10%, ** indicates significance at 5%, and *** indicates significance at 1%.

4.3 The impact of bank-specific determinants on the non-performing loans of Indonesian banks

The research findings indicate that only LDR and size as measures of bank-specific determinants affect the level of bank NPLs in Indonesia. LDR has a positive impact on NPLs, with high LDR increasing the risk of NPLs. This may be because low liquidity can force banks to provide credit to less creditworthy borrowers. This finding aligns with Bayar (2019) who shows that LDR positively affects NPLs in emerging market economies. LDR is also found to have a significant effect on NPL. The practical implication of this is banks implementing a risk management strategy of optimising liquidity risk management.

Large banks tend to have better resources to manage risks, but sometimes engage in higher risk-taking. Therefore, bank size can have a negative or positive effect on NPLs. The findings in this study confirm the negative impact of bank size on NPLs in Indonesia. Banks can manage risks that may arise with high loan levels, reflected in the high and low NPLs. The study's results do not align with previous studies that find bank size positively affecting NPLs (Twairesh, 2024), or having no significant impact (Fajar & Umanto, 2017).

Low profitability is often associated with the inability of banks to manage credit effectively. Less profitable banks tend to be more vulnerable to NPLs. While profitability should be able to affect the level of NPLs, the results of this study do not provide evidence that ROA and ROE significantly impact bank NPLs in Indonesia. This finding does not align with previous studies that show ROA being a significant determinant of NPLs, with a positive and significant impact during the pandemic (Alnabulsi, Kozarević & Hakimi, 2022; Apergis, 2022), or a negative effect (Albashayreh, 2024).

This study uses a dataset covering 2020 and 2021, at the height of the Covid-19 pandemic, which affected bank performance in Indonesia, including controlling NPLs. Covid-19-related measures taken by the government and financial authorities, such as loan moratoriums, stimulus

measures, or interest rate cuts, affected banking NPLs in Indonesia.

Bank capital structure affects risk tolerance and ability to absorb losses. Banks with a high CAR tend to be better able to absorb losses due to bad debts. Pancotto, ap Gwilym and Williams (2024) find that banks with more substantial capital tend to have lower NPL levels, given that they have less incentive to engage in risky practices, while Erdas and Ezanoglu (2022) show that CAR has a negative association with NPLs. The results of the present study, however, indicate that CAR does not significantly affect NPLs for Indonesian banks. This is in line with previous research, including Alnabulsi, Kozarević and Hakimi (2022), Khan, Siddique and Sarwar (2020), and Stefano and Dewi (2022).

4.4 *The impact of GCG on the non-performing loans of Indonesian banks*

The study results confirm that the independent board of commissioners is a significant GSG mechanism against bank NPLs in Indonesia. The number of independent commissioners has a positive influence, while their composition has the opposite effect. The existence of an independent board of commissioners shows that banks can provide a monitoring mechanism for management performance, including credit policy. An effective independent board of commissioners can reduce NPLs by ensuring that credit evaluations are carried out carefully, supervising management so they do not take excessive risks in providing credit and reducing conflicts of interest, such as credit practices, to high-risk affiliated parties.

The positive and significant influence of the board size of independent commissioners found in the present study contradicts the theory and concept of governance. A board of commissioners should be able to reduce the level of NPLs by providing monitoring reinforcement, but this study finds that the number of independent commissioners increases the level of NPLs. This indicates that the role of independent commissioners is not yet optimal. Independent commissioners in banks in Indonesia can play a more significant role in terms of their educational qualifications and expertise.

The negative impact of the composition of the independent commissioners supports previous studies finding that corporate governance, as measured by board size and independence, negatively impacts the level of NPLs (Ahmad et al., 2016). The independence of the board of commissioners refers to the percentage or proportion of independent commissioners on the board, which has been shown to have a negative and significant effect on the level of NPLs in Indonesian banks (Ramadhanti, Butar Butar & Pangaribuan, 2021). The relationship between the implementation of corporate governance and the level of NPLs shows a significant positive influence (Khatun & Ghosh, 2019). In contrast, the data indicates an inverse relationship between NPLs and the level of board independence (Islam, 2020). Other research

reveals that a more significant proportion of independent directors across the full spectrum of banks enhances oversight, thus improving loan quality (Tarchouna, Jarraya & Bouri, 2022).

The proportion of women commissioners does not have a significant impact on NPLs. This result indicates that the role of women commissioners does not significantly impact decision-making and policies, especially in maintaining credit risk channelled by banks. This contradicts previous research, such as Mansour et al. (2024) indicating that women outperform men as top executives, and calling for Asian companies to actively recruit and advance women in top management roles. Mansour et al. (2023) also show that women executives positively impact bank performance indicators, while Mansour et al. (2022) find that broader governance measurements, such as the use of governance indices, will strengthen findings on the influence of governance on company performance, including the level of NPLs.

5. Conclusion

This study aims to analyse the influence of bank-specific determinants on bank NPLs in Indonesia by adding GCG factors. The FE regression panel data model analysis shows that LDR positively affects NPLs, and bank size can reduce NPLs. In addition, the proportion of the independent board of commissioners can significantly negatively impact NPLs. However, the number of independent commissioners has a positive effect on NPLs. ROA, ROE, leverage, and CAR do not considerably affect NPLs, while the existence of women commissioners does not reduce NPLs.

The limitation of this study is that it only examines the NPLs of Indonesian banks over the period of 2018 to 2023. Future research can explore broader datasets to obtain important findings. GCG measurement can be studied more broadly by analysing the gender diversity, educational background, and expertise of directors and commissioners, and linking it to ownership structure. In addition, this study is also limited in that it only relies on the strength of financial reports published by the IDX, but does not consider internal bank risk policies or regulatory interventions. Therefore, a qualitative study can be conducted by future researchers by interviewing executives or analysing relevant regulations.

The practical implications of this study are related to the significant influence of LDR on NPLs. Bank management should be able to determine strategic policies for managing liquidity risk. An increase in LDR can reduce bank liquidity, making it more vulnerable to financial pressure in the event of a massive withdrawal of funds. Another implication is with regard to the role of independent commissioners, where it is found that the influence they exert is inconsistent. Strong monitoring from independent commissioners can

significantly impact the NPL level. Additionally, the theoretical implication of this study is an analysis of NPL determinants within a risk management framework. LDR is one of the important factors in mitigating credit risk in banking. Governance is also an aspect that banks must implement properly because it can reduce the level of NPL.

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