

The Relationship Between Green Finance and Financial Distress: Empirical Research on Banking in Indonesia

Edwin Basmar^{1,5*}, Carl M. Campbell², Siti Puryandani³, Erlin Basmar⁴

¹National Research and Innovation Agency (BRIN) Jakarta, Indonesia

²Faculty of Economics, Northern Illinois University, USA.

³STIE Bank BPD Jateng, Semarang, Indonesia.

⁴STIE Ottow & Geissler, Serui, Papua, Indonesia.

⁵STIE AMKOP Makassar, Indonesia.

*Email: e2nbm@yahoo.com

*correspondent author

ABSTRACT

An increase in green finance will only occur because of the banking intermediary function which can control financial distress. This research aims to measure banking financial distress in order to improve green finance, especially when macroeconomic pressure occurs. This research found that there was a negative period due to financial distress, resulting in a strong decline in green finance. These findings use the Ed Waves Index Development Model based on Bank Indonesia's quarterly financial reports from 2019 to 2023. The findings are categorized into 2 parts, the first part consists of periods 1, 3 and 5 showing a negative relationship with financial distress pressure with minimal response to green finance, while the second part consisting of periods 2 and 4 shows a positive relationship indicating that financial distress pressures respond optimally to green finance. This research contributes to banking financial activities in managing intermediary fluctuations in order to improve green finance in Indonesia.

Keywords: Green, Distress, Banking, Fluctuation, Financial Contraction

ABSTRAK

Peningkatan *green finance* hanya terjadi karena adanya kekuatan fungsi *intermediary* perbankan yang dapat mengendalikan *financial distress*. Penelitian ini bertujuan untuk mengukur *financial distress* perbankan guna meningkatkan *green finance*, khususnya ketika terjadi tekanan makroekonomi. Penelitian ini menemukan bahwa terdapat periode negatif akibat *financial distress*, sehingga terjadi degradasi kuat terhadap penurunan *green finance*. Temuan ini menggunakan pengembangan Model Ed Waves Index berdasarkan laporan keuangan Bank Indonesia secara kuartal dari tahun 2019 hingga 2023. Temuan dikategorikan dalam 2 bagian, bagian pertama terdiri dari periode 1, 3 dan 5 menunjukkan hubungan negatif dengan tekanan *financial distress* direspon minim terhadap *green finance*, sementara bagian kedua terdiri dari periode 2 dan 4 menunjukkan hubungan positif yang mengindikasikan bahwa tekanan *financial distress* direspon maksimal terhadap *green finance*. Penelitian ini memberikan kontribusi bagi aktivitas keuangan perbankan dalam mengatur fluktuasi *intermediary* agar dapat meningkatkan *green finance* di Indonesia.

Kata kunci: Green, Distress, Banking, Fluktuasi, Kontraksi Keuangan

Introduction

There has been a decline in the banking sector's ability to carry out intermediary functions (Sun et al., 2023). This condition resulted in a financial contraction characterized by a slowing pace of financial activity (Zhou et al., 2020). This situation is carried out to prevent the maximum risk of loss (Mikael Backman, 2011). In line with economic theory, financial distress is an early symptom of increasing financial risk which ends in bankruptcy (Basmar, III, et al., 2021). On the other hand, this situation is faced with sluggish economic activity which is detrimental to financial stability and economic growth (Dikau et al., 2020). The contradiction

in financial flows is contrary to the Paris Agreement memorandum which stipulates an increase in green finance which is mandatory for every country, in line with the G-20 Conference which instructed to preserve the environment to maintain global economic sustainability (Ivanova et al., 2021).

Anxiety in developed and developing countries regarding the decline in environmental sustainability is integrated into global financial activities, causing shocks and stimulating an economic crisis with serious risks. The economic crisis effects in Europe, the United States and the Covid-19 pandemic (1997, 2008 and 2019) have had an impact on the economic activities of every country, including Indonesia, which has high trade interactions. The pressure flow that arose resulted in a decline in financial profitability in all sectors, including banking, by increasing Non Performing Loans from Rp. 61 trillion to Rp. 68 Trillion (2005 to 2006). The Non Performing Loan phenomenon is in line with the Covid-19 Pandemic crisis effects which has become a global problem, through high contractions in international financial markets, resulting in Non Performing Loans again experiencing pressure from Rp. 55.4 trillion to Rp. 60.6 Trillion (2008 - 2009) (Kamran et al., 2020).

Later, Bank Indonesia saved the country's financial circulation through banking activities by liquidating several banks that were experiencing financial distress due to high levels of Non Performing Loans through the inconsistency effects in banking intermediary functions, however, overall the damage effect is not only due to Non Performing Loans but also due to multidimensional pressures that occur simultaneously and pressure banking profitability even lower. In line with Fareed et al. (2022) found that macroeconomic elements also play a role in controlling state financial flows. Therefore, financial distress due to contraction of financial fluctuations can influence the financial circulation movement to be negative towards green finance (Basmar, Campbell III, et al., 2022), indicating that banking activities have high sensitivity to external and internal factors that result in financial distress.

Theoretical findings explain the indirect relationship between the financial sensitivity effects on financial stability and economic growth through the banking intermediary function (Baharudin & Arifin, 2023). The intermediary function must continue to be carried out to maintain financial flows in the financial market to the industrial sector in order to increase overall financial activity. The increasing profits process is the main element in maximizing income, but this condition cannot run consistently because of pressures that influence financial activities and stimulate financial distress.

The relationship concept between the banking sector and other industrial sectors is regulated in Bank Indonesia's policy to channel credit to the industrial sector with the aim of increasing green finance through environmental conservation policies. Starting from the synergy and banking sector unpreparedness in anticipating changes in economic pressures in the financial cycle resulting in the financial distress risk, these damage phenomena can cause financial turbulence to experience strong contractions, in line with research conducted by Basmar, Takhim, Basmar, et al. (2023) found that the banks inability to carry out their intermediary function will result in a decline in financial performance with declining income causing the banking soundness level to decline.

The banking sector role is to be a catalyst in moving financial activities based on the economy pace. This engagement has an important role in identifying financial pressures that have a negative effect on achieving optimal green finance, therefore, financial stability and economic growth will also indirectly provide a positive response. The linkage reaction between the maintaining financial balance process and achieving green finance is detected through credit distribution as a means of driving industrial sector activities based on the environmental conservation concept. It is important in the relationship between the two sectors to maintain performance activities to avoid financial distress which results in a prolonged financial crisis.

The risk of a financial crisis in the long term causes green finance to experience acute pressure resulting in damaging effects on overall financial flows, green finance is concern throughout the world, green finance is a form of financial investment aimed at sustainable development sectors and initiatives, environmental products and policies which encourages sustainable economic development. In line with this definition, Pricewaterhouse Coopers Consultants specifically explains that green finance is financial products and services that take environmental factors into consideration in making credit decisions, stimulate the creation of an investment environment and encourage environmentally friendly technology for the industrial and business sectors. Another literature review explains that green finance in Indonesia is comprehensive support from the financial services industry for sustainable growth resulting from harmony between economic, social and environmental interests.

Green finance occurs due to high emissions of carbon monoxide gas and pollution from the industrial sector which results in greenhouse gas effects (Wang & Zhi, 2016), and policies are needed that function as part of the process of accelerating environmental recovery. Basmar, S, et al. (2022) explains the relationship between banks by including environmental factors in their loan portfolios, where green finance is the procurement and use of funds for activities to protect the environment and provide benefits for lenders, investment in environmental goods and services in activities that reduce environmental damage and climate, green finance produces economic benefits that promote a sustainable environment (Turner, 2014).

On the other hand, changes in financial distress occurred due to the development effects of globalization which resulted in a financial crisis which had an impact on decreasing the financial activities performance throughout the world. Globally, financial distress occurs in several large countries in the world such as the United States, Europe, Asia and other countries. Financial distress conditions occur due to an inability to flow finances, accompanied by an inability to allocate funds effectively and sustainably, resulting in financial circulation becoming increasingly hampered because the financial sensitivity level to acute financial recessions results in high costs (Chen et al., 2021 ; Yanarella et al., 2009 ; Ngo et al., 2021).

When financial contraction in the economy occurs, the industrial sector experiences a decline in profitability, therefore anticipation is needed in using finance process in the long term for not liquidated, which results in financial stability and economic growth not being achieved (Vercelli, 2019 ; Rapi et al., 2021). In line with these conditions, Basmar, Salim, & Rahman (2023)) emphasized that financial distress or a decline in financial conditions occurs due to internal and external factors, both partial and simultaneous, which have an impact on decreasing financial profitability in the long term. This statement is reinforced by Mohd & Kaushal (2018) who explain that financial distress starts from the financial declaration of the banking sector because the responsibilities carried out are increasingly greater. This condition is directly proportional to the risk that must be accepted due to financial failure and economic failure. Basmar, Campbell III, et al., (2021) show that the country's economic condition is experiencing an economic crisis and has an impact on low financial quality, this condition is identified as a symptom of financial distress.

Another literature review explains that financial distress is caused by financial constraints (Edwin Basmar & Erlin Basmar, 2021). This financial constraint is explained by the Neoclassical Model which states that financial distress occurs due to ineffective allocation of resources, especially in carrying out financial activities, while the Financial Model explains that there are conditions where the asset activity process is stated to be correct but the financial structure experiences liquidity constraints resulting in the banking sector experiencing a liquidity drought both in the long and short term. Meanwhile, the Corporate Governance Model shows that there is a lack of synchronization between the financial structure and inappropriate financial handling, therefore being out of the market is a consequence of inefficient financial management which does not find a way out of the problems that occur.

It was further explained that financial distress occurred due to the financial crisis caused by the Covid-19 pandemic, resulting in tightening and limiting space for daily activities resulting in a slowdown in financial performance. The effects of this policy result in financial distress and have an impact on global economic activity slowing down and experiencing a recession, therefore it needs to be anticipated through predictions as an important step for banks not to restructure or reorganize. The financial distress cause was found to be a decline in financial performance, failure to settle debts, liquidity drought and other effects that involve banks having to be liquidated permanently.

In line with these conditions, several economic sectors also experienced delays and resulted in green finance in Indonesia experiencing a significant decline (Zioło et al., 2021). This condition is in line with the decline in banking ability to carry out intermediary functions (Burian, 2006). This imbalance triggers financial distress which results in financial stability and economic growth also experiencing a strong contraction (Fathihani et al., 2021). This negative reaction also resulted in a financial crisis through financial performance activities by measuring banking Non Performing Loans.

Therefore, this research provides clarity in following up the banking financial movements effects in carrying out intermediary functions, through a financial flow control model to prevent the financial distress effects from having a negative effect on the industrial sector which focuses on increasing environmental sustainability for the increasing financial stability purpose and economic growth both nationally and internationally can be achieved.

Materials and Methods

Research Design

The state of the art in this research refers to classical theory regarding financial balance in the economy (Donaldson, 2005 ; Spinaci, 2021 ; Ficci & Unep, 2016). Based on this theory, financial balance can be achieved through banking sector activities to achieve financial stability and financial growth, while several other researchers stated that the the banking sector performance is measured through the banks ability to provide loans to industrial sectors related to environmental sustainability (Orellana, 2013 ; Takhim et al., 2023).

The relationship between theory and several studies means that a descriptive quantitative model is used to answer the problems in this research. This research is the basis for measuring financial pressure and the green finance effectiveness that experiences imbalances and provides input to stakeholders in determining policies when the economy experiences financial contraction.

Sampel Selection dan Data Sources

This research uses secondary data from Bank Indonesia financial reports in a time series, referring to financial distress conditions during the Covid-19 Pandemic crisis (2019 – 2023). This measurement condition was carried out because a financial recession had occurred as a financial distress model in this research, but this measurement can be developed further with a broader research model.

This research uses the the Ed Waves Index development (Basmar, Campbell III, et al., 2022) which measures financial activity behavior when financial distress occurs in the financial circulation. This development model is shown through financial waves experiencing financial distress due to the macroeconomic pressures effects, then tested simultaneously to obtain a measure of changes in green finance. Besides that, the development of this model can detect the financial contraction magnitude due to macroeconomic pressure which is tested through the intermediary function to determine the relationship between green finance and financial distress.

Instrument and Data Analysis

This research refers to measuring banking ability to increase green finance, through the theory of balance regarding financial stability and economic growth. This measurement is carried out through the intermediary function. Based on the state of the art this research, the balance model can be shown in the following equation.

$$\sum \alpha = \sum \beta \dots\dots\dots (1)$$

Equation 1 shows the financial flows balance in the banking sector through financial income (α) and financial distribution (β), therefore this model is a standard measure for measuring improvements in green finance

Furthermore, to determine the indicators in Equation 1, the value of α is determined from the value of savings (η), deposits (μ) and current accounts (ν), while the value of β is described in terms of financial flows in the form of investment credit (ξ), working capital credit (ζ) and consumption credit (ς), therefore the development of Equation 1 can be formulated in Equations 1a and 1b.

$$\sum (\eta + \mu + \nu) = \sum (\xi + \zeta + \varsigma) \dots\dots\dots (1a)$$

$$\ln \sum (\eta + \mu + \nu) = \ln \sum (\xi + \zeta + \varsigma) \dots\dots\dots (1b)$$

The balance measure shapes financial performance which leads to maximum balance to achieving green finance process. To measure the financial movements depth through macroeconomic effects, Equation 1b is given pressure from macroeconomic variables on financial activities which is described in the following equation:

$$\left(\ln \sum \tau \cdot \eta \sigma_t + \ln \sum \tau \cdot \mu \sigma_t + \ln \sum \tau \cdot \nu \sigma_t \right) = \left(\ln \sum \tau \cdot \xi \sigma_t + \ln \sum \tau \cdot \zeta \sigma_t + \ln \sum \tau \cdot \varsigma \sigma_t \right) \dots\dots (2a)$$

$$\left(\ln \sum \tau \cdot \eta \vartheta_t + \ln \sum \tau \cdot \mu \vartheta_t + \ln \sum \tau \cdot \nu \vartheta_t \right) = \left(\ln \sum \tau \cdot \xi \vartheta_t + \ln \sum \tau \cdot \zeta \vartheta_t + \ln \sum \tau \cdot \varsigma \vartheta_t \right) \dots\dots (2b)$$

$$\left(\ln \sum \tau \cdot \eta \varpi_t + \ln \sum \tau \cdot \mu \varpi_t + \ln \sum \tau \cdot \nu \varpi_t \right) = \left(\ln \sum \tau \cdot \xi \varpi_t + \ln \sum \tau \cdot \zeta \varpi_t + \ln \sum \tau \cdot \varsigma \varpi_t \right) \dots (2c)$$

In Equations 2a, 2b and 2c, the macroeconomic pressures effects have influenced the banking activities movement through inflation pressures (σ), exchange rates (ϑ) and interest rates (ϖ) through constant values (τ). This variable was chosen as an indicator that influences the green finance movement, because it has a strong relationship and has a direct influence on financial activities (Basmar, Sutriana, et al., 2022). The closeness occurs because financial circulation will experience significant changes in financial activities through macroeconomic indicators and have an impact on the banking sector performance which plays a role in maintaining financial circulation through the intermediary function.

This change form is detected through financial wave pressure, therefore the financial wave pressure effect can be measured optimally, a picture of the financial circulation movement can be shown through the following equation:

$$\ln \sum_{t=0} \tau \cdot \sigma \cdot \alpha_{1<\infty} = \ln \sum_{t=0} \tau \cdot \sigma \cdot \beta_{1<\infty} \dots\dots\dots (3a)$$

$$\ln \sum_{t=0} \tau \cdot \vartheta \cdot \alpha_{1<\infty} = \ln \sum_{t=0} \tau \cdot \vartheta \cdot \beta_{1<\infty} \dots\dots\dots (3b)$$

$$\ln \sum_{t=0} \tau \cdot \varpi \cdot \alpha_{1<\infty} = \ln \sum_{t=0} \tau \cdot \varpi \cdot \beta_{1<\infty} \dots\dots\dots (3c)$$

The opposit form of financial activity movements describes macroeconomic indicators that cause a decline in the intermediary function in increasing green finance. The pressure can be determined by the magnitude effect of banking financial flows. This condition is described based on the following equation:

$$\ln \sum_{t=0} \tau \cdot \sigma \cdot (\eta + \mu + \nu)_{-1 < \infty} = \ln \sum_{t=0} \tau \cdot \sigma \cdot (\xi + \zeta + \varsigma)_{-1 < \infty} \dots\dots\dots (4a)$$

$$\ln \sum_{t=0} \tau \cdot \vartheta \cdot (\eta + \mu + \nu)_{-1 < \infty} = \ln \sum_{t=0} \tau \cdot \vartheta \cdot (\xi + \zeta + \varsigma)_{-1 < \infty} \dots\dots\dots (4b)$$

$$\ln \sum_{t=0} \tau \cdot \varpi \cdot (\eta + \mu + \nu)_{-1 < \infty} = \ln \sum_{t=0} \tau \cdot \varpi \cdot (\xi + \zeta + \varsigma)_{-1 < \infty} \dots\dots\dots (4c)$$

Equations 4a, 4b and 4c represent the financial circulation movement from external macroeconomic variables (σ , ϑ and ϖ), which have an impact on the constant value of measuring financial activities in improving green finance which can be measured through financial pressure as shown in the following equation:

$$\ln \sum_{t=0}^{\max/\min} \tau \cdot (\sigma(\alpha) + \vartheta(\alpha) + \varpi(\alpha))_{1 > 0 > -1} = \ln \sum_{t=0}^{\max/\min} \tau \cdot (\sigma(\beta) + \vartheta(\beta) + \varpi(\beta))_{1 > 0 > -1} \dots\dots\dots (5)$$

To describe the pressure formation process in Equation 5, it can be measured specifically against pressure on banking activities, whether when there is an increase in green finance or vice versa. This equation has the measuring financial flows complexity, both when financial distress occurs through macroeconomic pressures, or changes in financial circulation in an effort to increase green finance.

$$\ln \sum_{t=0}^{\max} \tau \cdot (\sigma(\alpha) + \vartheta(\alpha) + \varpi(\alpha))_{1 < \infty} = \ln \sum_{t=0}^{\max} \tau \cdot (\sigma(\beta) + \vartheta(\beta) + \varpi(\beta))_{1 < \infty} \dots\dots\dots (5a)$$

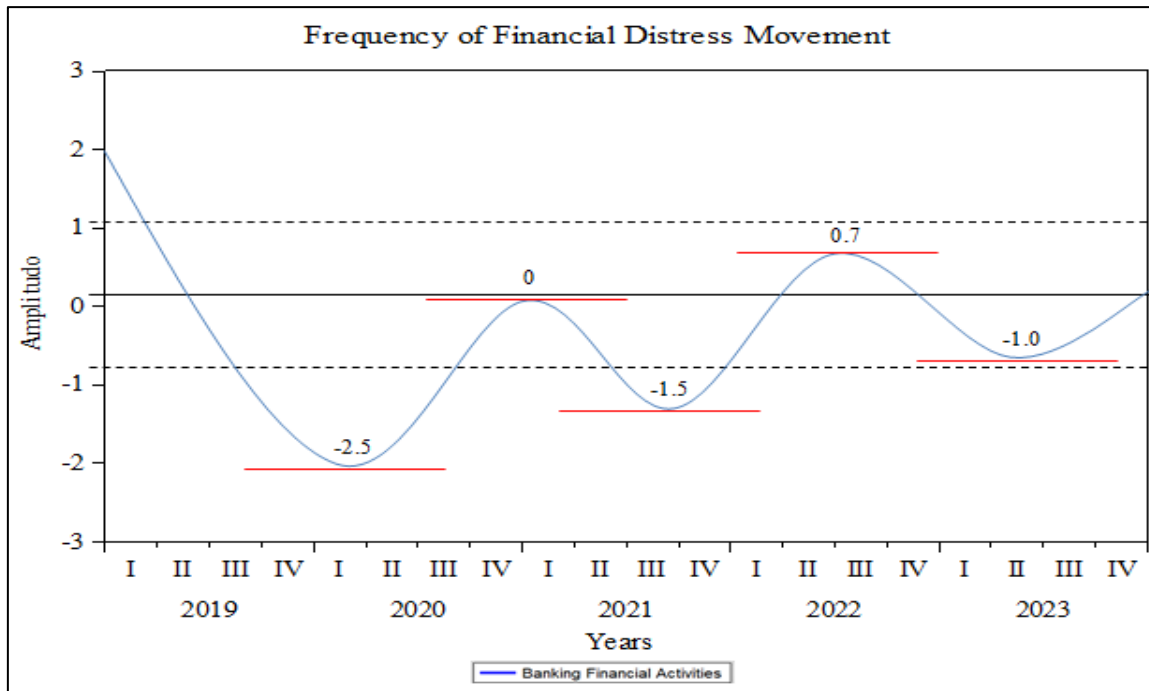
$$\ln \sum_{t=0}^{\min} \tau \cdot (\sigma(\alpha) + \vartheta(\alpha) + \varpi(\alpha))_{-1 < \infty} = \ln \sum_{t=0}^{\min} \tau \cdot (\sigma(\beta) + \vartheta(\beta) + \varpi(\beta))_{-1 < \infty} \dots\dots\dots (5b)$$

The financial relationship in Equation 5 explains that the financial activities movement through the intermediary function when financial distress occurs based on macroeconomic turbulence can influence the increase in green finance in the industrial sector, Therefore, measurements 5a and 5b show a strong connection between the intermediary function in improving green finance which has an impact on the financial stability and economic growth level.

Results and Discussion

Distribution of Financial Distress Flows

The flow of banking financial activities fluctuates, therefore financial distress indicates an imbalance in the intermediary function. The financial waves movement based on financial distress during the Covid-19 pandemic and after the Covid-19 pandemic showed strong turbulence after experiencing macroeconomic pressures which were identified until 2024. Financial distress reactions through wave movements in banking activity have an influence on the green finance growth in Indonesia based on the pressure distortion shown in Figure 1 and Table 1.



Source: Data Processing Results, 2024

Figure 1. Frequency of Financial Distress Movement

Banking financial flows, in general, move with high financial distress pressure, especially during the Covid-19 Pandemic (2019 - 2020), this behavior then slows down with the lags frequency being in the negative area in the following period. The financial distress waves is a reaction result that needs to be anticipated because contains strong risks and multiplier effects on economic indicators and provides acute depression when macroeconomics has a positive influence on intermediary functions, therefore the banking activity size drives financial flows as a catalyst for changes in green finance pressure as explained in Table 1.

Table 1. Results of Financial Distress Measurement Analysis

Period	$\Sigma \alpha = \Sigma \beta$	$\Sigma \sigma + \vartheta + \omega$	Distress Distribution	Correlation	Distress Area
I	0,16 A	- 2,66 A	- 2,50 A	Max	Negative
II	- 0,11 A	0,11 A	0,00 A	Min	Positive
III	- 0,48 A	- 1,02 A	- 1,50 A	Max	Negative
IV	- 0,69 A	1,39 A	0,70 A	Min	Positive
V	- 1,08 A	0,08 A	- 1,00 A	Max	Negative

Source: Data Processing Results, 2024

Financial distortion through financial distress effects occurs due to the relationship between changes in intermediary functions and turbulent macroeconomic pressures. These changes appear in every period, such as in the first period, The intermediary function pressure shows balance at 0.16 Amplitude, but experiences a contraction of macroeconomic pressure with a magnitude of - 2.66 Amplitude, resulting in a distress distribution magnitude of - 2.50 Amplitude, through a very strong maximum relationship between financial distress and green finance.

In the second period, the banking financial flow relationship reached stability at - 0.11 Amplitude, the balance reaction in this period did not show the macroeconomics effect which suppressed the financial rate balance pressure on banks with a value of 0.11 Amplitude,

therefore the distress distribution detection was 0.00 The amplitude, lack of a reaction relationship explains the weak link between financial distress and changes in green finance

The third period shows that pressure - 0.48 amplitude is a balanced relationship with banking performance, but the balance experiences a shift through the macroeconomic intervention pressure - 1.02 Amplitude, and creates a distress distribution - 1.50 Amplitude, the pressure impact shows that there is a strong maximum relationship between financial interactions distress with changes to green finance.

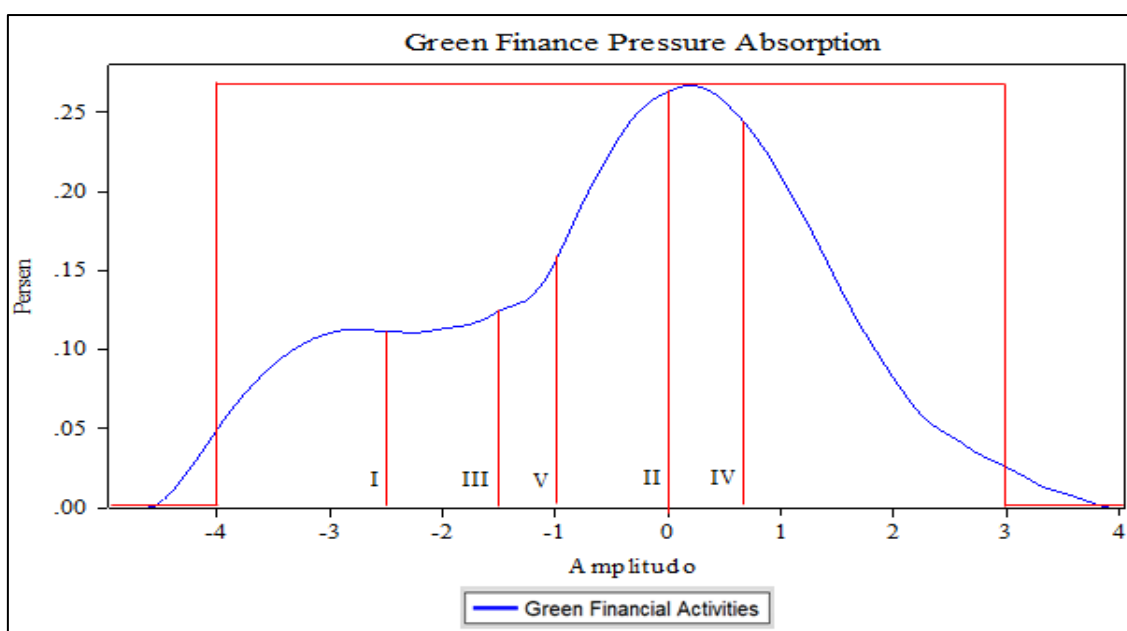
In the fourth period, the relationship between green finance and banking performance showed a balance of - 0.69 Amplitude, this reaction experienced a change in macroeconomic pressure of 1.39 Amplitude, resulting in 0.70 Amplitude as the magnitude of the distribution of distress in banking pressure, with minimal reaction to both pressures, there was a normal relationship between financial distress on green finance.

In the fifth period, financial balance is reached at - 1.08 Amplitude, macroeconomic intervention makes the distribution of distress to - 1.00 Amplitude and shifts the wave to 0.08 Amplitude, pressure distortion causes a strong maximum effect and influences changes in green finance through balance interactions financial flow.

Overall, Figure 1 and Table 1 indicate that the relationship between green finance and financial distress through banking activities and macroeconomic pressure shows high sensitivity, through a balance of intermediary functions with the dominance of negative pressure, thus stimulating a distress distribution with a range of - 2.50 Amplitude to 0.70 Amplitude with an interpreted value of very strong to weak, therefore, this distribution is a measure of financial pressure absorption for changes to green finance in Indonesia.

Green Finance Pressure Absorption

The green finance pressure absorption is influenced by the movements distribution in banking activities, which results in a shift in green finance when there is turbulence in the intermediary function, then the green finance absorption experiences strong pressure. The reaction to the inability to increase green finance has had a negative impact on the financial wave activity in Indonesia. Pressure infiltration potential indicates a measure of the quality and quantity of intermediary function. Each wave formed is interpolated through pressure which shows an interconnection in the increasing green finance direction, which is shown in Figure 2.



Source: Data Processing Results, 2024

Figure 2. Green Finance Pressure Absorption

The green finance pressure absorption in Figure 2 proves the connection between banking financial reactions in increasing green finance. In general, the wave movement pattern is perfectly formed through the intermediary function dynamics. The wave flexibility is in the same direction as the movement rate of the intermediary and green finance functions. There is a financial movement flow construct with the financial activity rate in positive and negative areas with changing pressure movements, based on the distress distribution effects. The changing pressure process is measured accurately through the financial absorption amount on the increasing green finance effectiveness as shown in Table 2.

Table 2. Results of Green Financial Pressure Absorption Measurements Analysis

Period	Distrees Distribution	Absorption Value	Absorption Volume	Pressure	Response
I	- 2,50 A	0.12 %	- 0.003 A	Decrease	Light
II	0,00 A	0.28 %	0.000 A	Increase	Very High
III	- 1,50 A	0.13 %	- 0.002 A	Decrease	Normal
IV	0,70 A	0.24 %	0.000 A	Increase	High
V	- 1,00 A	0.15 %	- 0.002 A	Decrease	Moderate

Source: Data Processing Results, 2024

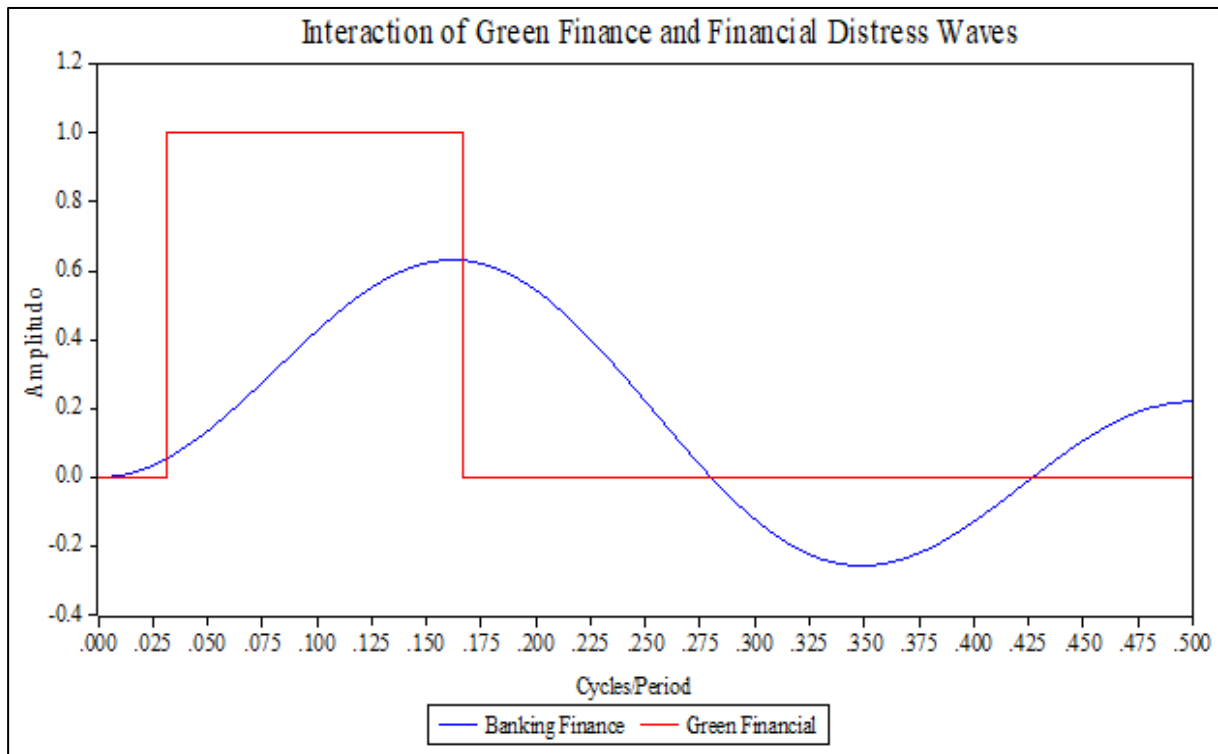
The green finance pattern response is formed through the financial waves dynamics based on the distress distribution. This effect shows how strong the financial distress influence is on increasing green finance as in the first period, through distributed financial distress - 2.50 Amplitude providing a green finance absorption reaction of 0.12% with a absorption volume of - 0.003 Amplitude, resulting in a decrease in wave pressure through the intermediary function, the pressure effect shows in the light category response. Second period, based on the financial distress distribution pressure of 0.00 Amplitude, there is a green finance absorption rate of 0.28% and a absorption volume of 0,000 Amplitude, giving the increasing effect the intermediary function pressure wave with a very high relationship. The third period shows that financial distress has a pressure distribution of - 1.50 Amplitude, resulting in green finance absorption of 0.13% with a absorption volume of - 0.002 Amplitude, a reaction to a decrease in pressure waves from the intermediary function, which indicates that the relationship is in normal conditions. In the fourth period, the financial distress involvement in the distribution pressure showed a value of 0.70 Amplitude, which had an effect on the green finance absorption rate of 0.24% and the absorption volume amounted to 0.000 Amplitude, had an impact on increasing wave pressure through the intermediary function, the response to the relationship was relatively high. Fifth period, financial distress pressure - 1.00 Amplitude, distorted at a green finance absorption rate of 0.15% with a absorption volume of - 0.002 Amplitude, This has an impact on decreasing the wave pressure function, indicating that the wave movement reaction is in the moderate category.

Overall, Figure 2 and Table 2 indicate that green finance in banking financial activities shows strong significance with the amount of pressure distortion absorption being fluctuating, This causes the waves flow to fluctuate based on absorption value 0.12% to 0.28% as a model for measuring the financial distress and green finance effects based on the pressure response level in the relationship. Therefore, this reaction is an important basis for determining policies regarding the banking activities size through financial receipts and credit distribution, in line with the increasing green finance process that is effective and efficient in the financial flows movement in Indonesia.

Green Finance Response in Banking Financial Activities

The significance of the relationship between increasing green finance and financial activity is shown through the two waves fluctuations which are related to changes in

macroeconomic indicators. The relationship between green finance and financial distress occurs in a dynamic pattern, but there are contradictory values of pressure in line with the macroeconomic magnitude pressure which plays a role in shaping pressure waves rate. Green finance behavior is highly dependent on the movement patterns of banking financial activities (Unep, 2016). Dependency reactions occur through financial flows that move in the same direction with the same pressure and duration, but in some periods green finance has quite strong pressure compared to financial distress pressure. The nature of the dependence between green finance and financial distress based on movement patterns and pressure waves is shown in Figure 3.



Source: Data Processing Results, 2024

Figure 3. Interaction of Green Finance Waves and Financial Distress

Green finance activities have a dynamic and stable tendency, sensitive behavior occurred during the Covid-19 pandemic crisis through significant pressure absorption on the financial wave activity which moved at normal and stable pressure, but with absorption levels which also experienced changes based on the pressure distribution obtained from banking financial flows. Meanwhile, financial waves move with different fluctuations in each period, differences occur due to internal and external pressures, therefore dynamic conjunctural effects in responding to each pressure response that influences them. The relationship between the two waves is displayed through the interaction measurement matrix of the green finance and financial distress waves in Table 3.

Table 3. Interaction Measurement Matrix of Green Finance and Financial Distress

Period	Distress Distribution	Absorption Value	Pressure	Response	Area
I	- 2,50 A	0.12 %	Decrease	Light	Negative
II	0,00 A	0.28 %	Increase	Very High	Positive
III	- 1,50 A	0.13 %	Decrease	Normal	Negative
IV	0,70 A	0.24 %	Increase	High	Positive
V	- 1,00 A	0.15 %	Decrease	Moderate	Negative

Source: Data Processing Results, 2024

The connection between the two waves can be measured from the the distribution aspect of financial distress pressure which is then adopted in the amount of absorption value received by the green finance wave, therefore the pressure, response and area of wave movement can be measured.

This research has supported the classical theory regarding financial balance through the up and down of both waves, This research indicate findings that financial distress distribution factors have an important role in increasing green finance, especially during the financial crisis through internal and external pressure, this pressure form was found at the Covid-19 Pandemic beginning which resulted in very high strengthening of financial distress (-2.50 A) with the amount of green finance absorption (0.12%) which is relatively light causes a decrease in pressure and the wave moves in the negative area, Furthermore, the financial activities movement experienced stagnation with low financial distress (0.00 A), but the amount of green finance absorption was classified as very high (0.28%) therefore the pressure increased and moved to the positive area, then a shift in financial activity with quite high financial distress (- 1.50 A) through the green finance absorption value (0.13%) which is classified as normal causes the wave to move down to the negative area, the next wave of financial activity that experienced financial distress was quite low (0.70 A) showing a high green finance absorption value (0.24%), making the wave increase in the positive area, the end of financial distress experienced moderate pressure (- 1.00 A) with a moderate green finance absorption value (0.15%) resulting in downward wave movements in the negative area of banking activity.

Increasing green finance depends on the banks ability to carry out intermediary functions. Financial crisis pressure has a positive relationship to the intermediary function, therefore the financial distress distribution results in a decrease in green finance in financial flows (Dikau & Volz, 2019). This research has examined that extraordinary financial pressure began when banking in Indonesia experienced the Covid-19 pandemic crisis, therefore there was a significant relationship between financial distress and green finance, this indicates that the assumptions in this research are acceptable. The intermediary function reduced green finance at the Covid-19 pandemic crisis beginning resulting in significant changes in financial flows, and cause negative shocks in financial behavioral interactions (Datta & Mohajan, 2013). This research results confirm previous findings (Basmar, Salim, Widiastuti, et al., 2023) that the financial crisis pressure intervention weakened financial activities and caused negative reactions, therefore the intermediary function experienced strong pressure due to the simultaneous decline in savings and loans. The decline in green finance occurred due to internal banking pressure through increasing interest rates and Non Performing Loans value, therefore banks provided credit selectively and carefully, in line with Bank Indonesia's decision to maintain banking soundness during the Covid-19 pandemic crisis in Indonesia.

Financial pressure on the intermediary function results in changes to green finance. Wang et al. (2023) explained that the financial crisis through macroeconomic indicators could result in pressure on green finance, due to the high level of Non-Performing Loans in financial activities during the Covid-19 Pandemic due to activity constraints from various aspects. Banks

are experiencing financial pressure due to sluggish debt payments, other pressures are being felt by the banking sector because the value of Non-Performing Loans has increased costs which are banks responsibility. This research also shows that the intermediary function has a strong attachment to the industrial sector, especially environmental preservation (Harun Ur Rashid & Uddin, 2018). This entanglement occurs because of the movements effect in financial activity on the industrial sector, however this condition has changed due to the financial crisis pressure, therefore the weakening of industrial sector activity during the Covid-19 pandemic crisis has had a significant impact on the shift in green finance.

Therefore, the relationship between green finance and financial distress shows very high significance, the effect of the Covid-19 Pandemic crisis pressure at the beginning of the measurement resulted in a decline in green finance, and increasingly severe because there is external pressure from macroeconomic indicators, the effect of pressure causes banking in Indonesia to experience a decline in the level of soundness, Therefore, Bank Indonesia has established policies for banks to maintain intermediary functions despite the Covid-19 pandemic crisis pressure for the industrial sector to maintain green finance performance. Another effort made by Bank Indonesia and banks in Indonesia is to maintain macroeconomic activities, which have a very strong influence on the intermediary function and have systemic effects on other economic elements. Therefore, macroeconomic changes are an element that causes financial distress, and policies are needed that can control the pressure to increase green finance which indirectly has a positive impact on financial stability and long-term economic growth in Indonesia.

Conclusion

The high level of financial distress pressure in periods 1, 3 and 5 which has a negative value indicates a decline in green finance in Indonesia, in line with the financial balance theory, financial distress pressure has an influence on the credit granting process in the industrial sector, resulting in the green finance experiencing achievement a strong degradation, as well as on the contrary. In this regard, banks apply the prudence concept in carrying out intermediary functions when financial distress occurs. By using the Ed Waves Index development model, the results of this research analyze the puzzle of decreasing green finance when financial distress occurs. Research findings show a significant positive relationship between green finance and financial distress in Indonesia. The very high absorption response to the green finance wave on financial activities is the high distribution impact of financial distress pressures in Indonesia.

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