

## THE IMPACT OF BOARD SIZE AND INDEPENDENT DIRECTORS ON NPL RATIOS: A COMPARATIVE ANALYSIS OF OLS AND QUANTILE REGRESSION METHODS

AUDREY PRAJNA  
REGI MUZIO PONZIANI\*

Accounting Department, Trisakti School of Management, Indonesia

[\\*meponzie@gmail.com](mailto:meponzie@gmail.com)

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**Abstract:** This research aims to examine the effect of board size, independent directors, big 4 auditors, audit committee size, audit committee expertise, and market concentration on NPL ratio. The data were taken from banks listed on Indonesian Stock Exchange from 2018-2022. There are two methods applied, multiple regression using ordinary least square (OLS) and quantile regression. The results show that board size and independent directors affect NPL ratio. Control variables, namely capital adequacy ratio and bank size, also affects NPL ratio. Multiple regression, however, fails to detect the influence of independent directors. It also exaggerates the effect of capital adequacy ratio and revenue diversification on NPL ratio. In the presence of nonnormality and heteroscedasticity, this research recommends the use of quantile regression to overcome the weakness of multiple regression using OLS. These findings provide important theoretical and practical implications. Theoretically, this study contributes to the corporate governance and banking risk literature by demonstrating that governance mechanisms, particularly board size and independent directors, play a significant role in influencing credit risk. Methodologically, the study highlights the superiority of quantile regression over OLS when dealing with non-normal and heteroscedastic data, thereby improving the reliability of empirical findings. Practically, bank management should pay greater attention to the composition and effectiveness of boards, especially by strengthening the role of independent directors to improve credit risk oversight and reduce NPL ratios. Regulators may also consider encouraging stronger governance practices and adopting more robust analytical approaches in evaluating banking performance and risk management.

**Keywords:** board size, independent directors, NPL ratio

### INTRODUCTION

The banking industry guarantees the sustainable level of the economy. It undertakes mobilization of savings and lending out to

borrowing units and thus facilitates financial intermediation. Among the core offerings of banks are risk and return-sharing products, along with trade-related financial services ([Ponziani &](#)

[Mariyanti, 2020](#)). However, every lending activity there lay inherent risks that in effect places the banks at a critical risk position in the form of credit risk. If credit risk is unmitigated, it daunts the financial soundness of the bank. To mitigate this risk, central banks must develop and implement effective monetary policies aimed at curbing inflationary pressures ([Ponziani, 2023](#)). Even so, an important parameter for assessing credit risk is the Non-Performing Loan (NPL) ratio which shows the percentage of outstanding or potentially overdue loans ([Al-Qudah et al., 2023](#); [Nguyen & Dang, 2022](#)). High NPL ratios do not only endanger the profitability and solvency of a bank but are also a threat to the stability of the financial system as a whole ([Kepramareni et al., 2022](#); [Iskandar et al., 2023](#)). Governments and regulators need to comprehend the factors that affect the NPL ratios of banks in order to implement measures that will enhance efficient risk management and enhance governance in the banking sector ([Bhattarai, 2020](#); [Salim & Suripto, 2023](#)).

[Hsiao & Yin \(2023\)](#) showed that large board size are sometimes said to contain a wide variety of skills and experiences, which in turn may facilitate decision-making processes and enable the bank to deal with more complex risk situations. Nevertheless, boards that are too large may experience difficulties with coordination and accountability, which may erode the quality of oversight and increase NPL ratios. The link between the size of a board and credit risk, therefore, is not straightforward and must be not just simple consideration ([Debrah et al., 2022](#)).

[Ramly & Ramli \(2022\)](#) found that percentage of the independent directors in the board is also important. Independent directors are supposed to have no competition of interest as they owe their fiduciary duties to the shareholders and the organization only ([Aryal et al., 2024](#)). Their objective oversight is likely to limit bad lending

behaviour and enhance good lending practices in the organization which in turn lowers NPL ratio. Likewise, Independent directors improve the quality of the decisions made by the board and assist in restricting management abuse of power and monitoring management, and controlling the risks of the firm ([Zhu & Wu, 2023](#)).

The role of the Big 4 auditors, which are known for their ruthlessly high standards of performance and financial transparency also have an indirect impact on credit risk ([Yoewono & Ariyanto, 2022](#); [Pham et al., 2025](#)). Having a Big 4 auditor is often regarded as a sign of sound governance and quality financial reporting, thereby lowering the risk of credit practices and enhancing the performance of loans ([Martani et al., 2021](#)). Few commercial Banks audited by Big 4 firms could gain additional credibility that warrants careful lending practices and are likely to see declining NPL ratios.

[Astuti & Chairunisa \(2021\)](#) stated that the audit committee's size and expertise also affect a bank's attitude towards credit risk. It would seem that if a committee size is too small, its effectiveness will also be hampered, whereas, large committee size could enhance the effectiveness of the committee's synthesis of perspectives. That said, a huge size may not be the best and most effective since it may foster inefficiencies and poor risk management practices. Equally important is their expertise in the areas of the Audit committee as these who have some education background in finance and accounting are likely to understand better the depth of issues concerned with risk management and reporting. This type of expertise also allows the committee to better enforce accountability on both the management and credit risks, thereby improving monitoring of NPL ratios.

Finally, the market concentration is an external factor that plays a crucial role in determining credit risks ([Qwader, 2022](#)). It is

understood that high concentration raises the chances that dominant banks would engage in riskier lending a practice due to diminished competition which might increase the non-performing loan ratios. On the other hand, these banks may use their oligopolistic power to enforce tighter risk management and more sounder credit policies which can be associated with lower non-performing loan ratios. As seen in the competitive environment of the banking industry, the connection between market concentration and the credit risk however is complex.

This research will show how NPL Ratio is affected by the board size, audit quality, independent director, audit committee size, audit committee expertise, and market concentration. The remainder of this paper is organized as follows: In the following sections, we develop our hypotheses then introduce our data and research methodology. We then explain and discuss the results in the following section. The last section will propose the conclusion.

### Hypothesis Development

The board structures of companies largely determine how effective overseeing tasks such as managing credit risk, which appears in terms of the Non-Performing Loan (NPL) ratio, is done by the members of the boards. Banks with large board size are less likely to spread misinformation and have better mitigation to control credit risks ([Pham, 2021](#)). Diversity in the membership of boards tends to facilitate the adoption of risk management processes that are geared at mitigating credit risk, which will leads to decreasing of the probability of careless strategy taken ([Grassa & Matoussi, 2014](#); [Alipour et al., 2019](#)). However, big boards can also suffer from too great a reliance on a small group of its members for essential communication and coordination in decision making that is needed for reasonably swift conclusions to be reached ([Ferrero et al., 2012](#)). This can lead to lesser

control of the boards over the approaches and policies of new loans, which would automatically cause a rise in the NPL ratio. The important aspect in the fight against risk and in ensuring correctness of financial data of a company is the selection of the external auditor. [Che et al. \(2020\)](#) states that it is typical of banks that are audited by the big four accounting firms to publish more credible and less distorted financial statements and more likely face a stronger discipline in the market of loanable funds and ballooning of credit risk is better controlled. By increasing the level and accessibility of information, the emphasis on high standards associated with Big 4 audits can result in better lending practices that would eventually lead to a lower ratio of non-performing loans. The existence of independent directors in a bank's board is also an important factor in the management of credit risk. These directors are independent and do not take side with any internal conflicts of interest. Thus, making the company more transparent and reliable ([Papadimitri et al., 2020](#); [Najwa et al., 2019](#)). So, the hypotheses will be as followed:

- H1: Board Size significantly influences NPL Ratio**
- H2: Big 4 Public Accounting Firms significantly influences NPL Ratio**
- H3: Board Independence significantly influences NPL Ratio**

[Tahir et al., 2020](#) suggest that the composition of audit committees consisting of a larger number of members is often accompanied by the presence of a wider pool of skills and insights enabling proper supervision of financial reporting and risk management. This diversity could then enhance the overall capacity of the bank to rate and control credit risks, which may lower the NPL ratio. Members experienced in the fields of finance or accounting are also inclined to be in a better position to assess risk management and complex financial reports ([Sadaa et al., 2023](#)).

[Minton et al., 2014](#)). They also allow the bank's audit committees to question management's decisions and guarantee more effective surveillance over credit risk, which facilitates reduction in the NPL ratio. Therefore, the hypotheses will be as followed:

**H4: Audit Committee Size significantly influences NPL Ratio**

**H5: Audit Committee Expertise significantly influences NPL Ratio**

The NPL ratio is also influenced by market concentration. The concentration-fragility hypothesis states that banks operating in a concentrated market may develop a risk-oriented mentality because they think that they are too big to fail ([Aldomy et al., 2020](#)). Such behavior may cause high NPL ratios to be obtained. On the contrary, the concentration-stability hypothesis asserts that when a long-term focus is maintained, major banks in the concentrated markets may deploy their earning potential and market power in implementing conservative lending policies with reduced NPL ratios ([Abdel-Wanis, 2021](#)). The balance between these opposing forces determines the extent of the relationship between the NPL ratio and market concentration ([Alyousfi et al., 2018](#); [Budhatokiet al., 2024](#)). This leads to followed hypothesis:

**H6: Market Share significantly influences NPL Ratio**

## RESEARCH METHOD

This study selected conventional banks listed on the Indonesian Stock Exchange from 2018 to 2022 as the sample. The banks were required to publish financial statements and annual reports during this period. The data utilized are cross-sectional, meaning they are not required to be balanced across each year. Multiple regression analysis was employed for this study,

with quantile regression conducted as an additional step to ensure the robustness of the results. The operational definitions of each variable are provided below.

### Dependent Variable

The dependent variable in this research is represented by the measure of credit risk. The proxy for the dependent variable is the Non-Performing Loan (NPL) ratio, titled as NPL RATIO, which is calculated as follows:

$$\text{NPL RATIO} = \frac{\text{Non-Performing Loans}}{\text{Total Loans}}$$

Non-Performing Loans consist of loans categorized as substandard, doubtful, and loss. A higher NPL ratio indicates greater credit risk, as it reflects a larger portion of loans that are not performing as expected. This measure serves as an essential indicator of the bank's asset quality and risk management effectiveness. The regression analysis incorporates this ratio to evaluate its determinants and implications.

### Independent Variables

The independent variables in this model are categorized into three groups: Corporate Governance, Market Concentration, and Control Variables. The Corporate Governance category comprises Board Size, Big 4 Auditors, Independent Directors, Audit Committee Size, and Audit Committee Expertise. The Market Concentration variable is represented by the Herfindahl-Hirschman Concentration Index, which evaluates the market share of deposits held by each bank. Meanwhile, the Control Variables include the Capital Adequacy Ratio, Bank Size, and Revenue Diversification. A detailed summary of each variable is provided in the table below.

**Table 1. Summary of Independent Variables**

| Variable                         | Symbol     | Operational Definition                                                                                                                   | Proxy                                                                                                                     |
|----------------------------------|------------|------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------|
| <b>Board Size</b>                | BSIZE      | Number of board of directors in the company                                                                                              | BSIZE = Number of BoD members                                                                                             |
| <b>Independent Directors</b>     | INDIR      | The proportion of independent directors from total number of directors                                                                   | INDIR = Number of Independent Directors / Total Number of Directors                                                       |
| <b>Big 4 Auditors</b>            | BIG4       | The auditors responsible for the company's financial statements, classified as either Big 4 or non-Big 4 public accounting firms.        | BIG4 = 1 if from Big 4; 0 if otherwise                                                                                    |
| <b>Audit Committee Size</b>      | ACSIZE     | The total number of members serving on a company's audit committee.                                                                      | ACSIZE = Number of Audit Committee Members                                                                                |
| <b>Audit Committee Expertise</b> | ACEXP      | The percentage of audit committee members with finance and accounting expertise relative to the total number of audit committee members. | ACEXP = Number of Audit Committee Members with Finance and Accounting Expertise / Total Number of Audit Committee Members |
| <b>Market Concentration</b>      | HERFINDAHL | The market share of deposit of a bank compared with total deposits of all banks                                                          | HERFINDAHL = Total Deposit in a Bank/Total Deposit of All Banks                                                           |
| <b>Capital Adequacy Ratio</b>    | CAR        | The ratio of a bank's capital reserved to cover potential losses from a decrease in asset value.                                         | CAR = (Tier I Capital + Tier II Capital) / Risk-Weighted Assets                                                           |
| <b>Bank Size</b>                 | SIZE       | The total value of assets held by the bank, scaled using the natural logarithm.                                                          | SIZE = Ln (Total Assets)                                                                                                  |
| <b>Revenue Diversification</b>   | REVDIV     | The proportion of a bank's revenue that comes from noncredit source (less risky assets)                                                  | REVDIV = Fee-Based Income / Total Revenue                                                                                 |

## RESULTS AND DISCUSSIONS

Firstly, we are going to show the sampling results. Table 2 below shows the samples used in this research.

Table 2 above shows data there are 227 observations coming out from the sampling process. The data will be treated as cross-sectional data so that unbalanced number of banks of each year will not matter. There are only 2 criteria used namely the banks are listed from

2018 until 2022 and they have the required data for this research. Table 3 below shows the descriptive statistics for the variables

From table 3, we can see that the mean for NPL ratio is 3.70%. This indicates a good ratio overall because the number is below 5%. The maximum NPL ratio in the sample is 27.35%. This indicates a large uncollectibles within a bank. Improvement in risk management practice and loan policy should be improved to atone the NPL

ratio. The most board of directors size is 11 individuals with the least is only 2. The average for board size is between 4 to 5 individuals in a board. We could also see that most of the banks are audited by Big 4 public accounting firms. However, the proportion is quite balanced because almost half is audited by non Big 4 (Big 4 proportion is 51.75%). Audit committee size ranges from 2 to 8 individuals in a board. The majority of the audit committee member comes from accounting and finance background. Market concentration is measured by Herfindahl-Hirschman index (hence the variable name HERFINDAHL). This index denotes the market share proxied by total deposits by the banks. Therefore, the total of the HERFINDAHL will be 1. The size of the banks in this sample ranges from 27.2226 until 35.2282. Since this is a natural logarithm term, then we have to make it in exponential term to know the absolute number. After rendering it in exponential order, we

found that the smallest bank in the sample has an asset of around IDR 660 billion, while the biggest bank has an excess of IDR 1,000 trillion. The biggest bank in Indonesia right now is Bank Mandiri (the asset is IDR 1,900 trillion followed by bank BRI (the asset is 1,800 trillion). However, when it comes to total deposits, BRI has more deposit compared to Bank Mandiri (IDR 1,300 trillion versus IDR 1,296 trillion). The last variable is REVDIV that is how a bank diversifies its revenues. Part of the revenue will come from interest expense (risky revenue due to its probability of being uncollectible) and fee-based revenue (less risky revenue). The least diversified revenue of the banks in the sample has 0.01% of its revenues come from fee-based revenue. This means the rest (99.99%) comes from loan distribution activity. The most diversified bank has 21.81% of its revenues from fee-based revenue. The average proportion for the sample is 4.43%.

Table 2. Samples

| No            | Year | Number of Banks |
|---------------|------|-----------------|
| 1             | 2018 | 45              |
| 2             | 2019 | 43              |
| 3             | 2020 | 45              |
| 4             | 2021 | 47              |
| 5             | 2022 | 47              |
| Total Samples |      | 227             |

Table 3. Descriptive Statistics

| Variables  | Min     | Max     | Std Deviation | Mean    |
|------------|---------|---------|---------------|---------|
| NPL RATIO  | 0       | 0,2735  | 0,0385        | 0,0370  |
| BSIZE      | 2       | 11      | 2,1508        | 4,7061  |
| INDIR      | 0,3333  | 1       | 0,1245        | 0,5880  |
| BIG4       | 0       | 1       | 0,4986        | 0,5175  |
| ACSIZE     | 2       | 8       | 1,1640        | 3,8158  |
| ACEXP      | 0       | 1       | 0,2295        | 0,7799  |
| HERFINDAHL | 0       | 0,2185  | 0,0466        | 0,0224  |
| CAR        | 0,0901  | 3,9050  | 0,4410        | 0,3481  |
| SIZE       | 27,2226 | 35,2282 | 1,7812        | 31,2890 |
| REVDIV     | 0,0001  | 0,2181  | 0,0479        | 0,0443  |

Source: Processed Data (2024)

**Table 4. Correlation Matrix**

|                   | <b>BSIZE</b>  | <b>INDIR</b> | <b>BIG4</b> | <b>ACSIZ<br/>E</b> | <b>ACEX<br/>P</b> | <b>HERFIN<br/>-<br/>DAHL</b> | <b>CAR</b> | <b>SIZE</b> | <b>REVDI<br/>V</b> |
|-------------------|---------------|--------------|-------------|--------------------|-------------------|------------------------------|------------|-------------|--------------------|
| <b>BSIZE</b>      | 1             |              |             |                    |                   |                              |            |             |                    |
| <b>INDIR</b>      | -0.2678       | 1            |             |                    |                   |                              |            |             |                    |
| <b>BIG4</b>       | 0.3817        | -            | 1           |                    |                   |                              |            |             |                    |
|                   |               | 0.0359       |             |                    |                   |                              |            |             |                    |
| <b>ACSIZE</b>     | 0.6528        | 0.0194       | 0.233       | 1                  |                   |                              |            |             |                    |
|                   |               |              | 0           |                    |                   |                              |            |             |                    |
| <b>ACEXP</b>      | 0.1277        | -            | 0.007       | 0.1241             | 1                 |                              |            |             |                    |
|                   |               | 0.1131       | 7           |                    |                   |                              |            |             |                    |
| <b>HERFINDAHL</b> | 0.5696        | -            | 0.366       | 0.5340             | 0.1156            | 1                            |            |             |                    |
|                   |               | 0.0496       | 0           |                    |                   |                              |            |             |                    |
| <b>CAR</b>        | -0.1768       | 0.0439       | 0.060       | -0.1882            | -                 | -0.1383                      | 1          |             |                    |
|                   |               |              | 9           |                    | 0.0246            |                              |            |             |                    |
| <b>SIZE</b>       | <b>0.7509</b> | -            | 0.429       | 0.5272             | 0.2215            | 0.7379                       | -          | 1           |                    |
|                   |               | 0.1701       | 3           |                    |                   |                              | 0.3418     |             |                    |
| <b>REVDIV</b>     | 0.3756        | 0.0275       | 0.137       | 0.2019             | 0.1909            | 0.5407                       | -          | 0.5397      | 1                  |
|                   |               |              | 1           |                    |                   |                              | 0.1288     |             |                    |

Source: Processed Data (2024)

Next we implement normality test for Jarque-Bera. The equation for Jarque-Bera is:

$$JB = \frac{N}{6} \times (S^2 + \frac{(K-3)^2}{4})$$

N is the number of observation, S is the skewness, K is the kurtosis. With the value of N equals to 227, the skewness equals to 3.1721, the kurtosis equals to 15.0811, we derive to the JB value of 1753. After computing the value of JB, we will check whether the p-value of the JB is above 0.05. If it is above 0.05, then the hypothesis of normality is not rejected. Our calculation shows that the p-value is 0.0000 and therefore, the data is not normally distributed. In this case we count on the central limit theorem in which large data sample can be assumed to have the normal

distribution. We will also include quantile regression, besides the multiple regression, to deal with the normality and heteroscedasticity problem (if any).

After checking the normality, we proceed to multicollinearity problem. Firstly, we will use correlation matrix to check for any strong correlation between 2 variables as indicated by table 4 below.

Table 4 above shows the correlation matrix among variables. One correlation in particular is above 0.75 namely between board size and bank size. Large banks have the proclivity to have large board members. After that, the correlation between HERFINDAHL and Size is also strong, 0.737. The positive correlation indicates that large banks tend to have large market share. We can see that Indonesia

population like to deposit their money with large banks. This could be because they believe large banks tend to be safer because they have more capital to withstand crisis or bad economic downturn. Audit committee size also correlate positively with board size. Banks with large board size (audit committee size) tend to have also large audit committee size (board size). This is corroborated with the fact that audit committee size also has a positive correlation with bank size. We investigate further whether Size and Board Size also have multicollinearity problem with other variables. We will run the following regressions:

$$\text{SIZE} = \alpha_1 + \beta_1 \text{BSIZE} + \beta_2 \text{INDIR} + \beta_3 \text{BIG4} + \beta_4 \text{ACSIZE} + \beta_5 \text{ACEXP} + \beta_6 \text{HERFINDAHL} + \beta_7 \text{CAR} + \beta_8 \text{REVDIV}$$

$$\text{BSIZE} = \sigma_1 + \lambda_1 \text{SIZE} + \lambda_2 \text{INDIR} + \lambda_3 \text{BIG4} + \lambda_4 \text{ACSIZE} + \lambda_5 \text{ACEXP} + \lambda_6 \text{HERFINDAHL} + \lambda_7 \text{CAR} + \lambda_8 \text{REVDIV}$$

From the above equations, we will derive the VIF and Tolerance. If VIF is more than 10 and Tolerance is less than 0.1, then there is a multicollinearity problem. The following is the formula for Tolerance and VIF:

$$e^2 = \begin{matrix} 0.00512 + \\ (0.01135) \\ 0.00015 \text{ ACSIZE} - \\ (0.0004) \\ 0.0002 \text{ SIZE} + \\ (0.0003) \end{matrix} \begin{matrix} 0.00041 \text{ BSIZE} + \\ (0.0002) \\ 0.0004 \text{ ACEXP} - \\ (0.0014) \\ 0.01327 \text{ REVDIV} \\ (0.0086) \end{matrix} \begin{matrix} 0.00306 \text{ INDIR} + \\ (0.0028) \\ 0.0165 \text{ HERFINDAHL} - \\ (0.0114) \end{matrix} \begin{matrix} 0.00018 \text{ BIG4} + \\ (0.0007) \\ 0.0001 \text{ CAR} - \\ (0.0009) \end{matrix}$$

$$\text{Tolerance} = 1 - R^2$$

$$\text{VIF} = 1/\text{Tolerance}$$

After running the regression, we obtain the results as shown by the table below.

The adjusted R-Square is 3.7133%. The total observation is 226. Therefore, the Chi-Square is 8.3921. If calculate the p-value based on the Chi-Square distribution, the p-value is 0.015055. Therefore, the hypothesis that the model does not contain any heteroscedasticity problem is rejected. The variance is heteroscedastic. Therefore, we will run regression that is based on heteroscedasticity and autocorrelation robust standard error. Table 6 belows displays the regression results.

The above table shows that the VIF and Tolerance of BSIZE and SIZE are still within the tolerated limit. The VIF are both 3.440576 and 4.655481, which are below 10. The Tolerance are also more than 0.1. Therefore, there is no multicollinearity problem among the variables. Next, we proceed to heteroscedasticity test. In this research we use White test in which the residuals from the original regression equation will act as the dependent variable. The following is the regression results for the Langrange-Multiplier equation:

**Table 5. Regression Results**

| Variables    | VIF      | Tolerance |
|--------------|----------|-----------|
| <b>BSIZE</b> | 3.440576 | 0.290649  |
| <b>SIZE</b>  | 4.655481 | 0.214801  |

Source: Processed Data (2024)

**Table 6. Regression Results**

| <b>Variables</b>  | <b>Model 1</b>         | <b>Model 2</b>          | <b>Model 3</b>         | <b>Model 4</b>                       |
|-------------------|------------------------|-------------------------|------------------------|--------------------------------------|
| <b>Constant</b>   | 0.2321***<br>(0.0839)  | 0.2321***<br>(0.0700)   | 0.1991***<br>(0.5405)  | <b>0.1991***</b><br><b>(0.5401)</b>  |
| <b>BSIZE</b>      | 0.0058***<br>(0.0021)  | 0.0058***<br>(0.00197)  | 0.0039***<br>(0.0013)  | <b>0.0039***</b><br><b>(0.0012)</b>  |
| <b>INDIR</b>      | 0.00108<br>(0.0209)    | 0.00108<br>(0.0261)     | -0.0246*<br>(0.0135)   | <b>-0.0246*</b><br><b>(0.0135)</b>   |
| <b>BIG4</b>       | -0.0027<br>(0.0053)    | -0.0027<br>(0.00417)    | -0.0042<br>(0.0035)    | <b>-0.0042</b><br><b>(0.0034)</b>    |
| <b>ACSIZE</b>     | 0.0014<br>(0.0029)     | 0.0014<br>(0.00284)     | -0.0022<br>(0.0019)    | <b>-0.0022</b><br><b>(0.0019)</b>    |
| <b>ACEXP</b>      | -0.0025<br>(0.0107)    | -0.0025<br>(0.01004)    | 0.0042<br>(0.0069)     | <b>0.0042</b><br><b>(0.0069)</b>     |
| <b>HERFINDAHL</b> | -0.1031<br>(0.0845)    | -0.1031<br>(0.07835)    | 0.0482<br>(0.0545)     | <b>0.0482</b><br><b>(0.0544)</b>     |
| <b>CAR</b>        | -0.0121***<br>(0.0069) | -0.0121***<br>(0.00441) | -0.0102**<br>(0.0045)  | <b>-0.0102**</b><br><b>(0.0044)</b>  |
| <b>SIZE</b>       | -0.0071***<br>(0.0028) | -0.0071***<br>(0.00241) | -0.0052***<br>(0.0019) | <b>-0.0052***</b><br><b>(0.0018)</b> |
| <b>REVDIV</b>     | 0.1149**<br>(0.0636)   | 0.1149**<br>(0.05817)   | -0.0112<br>(0.0411)    | <b>-0.0112</b><br><b>(0.0411)</b>    |

\*\*\*significant at 0.01

\*\*significant at 0.05

\*significant at 0.1

Source: Processed Data (2024)

Table 6 above shows 4 models of regressions. The first model is multiple regression (Ordinary Least Squares procedure). The second model is multiple regression with robust standard errors. The third model is quantile regression. The fourth model is quantile regression with robust standard errors. Model 1 and model 2 yield the same coefficient. However, they differ in the standard error (the number in the brackets). Overall, the standard error for model with robust standard errors is always lower. However, this does not change the p-value. We can see that board size (BSIZE), capital adequacy ratio (CAR), and bank size (SIZE) are all significant at 0.01. Revenue diversification (REVDIV) is significant at

0.05. All the other variables are not significant. However, we should see these results in light of nonnormality and heteroscedastic point of view. These two problems might distort the results. Therefore, it is imperative to run the robust analysis using quantile regression (model 3) and quantile regression with robust standard error (model 4).

Model 3 and model 4 yield the same regression parameters (coefficient). However, they differ very slightly in the standard error. Therefore, the p-values of the regression do not change very much. According to model 3 and 4, board size (BSIZE) and bank size (SIZE) are significant at 0.01. Capital adequacy ratio (CAR) is

significant at 0.05. Lastly, INDIR (independent directors) is significant at 0.1. Previously, INDIR is not significant under model 1 and 2. It turns out that it is still significant at 0.1 level. The first variable that is influential is board size. A positive coefficient indicates that the increase in board size will increase NPL ratio. This means board size alone is not enough. Banks also have to focus on the quality of the board. A more independent and competent board is also crucial in supervising the banks risk-taking activity. Without adequate quality, increase in board size might hamper the operating activity of a bank. Loans might be distributed unchecked that will in turn increase the amount of non-performing loans. Big board size will muddle the coordination and prove the supervision to be more difficult. The second variable is board independence. The influence of independent director is negative toward NPL ratio. The larger the proportion of independent director, the lower NPL ratio would be. Hence, the independent directors are instrumental in putting the reins on the expansion of loan so that risky loans can be avoided that might increase NPL ratio. Without independent directors' supervision, banks might grow the loans without heeding the quality of the loans. If the loans become uncollectible, the banks might face financial difficulty that can lead to bankruptcy. Bankruptcy within the banking system might pose systemic risk to the whole economy. Therefore, it is recommended for the banks to increase the proportion of independent directors to supervise and put a check on the loan expansion or growth. The third and fourth variables that exert significant influence toward NPL ratio are capital adequacy ratio and bank size. In this research capital adequacy ratio and size are all control variables. Therefore, we do not posit special hypotheses for these variables. These variables have negative influence. The bigger the capital and size of the banks, the lower the NPL ratio. The more capital a

bank has, the more its proclivity to maintain that capital to withstand loan losses. Therefore, this will lead to prudence behavior and good risk management. Larger banks also have the incentive to remain prudent. Larger banks are proven to have higher market share. To maintain this share and keep a good image and trust, they should practice good risk management. Therefore, larger banks tend to have lower NPL ratio.

## CONCLUSIONS

This research purports to examine the influence of board size, independent directors, big 4 auditors, audit committee size, audit committee expertise, and market share (concentration) in light of multiple regression and quantile regression. The research results show that in the presence of nonnormality and heteroscedastic problem, multiple regression run using ordinary least square (OLS) might distort the results. Influential variable under OLS might prove insignificant or has the lesser significance. OLS might also state other variable to be insignificant when in reality it does exert some influence. Therefore, it is recommended to always compare the results of OLS with quantile regression. Board size and independent directors are influential toward NPL ratio. Larger board size will increase NPL ratio. Hence it will increase the credit risk of a bank. Independent directors, together with capital adequacy ratio and bank size, negatively affect NPL ratio. OLS states that revenue diversification significantly affects NPL ratio. However, it is not proven under quantile regression. The research results must be interpreted with research limitations in mind. In this research, the data are treated as cross-sectional data. Therefore, the time series effect are not taken into account. This is because the research wants to conduct robust analysis using quantile regression. Future research might endeavor to apply other kinds of regression such as Ridge regression or Lasso

Regression and compare the results with OLS or quantile regression.

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