



Financing For Sustainability and Bank Performance: Case of G-20 Countries

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ABSTRACT: Unstable economic conditions and high uncertainty resulting from the COVID-19 pandemic and geopolitical tensions between Russia and Ukraine have made it difficult for global economic recovery. Banks has an important role in the economy to support the implementation of a sustainable economy through the disbursement of sustainable financing. The bank expects sustainability financing has a positive impact on financial performance. It can attract investors because one of the main priorities of investors at this time is a sustainable business. The study uses 68 banks from G-20-member countries and several countries in ASEAN that are not included in the G-20 from 2019 to 2021 performance. In assessing the impact of the disbursement of sustainable financing on financial performance (using the ratio of non-performing loans, net interest margin, and capital adequacy ratio as financial performance variables), the authors use panel data regression, while to assess the impact of sustainable financing distribution on ESG performance using binary logistic regression. The results show that there is a significant positive impact from the distribution of sustainable financing on net interest margins and the capital adequacy ratio, and a significant negative impact on the non-performing loans ratio. In addition, this study's results also show a significant positive impact on improving ESG performance. This shows that by the disbursement of sustainable financing, banks will get a positive impact on financial performance and can attract investors.

KEYWORDS: Bank; G-20; Financial Performance; ESG Performance; Logistic Binary Regression; Panel Data Regression; Sustainable Financing.

INTRODUCTION

The G20 is a multilateral cooperation forum consisting of 19 main countries and the European Union (EU). The G20 represents more than 60% of the world's population, 75% of global trade, and 85% of the world's GDP. The goal of the G20 is to achieve strong, sustainable, balanced, and inclusive global growth. Sustainable finance is one of the main focuses of the conference, which will discuss climate risks and the risks of the transition to a low-carbon economy, and sustainable finance (sustainable finance) from a macroeconomic and financial stability point of view. Sustainable finance is an approach from the financial services sector to support the goals of sustainable development and climate change. It is undeniable that many people do not realize the importance of a sustainable economy and its impact on the environment and life in the future. The bank is one of the financial service institutions that have an important role in developing the national economy, and even has a strategic role in an economic system. One of the real implementations of sustainable funding is by not providing capital loans to businesses that have the potential to damage the environment. Therefore, financial institutions are encouraged to be able to integrate environmental, social and business governance principles into their credit and investment policies. Therefore, the banking industry has a very important role in supporting sustainability finance by implementing ESG in its banking operations.

Environment, Social, and Governance (ESG) is an important basic guideline to support the company's sustainability. The majority of companies in developed countries have tried to implement ESG as much as possible in order to create a balance in the business ecosystem. Unfortunately, the positives for the business climate have not yet occurred. These findings indicate that there are still improvements that can be made in aspects of corporate governance and accountability. This is also a solution to maintaining economic growth and stability in the midst of the threat of a global crisis, given the real threat of a food crisis and energy crisis as a result of the Russian invasion of Ukraine in early 2022. Investment activities by considering ESG in companies, especially in banking industries have not been widely applied. Therefore, measuring the estimated effect of ESG on the banking industries (through several monetary indicators) is important to determine whether there is a scientific effect. And if there is, it can be seen how much influence (coefficient value) the ESG has. The calculation or measurement of the estimated influence of ESG Investment



is also considered important because of the strategic role of banks in the success of sustainable national development, one of which focuses on maintaining environmental, social, and good governance conditions.

BUSINESS ISSUE

To encourage banking industry to issue sustainability financing, it is essential that commercial banks see a return on their investments in such financing; thus, legislative guidance on sustainability financing is essential. In the context of a rapidly increasing sustainable economy and a strong environmental industry, sustainability financing illustrates how commercial banks can exercise corporate social responsibility in the area of environmental protection. Investors. Based on PwC’s Global Investor Survey 2022 Investors foresee a huge increase in climate change and cyber threats over the next five years (including hacking and disinformation). They also feel that firms may enhance their performance in two areas: management of climate change and innovation reporting. Similarly, investors alluded to potential solutions. Seven out of ten investors believe that companies should report on the relevance of sustainability to strategy, the costs of achieving sustainability commitments (including climate objectives), and the impact of sustainability risks and opportunities on the underlying assumptions of financial statements. In addition, generating new and improved products, services, and business practices should be an organization’s primary objective (83%). Second in importance is the need to maintain profitable financial performance (69 percent). Investors also place a premium on environmental, social, and governance (ESG) outcomes, with data security and privacy ranking third (51%), effective corporate governance ranking fourth (49%), and reducing greenhouse gas emissions rounding out the top 5 (PricewaterhouseCoopers Global, 2023). (See diagram below)

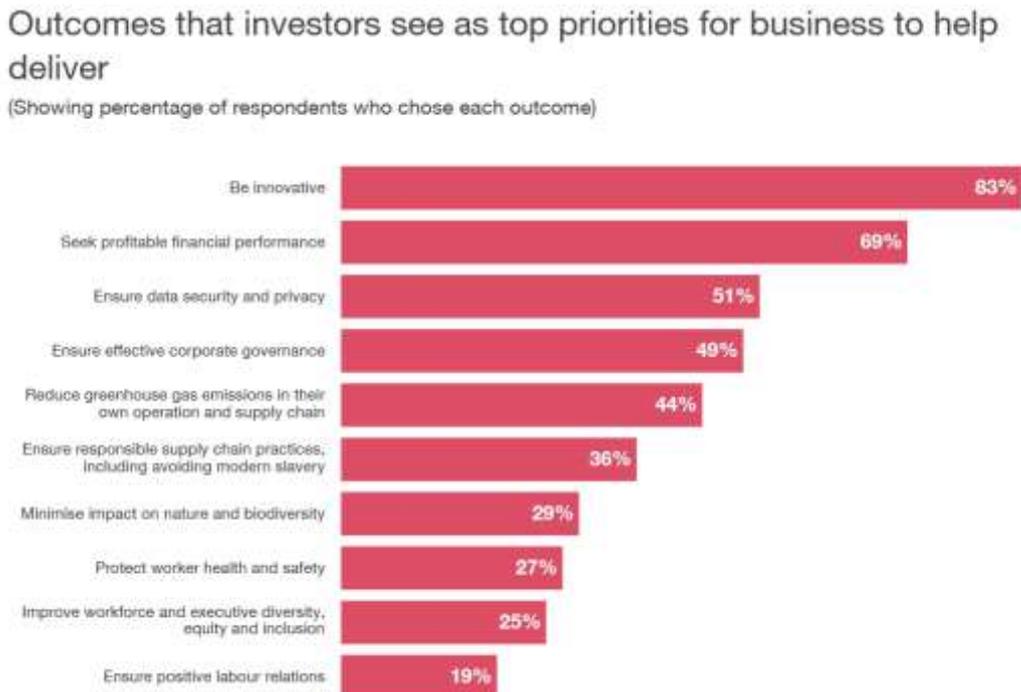


Figure I. Investors' top priority for the business

Thus, the research question in this study is whether the banking industry can improve its financial performance by developing a sustainable financing business? and does this sustainability financing increase the likelihood of changing the ESG Score? bearing in mind that for now ESG performance is one of the priority points considered by investors. The purpose of this thesis is to aims and analyzes the relationships between ten dimensions of the environmental, social, and governance pillars and bank financial performance. By observing and analyzing the ESG performance using ESG Score and financial performance on banking industry.

LITERATURE REVIEW

In this paper, the researcher needs to identify some of the theories that will be applied in this paper and discussed. These theories include: 1) Financial Performance 2) Sustainable Business and 3) research hypothesis.



1) Financial Performance

Businesses able to maximize their stakeholders' wealth are essential for the economic development of developing nations. Economists frequently use the analogy of a motor to explain their impact on the economic, social, and political development of a nation. In order to thrive in the current market, every business must function under performance-based circumstances. Increasingly, academics of strategic management are interested in investigating how to improve a company's bottom line. An investor can evaluate the financial performance of a firm to determine whether it is of high quality. Elle's valuation varies according on the scale of its operations. Hantono (2018) (Hantono, 2018) explains that the company's basic position will serve as the basis for investment decisions based on the company's financial success. According to Kariyoto (2017) (Kariyoto, 2017), financial performance is the result of a company's business operations as represented in its financial statements. Financial ratios are a metric used to evaluate the health of a business or bank and to determine whether or not certain goals have been met. Among the many financial ratios calculated, the profitability ratio is the most reliable indicator of a bank's success. Capital adequacy ratio (CAR), non-performing loan (NPL), and net interest margin (NIM) are some of the factors influencing bank performance.

a. Non-Performing Loan (NPL)

Borrowers are unable to make their loan payments for various reasons, resulting in non-performing loans. Typically, the financial crisis is to blame, as it raised the proportion of bad loans. A financial institution's asset quality can be approximated by the proportion of its loans deemed "non-performing." The proportion of delinquent debtors is defined by the number of borrowers who do not repay their loans as agreed. Therefore, the percentage of nonperforming loans held by a bank is indicative of the bank's asset quality. This can be achieved by utilizing some of the most fundamental financial criteria, which assess everything from profitability and capital to market and credit risk and liquidity. Consequently, a nonperforming loan is a warning sign that something is amiss at the financial institution that issued it. If the trend continues, an increase in nonperforming loans (NPL) might have a chilling effect on a bank's ability to offer credit in the succeeding period.

$$\text{Non - Performing Loan (NPL)} = \frac{\text{Non - Performing Loan}}{\text{Total Loan}}$$

b. Net interest margin (NIM)

The net interest margin is the proportion by which a bank's interest income is less than the amount of interest paid to its lenders. Similar to a non-financial company's gross margin, the net interest margin of a financial institution requires precise computation. The net interest margin is used as a standard against which financial firms' risk management procedures can be evaluated. Variations in interest rates are a possible threat source. This is because swings in interest rates influence both interest income and interest expenses. The growing value of the interest margin ratio indicates that the rate of return on managed productive assets is increasing. The net interest margin is utilized in a financial institution's strategy formulation.

$$\text{Net Interest Margin (NIM)} = \frac{\text{Interest Revenue} - \text{Interest Expenses}}{\text{Productive Assets}}$$

Net interest income is calculated by subtracting principal expense from interest revenue. In the meantime, "productive assets" refers to those that can be sold for a profit or earn interest.

c. Capital adequacy ratio (CAR)

The Capital Adequacy Ratio measures the capacity of a bank to set aside funds for use as loss reserves. Credit, securities, and claims against other banks all include risk, and these assets must be financed. Banks can accomplish this by utilizing public savings, time deposits, demand deposits, and other funding sources. The Capital Adequacy Ratio is a statistic used to assess the safety and soundness of a financial institution in light of probable losses from high-risk investments. Primary and additional financial resources exist. That is a combination of your own funds and contributions from others, like investors or delighted consumers. In the meanwhile, the term "risk-weighted assets" will be used to represent investments with varying amounts of risk. Credit stands out as the riskiest asset type for financial institutions to hold when compared



to other asset classes. Capital availability is extremely important in the banking industry. For the obvious reason that capital is necessary for banks to grow and expand their activities. It is impossible for a bank to function without good capital management. In this sector, financial institutions must adhere to all applicable rules and regulations.

$$\text{Capital Adequacy Ratio (CAR)} = \frac{\text{Tier 1 Capital}}{\text{Risk - Weighted Assets}}$$

d. Total Assets (TA)

Total assets are the total assets possessed by businesses or financial institutions and utilized to fund their activities. The expansion of total assets comprises the expansion of both current and noncurrent assets. The total assets of a bank are both an indicator of its contribution to the national economy and a quantitative estimate of its size. The value of a bank's assets is used to determine its market share in an economy. In this research, total assets are used as a control variable that represents bank size or bank characteristics. The total assets obtained from the financial statements will be reconciled with the natural logarithm to prevent or reduce fluctuations in data that are at odds with significant differences.

e. Leverage Ratio (LVRG)

In general, the leverage ratio serves as a measurement or degree of a company's capacity to repay or meet its financial commitments. The higher the leverage ratio, the larger the loan, which suggests that the company's financial health is poor and that it is at risk of bankruptcy.

$$\text{Debt to Equity Ratio (DER)} = \frac{\text{Total Debt}}{\text{Total Equity}}$$

In this study, leverage is used as a control variable that represents bank characteristics.

f. Covid Period (COVID)

Corona Virus Disease 2019 or commonly abbreviated as COVID-19 is an infectious disease caused by SARS-CoV-2, a type of coronavirus. People with COVID-19 can experience fever, dry cough, and difficulty breathing. Apart from total assets and leverage, the Covid-19 period is also a control variable where in the time period tested there was a period when an economic crisis occurred caused by the spread of the Covid-19 virus, to be precise in 2020 the spread of covid expanded and made several countries experience an economic recession in 2020.

2) Sustainable Business

The term "business sustainability" refers to a company's capacity to meet its present expenses without compromising its (or anybody else's) ability to meet its long-term future needs (Bansal & DesJardine, 2014). Incorporating sustainability elements and transitioning from shareholder capitalism to capitalism with social responsibility are both required if enterprises are to fulfill their social mission of advancing the general welfare of society. (Kumar & Christodouloupoulou, 2014) (Kumar & Christodouloupoulou, 2014). The change toward environmental sustainability will be facilitated by organizational practices in three areas: management planning and organization, operations, and communication. When confronted with environmental issues, companies should adopt sustainable strategies for three reasons: competitiveness, legitimacy, and ecological accountability (Bansal & Roth, 2000).

The first is the environmental aspect, which deals with how much energy or natural resources are used by the company during operations and what kind of waste or pollution is produced as a result that affects the environment (nature, plants, animals, and human itself). The idea of sustainability will be in danger if natural resources are used excessively and replenish themselves more quickly than they would otherwise. The social component focuses more on how the business interacts with its internal and external communities, including its workers, suppliers, customers, communities, and government. In order to continue growing together and not harming one another, the business must maintain relationships with the neighborhood. This includes hiring local talent, providing social services to the neighborhood, and keeping business practices consistent with the values of the area. The governance component is concentrated on how a business is run ethically, professionally, and in accordance with all relevant laws (both regional



and national regulations). Environmental, social, and governance (ESG) factors can aid investors in making more informed decisions when investing. ESG serves as the foundation for all the concepts it encapsulates. This ESG standard is meant to help customers buy goods and services from businesses that genuinely care and adhere to these concerns and issues as well as investors choose the companies, they will invest in. The company and the investor will benefit mutually from this kind of action.

ESG challenges such as the depletion of natural resources, shifts in global governance, the management of a varied global workforce, and modifications to the regulatory environment may have an impact on the long-term risk-and-return profile of investment portfolios. MSCI's Environmental, Social, and Governance (ESG) Ratings are intended to assist investors in evaluating ESG risks and opportunities and incorporating them into portfolio construction and management. Our global team of over 200 experienced research analysts analyses millions of data points across 35 ESG Key Issues in order to uncover the intersection between a company's core business and the industry issues that can generate big risks and/or opportunities. Comparing businesses to others in their industry yields grades ranging from AAA (outstanding) to CCC (poor). The objective of MSCI's ESG Ratings is to evaluate a company's preparedness for and response to ESG risks that could have a meaningful impact on its financial performance. MSCI collects information from several sources, such as business financial and sustainability disclosure, specialist government and academic data sets, media search, etc. The information is then categorized based on three indicators and assigned a score between 1 and 10 depending on exposure, management, and critical criteria. Then, we assign each pillar a weighted average grade based on how accurately it reflects the underlying concepts. After calculating the weighted average key issue score and the adjusted final industry score, the per-set scores are converted into a letter rating matrix, commonly known as an ESG letter rating.

3) Research Hypothesis

The regression equation is an equation that defines the nature of the relationship between two or more variables. Economics, for example, describes simple equations and is widely known for its use to show relationships between variables in simple linear equations (Wibowo A. , 2012). The framework for the formulation of the problem is as follows, with hypotheses or short-term solutions grounded in theory and the connection between research objectives.

H1a = $\beta \neq 0$ (Sustainability Financing has negative correlation to NPL)

H1b = $\beta \neq 0$ (Sustainability Financing has positive correlation to NIM)

H1c = $\beta \neq 0$ (Sustainability Financing has positive correlation to CAR)

H1d = $\beta \neq 0$ (Sustainability Financing has an impact on the Upgrading ESG Rating)

This hypothesis is made based on the theory and results of previous studies where Weber's research (2005) (Weber, 2005), using a sample of European banks, over time, being environmentally conscious can improve a financial institution's profit line and research by Guan et al. (2017) (Guan, Zheng, Hu, Fang, & Ren, 2017) and Cui et al. (2018) (Cui, Geobey, Weber, & Lin, 2018), using a sample of Chinese banks, found that green financing helped reduce the bank's risk and improve the quality of its assets. From this research, the authors also conceptually in sustainability financing have lower risks because the exposure to risks faced is lower in line with the implementation of ESG, because ESG does not only prioritize good governance but also social and environmental impacts so that it can carry out analysis risk very well. In addition, Sustainable finance is an approach from the financial services sector to support sustainable development goals and climate change. So, sustainable finance is a new approach that takes into account environmental factors (climate change) and social factors that can increase financial risks for financial institutions. Based on the explanation, the authors argue that the distribution of sustainability financing should have a positive effect on ESG Performance.

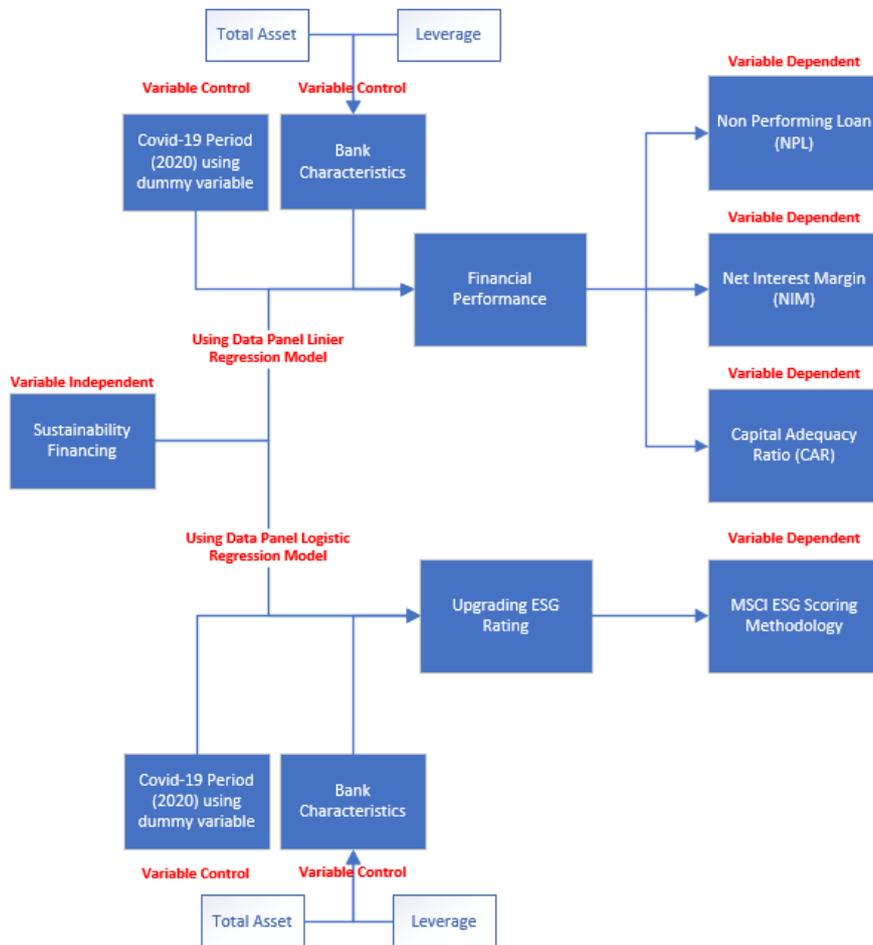


Figure I. Conceptual Framework

RESEARCH METHODOLOGY

In this final project, the research method used is a quantitative methodology that uses ESG rating and financial performance data as secondary data and uses financial performance to analyze financial ratios such as NPL, NIM, and CAR. These ratios are used as the dependent variable of financial performance in measuring the influence of ESG on company performance. Other than that, this research uses Total Asset, Leverage Ratio, and Covid Period as variable control in determining the relationship between sustainability financing and financial performance. In addition, researchers also use ESG rating data obtained from independent parties as the dependent variable, where the ESG rating is secondary data. And the independent variable is Sustainability Financing, the data of which is obtained from the sustainability report for each bank. In conducting this research, the researcher uses a hypothesis test to determine whether there is a significant influence or not between sustainability financing to ESG and Financial Performance implementation by using the ESG rating as evidence of the ESG Performance. To investigate the relationship between these variables, researchers used panel data regression tests for financial performance and logistic binary regression for ESG Performance to find out the most significant effect.

A. Data Collection

The independent variable in this study is the sustainability financing from each bank that we used to sample from period 2019 to 2021. Value of sustainability financing is an approach from the financial services sector to support sustainable development goals and climate change. So, sustainable finance is a new approach that takes into account environmental factors (climate change) and social factors that can increase the financial risk for financial institutions, one of which is a bank, because banks are financial institutions that play the most important role in the economy. The author uses the ratio between sustainability financing and the total loan portfolio, this is used to be a control variable in sustainability financing. To obtain data on sustainability financing, researchers



use media sustainability reports published by each sample bank, so to obtain data on sustainability financing, researchers use a secondary data approach.

The first dependent variable is the ESG (environmental, social, governance) rating of each sampled bank. The value of the environmental component of the ESG is indicated by three indicators, namely resource use, emission, and innovation. The value of the social component is indicated by four indicators, namely workforce, human rights, product responsibility, and community. The value of the governance component is indicated by three indicators, namely management, shareholders, and CSR strategy. Each value of these components is the result of an assessment conducted by MSCI on the bank's performance from period 2019 to 2021 which is obtained from the information disclosed by the company in its financial statements and annual reports and obtained by the rating method.

And the second dependent variable in this study is financial performance, the authors use NPL, NIM, CAR, Total Asset, and Leverage Ratio to represent the bank's financial performance from period 2019 to 2021. As with other variable data, researchers use the media annual report published by each sample bank, so to obtain financial performance data (NPL, NIM, CAR, Total Asset, and Leverage Ratio) researchers use a secondary data approach.

Table I. Definition of Variables and Source of Data

Variable	Symbols	Source Data	References
Non-performing loan (dependent variable)	NPL	Financial statement (2019 – 2021)	(Sukmadewi, 2020)
Net interest margin (dependent variable)	NIM	Financial statement (2019 – 2021)	(Sukmadewi, 2020)
Capital adequacy ratio (dependent variable)	CAR	Financial statement (2019 – 2021)	(Sukmadewi, 2020)
ESG Rating (dependent variable)	ESG	Database MSCI Rating from official website	(Tarmuji, Maelah, & Tarmuji, 2016) and (Duque-Grisales & Aguilera-Caracuel, 2021)
Sustainability financing to loan ratio (independent variable)	SF	Sustainability report (2019 – 2021)	(Guan, Zheng, Hu, Fang, & Ren, 2017) and (Cui, Geobey, Weber, & Lin, 2018)
Total assets (variable control)	TA	Financial statement (2019 – 2021)	(Nyabaga & Matanda, 2020)
Leverage (variable control)	LVRG	Financial statement (2019 – 2021)	(Nyabaga & Matanda, 2020)
Covid-19 Period (variable control)	COVID	Author's judgment and justification	Author's judgment and justification

B. Data Analysis Methods

Researchers carry out data collection to capture various phenomena information according to the scope of research needed. The data used in this research is secondary data. Secondary data is a historical data structure regarding variables that have been collected by other parties (Hermawan & Yusran, 2017). This research data is using secondary data. For data on sustainability financing and financial performance, researchers obtain annual reports and sustainability reports from each bank's official website, while the ESG Rating data is taken from the Refinitiv database which can be accessed through the official website. This study uses panel data regression tests to see the effect between sustainability financing and financial performance, while to determine the effect between sustainability financing and the ESG Rating uses binary logistic regression because the ESG Rating is formed into a dummy variable which only has 2 values (0 if there is no change in rating and 1 if there is a change in the ESG rating). Panel data regression tests and logistic binary regression analysis were processed using STATA Software.

1) *Panel Data Regression*

The objective of the research is to establish a relationship between the dependent and independent variables; the obtained data will be examined using multiple linear regression to support the study's conclusions. This analysis will utilize panel data, which includes time series and cross-sectional data. Importing data entered into Microsoft Excel into STATA for testing. In general, panel data regression models can be written as follows:



$$Y = a + \beta_{1it}X_{1it} + \beta_{2it}X_{2it} + \beta_{3it}X_{3it} + \beta_{4it}X_{4it} \dots \dots + \beta_{nit}X_{nit} + e$$

$$i = 1, 2, \dots, n \quad t = 1, 2, \dots, T$$

Where Y is the dependent variable and X is the independent variable. While a is a constant and b is a regression coefficient for each independent variable. While the I is represent the unit cross section and t is time period. Time series and cross section data can be combined to produce higher quality and more extensive data than could be obtained using either type of data alone (Gurajati & Porter, 2009). In data panel regression, assumptions must be met so that the resulting estimate is Best Linear Unbiased Estimator (BLUE), in the form of constant error variance for each variable, error is normally distributed, there is no strong linear relationship between independent variables (non-multicollinearity), and error. are independent of each other (non-autocorrelation). To determine the effect of the independent variable on the dependent variable. Test the significance of the parameters of β with hypothesis as follows.

- $H_{0a} = \beta = 0$ (Sustainability Financing has no correlation to NPL)
- $H_{1a} = \beta \neq 0$ (Sustainability Financing has negative correlation to NPL)
- $H_{0b} = \beta = 0$ (Sustainability Financing has no correlation to NIM)
- $H_{1b} = \beta \neq 0$ (Sustainability Financing has positive correlation to NIM)
- $H_{0c} = \beta = 0$ (Sustainability Financing has no correlation to CAR)
- $H_{1c} = \beta \neq 0$ (Sustainability Financing h has positive correlation to CAR)

This study employs panel data regression to examine the impact of several variables on financial performance, including Sustainability Financing, Natural Logarithm Total Assets, and Leverage. When estimating panel regression using cross-sectional data, one of the three estimation methods will be chosen. The three types of data models accessible for estimating regression in panel data are Common Effects Models, Fixed Effects Models, and Random Effects Models. Before using the multiple linear regression method, it is necessary to test the standard hypothesis. The classical assumption test is required to test the regression model that will be used because the assumptions of multicollinearity, autocorrelation, and heteroscedasticity are absent in the model, as verified by the standard assumption test. Multiple Linear Regression is used exclusively for this test on scaled or serialized data.

2) *Binary Logistic Regression*

Logistic regression model describes the relationship between the likelihood of an event of interest, $P(Y = 1)$, and a linear combination of independent variables (Xs) using the logit link function. The three most frequent link functions are logit, probit, and complimentary log-log (Faraway, 2016). As indicated in the equation below, the logit link function is the natural log of the odds ratio, which is the ratio between the probabilities of an event of interest occurring (if it occurred, p), and not occurring (if it did not occur, n). (Kirkwood & Sterne, 2003).

$$Logit (p_1) = \ln \left(\frac{p_1}{1 - p_0} \right) = Cons + \beta_{it}X_{1it} + \beta_{it}X_{2it} + \beta_{it}X_{3it} \dots + e$$

$$i = 1, 2, \dots, n \quad t = 1, 2, \dots, T$$

Logistic regression model describes the relationship between the likelihood of an event of interest, $P(Y = 1)$, and a linear combination of independent variables (Xs) using the logit link function. The three most frequent link functions are logit, probit, and complimentary log-log (Faraway, 2016). As indicated in the equation below, the logit link function is the natural log of the odds ratio, which is the ratio between the probabilities of an event of interest occurring (if it occurred, p), and not occurring (if it did not occur, n). (Kirkwood & Sterne, 2003). The result of linear regression is a straight line on the graph, while the result of logistic regression is an S-curve. Variations are attributable to the logit link function utilized in logistic regression. As the final model is developed, its goodness of fit should be evaluated to determine how well it fits the data. The R^2 value of logistic regression is typically low, in contrast to the R^2 value of linear regression; hence, the goodness-of-fit test is suggested above reporting the R^2 value (Hosmer, Lemeshow, & Sturdivant, Applied Logistic Regression, 2013). On the estimated probability, Hosmer-Lemeshow goodness of fit is determined using the chi-squared distribution and the percentile grouping method. The null hypothesis of this test assures that the model is properly fitted. If the value of p is less than the significance criterion, the model is deemed untrustworthy (Hosmer, Lemeshow, &



Sturdivant, Applied Logistic Regression, 2013). To determine the effect of the independent variable on the dependent variable using the logistic binary regression. Test the significance of the parameters of β with hypothesis as follows.

$H_{0d} = \beta = 0$ (Sustainability Financing has no impact on the ESG Rating)

$H_{1d} = \beta \neq 0$ (Sustainability Financing has an impact on the ESG Rating)

RESULT AND DISCUSSION

A. Regression Model

Related to this research there are 2 different regression models, therefore in the discussion, this regression model will be divided into 2 regression models. Each regression model will later be tested using control variables in the form of total assets (TA) and leverage (LVRG). The first regression model will discuss the relationship between sustainability financing and financial performance, where the sustainability financing variable used is the ratio of sustainability financing to total loans and the financial performance variable uses the ratio of non-performing loans (NPL), net interest margin (NIM), and capital. Adequacy ratio (CAR). The first regression model will use multiple linear regression. The first regression model will be like the formula below:

$$\begin{aligned}
 NPL (y_1) &= Cons + \beta_{it}SF_{it} + \beta_{it}TA_{it} + \beta_{it}LVRG_{it} + \beta_{it}COVID_{it} + e \\
 NIM (y_2) &= Cons + \beta_{it}SF_{it} + \beta_{it}TA_{it} + \beta_{it}LVRG_{it} + \beta_{it}COVID_{it} + e \\
 CAR (y_3) &= Cons + \beta_{it}SF_{it} + \beta_{it}TA_{it} + \beta_{it}LVRG_{it} + \beta_{it}COVID_{it} + e \\
 & i = 68 \text{ banks} \quad t = 2019, 2020, \text{ and } 2021
 \end{aligned}$$

The second regression model will discuss the relationship between sustainability financing and the ESG Rating, where the variable for sustainability financing used will be the same as the first model, while for the ESG rating, it uses a dummy variable with binary options 1 and 0, where if 1 then the increasing ESG rating while 0 did not experience a change or decreasing rating in the ESG Rating. The second regression model will be like the formula below:

$$\begin{aligned}
 Logit (ESG p_1) &= \ln \left(\frac{p_1}{1 - p_0} \right) = Cons + \beta_{it}SF_{it} + \beta_{it}TA_{it} + \beta_{it}LVRG_{it} + \beta_{it}COVID_{it} + e \\
 & i = 68 \text{ banks} \quad t = 2019, 2020, \text{ and } 2021
 \end{aligned}$$

I. Panel Data Regression

Table II. Result of Classical Assumption Test

Dependent Variable	Normality Test	Heteroscedasticity Test	Multicollinearity Test	Auto-correlation Test	Selection of Estimation Model
NPL	Not Pass	Pass	Pass	Pass	Fixed Effect Model
NIM	Not Pass	Not Pass	Pass	Pass	Fixed Effect Model
CAR	Not Pass	Pass	Pass	Pass	Fixed Effect Model

All the model is not passed the normality test. Because the data used is financial data obtained from the financial statements of each bank, the authors cannot make improvements to the data so they consider this normality test as a research limitation. Other than that on heteroscedasticity test for NIM is not passed, so the robust standard error must be used in carrying out the regression to pass heteroscedasticity.

For NPL regression model, all the independent variables have a significant effect on non-performing loans (NPL) ratio, except variable covid since has P value above alpha (5%), meanwhile the others the resulting P values have values below alpha (5%). For sustainability financing and total assets, they have a negative significant characteristic of non-performing loans, while leverage has a positive significance of non-performing loans ratio. Then H1a for this model is accepted, where sustainability financing to loan ratio has a significant negative effect on non-performing loans ratio. Then the regression model for this model will be as below,

$$NPL = 0.1658 - 0.0942 SF - 0.0094 TA + 0.0069 LVRG + e$$



For NIM regression model, a robust approach has been taken because this model has not passed the heteroscedasticity test. All of the independent variables have a significant effect on the net interest margin (NIM). Where all the resulting P values have values below alpha (5%). For sustainability financing to total ratio and total assets, they have a positive significant effect on the net interest margin, while leverage ratio has a significant negative effect on the net interest margin. Then H1b for this model is accepted, where sustainability financing to total loan ratio has a significant negative effect on the net interest margin. Then the regression model for this model will be as below,

$$NIM = -0.5447 + 0.0457 SF + 0.0054 TA - 0.0035 LVRG + e$$

For CAR regression model, all the independent variables have a significant effect on the capital adequacy ratio (CAR). Where all the resulting P values have values below alpha (5%). For sustainability financing to total loan ratio and total assets, it has a positive significant effect on the capital adequacy ratio, while leverage ratio has a significant negative effect on the capital adequacy ratio. Then H1c for this model is accepted, where sustainability financing to total loan ratio has a significant negative effect on the capital adequacy ratio. Then the regression model for this model will be as below,

$$CAR = -0.0222 + 0.2043 SF + 0.0123 TA - 0.0098 LVRG + e$$

II. Binary Logistic Regression

The second regression model will discuss the relationship between sustainability financing to total loan ratio and the ESG Rating, where the variable for sustainability financing to total loan ratio used will be the same as the first model, while for the ESG rating, it uses a dummy variable which is categorized into 2, "0" for an ESG rating that is not changed and decreasing, meanwhile "1" for upgrading ESG rating. The results of the tests that have been carried out as in the figure above, the Hosmer and Lemeshow values indicate a probability value of 0.1380 where the probability value (P-value) ≥ 0.05 , which means that there is no significant difference between the model and the data or it can be said that the model can be used for predict the observed value. From the results of the logistic regression test above, it can be seen that the $P > z$ value is below the alpha value (5%) only for the sustainability financing to loan ratio variable with a $P > z$ value of 0.000 and Covid period variable with a $P > z$ value of 0.017, while the control variable (total assets and leverage) is above the alpha value (5%) with a P value $> z$ total assets of 0.274 and a P value $> z$ leverage of 0.525. This shows that only the variable sustainability financing has a significant effect on the change in the log of upgrading ESG rating, while other variables do not have a significant effect. That way the binary logistic regression formula will be as below:

$$\text{Logit} (ESG p_1) = \ln \left(\frac{p_1}{1 - p_0} \right) = -3.0374 + 18.4519 SF + 0.8025 COVID + e$$

The coefficients and constant will be utilized in the following calculation of the score. Negative coefficient values imply an inverse link between the independent variables and the dependent variable. If the coefficient is truly negative, there is little chance of a change. From the formula above, it can be deciphered every 1% change in the sustainability financing to loan ratio variable will result in a 0.184519 increase in $\text{logit}(p)$ or $\text{log}(p/1-p)$. If $\text{log}(p/1-p)$ increases by 0.184519, that means that $p/(1-p)$ will increase by exponential $(0.184519) = 1.12$. This is a 12% increase in the odds of upgrading the ESG Rating. Other than that, each occurrence of the covid period will result in a 0.8025 increase in $\text{logit}(p)$ or $\text{log}(p/1-p)$. If $\text{log}(p/1-p)$ increases by 0.8045, that means that $p/(1-p)$ will increase by exponential $(0.8045) = 2.24$. This is a 124% increase in the odds of upgrading the ESG Rating, this explains that when Covid-19 occurred, the role of the banking industry was very vital in forming a sustainable business. Therefore, it can be interpreted that the role of the banking industry when Covid-19 occurred had an effect on increasing the ESG rating.

III. Data Analysis Regression Emerging vs Developed Countries

The author also performs additional data analysis related to data regression analysis for a sample of emerging countries and a sample of developed countries. Based on the data owned by the authors, they are classified based on emerging countries and developed countries, resulting in 20 countries that are part of this sample, 9 countries are classified as developed countries and 11 countries are classified as emerging countries.



Table III. List of Developed and Emerging Countries

Country	Classification	Country	Classification
Australia	Developed	Argentina	Emerging
Canada	Developed	Brazil	Emerging
France	Developed	China	Emerging
Germany	Developed	India	Emerging
Italy	Developed	Indonesia	Emerging
Singapore	Developed	Japan	Emerging
South Korea	Developed	Malaysia	Emerging
United Kingdom	Developed	Mexico	Emerging
United States	Developed	Russia	Emerging
		South Africa	Emerging
		Turkey	Emerging

Based on the results of separate regression tests between samples of emerging and developed countries (please refer to Appendix C for detailed regression results), the sustainability financing to loan ratio and leverage have a significant effect on the non-performing loan (NPL) ratio in developing countries, while in emerging countries only total assets that affect non-performing loans (NPL). Whereas in developed countries there is only covid variables that have a significant effect on net interest margin (NIM), this is in contrast to emerging countries, where in emerging countries all independent variables (sustainability financing to loan ratio, total assets, and leverage) have a significant influence on the net interest margin (NIM). This is also the same result for the effect on the capital adequacy ratio (CAR) in emerging countries, where all the independent variables (sustainability financing to loan ratio, total assets, and leverage) have a significant influence on the capital adequacy ratio (CAR). But not for developed countries, where only total assets and leverage have a significant effect on the capital adequacy ratio (CAR). Regarding the upgrading ESG rating, it only occurs in emerging countries which have a significant influence on the sustainability financing to loan ratio (SF) and the upgrading ESG Rating, whereas in developed countries only covid has a significant effect on increasing the ESG Rating, this is because developed countries have better economic capacity to deal with covid-19, and their banking conditions will be able to have a positive impact on the environment better than developing countries. This indicates that sustainability financing has a greater impact on the financial performance of banks in emerging countries, while in developed countries it has an impact on the quality of loans extended. With more stable economic conditions, it is clear that the sensitivity of sustainability financing to financial performance is not that significant, on the contrary, if the country's economic conditions are not very stable, this is what emerging countries are facing in the current economic conditions. Therefore, the distribution of sustainability financing will be more sensitive and significant in emerging countries.

B. Business Solution

With the existence of sustainability financing, banks take a role in disbursement of loans with several criteria that prioritize ESG points in lending. But it should also be noted whether this sustainability financing has a correlation with financial performance in the banking industry. In addition, it is also necessary to pay attention to the focus of investors in the midst of current economic conditions, whether the steps taken by the banking industry in disbursement of sustainability financing have an impact or correlation on investors, considering that currently, ESG performance is one of the main focuses of investors. Based on analysis on previous section, there is a significant relationship between sustainability financing and financial performance, where the financial performance variables used are NPL, NIM, and CAR. For NIM and CAR the resulting significant relation is positive, while the NPL is negative. This means that the higher the disbursement of sustainability financing will increase the ability of banks to manage risk (this can be seen by decreasing the NPL ratio and increasing CAR) and increasing profitability (this can be seen by increasing NIM if sustainability increases).

Other than that, this research has shown a result that sustainability financing will increase the likelihood of increasing the ESG rating, this is by using binary logistic regression testing where the results are positively significant. The results of the analysis of this study can be seen by the disbursement of sustainability financing, besides being able to have a real impact on ESG implementation, it can also have a positive impact on the company's financial performance. Increasing profitability and improving the quality of credit provided can be a good achievement for the banking industry. In addition, the disbursement of sustainability financing can also provide positive value to the banking industry in the eyes of investors at this time, this is very necessary in



obtaining funding which can later be channeled. Currently, many organizations are engaged in mutual funds, especially with the ESG concept, which collects funds to be distributed to entities that have good ESG ratings as well.

CONCLUSION

There is a significant relationship between sustainability financing and financial performance, where the financial performance variables used are NPL, NIM, and CAR. For NIM and CAR the resulting significant relation is positive, while the NPL is negative. This means that the higher the disbursement of sustainability financing will increase the ability of banks to manage risk (this can be seen by decreasing the NPL ratio and increasing CAR) and increasing profitability (this can be seen by increasing NIM if sustainability increases). The risks faced by banks will be lower when it comes to sustainability financing, this is because if the debtor wants to get sustainability financing, then the debtor must have several risk management certifications related to sustainability business including waste management to the welfare of its employees. This requirement is more stringent when compared to the requirements for loan facilities in general. In addition, banks obtain funding from various financial institutions with the theme of green funding, one example is by issuing Green Bonds. Where green bonds or green funding have a lower interest rate than interest rates for bonds or funding in general, this can lower the cost of funds at these banks and generate lower interest expenses as well. This will make the profitability of the bank will be better.

Other than that the results of sustainability financing will increase the likelihood of increasing the ESG rating, this is by using binary logistic regression testing where the results are positively significant. This was confirmed by interviews conducted by the author with several correspondents who have strategic positions in banks. Currently, many investors are interested in investing in companies that comply with regulations related to sustainability business. In addition, in the current situation, there are many organizations or mutual funds that are willing to provide funding to companies that comply with ESG, including those in the banking industry.

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