INTERNATIONAL JOURNAL OF SOCIAL AND MANAGEMENT STUDIES (IJOSMAS)

Volume: 6 No. 4 https://www.ijosmas.org e-ISSN: 2775-0809

The Influence of ESG Disclosure, Leverage, and Company Size on Financial Performance at Bank KBMI 3 and 4: The Role of Credit Quality Moderation

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Abstract *- The banking industry is under pressure to integrate sustainability practices while maintaining profitability. This research aims to examine the impact of Environmental, Social, and Governance (ESG) Disclosure, Leverage (Debt-to-Equity Ratio/DER), and firm SIZE (SIZE) on financial performance (Return on Assets/ROA) in publicly-owned banks KBMI 3 and 4 during the period of 2019 ~ 2023, as well as the moderating role of Credit Quality (Non-Performing Loan/NPL). Data from five years across eight banks were analyzed using random and fixed-effects regression. The main results indicate that ESG Disclosure and DER have a significant positive direct effect on ROA, while SIZE has a negative effect. NPL has been proven to strengthen the relationship between ESG-ROA and DER-ROA confirming that good credit risk management enhances the benefits of sustainability strategies and funding but does not moderate the influence of company SIZE. This moderation model demonstrates a strong capacity to account for variation in ROA, highlighting the crucial synergy between ESG practices and credit risk management in enhancing bank performance.*

Keywords *: ESG Disclosure, Leverage, Company SIZE, Non-Performing Loan, Return on Assets, Panel Data Regression.*

I. INTRODUCTION

In the system modern economy , banks have role central as institution intermediation connecting finance the party that owns excess funds with the party in need financing . Through function this , the bank does not only push growth economy , but also maintain stability system finance national . Therefore that , performance bank finances become indicator important in evaluate effectiveness role said . Good performance reflect efficiency operational , management healthy risks , as well as bank's ability to create mark for stakeholders interests . Nathania and Ekawati (2024) found that performance Bank finances are heavily influenced by internal and external factors , including governance and risk . credit .

Optimal performance is important for banks to maintain sustainability activity operational and improve mark company . For can measure performance banking , general Return on Assets (ROA) used as proxy . In 2019 , banking ROA is at a prime level, namely 2.47% before exposure pandemic , reflecting effectiveness allocation assets and stability interest income . Entering 2020, the pressure external in the form of the COVID-19 pandemic is pressing request credit and forcing banks to add provision For credit problematic , so ROA goes down drastic to 1.59%. Fiscal and monetary stimulus policies in early 2021 began jack up market optimism : ROA rises again to 1.85%, along with loosening restructuring credit and relaxation interest rates , even though still below pre - pandemic levels . 2022 marks further recovery strong , supported by improvements quality assets , digital banking acceleration , and efficiency operational , so that ROA rose again to 2.45% which is almost touch ROA position in 2019. The peak achieved in 2023, when ROA reaches number highest in five years last , namely 2.78%. Achievement the is reflection the success of the bank in manage risk , increase non-interest income , and apply principle sustainability (ESG) in operational . Fluctuations This describe the importance of management strategy risk credit , optimization capital structure , and commitment towards ESG Disclosure for guard profitability term long and pushing mark company .

Environmental, Social, and Governance (ESG) Disclosure is form non- financial disclosures by companies that explain How company manage issues environment or Environment (E), social or Social (S), and governance or Governance (G). ESG Disclosure reflects level transparency and responsibility answer company to sustainability as well as compliance with the principles of good governance . In the sector banking , ESG

Disclosure is important For show commitment to financing sustainable , protection environment , and governance a potential good risk impact positive on the perception of investors, customers , and regulators.

Various study empirical has indicates that ESG disclosure has impact positive to performance finance companies , including in sector banking . ESG Disclosure is assessed capable increase mark company with form greater investor perception Good to risk and stability long- term (Frias-Aceituno et al., 2013). Companies that have level high ESG disclosure tend show performance more finances good , such as higher ROA and ROE tall compared to companies that do not do disclosure (López et al., 2007). In Indonesia, ESG Disclosure has also been proven influential positive on ROA in the industry banking , where transparency to issue environmental and social associated with decline risk as well as improvement loyalty customers (Aulia et al., 2023).

However so , no all studies find consistent results . Some study show that the influence of ESG on performance finance Not yet significant , especially Because its implementation is still nature symbolic in a number of Indonesian banks, especially after COVID-19 pandemic (Rahmawati et al., 2024)

H1: ESG Disclosure has an impact positive on Financial Performance at KBMI Banks 3 and 4

Leverage in context finance refers to the extent to which a company using loan funds (debt) to finance asset operational . The Leverage Ratio shows structure funding company , and measured with compare amount of debt to total equity or assets . High leverage show company (or bank) more Lots depend on external funds (debt), which can increase risk finance If No balanced with performance good operational .

A number of studies has show that Leverage has influence to performance finance companies , including commercial banks . Research by Zeuspita and Yadnya (2019) revealed that the Debt to Equity Ratio (DER) has an effect negative significant on Return on Assets (ROA) in conventional banks in Indonesia (Zeuspita & Yadnya, 2019). Findings similar was also obtained by Anggriani et all (2023), who showed that DER and Non-Performing Loans (NPL) are simultaneous affect ROA, as well as that The impact of DER on ROA is greatly influenced by conditions quality bank credit .

On the other hand , a study by Mandiri (2016) shows that DER does not own influence significant on ROA, while NPL actually influential significant , so that emphasize importance role quality credit as variables moderation in connection between Leverage and profitability (Mandiri , 2016).

H2: Leverage has an effect negative on Financial Performance at KBMI Banks 3 and 4

Size company is something indicators that show big small something entity based on total assets , total income , or amount employees . In the research finance , size company generally proxied with Natural Logarithm (Ln) of Total Assets, because mark asset absolute usually very large and vulnerable against scale bias .

Various studies empirical show that size company own significant relationship with performance financial . Size company influential positive on Return on Assets (ROA) in general banks in Indonesia, where institutions are more big tend own efficiency more operational high (Damayanti & Mawardi , 2022). Companies with scale big is also considered more stable in a way financial and have resilience to pressure external , which has an impact on greater profitability good (Jaya, 2020). In addition , the size company contribute positive to performance finance through utilization scale economy and diversification source income (Luckieta et al., 2021).

However , in small and medium banks , the size company No show influence significant to performance finance , which is likely due to limitations in capacity managerial and resources power possessed (Hamzah, 2021).

H3: Company size has an effect positive on Financial Performance at KBMI Banks 3 and 4

Credit Quality in context banking refers to the ability debtor For fulfil obligation payment his credit . One of the indicator main in measure quality credit is Non-Performing Loan (NPL) ratio , ie proportion credit problematic to the total credit provided . High NPL show height risk fail pay , which can impact negative to performance bank finances , especially Return on Assets (ROA).

Non-Performing Loans (NPL) are known own influence to performance bank finances . NPLs have an impact negative significant on Return on Assets (ROA) in conventional banks in Indonesia (Sa'adah & Wahyuni, 2023). The increase in NPL can also lower efficiency operational and profitability bank (Putra & Rahyuda , 2021). On the other hand , the influence of NPL on ROA can varies depending on the scale of the bank as well effectiveness management applied risks (Fauziah, 2021) .

H4: Credit Quality (NPL) has an effect negative on Financial Performance (ROA) at KBMI 3 and 4 banks

Volume: 6 No. 4 https://www.ijosmas.org e-ISSN: 2775-0809

A number of study empirical show that ESG Disclosure has influence positive on ROA, especially when risk credit can controlled . For example , studies by Mudzakir and Pangestuti , (2023); Sutopo (2025) show that consistent ESG practices capable increase profitability of commercial banks in Indonesia. In the context of this , Non-Performing Loan (NPL) as indicator quality credit play a role as variables moderation that can strengthen or weaken connection between ESG Disclosure and ROA. When NPL is low , the influence positive ESG on ROA tends to increase Because risk controlled credit allows banks to maximize benefit from practice sustainability .

However so , no all banks are capable manage ESG effectively effective , especially in condition quality deteriorating credit . When NPL is high , the burden the risks borne by the bank can hinder effectiveness of ESG Disclosure in increase performance finance . In this situation said , the costs high ESG implementation No balanced by efficiency operational , so that ESG Disclosure is actually can impact negative on ROA. Research by Verina and Rohman (2024) supports this view this , with findings that ESG Disclosure does not always give contribution positive to profitability , especially in banks with high NPL levels . Therefore that , research This submit hypothesis that ESG Disclosure has an impact positive on ROA, and the influence the moderated by NPL, either in a way strengthen and weaken connection depending on the level quality credit owned by the bank.

H5: Credit Quality (NPL) moderates The influence of ESG Disclosure on Financial Performance (ROA) at KBMI 3 and 4 banks

A number of studies empirical show that DER has influence positive on ROA, especially when risk credit can managed leverage in a way effective proven capable increase profitability in commercial banks in Indonesia (Mandiri , 2016); (RISMAWATI, 2024). In the context of this , Non-Performing Loan (NPL) as indicator quality credit play a role as variables moderation that can strengthen or weaken connection between DER and ROA. When NPL is low , the influence positive DER on ROA tends to increase Because risk controlled credit allows banks to maximize benefit from financing external .

However , in condition quality deteriorating credit , high leverage precisely can enlarge risk finance and reduce efficiency operational . When NPL is high , interest expense and potential fail pay increases , resulting in a high DER No Again give mark plus to ROA. The DER ratio is known own impact significant negative on ROA, especially in banks that have high NPL levels (Zeuspita & Yadnya, 2019). In this situation said , aggressive capital structure precisely weaken performance finance Because increasing burden risk and decline effectiveness managerial . Therefore that , research This submit hypothesis that DER has an effect on ROA, and the influence the moderated by NPL, either in a way strengthen and weaken connection depending on the level quality credit owned by the bank.

H6: Credit Quality (NPL) moderates The influence of Leverage (DER) on Financial Performance (ROA) at KBMI 3 and 4 banks

A number of study empirical show that SIZE has influence positive on ROA, especially when risk credit can controlled . Bank size plays a role in push improvement profitability , especially when The NPL level is at a low level (Mandiri , 2016; Damayanti & Mawardi , 2022; Anggawulan & Suardikha , 2021). In the context of this , Non-Performing Loan (NPL) as indicator quality credit play a role as variables moderation that can strengthen connection between SIZE and ROA.

However , in condition quality deteriorating credit , size big company No always ensure high efficiency and profitability . When NPLs increase , large banks precisely can face burden greater risk big due to high credit volume and complexity increased managerial . NPL does not show ability For moderate connection between SIZE and ROA in general significant , even in a number of case , SIZE does not give influence against current ROA quality credit experience decline (Anggawulan & Suardikha , 2021). This matter show that scale large operations can become burden If No balanced with management risk effective credit .

H7: Credit Quality (NPL) moderates influence Company Size (Ln Total Asset) on Financial Performance (ROA) at KBMI Bank 3 and 4

Conceptual model proposed based on the hypothesis is shown in figure 1.

Framework think in study This there is Financial Performance as variables bound by ESG Disclosure, Leverage and Company Size which are moderated by Credit Quality. The framework think the theory presented following explain connection between variables namely ESG Disclosure (X1), Leverage (X2) and Company Size (X3) on Financial Performance (Y) moderated by Credit Quality (Z).

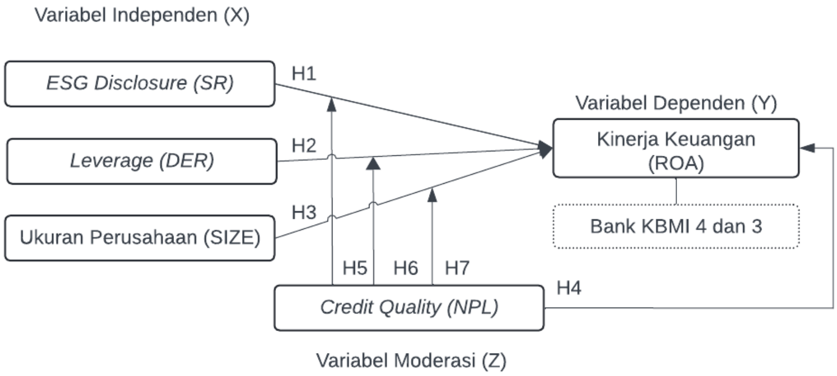

Figure 1. Research Model

II. METHOD

Study This use approach quantitative Because aim For test connection between variables in a way objective and measurable using numerical data . Type of research this is very appropriate For analyze influence variables independent such as ESG Disclosure, Debt to Equity Ratio (DER), and size company (SIZE) against Return on Assets (ROA) as variables dependent . In addition , research this also involves variables moderation namely Non-Performing Loan (NPL) for see whether connection between variables independent and ROA is influenced by the level of credit problematic . Approach quantitative allows researchers For test hypothesis in a way statistics and generate conclusions that can be drawn generalized . Population in the study This are KBMI Bank 4 and 3 listed on the Indonesia Stock Exchange for the period 2019 ~ 2023. The number of population obtained in study This as many as 8 public banks

Study This using the test model panel data regression , namely methods used For modeling influence variables predictor (variable that influences or variables independent) against variables response (variables that are influenced or variables dependent) in a number of observed sectors from something object study during period period time certain . In addition , panel data regression is also used For do forecasting variables response to each existing sectors . However , for predict it , it is necessary done forecasting moreover formerly For variables predictors in each sector . Analysis and testing this panel data regression will done with use tool help program EViews 12.

III. RESULTS AND DISCUSSION

A. Result

a. Regression Model Selection

- Chow Test (Common effect vs Fixed effect)

Effects Test	Statistics	df	Prob.
Cross-section F	2.974388	(7.25)	0.0206
Cross-section Chi-square	24.234421	7	0.0010

Based on The results of the Chow Test (Redundant Fixed Effects Tests) in Table 4.8 can be seen seen that mark probability (p-value) for Cross-section F is 0.0010. Because this p- value Far more small from level significance 0.05 (α=0.05), then hypothesis zero (H0) which states that the Common Effect Model (CEM) is rejected . With thus , it can concluded that the Fixed Effect Model (FEM) is a better model in accordance For estimate connection between SR, DER, SIZE and NPL variables on ROA in commercial banks in the sample. This is indicates existence characteristics unique or difference specific between companies that do not can neglected and necessary accommodated in the model, so that Fixed effect model approach will give more estimates accurate .

- Hausman Test (*Fixed effect* vs *Random effect*)

Test Summary	Chi-Sq. Statistic	Chi-Sq. df	Prob.
Random cross-section	20.820718	7	0.0040

Based on Hausman Test results (Correlated Random Effects Test) in table 4.9, the value The probability (p-value) for random cross-section is 0.0040. Because this p- value more small from level significance 0.05 (α=0.05), then hypothesis zero (H0) which states that the Random Effect Model (REM) is more appropriate rejected . With thus , it can concluded that the Fixed Effect Model (FEM) is the most appropriate model For estimate connection between variables in study this . This result indicates existence correlation between effect individual bank with variables independent , so that the use of Fixed effect Model is required For produce consistent and unbiased estimates .

b. Determination of Research Model

Following is results Estimation of Regression Test of Financial Performance of Commercial Banks In a way Partial Using the Fixed Effect Method with a Moderating Role :

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.076924	0.015890	4.841123	0.0000
SR	-0.053490	0.015383	-3.477316	0.0015
DER	-0.003186	0.000872	-3.653262	0.0009
SIZE	-7.12E-05	6.14E-05	-1.159582	0.2548
NPL	-0.020786	0.007629	-2.724538	0.0103
SRNPL	0.020275	0.008268	2.452267	0.0198
DERNPL	0.000639	0.000261	2.451312	0.0199
SIZENPL	4.57E-05	2.73E-05	1.673653	0.1039

R-squared	0.659432	Mean dependent var	0.016054
Adjusted R-squared	0.584932	S.D. dependent var	0.007663
S.E. of regression	0.004937	Akaike info criterion	-7.607322
Sum squared resid	0.000780	Schwarz criterion	-7.269546
Log likelihood	160.1464	Hannan-Quinn criter.	-7.485193
F-statistic	8.851515	Durbin-Watson stat	1.715506
Prob(F-statistic)	0.000005		

Based on the coefficient test panel data regression fixed effect model simultaneous can concluded that three from four variables free to use in study influence performance general bank finance in sample in a way significant . Meanwhile testing equality For overall variables free to enter In the fixed effect panel data regression model , the F-test is used . The results of the F- test are as shown . in table 4.12 values the probability of an F-statistic of 0.000005 is far more small from level significance 0.05 (α=0.05), then The Null Hypothesis (H0) is rejected .

It means that in a way overall or simultaneous , three from four variables ESG Disclosure (SR), Leverage (DER), Company Size (SIZE), Credit Quality (NPL), together with variables related moderation (SR_NPL, DER_NPL , SIZE_NPL) entered in the Fixed effect panel data regression model , it has significant influence on Financial Performance (ROA) at commercial banks KBMI 3 and 4 which listed on the IDX and consistent publish Sustainability Report during period 2019 to 2023. In other words, the regression model that was built This fit and capable explain variations in performance general bank finances in the sample . This supports premise that factors the in a way collective important in determine performance general bank finance .

Based on the panel data regression output of the Fixed effect model, the Adjusted R-squared value is 0.584932 (or rounded to 58.49%) shows that 58.49% of the total variation in Performance Financial (ROA) can explained by variation from all over variables free to enter in the regression model these , namely ESG Disclosure (SR), Leverage (DER), Company Size (SIZE), Credit Quality (NPL), and variables moderation interactions (SR_NPL, DER_NPL, SIZE_NPL).

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In other words, the combined contribution (influence) from variables independent and moderate the to performance finance Enough large , namely 58.49%. The remainder , around 41.50%, is variation performance financial performance explained by other factors not including in the research model This is a sufficient Adjusted R-squared value. tall This indicates that the regression model used own ability explain (power predictive) which is sufficient strong and relevant in predict or explain changes in performance finance in general banks in sample .

B. Discussion

Study This aim explain How quality measured credit past Non-Performing Loan (NPL) ratio moderates connection between a number of variables finance —ESG Disclosure, Leverage (DER), and Company Size (SIZE)— with Bank profitability (Return on Assets/ROA) in KBMI groups 3 and 4. Hypothesis moderation designed For catch dynamics in which pressure quality credit can change direction or strength influence variables independent on ROA.

Hypothesis First state that ESG Disclosure has an impact positive significant on ROA in the model without moderation . However , after include NPL as moderator variable , coefficient ESG directly becomes weaken and turn around negative , indicating that quality bad credit can dampen benefit sustainability . On the other hand , the ESG×NPL interaction shows effect positive and significant , which describes that when NPL is high , the intensity ESG disclosure returns push profitability as signal mitigation risk reputation .

Hypothesis second test The role of Leverage (DER). Without NPL, the increase in DER tends to increase ROA through effect taxes and expansion assets . After moderated , effect DER changes immediately negative , indicating that debt is excessive can pressing performance when quality credit decreased . However , the coefficient DER×NPL interaction remains positive and significant , confirming that bank's ability to manage credit problematic become determinant is leverage high can return support profitability .

Hypothesis third focused on Company Size (SIZE). Before considering NPL, scale large assets precisely influential negative on ROA, indicating the existence of diseconomies of scale. After moderated by NPL, the influence direct fixed SIZE No significant and the SIZE×NPL interaction is also not cause change means . Findings This confirm that in condition pressure credit , size big just No Enough lift performance without efficiency operations and management adequate risk .

Lastly , the hypothesis fourth highlight the role of NPL itself . In the basic model without interaction , NPL does not influential significant on ROA. However when analyzed in framework moderation , NPL shows impact negative significant on ROA, revealing that the model includes variables interaction more capable catch strength risk credit in influence profitability .

In a way Overall , only ESG Disclosure and DER are beneficial strategic can optimized with good NPL management . Size company No show flexibility influence even though supported by NPL interactions , whereas understanding to role NPL moderation is important For reveal effect risk hidden credit .

IV. CONCLUSION

Study This study How ESG disclosure (Sustainability Report), capital structure (DER), and scale assets (SIZE) affects bank profitability (ROA) in KBMI groups 3 & 4 for the 2019–2023 period , with role moderation ratio credit non-performing loans (NPL). Using panel data regression for eight banks that regularly issue report sustainability , studies This blend time series and cross section dimensions for examine effect live and interactive variables finance on ROA.

On the model without moderation , findings show that improvement ESG disclosure in general significant drives ROA, while leverage (DER) also increase profitability through tax shield benefits . On the other hand , the size company influential negative , reflecting diseconomies of scale when asset enlarged , and NPL does not give impact directly on ROA. In simultaneous , fourth variables independent explain part big variation profitability , marking reliability of panel data regression models for policy managerial .

After include NPL as moderator variables , patterns the influence of ESG and DER shifts : the effect direct both of them weaken or even changed negative in the middle pressure quality declining credit . However ESG×NPL and DER×NPL interactions are the same display coefficient positive and significant , indicating that practice sustainability and reuse of debt raise ROA provided accompanied by management risk tight credit . Size company still No significant Good in a way direct and in the interaction with NPL, while NPL itself show influence negative significant to ROA when analyzed in framework moderation .

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In a way conceptual , results This confirm that ESG Disclosure and leverage are just can function optimally as driver profitability If combined with effective NPL control . From the side managerial , banks need integrating risk strategies credit and sustainability in a way simultaneously , while the regulator can strengthen policy ESG reporting and framework adaptive NPL handling For increase stability sector banking .

Study This limited to the aggregate ESG index , KBMI 3 & 4 bank groups , and secondary data without enter variables macroeconomics or advanced robustness testing . Recommendations For studies furthermore covering separation ESG dimensions , expansion sample cross bank and institution categories non-bank finance , integration indicator macro , the use of primary data for validation , as well as application of dynamic panel model such as the GMM System for overcome potential endogeneity .

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