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INDONESIA'S GREEN, RED ECONOMIC SECTORS AND BANKING CREDIT RATES

Heru Setyo Handogo[1], Irene Rini Demi Pangestuti[2]
Diponegoro University, Indonesia
Email: herush@gmail.com[1], irenerinidp1960@gmail.com[2]

Abstract

This research is to analyze the influence of economic sectors on loan interest rates given, by linking it to the issue of sustainable finance. This research tries to see whether there are differences in credit interest rates given by banks in Indonesia to economic sectors that support the environment (green) and economic sectors that support the environment. endangers the environment (red). The research uses samples from bank data in Indonesia for the period 2016 to 2021. Credit data is mapped to green and red economic sectors with criteria according to the Indonesian Green Taxonomy. Data is processed by panel regression using the fixed effect model. The results of the study show that there is a negative and significant relationship between green credit and loan interest rates. On red credit, although it has a positive correlation, it is not statistically significant.

Keywords: green economy, banking, credits, interest rate, green credit, sustainable finance, red credit.

INTRODUCTION

Indonesia as Nationally Determined Contribution (NDC) in 2021 has a target of reducing carbon emissions by up to 29% unconditionally and voluntarily by 2030 through the Business As Usual scenario. Currently there is increasing concern from stakeholders regarding the importance of anticipating risks from climate change. To achieve this, support from all sectors, including the financial sector, especially banks, is needed.

Policies to deal with climate change through Banks can be carried out through the following transmission channels: (1) provision of factors that support the green economy sector (Green Supporting Factors) such as reducing capital requirements or different treatment of credit in the green sector (2) Imposition of Carbon Tax for non-green sectors and (3) Bank sentiment on environmental concern (Dunz et al., 2020).

The Financial Services Authority (OJK) as the financial services regulator supports efforts to anticipate efforts to reduce carbon and risks arising from the environment by issuing a Sustainable Finance Roadmap and is currently entering phase II (2021 – 2025) as an initial effort to achieve a low carbon economy that pays attention to aspects environmental (Envrointmental), social and governance (Governance) or known by the abbreviation ESG (OJK, 2021).

OJK has also previously required banks to issue sustainability reports compiled based on the Sustainable Development Goals criteria from the United Nations. This support was further strengthened by the issuance of the Indonesian Green Taxonomy as the initial standard for classifying economic activities that support sustainable finance and mitigation of environmental change, so that business sectors can be classified as green, yellow and red.(Authority, 2022). The sectors covered in Indonesia's green taxonomy are broader than the criteria in the sustainability report considering that they have been adjusted to the latest developments and the characteristics of Indonesia.

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Based on the Indonesian green taxonomy, the criteria for a green economic sector are not significantly endangering the environment, having a positive impact on the environment and in accordance with the environmental objectives of the taxonomy, yellow is not significantly endangering the environment, and red is classified as an activity that endangers the environment. In the green taxonomy, OJK has classified 919 economic sectors to be used as a reference by financial service institutions including banks, including in lending activities to debtors.

Banks are currently required to strengthen ESG implementation and pay attention to risks arising from environmental impacts. Various studies that have developed regarding the relationship between the environment and banks and companies in general show this. Research shows that climate and environmental changes have a negative impact on the condition of banks and individual companies (Lamperti et al., 2021). The application of ESG is also generally considered to provide benefits to the performance of a company including the Bank(Alareeni & Hamdan, 2020). Application of ESG at a certain level has a positive impact on capital, cash flow and NIM, but excessive application does not have a balanced impact on the value of the Bank (Azmi, 2021).

Banks can take various steps to support ESG implementation and mitigate environmental impacts. One way is to provide different treatment between debtors who have businesses in the economic sector that supports the environment (green) and debtors engaged in economic sectors that are harmful to the environment (red).

Several studies have shown differences in interest rates, credit spreads or additional risk premiums on loans. Interest rates can be used as a driving tool for selection of credit for green sector businesses by providing different interest rates so that based on selection through these interest rates can support sustainable growth (Lamperti et al., 2021).

Loans that support sustainable finance, including syndicated loans, earn interest rates which are generally lower than ordinary loans (Pohl et al., 2023) (Degryse et al., 2023). Apart from that, companies operating in sectors that support environmental conservation innovation can also get credit in large amounts and more easily (Xing et al., 2021). A larger and cheaper amount of credit can of course be influenced by the credit interest rate provided by the bank. Providing green credit can also reduce bank risk in general, especially large banks (An et al., 2023)

Meanwhile, companies that have contributed to high carbon emissions will get less credit and affect the credit rating and will affect the interest rates that will be obtained from banks in the future.(Ding et al., 2023). Companies that have a bad record and have been sanctioned for violations of environmental issues get higher interest rates from banks (Gu et al., 2023).

Research on the relationship between credit interest rates and green or red credit is generally carried out in developed countries such as the US, EU and China. For banking conditions in Indonesia, it is relatively limited and generally discusses the relationship between green credit and bank profitability and refers to data in the sustainability report (Andaiyani et al., 2023) (Nugrahaeni & Muharam, 2023). Research on the influence of the

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economic sector on interest rates by utilizing the Indonesian green taxonomy has not yet been found.

This research attempts to fill this gap by contributing to existing research through 1) Research on conditions in Indonesia regarding the relationship between credit interest rates and the debtor's economic sector in relation to the impact on the environment, considering that research in Indonesia regarding this matter is still limited 2) Sector division The economy is carried out based on Indonesia's green taxonomy so that the impact of economic sectors that support the environment (green economic sector) and economic sectors that endanger the environment (red economic sector) can be known.

LITERATURE REVIEW

Banks are increasingly being asked by stakeholders to support sustainable financial activities (sustainability finance). Research shows that increasing stakeholder awareness of environmental changes will have consequences for the company if the company does not follow suit, starting from reduced competitiveness and costs that must be borne for operational changes to adapt to environmentally friendly activities. (Kabir et al., 2021). This is in line with stakeholder theory, namely that the interests of stakeholders are one of the determining factors in how the company moves because basically the company was formed to realize the interests of stakeholder values. (Freeman et al., 2010). The implementation of ESG in general will strengthen Enterprise Risk Management in companies in certain industries so that it will have a positive effect on company performance (Chairani & Siregar, 2021).

Banks in order to meet stakeholder expectations to support sustainable finance and ESG implementation, can be done by providing different credit interest rates to debtor businesses that support environmental activities compared to debtor businesses that harm the environment.

In research conducted by (Giraudet et al., 2021), measures the difference in credit interest rates for green projects that support the environment (greener projects) by French banks in the period 2015 and 2016. This research shows that there are differences in interest rates for green projects compared to conventional projects.

In previous research, it was found that there is an additional risk premium for carbon emissions produced by listed companies in Europe (Kleimeier & Viehs, 2021). The research results show that the higher the carbon emissions produced by a company, the higher the credit spread it applies. This is in line with research in China in the 2009 – 2019 period, which shows that the cost of credit provided by banks to companies has a positive correlation with the level of carbon produced. (Zhu & Zhao, 2022).

Based on previous theory and research, for Indonesian banking, the more credit to the green economy sector, the lower the loan interest rates provided by the Bank. Meanwhile, the higher the credit to the red economy sector, the higher the loan interest rate provided by the Bank.

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Banking Risk

Risk in banking according to POJK No.18/POJK.03/2016 dated 16 March 2016 concerning the Implementation of Risk Management in Commercial Banks, is the potential for loss due to the occurrence of certain events. Meanwhile, risk management is a series of methods for identifying, measuring, monitoring and controlling risks arising from the Bank's business activities.

In general, credit risk is one of the most important risks considering that based on Indonesian Banking Statistics as of December 2021, total Indonesian banking credit reached IDR 5,768 trillion or equivalent to 57% of total banking assets which reached IDR 10,112 trillion. This shows that credit has an important significance for the sustainability of the Bank, especially if there is a significant increase in non-performing loans at a bank.

Credit Risk

Some definitions of credit risk are as follows:

1. POJK Credit Risk Management for Commercial Banks states that credit risk is the risk resulting from the failure of other parties to fulfill their obligations to the Bank.
2. Saunders and Cornett (2018) Explaining credit risk is the inappropriateness of payments or payments that are not in full on cash flows compared to agreements on loans or securities owned by financial service institutions.
3. Credit risk is the risk of loss from the failure of the obligor to fulfill/settle his obligations (Bessis 2015).

Environmental and Climate Change Risks

Climate change is increasing awareness of the importance of mitigating environmental and climate-related risks, including in the financial sector. Climate-related financial risks are risks that arise from changes in the environment/climate or in the context of mitigating these environmental changes. (BIS 2021). The BIS explains that the risk of climate/environmental change is transmitted through the following influences:

1. Physical risk, namely the risk arising from climate change that directly affects the economy. Examples are disasters due to climate change, sea level rise etc.
2. Transition risk is the risk that arises from efforts to transition to more sustainable economic activities such as policy changes, technological innovation, consumer preferences, investor preferences.

In the Sustainable Finance Roadmap II published by the OJK, apart from the transmission of the risks mentioned above, there is also the risk of liability for fulfilling environmental-related provisions, such as penalties for demands from stakeholders and enforcement of environmental-related regulations by legal authorities.

Interest Rate Theory

The Bank's interest rate given to debtors takes into account the level of profit taken by the Bank, base lending rate, minimum reserve requirements, administration costs, and risk

premium from the Debtor. (Casu, Girardone, and Molyneux 2008). Risk premium describes the risk level of the debtor, so that the riskier the risk, the higher the risk premium (Saunders and Cornett 2018).

Indonesian Green Taxonomy

The implementation of environmentally friendly business activities is increasingly being communicated, but the criteria used to determine whether a business is included in business sector activities that support the environment are often unclear. On the other hand, companies often promote that their company is environmentally friendly, but in reality it is only for the company's image, which recently is often referred to as greenwashing activities.

This encourages the urgency of preparing green taksanamoi. In the Green Taxonomy of Indonesia issued by the OJK, it is stated that the urgency of issuance is for the need for standardization regarding the definition of green criteria. In addition, there is a need to carry out regular monitoring of lending/financing to the green sector.

OJK stated that green taxonomy is a classification of economic activities that support efforts to protect and manage the environment as well as implement mitigation and adaptation to climate change. (Authority 2022). Apart from Indonesia, there are countries or regional regions that have also developed taxonomies for environmental sector classification, such as China with the Green Bond Endorsed Project Catalouge, the European Union with The Taxanomy Regulation, and ASEAN through the ASEAN Taxanomy for Sustainable Finance version 1.

The strategic objective of Indonesia's green taxonomy is basically to develop clear definitions and criteria related to economic sectors that support climate change risk mitigation. This is ultimately expected to encourage innovation in the economic sector which has a positive impact on the environment. The green taxonomy is also expected to be a driving force for funding/financing of sectors that support the environment by FSI. On the other hand, green taxonomy is also a tool for monitoring growth developments in economic sectors that support the environment.

The Indonesian Green Taxonomy was prepared by mapping the standard classification of Indonesian Business Fields which has been compiled by the Indonesian Central Bureau of Statistics into green, yellow and red economic sectors with the following definitions:

a. Green is a business activity that is in favor of protecting and managing the environment by protecting, improving and enhancing the quality of the environment. In addition, mitigation and adaptation to climate change are carried out. This economic sector is also required to comply with governance standards and various rules set by the government. Debtors in this economic sector must also apply best practices according to national or international standards.
b. Yellow - Business activities that do not fully meet green criteria related to environmental management and protection so they still need to be equipped with environmental management best practices and fulfillment of other measurement aspects.
c. Red - Activities in the business sector cannot meet the criteria/thresholds as well as the other two criteria.

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Linkages Between Research Variables

Effect of Green Economy Sector Credit Amount on loan interest rates

The application of ESG in general will strengthen Enterprise Risk Management in companies in certain industries so that it will have a positive effect on company performance(Chairani and Siregar 2021). In the banking sector, application of ESG at a certain level has a positive impact on capital, cash flow and NIM, but excessive application does not have a balanced impact on the value of the Bank (diminishing return to scale).(Azmi 2021). Improved performance will signal that companies that support the green sector have better performance and lower risk.

Banks in order to meet stakeholder expectations to support sustainable finance and ESG implementation, can be done by providing different credit interest rates to debtor businesses that support environmental activities compared to debtor businesses that harm the environment. Based on previous theory and research, for Indonesian banking, the more credit to the green economy sector, the lower the loan interest rates provided by the Bank.

H1: The amount of credit in the Green Economy Sector has a negative effect on lending rates.

The influence of the red economic sector on credit interest rates

The red economy sector is, as previously explained, business activities that are not in favor of protecting and managing the environment. The red economy sector includes the mining sector such as coal mining, oil processing, nickel mining. Other sectors include fishing for biota, steel industry, etc.

To meet the expectations of stakeholders, the Bank will try to reduce lending to the red economy sector, one way is by granting higher interest rates to this sector so that the higher the credit to the red economy sector, the higher the loan interest rates provided by the Bank. Based on stakeholder theory and references to previous research, the hypothesis is formulated as follows:

H2: The number of credits in the Red Economy Sector has a positive effect on credit interest rates

Research Thinking Framework

The research framework carried out is as follows:

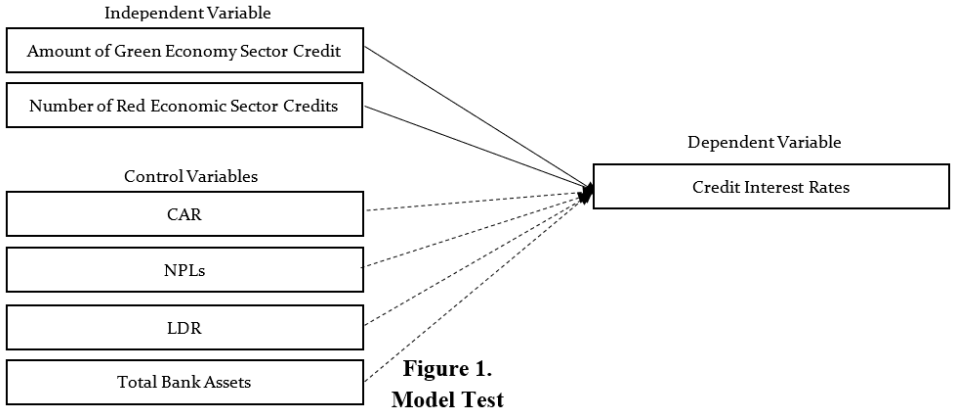

Figure 1.
Model Test

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METHODS

Hypothesis testing uses regression analysis for panel data that is influenced by the effect of individual banks.

Population and Sample

The data used in this research is conventional bank data in Indonesia for 2016 - 2021 with data sources from the OJK. Credit data from each bank is grouped by economic sector and then mapped into green or red credit categories in accordance with the criteria in the Indonesian green taxonomy issued by the OJK. This research excludes banks that carry out corporate actions such as mergers and/or acquisitions which cause changes in the bank's strategy or incomplete data to ensure balanced panel data.

The population of conventional banks in Indonesia during the 2016 – 2021 period is 103 banks. There were 15 banks that carried out mergers and acquisitions in that period, and there were 10 banks that did not have credit to the green/red economy sector, so the total sample used was 78 banks with a total of 1,872 data.

Operational definition

An explanation of each research variable used in this study is as follows.

Table 1 Variable Definitions

FLOWER	The average interest rate on loans provided by the Bank
KRD_RED	Amount of credit to the green economy sector by the Bank
KRD_GREEN	Amount of credit to red economic sectors by the Bank
CAR	Capital Adequacy Ratio, Comparison ratio between total capital and risk-weighted assets
NPLs	Non Performing Loans. Credit that has a quality of 3 – 5. The NPL used is gross NPL
LDR	Loan to Deposit Ratio. Comparison ratio between total credit and total Third Party Funds
TA	Total Bank Assets

Use of Control Variables

There are several factors from banks outside macroeconomic factors that will have an influence on credit interest rates as per research from (Golbabaei & Botshekan, 2022) as follows:

1. Capital
2. Credit Quality
3. Liquidity conditions
4. Total Assets

To ascertain the effect of credit to the green and red economic sectors on bank lending rates, the 4 (four) factors above will be used as control variables in this research. The factors above are translated in this study as the ratio of CAR, NPL, LDR and total assets of the bank.

There is an influence of CAR on credit interest rates (Golbabaei & Botshekan, 2022). Reducing the required capital requirements will reduce credit costs due to the need for less capital to mitigate risk (Bichsel et al., 2022).

Poor credit quality as reflected in the NPL and CKPN ratios shows that the Bank has a high credit risk and in the context of risk aversion, the Bank will impose a risk premium on debtors (Were & Wambua, 2014).

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Liquidity has an influence on lending rates considering that Banks with high liquidity will make efforts to reduce TPF, among others by reducing TPF interest rates thereby providing an opportunity for Banks to reduce Lending rates (Bichsel et al., 2022).

Large banks generally have resilience in dealing with increases in policy interest rates so they are able to provide low interest rates (Naqvi & Pungaliya, 2023).

The equation of the research model

The model in this research is as follows:

Model 1

$$Bunga_{it} = \alpha_i + \beta_1 KRD_{HIJAU}{}_{it} + \beta_2 KRD_{MERAH}{}_{it} + \varepsilon$$

Model 2 with control variables

$$Bunga_{it} = \alpha_{it} + \beta_1 KRD_{merah}{}_{it} + \beta_2 KRD_{hijau}{}_{it} + \beta_3 CAR_{it} + \beta_4 NPL_{it} + \beta_5 LDR_{it} + \beta_6 TA_{it} + \varepsilon$$

The variable is the loan interest rate provided by bank i in period t. While and are respectively credit to the red economy sector and the green economy sector by bank i in period t. The control variables of bank i for period t are reflected by , ,, and respectively for CAR, NPL, LDR and total assets - with complete definitions in table 1. $Bunga_{it} KRD_{merah}{}_{it}\ \beta_2 KRD_{hijau}{}_{it} CAR_{it} NPL_{it}\ LDR_{it}\ TA_{it}$

Data analysis technique

Data testing is carried out through panel data regression with the Fixed Effect Model (FEM) to anticipate the individual impact of each bank. The data used is large in addition to using a robust standard error to anticipate the effects of autocorrelation and heterodexity.

RESULTS AND DISCUSSION

Overview of Research Objects and Descriptive Data

The data used in this research is data from conventional banks in Indonesia that have credit to the green and/or red economic sectors in accordance with OJK criteria throughout 2016 to 2021. Apart from that, it also excludes banks that carry out corporate actions such as mergers and/or acquisitions which cause data incomplete because it merges with other banks. Data that meets the criteria are as follows:

Table 2. Conventional bank data criteriaregistered with OJK in 2016-2021

Selection Criteria	Banking
Total Conventional Banks in 2016	103
Banks conducting mergers/acquisitions (2016 – 2021)	15
Banks that do not have credit to green and/or red economic sectors	10
Total Sample banks	78

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The data used is quarterly data so that the amount of data used is 1,872 samples. Then for sStatistical descriptions of research data consisting of minimum, maximum, average and standard deviation values are explained below.

Table 3. Descriptive Statistics

	Flower	KDR_ Green	KDR_ Red	CAR	NPLs	LDR	TA
Mean	0,1113	42.697.311	2.297.768	0,2502	0,0310	0,8977	93.726.819
Median	0,1124	7.951.796	206.735	0,2161	0,0288	0,8566	23.444.229
Standard Deviation	0,0296	102.990.345	6.907.894	0,1363	0,0212	0,2760	209.715.920
Minimum	0,0270	78.029	0,32	0,1019	0,0000	0,3687	671.227
Maximum	0,2518	704.754.087	85.199.373	1,2345	0,1581	2,8967	1.442.736.589

The credit interest rate given during the research period averaged 11.13% with a range between 2.7% to 25.18%. The highest and lowest interest rates are provided by private banks according to the business characteristics of the two banks. Indonesian banking CAR is quite strong with an average of 25.02%, far above the minimum requirements required by the regulator. Likewise, NPL and LDR are quite well maintained with an average of 3.1% and 89.77% respectively.

Table 4. Test Results

	Dependent variable: INTEREST	
	(1)	(2)
	Model 1	Model 2
	b/n	b/n
KRD_GREEN	-0.029***	-0.025***
	(7.41)	(-4.18)
KRD_RED	0.001	0.001
	(0.59)	(0.38)
TA		-0.003
		(-0.44)
CAR		-0.045***
		(-3.145)
constant	0.564***	0.582***
	(7,42)	(5,77)
Fixed Securities Bank	Yes	Yes
Adj. R2	0.2701	0.3284
N	1872	1872

The results of the study using the FEM panel data regression are as in table 4, indicating a significant negative correlation between the number of green loans and the average interest rate provided by the Bank.

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In model 1, based on the adjusted R2 value, it shows that the KRD_MERAH and KRD_HIJAU variables together can explain 27.01% of the variation in the movement of the INTEREST variable. Based on the regression results, increases or decreases in green credit significantly influence the interest rates given by banks with a negative correlation. Every 2.9% increase in credit to the green economy sector will reduce credit interest rates by 1%. However, on the other hand, the red economic sector has a positive correlation with interest rates but is not statistically significant.

In testing the control variables, it is known that the variables that significantly influence credit interest rates are Total Assets and CAR, while NPL and LDR do not have a significant effect. NPL and LDR do not have a significant effect because the average NPL and LDR are maintained at a fairly optimal point in the research period with NPL less than 3% and LDR ranging from 80% to 90% so the Bank does not take into account significant changes in NPL and LDR in determining loan interest rates.

Based on this, in model 2 the independent variables used are the significant independent and control variables, namely KRD_GREEN, KRD_MERAH, TA and CAR. Furthermore, in model 2 in the form of testing with control variables to get consistent results.

The KRD_HIJAU variable has a significant effect with a negative correlation to the INTEREST variable. Meanwhile, the KRD_MERAH variable does not significantly influence the INTEREST variable but has a positive correlation.

The control variable CAR has a significant influence with a negative correlation on INTEREST. Additional capital at the Bank will generally provide flexibility for the Bank to reduce interest rates, because existing capital can be used to replace funds from third parties.

The total amount of bank assets does not have a significant effect in model 2. There is a possibility that the TA variable has a high correlation with credit even though it is still at a tolerable stage. This is understandable because banking assets in Indonesia are generally dominated by credit.

The use of control variables shows an improvement in the adjusted R2 value from 27.01% to 32.84%, this shows that the use of control variables can better explain the influence of the dependent variable on the independent variable.

This research confirms various previous studies which state the link between green credit and credit interest rates (Giraudet et al., 2021); (Pohl et al., 2023) (Degryse et al., 2023). This research shows that there is a tendency for banks in Indonesia to reduce credit interest rates due to the increase in the number of green loans at these banks. So far, Indonesian banking has assessed the green economy sector as an economic sector that can be properly mitigated in terms of risk, thereby providing credit to the sector. This is supported by the increasing trend of providing credit to the green sector every year, which in 2016 amounted to IDR 2,916 trillion to IDR 3,845 trillion in 2021.

The research results show that the red economy sector does not influence credit interest rates, possibly because the amount of red economy sector credit is small compared to total Indonesian banking credit, namely less than 5%. The economic sectors defined as red economic sectors in Indonesia's green taxonomy are only a few and generally come from the mining sector such as coal, nickel, tin and petroleum which are Indonesia's mainstay

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commodities, so banks still provide support for the running of Indonesia's economic activities.

CONCLUSION

Banks need to pay attention to the implementation of sustainable finance to meet the expectations of stakeholders. Support can be provided through Bank policies in lending including interest rates. This study shows that the amount of credit extended by banks in Indonesia to the green economy sector can affect the interest rates on loans. This shows that an increase in green credit can lower credit interest rates. However, the increase or decrease in credit in the red economy sector does not affect the level of interest rates provided by the Bank.

The results of this study indicate that the Bank has started to pay attention to the interests of stakeholders related to the implementation of sustainable finance which is increasing from time to time, especially related to economic sectors that support the environment. However, the Bank is also still considering the interests of other stakeholders related to mining commodities which are the mainstay of the Indonesian economy.

There are limitations in this study such as not all banking data can be used because there are banks that carry out mergers and acquisitions and not all banks extend credit to the green economy sector and/or the red economy sector. On the other hand, there are still economic sectors that have not been mapped in the green taxonomy issued by OJK, so that more and more sectors are mapped by OJK in the future, different research results can be produced. In addition, in this study the focus is on the economic sector owned by the debtor, not taking into account the possibility of individual debtors who do not meet or violate environmental preservation requirements so that they cannot be assessed as debtors who support environmental preservation.

Future research can be carried out by considering the Bank's external and internal factors that can influence environmental risk in more depth to determine the factors that can influence credit interest rates. Apart from that, research can be carried out at the Southeast Asian and international levels on the influence of the economic sector in relation to environmental issues on credit interest rates. This takes into account the existence of a green taxonomy also compiled by the Asian South East Association of Nations (ASEAN) as well as fairly complete ASEAN banking data.

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Heru Setyo Handogo[1], Irene Rini Demi Pangestuti[2]
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