The Effect of Interest Rates on the Financial Cycle in Indonesia

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Abstract— *The purpose of this study is to determine the relationship between interest rates and the pressure on the movement of the financial cycle in Indonesia. This study uses secondary data from Bank Indonesia from 1990 to 2017, data is processed using Simultaneous Equation Model. The results of this study found that interest rates have a positive and significant impact on the financial cycle, with a pressure of 0.72 to - 23.92 Amplitude. The renewal of this research shows that short-term interest rates are very effective for economic growth, and long-term interest rates can make pressure on the financial cycle in Indonesia.*

Keywords – Interest Rate, Financial Cycle, Financial Crisis

I. INTRODUCTION

The financial cycle changes rapidly, one of them due to changes in interest rates, changes in the financial cycle are very different for developing countries and developed countries. For developing countries, interest rates will increase economic growth, while for developed countries interest rates will have an effect on the financial cycle and financial crisis (subprime morgage).

This phenomenon shows that financial cycle measurement using interest rate variables is still controversial, interest rates give effect to financial cycle movements on positive and negative pressures, this movement illustrates that these pressures influence the ups and downs of the financial cycle, therefore researchers will look at interest rates can affect the financial cycle in developing countries, and become a measure of the prevention of financial crises such as subprime morgage in Indonesia.

Empirically it was found that interest rates are one measurement tool for the financial cycle[1], so that proper control of interest rates will maximize financial cycle movements within reasonable limits (increased economic growth).

Overall this study will describe interest rate pressures in influencing the movement of the financial cycle, as well as being a control in increasing economic growth or a tool to prevent a financial crisis, each period of financial movements always has different effects, so this research will provide input for managers finance in order to be able to decide the right policy, through the wave of the financial cycle, in creating economic growth as a developing country like Indonesia.

II. LITERATURE REVIEW

Empirical research on the relationship of interest rates to the financial cycle by using Non-linear Effects VIX[2], in statistical calculations provides a weakening effect on the financial cycle, thus influencing global finance, private capital can improve the development of the financial sector, this study concluded that the state cannot avoid financial shocks global[3]

Other studies tend to see that interest rates in relation to monetary policy show that the interest rate policy that is set to a maximum will have a positive effect on the workings of the financial system which is characterized by a stable financial movement[4]

According to[4] measure financial movements by including several variables such as interest rates, exchange rates, asset prices, bank loans, company balance sheets, and household wealth values, which describe the level of demand for money.

Some other researchers have found that changes in the financial system that affect the financial cycle will also have an effect on the financial crisis[5]. Measurements using the Financial Conditions Index (FCIs), the index can predict economic activity, testing several variables has a significant impact on the financial crisis, so the measurement of past crises can be used as a reference in measuring future crises.

Anticipating the crisis using this model can be a warning against the impending crisis.

Research in several countries generally uses the concordance formula[6] where the purpose of using this formula is very simple just by looking at the movements of 2 variables (credit and financial fluctuations)[7] which move strongly enough to put pressure on finance.

From this pressure, it can be measured the amount of influence that has an impact on the damage of the financial system in a country. This measurement is also used in Indonesia[8], but the effect is not maximal in giving conclusions about the financial crisis in Indonesia, due to several things:

First, the measure only uses a credit variable, while in the case of Indonesia the use of credit is quite large, but this does not damage the existing banking system in Indonesia, because Indonesian banks work very carefully after the financial crisis that occurred in 1997.

Second, the size of the financial crisis that occurs not only can be measured through credit, because the amount of credit channeled based on central bank policies, such as the size of the interest rate, both credit and deposits.

Third, Indonesia is a developing country, so to measure the financial cycle it is better to put forward some macroeconomic variables that are seen as having an effect on the movement of the financial cycle, using several variables will give more accurate results.

In line with the background above, where the subprime morgage financial crisis is caused by central bank policy in setting interest rates, the researcher will develop a broader measurement of the financial cycle, by measuring more specifically the financial movements in Indonesia through a central bank policy system set financial interest rates (credit). This research is a development of previous research that partially measures credit and growth by using the financial cycle in Indonesia[9].

III. RESEARCH METHOD

The strength of this research is because it uses 112 sample interest rates obtained from central bank financial statements in Indonesia, the data is presented quarterly, from 1990 to 2017[10], so that with long data it will show the relationship of interest rates (endogenous) and financial cycles (exogenous) using the Simultaneous Equation Model (SEM) method.

This measurement will look at the effect of financial cycle movements through the interest rates set by central banks[4], but the weakness of this analysis tool is because it links several indicators that are not included in the macroeconomic sector. So that researchers tend to measure financial movements only with macroeconomic modeling.

Measurement begins with measuring the financial cycle through the function of interest rates, this is to find out the magnitude of the influence of interest rates in influencing the movement of the financial cycle, these measurements can be written as follows:

$$F_c = f\ (i) \qquad\qquad (1)$$

The equation shows that the financial cycle is only measured using interest rates, and only the macroeconomic sector. So that from equation 1, it can be developed using the Cobb Douglas function written as follows:

$$F_c = \alpha + \beta\ (\mathfrak{m} + \mathfrak{z}) + \varepsilon \qquad\qquad (2)$$

The measurement of the financial cycle can be described from the movement of the short-term nominal interest rate (ɱ) determined by the Central Bank, and the credit interest rate (ɜ) obtained from the balance of credit demand in the market, so that it can be written simply as follows:

$$F_c = \alpha + \beta\ \mathfrak{m} + \beta\ \mathfrak{z} + \varepsilon \qquad\qquad (3)$$

From the results of equation 3, pressure measurements are carried out by forming a financial wave[11]. From the movement of the wave, the magnitude of the pressure to determine the amount of the effect of the interest rate is determined by influencing the financial cycle.

IV. RESULT AND DISCUSSION

After going through a series of calculations, it was found that the financial cycle moves very volatile, based on the results of research using Simultaneous Equation Model analysis, showing that there is a significant positive effect between changes in interest rates to changes in the financial cycle, with a probability level of 0,000. R square (R2) is 45 percent, which means that every 1 percent change in interest rates will have an effect on the movement of the financial cycle by 45 percent.

The 45 percent value is a fairly large number for one macroeconomic variable (interest rate) in describing the movements of the financial cycle in Indonesia, but there are still some macroeconomic variables (55 percent) which can also affect the movement of the financial cycle.

The pressure generated does have a considerable impact on the financial cycle, the movement of interest rates throughout the measurement period shows that pressure tends to fluctuate, then gradually stabilizes, but behind that change the pressure shown by interest rates increasingly influences the movement of the financial cycle heavy for a long period of time.

The short-term interest rate movement has a positive effect on the economy, with optimal growth through credit[12], so that it will encourage business development to become better, and can stimulate other macroeconomic variables to make developing countries grow, and this growth certainly drives the financial cycle to continue expansion and move to the point of the economic *boom*.

On the other hand, long-term interest rate movements have a negative effect on the financial cycle, because market reactions will have saturation in the economy, thus giving an influence on financial performance (banking) in managing their finances (NPL increases). Where the decline in the financial performance of the banking sector for the long term

will affect the movement of the financial cycle marked by financial movements towards the direction of financial recession or bust point, and if the financial cycle moves for 10 years[13], it will put pressure on the financial crisis[14], overall movement can be seen in the picture below.

Picture 1, Interest Rates to Financial Cycle

Note

— Short-term nominal interest rates (ɱ)
— Credit interest rates (ȝ)
— Financial cycle (F_c)
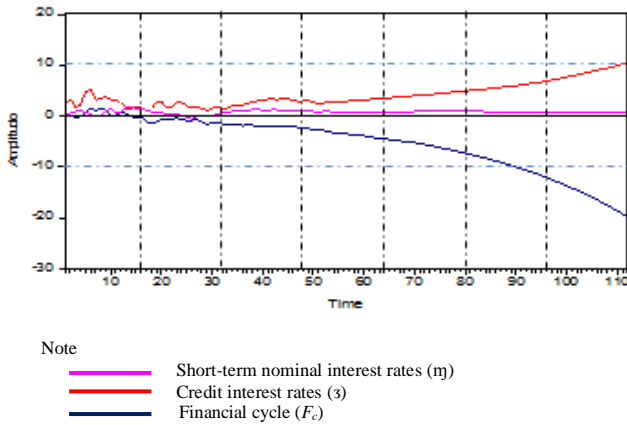
There is a strong interaction between interest rates and the financial cycle, this interaction is characterized by wave density and the amount of pressure that occurs.

Overall the wave density of interest rates (ɱ + ȝ) and the financial cycle are very fluctuating, the contraction of credit interest rates (ȝ) tends to be above the wave of the central bank's interest rate (ɱ), this is due to several things, namely *first,* the need for credit is very high, because many business sectors will continue to depend on credit in developing their business, *second,* the amount of loans channeled by banks is determined by the high and low interest rates given that Indonesia is a developing country and has the potential to earn large profits, *third*, the high wave of credit interest rates (ȝ) due to banks needing large profits as part of maintaining the capital strength set by Bank Indonesia, *fourth,* the development of interest rates will give a positive reaction for investors, in investing their capital in a country (without political, socio-cultural aspects, etc.) so that this will have a strong influence on the economic foundation in Indonesia.

Partially seen that the wave of financial cycle tends to follow the direction of a wave of credit rates (ȝ), while a wave of central bank interest rate (ɱ) moves with the waveform tends to be flat in the long term, although in the initial measurement of the wave motion is quite dynamic, but at the end of a period of pressure interest rates tend to decline, this is due to several things, *first*, the loan interest rate was responded quickly by the market, thus stimulating the financial cycle movement quickly, while the implementation of the Bank Indonesia interest rate was responded slowly by requiring time in its implementation. *Second*, banks will set interest rates based on their needs, but are still within the limits of the central bank's policy, so that the fluctuations in the wave of credit interest rates are more dynamic than the Central Bank's interest rates, because the central bank sets interest rates only as an anticipation of improper financial fluctuations. Interest rate pressures on the financial cycle have different intensities for each period, this is because the central bank's policy in setting interest rates is

responded differently by all financial stakeholders in Indonesia, so the effects can be seen through the table below:

Table 1. Results of Research Analysis

t	Average Pressure (i)		Total Average Pressure (i)	F_c
	ɱ	ȝ		
0 - 16	0.07	1.07	1.14	0.72
17 - 32	0.08	1.97	2.05	-1.86
33 - 48	0.30	2.21	2.51	-3.90
49 - 64	0.28	0.75	1.03	-4.22
65 - 80	0.27	0.63	0.90	- 7.59
81 - 96	0.27	0.38	0.65	-10.05
97 - 112	0.25	0.36	0.61	-23.92

The results of this study found that the total average interest rate pressure in the initial period (period 0 to 64) is very fluctuating, moving between 1.03 to 2.51 amplitude, the effect of the pressure is responded to by the financial cycle that moves in the range 0.72 to -2.22 amplitude.

This condition explains that when the central bank's policy raises interest rates, the bank will run its operations through credit distribution based on the central bank's policy, but the implications of the high interest rate policy are reversed by the market, so that even though interest rates increase, demand credit will continue to grow, in line with economic growth.

Another implication of the central bank's policy of increasing interest rates is that there is a rise in financial activity in Indonesia, where this period of the financial cycle moves at the initial period of the boom point (periods 0 to 16) due to a high level of credit expansion.

On the other hand, the total interest rate pressure at the end of the period (periods 65 to 112) tends to decrease, moving between 0.61 to 0.90 amplitude, the pressure is responded to by the financial cycle as heavy pressure, marked by movements between -7.59 to -23.92 amplitude in the financial cycle .

This situation illustrates changes in market behavior, in which the central bank decreases the interest rate as well as the banking sector, but the implications of this are not responded to by the market, there is no surge in credit demand from the banking sector.

In this condition there are two aspects that need to be considered *first,* the financial sector tries to increase economic growth by reducing interest rates, because the Indonesian economy is getting worse after the global crisis that occurred in Indonesia. *second*, from financial market players, where it appears that the market has experienced a sluggishness in its balance sheet, so that even though the central bank's policy offer, which is quite impartial for financial markets, has not received a positive response from the financial users themselves.

Therefore, changes in the pattern and development of the financial cycle movements are inseparable from changes in overall interest rates (ɱ + ȝ) and interest rates in part (ɱ, ȝ), because the potential of the financial cycle is supported by the amount of pressure given by the two elements which is a measurement, this is because the economic conditions in Indonesia are very sensitive, so that appropriate policies are

needed to control financial activities so that the financial crisis does not repeat in Indonesia.

V. CONCLUSION

No matter how small the change in interest rates will have an influence on the movement of the financial cycle, for the short term, interest rate policies have become effective for economic growth in Indonesia, such as financial expansion through credit and responded with a financial cycle to the boom.

Long-term interest rate policies will put heavy pressure on the financial cycle, as the movement of the financial wave leads to a bust point, caused by a financial recession that results in financial crisis in Indonesia.

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