The Finance Circulation Control Through Green Interest Rates in Indonesia

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Abstract

This study aims to determine the magnitude of interest rates influence on the financial cycle movement in Indonesia, green interest rates pressure is measured by the development of the Ed Waves Index measurement model, through Bank Indonesia Financial Report data from 1950 to 2020 on a quarterly basis. This research novelty because this research is a the development of a model in measuring the financial cycle in Indonesia, the research process was carried out by filtering one of the macroeconomic variables that formed the pre-existing financial cycle wave. This study results indicate that green interest rates pressures will have a strong influence on the financial cycle wave from + 3.7 Amplitudo to - 1.5 Amplitudo, when the financial cycle wave tends to weaken. This also applies to the opposite in the period of economic growth activity in Indonesia.

Keywords: Economic Growth, Circulation, Crisis, Financial Cycle, Interest Rates*i*

INTRODUCTION

The country's economic activity is determined by the interest rates movement (Basmar et al., 2024; Laeven & Valencia, 2013). All the existence of financial movement is always based on the interest rates pressure factor (Loayza & Pennings, 2020). This condition affects the fluctuations in the financial cycle movement, both through financial turnover in the banking sector and other sectors (Ma et al., 2023).

Currently, interest rates become a global problem. This research is important because it was not found in previous research that linked the relationship between the intermediary function of banking with environmental sustainability in increasing the green economy. Therefore, green interest rates research becomes a financial circulation control tool to increase the sustainability of financial stability and economic growth.

Green interest rates are part of several macroeconomic indicators that directly affect changes in economic activity (Acharya & Steffen, 2020; Fornaro & Wolf, 2020). Green interest rates activity shows the money amount on economic activity in achieving financial market balance, especially for the growth and development of economy (Eichenbaum et al., 2021). Other indicators of green interest rates pressure are changes in inflation, exchange rates and investment(Cortina et al., 2021; Huneeus, 2018). All indicators have an impact on the financial cycle movement, regardless of partial or simultaneous measurement through macroeconomic variables in a country (Adam et al., 2020; Wang et al., 2023; Dikau & Volz, 2021).

An overview of green interest rates policy in Indonesia is controlled by Bank Indonesia through monetary policy, using a focus point on fluctuations in the BI 7 Day Reverse Repo Rates with the main target of Bank Indonesia controlling inflation, price stability and economic welfare (Kamran et al., 2020).

This concept is the government responsibility, especially in maintaining the national economy balance through fiscal policy (by reducing the fiscal deficit, increasing taxes and reducing subsidies), and monetary policy (maintaining financial stability, controlled inflation and economic growth), with efforts to achieve the Central Bank's policy targets because the green interest rates behavior is very sensitive and fluctuates (Z. Chen et al., 2022; Baharudin & Arifin, 2023).

Green interest rates behavior and patterns have a positive response to the financial cycle (Mir & Bhat, 2022; Zhou et al., 2022). The savings movement rates increases investment, as an effort to increase economic growth and development set by Bank Indonesia can be achieved (Ye et al., 2022; Wang & Zhi, 2016). The green interest rates behavior and pattern also balances the

community behavior and pattern, and creates an increase in the bank credit supply, such as investment in a project (group) or individual investment (individual) (Islam et al., 2014; Akomea-Frimpong et al., 2022).

The behavior and green interest rates patterns, have an impact on the speed and financial turnover magnitude, through the money supply in the economy balance in the measurement period (Khalatur & Dubovych, 2022; Masukujjaman & Aktar, 2014). Behavior and patterns become economic balance indicators in particular and the economic activity process in general (Sachs et al., 2019). The high impact of behavior and green interest rates patterns, the government controls interest rates through monetary policy (Taghizadeh-Hesary & Yoshino, 2020; Rakić & Mitić, 2012). This instrument is important in determining business sustainability in various economic sectors, including banking and other financial institutions in Indonesia (Shakil et al., 2014; J. Chen et al., 2022).

Green interest rates policy control by Bank Indonesia aims to maintain financial balance in economic activity due to the sensitive behavior of interest rates and fluctuating patterns (Mikael Backman, 2011; Rasoulinezhad & Taghizadeh-Hesary, 2022). Green interest rates activities move freely, the initial concept of green interest rates theory has shifted through symptoms of the financial crisis and financial behavior during Covid 19 Pandemic, both globally and the Indonesian economy (Md. Shafiqul Islam, 2013; Dörry & Schulz, 2018).

This phenomenon shows that the sensitive interest rates behavior and fluctuating patterns affect the financial cycle movement in Indonesia. In both conditions (financial crisis and the Covid-19 Pandemic), the economic balance slowed and financial growth declined, even in very risky conditions, green interest rates pressures on the financial cycle caused economic activity to experience a recession

RESEARCH METHOD

The measurement of green interest rates pressure with changes in the financial cycle waves uses a secondary data set from Bank Indonesia Financial Statements on an annual basis and then grouped on a quarterly basis from 1950 to 2020. There are several methods of collecting data, especially the annual data in 1950 through several literatures related to the same research field.

Through data collection, the green interest rates pressure measurement is carried out by modifying and developing the Ed Waves Index model (Basmar et al., 2023). This measurement can be more specific in finding and determining the green interest rates pressures magnitude, which affect the waves movement in the financial cycle, by adopting Classical and Keynesian thinking, the economy runs normally with the assumption that interest rates (α) are the same as the financial cycle movement (β), this is illustrate by the following equation:

$$\alpha = \beta \tag{1}$$

In equation 1, the variable α filtered by entering the money supply (η) (total σ1, σ2, σ3) under various conditions, as shown in the following equation:

$$\eta_0 = \Sigma \sigma_{1\,(2 \geq 0 \leq -2)} + \Sigma \sigma_{2\,(2 \geq 0 \leq -2)} + \Sigma \sigma_{3\,(2 \geq 0 \leq -2)} \tag{2}$$

In a normal economy, the amount η in total must be met through the availability of σ_1, σ_2, σ_3, through the limitation of pressure movement between points +2 Amplitude to -2 Amplitude, a new measurement equation for α_0 like:

$$\alpha_0 = \eta_0 \tag{3}$$

Equation 3 is reduced to be more specific to η as in the following equation:

$$\alpha_0 = \Sigma (\sigma_1, \sigma_2, \sigma_3)_{(2 \geq 0 \leq -2)} \tag{4}$$

Equation 4 shows that interest rates move normally, economic growth is stable through financial supply and demand in the money market and capital market, which has an impact on the normal movement of the financial cycle wave in economic activity.

Referring to Equation 4, the economy is not always in normal condition, because σ can change, either at σ_1, σ_2, or σ_3 the equation will look like:

$$\sigma_{tot\ max} = \Sigma\ \sigma_{1\ (\geq 2)} + \Sigma\ \sigma_{2\ (\geq 2)} + \Sigma\ \sigma_{3\ (\geq 2)} \quad (5)$$

and/or

$$\sigma_{tot\ min} = \Sigma\ \sigma_{1\ (\geq -2)} + \Sigma\ \sigma_{2\ (\geq -2)} + \Sigma\ \sigma_{3\ (\geq -2} \quad (6)$$

Changes in Equations 5 and 6 are caused by external influences that affect the movement, when there is a change in economic phenomena, the equation also reacts, this can be seen through the following equation:

$$\alpha_{bust} = \Sigma\ \sigma_{1\ (-2 \leq \infty)} + \sigma_{2\ (-2 \leq \infty)} + \sigma_{3\ (-2 \leq \infty)} \quad (7)$$

Equation 7 indicates that the Central Bank is using an easy money policy because the economy needs an expansionary monetary policy to anticipate the financial cycles waves moving to and in the negative area for longer and make a decline in economic growth. On the other hand, external pressure can occur otherwise, this condition can be described by the following equation:

$$\alpha_{boom} = \Sigma\ \sigma_{1\ (2 \leq \infty)} + \sigma_{2\ (2 \leq \infty)} + \sigma_{3\ (2 \leq \infty)} \quad (8)$$

Equation 8 shows a better economy, for this indication the role of the Central Bank tends to be passive, taking into account changes in the economy that can affect the financial cycle wave the movement towards a financial recession or financial depression. To anticipate movements above the maximum limit, the Central Bank's policies suppress the growth rate η with a contractionary policy (monetary contractive policy) through the green interest rates channel in the form of a tight money policy, economic conditions will run according to the following equation:

$$\alpha_{0} = \sigma_{tot\ max} < 0 > \sigma_{tot\ min} \quad (9)$$

Interest rates through effective monetary policy are described in Equation 9, then an examination of the financial cycle wave through Equation 1 is synchronized with Equation 9 which is considered as interest rates reaching a normal point, the equation is described as follows:

$$\sigma_{tot\ max} < 0 > \sigma_{tot\ min} = \beta_{0} \quad (10)$$

Equation 10 assumes that interest rates make the financial cycle move normally, indirectly when interest rates change due to external pressures, the financial cycle will change, this can be illustrate by the following equation:

$$\sigma_{tot\ max} = \beta_{boom} \quad (11)$$

and/or

$$\sigma_{tot\ min} = \beta_{bust} \quad (12)$$

Referring to Equation 1, the interest rates measurement and the waves movement in the financial cycle can be found, all conditions can be combined through the following equation:

$$\alpha_{boom} = \beta_{boom} \quad (13)$$

and/or

$$\alpha_{bust} = \beta_{bust} \quad (14)$$

Equation 13 and/or 14 is an accurate measurement model for the green interest rates pressure magnitude on the financial cycle waves, in addition, the movements effect can determine the Central Bank of Indonesia policies.

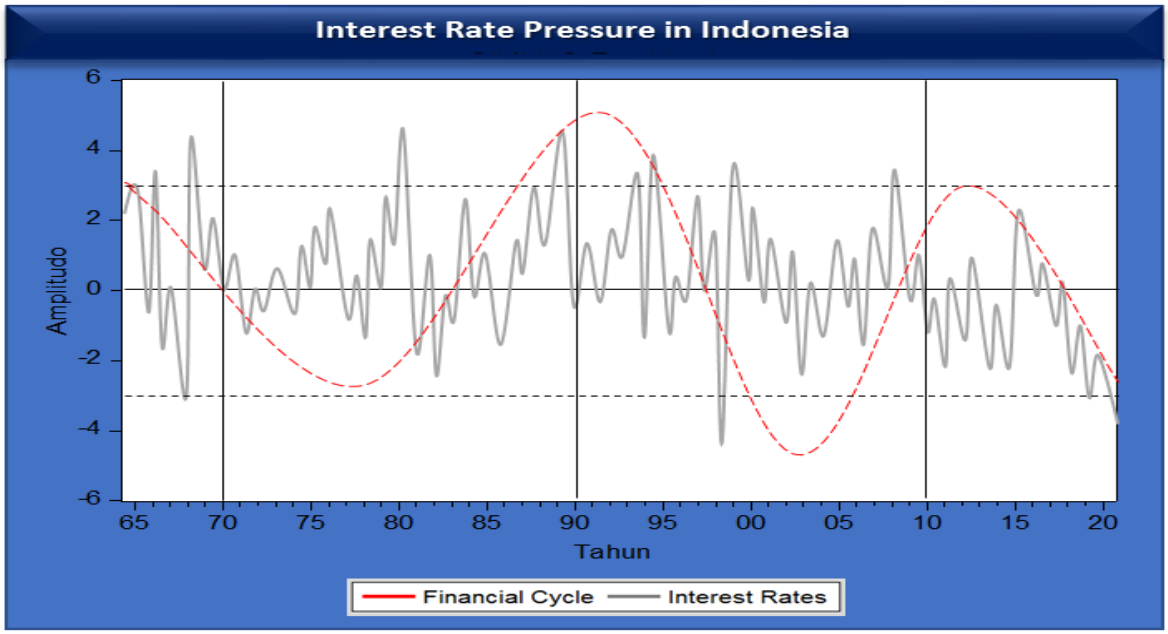
RESULT AND DISCUSSION

Determinants Of Green Interest Rates Fluctuations

The results of the study illustrate the relationship between green interest rates pressures and the financial cycle waves, which are described by fluctuations in the movement of each parameter in this study.

Referring to the Ed Waves Index development model which is described in the research methodology related to the relationship between interest rates and the financial cycle, in particular to determine the green interest rates magnitude pressure on the financial cycle waves in Indonesia, the model shows better results.

Specifically, the research results in Figure 1 represent green interest rates movement activities and the financial cycle, while Table 1 also explains the green interest rates magnitude pressure on the financial cycle waves in Indonesia, all of which can be seen in Figure 1 and Table 1 below:



Sources: Processed Data, 2025

Figure 1. Green Interest Rates Activity and Financial Cycle in Indonesia

Period 1 (1950 - 1970) green interest rates pressure fluctuated, dominated in the positive area, the highest pressure was 4.3 Amplitude, there was movement in the negative area with pressure - 3.7 Amplitude. The financial cycle wave experienced a financial recession with movement rate of 45 degrees, mostly in the positive area with the final wave being at 0 Amplitude.

Period 2 (1971 - 1990) interest rates were still volatile and more accretive than period 1, the highest pressure was in the positive area of 4.7 Amplitude, while in the negative area it was weak at - 2.1 Amplitude. The financial cycle wave forms one perfect cycle, the lows are in the negative area - 2.5 Amplitude, the wave rates is 35 Degrees, the duration speed is very fast (7 years), then the wave is moving in the positive direction, the wave movement rates is 45 Degrees, the duration speed is slowing down slightly (14 years) to peak growth at 5.7 Amplitude.

Period 3 (1991 - 2010) green interest rates pressures were getting denser with high mass fluctuations, the amount of pressure moving normally, mostly in the positive area with the highest pressure of 3.6 Amplitude, while the pressure in the negative area increased compared to the previous period, the pressure in this period - 4.5 Amplitude. The financial cycle wave is moving in a U shape, indicating the financial cycle wave is reaching lows in the negative area - 5.6 Amplitude, the lowest wave rates is 60 degrees, the duration speed is almost the same (10 years) as the financial cycle wave end in the positive area.

Period 4 (2011 - 2020) green interest rates pressure fluctuated and the gap widened compared to the previous period, due to green interest rates pressure through the perfect wave response of the financial cycle. During this period, interest rates only touched the positive area with a pressure of 2 Amplitude, several other pressures were in the positive and light area between 0.1 Amplitude to 0.3 Amplitude, while other pressures in the negative area were under very heavy pressure in position - 4.0 Amplitude. The financial cycle wave shows a slowdown with a consistent slow movement, the financial cycle wave after reaching a peak of 3 Amplitude, then moves down sharply to - 3 Amplitude, similar to period 3, the wave movement tendency in the negative area for a long period through a wave decline of 25 degrees close to 0, at a rates of short duration (5 years).

The amount of green interest rates pressure on the financial cycle in Indonesia can be calculated with the results shown in Table 1 below:

Table 1. Green Interest Rates Pressures and the Financial Cycle Wave in Indonesia

Period	Year	Pressure Interest Rates	Wave Financial Cycle	Connection
1	1950 - 1970	(+) 3.7	(-) 5.8	≥
2	1971 - 1990	(+) 2.0	(+) 5.8	=
3	1991 - 2010	(-) 1.5	(+) 7.2	≤
4	2011 - 2020	(-) 0.6	(-) 4.3	=

Sources: *Processed data, 2022*

In Table 1, the findings explain the differences in the financial cycle waves response to green interest rates pressures, such as in Period 1, measurements from 1950 to 1970 with sufficient data was found that the average green interest rates pressure is 3.7 Amplitude, the pressure tendency is in the positive area, the pressure is responded by the financial cycle wave to the negative area an average of -5.8 Amplitude, during this period, green interest rates pressures were stronger than the financial cycle wave.

In Period 2 measurements from 1971 to 1990 with sufficient data quality was found that the average green interest rates pressure was 2.0 Amplitude, the pressure trend was in the positive area, the pressure magnitude was responded by the financial cycle wave to the positive area with an average of 5.8 Amplitude, during this period, green interest rates pressures are in line with the financial cycle waves.

In Period 3, measurements from 1991 to 2010 with sufficient data quality was found that the average green interest rates pressure was - 1.5 Amplitude, the pressure tendency in the negative area, the pressure magnitude was responded by financial cycle waves to the positive area with an average of 7.2 Amplitude, in this period the pressure on interest rates has a weak effect on the financial cycle waves.

In Period 4, measurements from 2011 to 2020 with decent data quality was found that the average green interest rates pressure is -0.6 Amplitude and the pressure trend is in the negative area. The pressure magnitude is responded by the financial cycle wave movement to the negative area as well, with an average response value of 64.3 Amplitude. During this period, green interest rates pressures had a positive effect on the financial cycle waves.

The Green Interest Rates Relationship

The interest rates role is important, because the economy growth and development is based on the Central Bank policy towards the targets achievement through the interest rates performance (Ullah, 2013; Lindenberg & Volz, 2016; Park & Kim, 2020; Guang-Wen & Siddik, 2023; Nawaz et

al., 2021). Green interest rates activity in Indonesia has a broad effect on increasing growth through financial cycle activities, fluctuating financial cycle movements with dynamic pressures throughout the economy (Ahmed, 2012; Shleifer & Vishny, 2019; Sun et al., 2023).

The interest rates characteristics at the Indonesia's development beginning were marked by stronger pressure, compared to the financial cycle waves movement, because from 1950 to 1970 Indonesia built maximum facilities and infrastructure for smooth economic circulation (Shershneva & Kondyukova, 2020; Schaefer, 2017). The projects development in the real sector continues to increase for the community to carry out their activities including improving community welfare, but high interest rates have no effect on financial activities, therefore the financial cycle did not respond dominantly to green interest rates pressures in that year (Nedumaran et al., 2020; Volz, 2018).

Entering 1971 to 1990, the green interest rates adjusted to the slightly slower economic activity in the previous year, with changes and better economic growth, making Indonesia a developing country on par with other countries, in addition to the influx of investors to Indonesia there has been an increase in the industrial sector. Investor confidence in the economy performance has had a positive impact, therefore, green interest rates pressures in this period are in line with the financial cycle wave movement with high economic developments in Indonesia.

Indonesia's economic growth experienced a shock from 1991 to 2010, Indonesia's economic growth suddenly stopped because the financial crisis made it difficult to neutralize a volatile economy, accompanied by an unprepared financial system in several sectors. These conditions make economic pressures even more severe, the readiness of monetary policy and fiscal policy is part of neutralization process in a slumping economy, accompanied by macroeconomic variables that move freely making economic pressures even more severe.

This condition shows the truth of Adam Smith's theory (1759), Economic conditions are increasingly difficult to achieve financial cycle neutrality. The political, legal, social and cultural aspects are an important part of economic pressures in critical times, therefore green interest rates pressures in this period are indicated to be weakening due to changes in the situation and strong external pressures. The financial cycle wave in Indonesia then moved towards a deep financial recession, even approaching a financial crisis.

Anticipating the economic downturn, the government made a complete overhaul of the damage caused by the twin crisis in Indonesia. Bank Indonesia continues to strive towards financial recovery, but achieving maximum growth is not easy, especially since the economy was under stress in the previous period. The government implemented various policies, including reforms to macroeconomic elements such as inflation, exchange rates and banking credits that previously moved without control.

This situation has become the most expensive lesson for the government, economic growth that has not been maximized and the Global Covid-19 Pandemic pressure in all countries, has made financial crises such as in 1997 and 2008. The Covid-19 pandemic pressure is much heavier than the financial crisis in the previous period, the Indonesian economy is in "suspended state" and it is difficult to predict the end of the period. The damage caused was quite heavy, activities in all sectors were less than optimal which reacted to the slowdown in economic growth, even being in a negative position (Zheng et al., 2021; Hossain, 2020). The government maintains that the economy is in a positive position, such as lowering loan interest rates, which is a policy of the Central Bank in an effort to increase real sector activity, but efforts are quite heavy, the economy remains weak and this condition is responded positively by financial cycles wave in a negative area

CONCLUSION

Based on the Ed Waves Index development measurement model, which filters the green interest rates variable on the financial cycle wave that has a strong effect in the initial period of measurement, then green interest rates pressure moves in the direction of the financial cycle wave. Green interest rates pressures weakened in the next period to the financial cycle waves, with a positive response to the negative, green interest rates pressures had a strong influence on the financial cycle waves when the financial cycle waves weakened, and vice versa

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