The Determinant of Financial System Stability in Indonesia

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Abstract

The stability of the financial system in Indonesia is still quite vulnerable to disturbances (shock) from within and outside the country as indicated by a high ratio of NPLs or bad loans. The purpose of this study was to determine and analyze the effect of world crude oil prices as an indicator of external shock, exchange rates, inflation, and the BI rate on financial system stability in Indonesia in the short and long term. This study uses regression analysis of time series data from 2002 to 2020, using the ECM (Error Correction Model) method. The results show that in the short term the variables that affect financial system stability are inflation and BI rate variables, as well as world crude oil prices and variables. The exchange rate has no effect on financial system stability, while in the long term the variables that affect financial system stability are world crude oil prices, exchange rates, and the BI rate, while inflation has no effect on financial system stability.

Keywords: Financial, NPL, Crude Oil Price, Exchange Rate, Inflation, BI Rate

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INTRODUCTION

The financial system has a very important role in the economy of a country. The financial system helps reallocate resources, especially funds, so that excess funds in surplus units can be utilized by underfunded units. The financial system greatly impacts the national economy by increasing the ability to use funds in the economy, as well as helping to facilitate the distribution of funds through payment system services. Financial system stability is closely related to the development and stability of a country's economy (Otoritas Jasa Keuangan, 2017)

Financial system stability is a condition in which economic mechanisms in pricing, fund

allocation and risk management function properly and support economic growth, or it can also be interpreted as avoiding a country from monetary or financial crises. (Indonesian central bank, 2020). Financial system stability is closely related to the health of financial institutions and financial market stability.

The health of financial institutions is related to the ability of financial institutions to carry out the liaison or intermediation function as well as other financial service functions such as a smooth payment system under normal conditions and when there is pressure in the financial system, while financial market stability means the market's ability to provide buying and selling facilities for assets. at an efficient price (Otoritas Jasa Keuangan, 2017)

One instrument that is a measure of financial system stability in Indonesia can be seen by using the ratio of non-performing loans (NPL). Financial system stability is indicated by the level of non-performing loans (NPL) that affect the financial system and the economy as a whole. Vulsat (2016) stated that if financial system stability is achieved, the banking system will be healthy so that it will have a good impact on the country's economy.

Use of NPLs to test the vulnerability and resilience of financial system stability (Sorge, 2004), So to see the phenomenon of financial system stability in a country, it will be easier to see from the ratio of non-performing loans (NPL) (Syaputra & Adry, 2019). Non-performing loan (NPL) is one of the factors that determine the health of banking.

By looking at the value of the NPL ratio, it can be seen an evaluation of the condition of credit risk, profitability, liquidity, capital conditions, and market risk. (Indonesian central bank, 2015). Non-performing loans that occur

will have a negative impact on the health condition of banks, especially on the inability of banks to disburse loans. A low NPL ratio in a country indicates that the financial system is in a stable condition, and vice versa if a high NPL ratio indicates that there is financial system instability in a country due to inefficient management of the banking sector to overcome credit risk.

The higher the NPL ratio, it can be concluded that there is something wrong with the financial system, which means that there will be more negative consequences (Pranata & Nurzanah, 2017). The way to calculate NPL is by dividing the number of substandard, doubtful, and bad credit collectibility by the total credit disbursed, then multiplied by 100%. NPL results are presented in percentage form. According to Indonesian central bank (2015), the ideal NPL ratio is around 5%. A ratio above 5% indicates more bad loans than current loans.
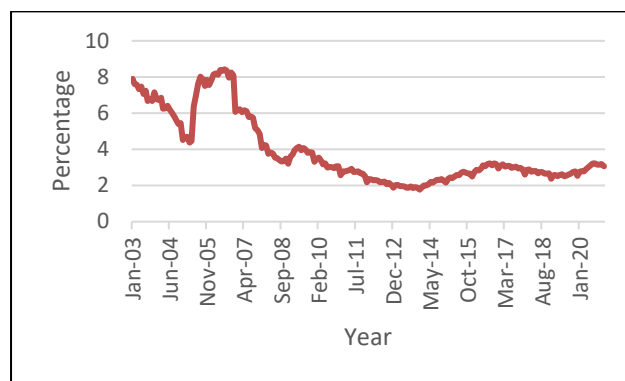
Figure 1. Non-Performing Loans (NPL) Indonesia 2003-2020

Source: Indonesian central bank processed, 2022

In more detail, Indonesian central bank divides the criteria for the NPL ratio into five types, namely the NPL ratio of less than 2% is included in the very healthy criteria, the NPL ratio between 2% to 5% is included in the

healthy criteria, the NPL ratio of 5% to 8% is included in the fairly healthy criteria, NPLs of 8% to 12% are included in the unhealthy criteria, and NPL ratios above 12% are included in the unhealthy criteria.


Figure 2. World Crude Oil Prices 2002-2020
Source : Investing.com, 2022

From 2003 to 2020 the financial system in Indonesia experienced instability, as seen from the ratio of non-performing loans (NPL) released by Indonesian central bank in the Financial Stability Study (Figure 1). 2006 which indicates a financial crisis. In 2005, there was a crisis in the banking sector which was marked by a high value of the NPL (Non Performing Loan) ratio where debtors failed to make payments scheduled for a certain period of time or commonly referred to as bad loans. (Vinus & Kusairi, 2017).

In 2008, to be precise in October, the NPL ratio increased due to the global financial crisis causing disruption in banking performance and the financial system becoming unstable (Figure 1.1). The global financial crisis marked by the breakdown of the banking system due to the problem of credit failure on housing in the United States spread to Asia and Europe, including Indonesia (Dafermos et al., 2018).

The problems that occurred in America started from the failure to pay housing loans. This was due to the rapid growth of the subprime mortgage market (subprime credit) in America, the factor influencing the increase was the high demand for the housing sector (low mortgage interest rates and house prices). The high demand for the housing sector makes mortgage lenders offer their products without paying close attention to the level of risk they will face.
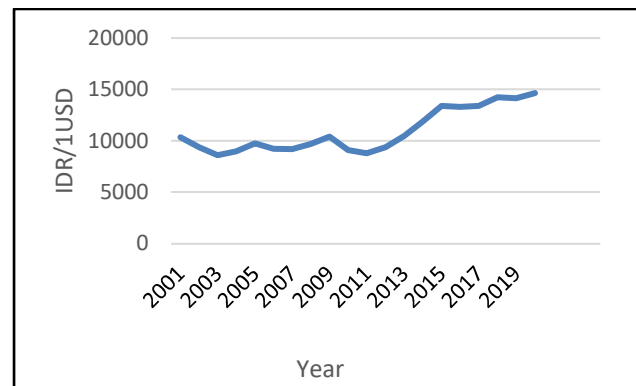

Figure 3. Exchange Rate of IDR against USD 2002-2020
Source: Indonesian central bank processed, 2022

This results in high-risk mortgages, coming from consumers who are not eligible and are declared having difficulty paying installments or failing to pay (Rimbi Wulansari, 2020). The incident provided lessons on the importance of reducing systemic risk and maintaining financial system stability. An unstable financial system can be caused by many factors and disruptions.

The cause of financial system instability generally occurs due to market failures originating from outside (internationally) and internally (domestic). Risks that often occur in the financial system are market risk, credit risk, operational risk, and liquidity risk. These risks

are components that cause financial system instability from the banking or microprudential sector (Viphindrartin et al., 2021).
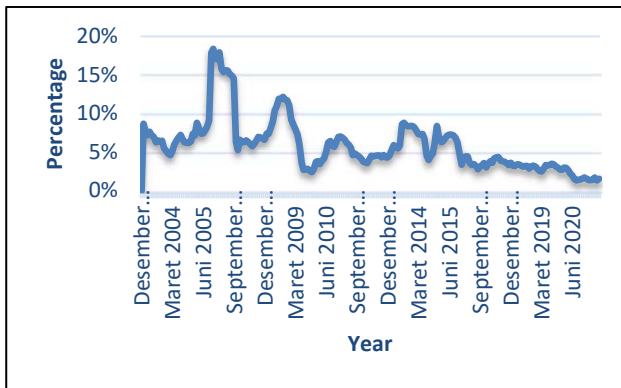
Figure 4. Inflation 2002-2020

Source: Badan Pusat Statistik (BPS) processed, 2022

The instability of the financial system has an impact on all aspects and sectors in the country, such as constraints on economic growth due to the uneven distribution of funds. Monetary policy also runs ineffectively so that the country's sovereignty is disturbed and triggers public distrust (Phan et al., 2021). Financial System Stability (SSK) is also influenced by conditions of monetary stability to create favorable macroeconomic conditions.

Meanwhile, monetary conditions are influenced by conditions of interest rates, inflation, and exchange rates (Wiku, 2021). From macroeconomic conditions, it will also have an impact on the stability of the Indonesian financial system (Rusydiana et al., 2019). Observing the current state of the Indonesian financial system, there are challenges of a slowdown in the domestic economy as a result of internal and external shocks.

Economic fluctuations will get worse due to shocks or shocks originating from domestic and foreign monetary variables (external

shocks). The monetary variables include the money supply, interest rates, inflation, and exchange rates. The implementation of expansionary and contractionary monetary policies by the monetary authorities as an effort to change policy ultimately results in shocks to domestic monetary variables (Novella & Syofyan, 2019).

External shocks in the form of volatility in the prices of the world's main commodities, namely world crude oil prices, have an impact on the economy of a country, both on a small and large scale. (Khaliq, 2017). On a micro level, the increase in production costs in economic activities will have an impact on increasing the selling price of products which causes a decrease in the level of consumer demand for products so that the goods produced cannot be fully absorbed by the market and ultimately the company suffers losses.
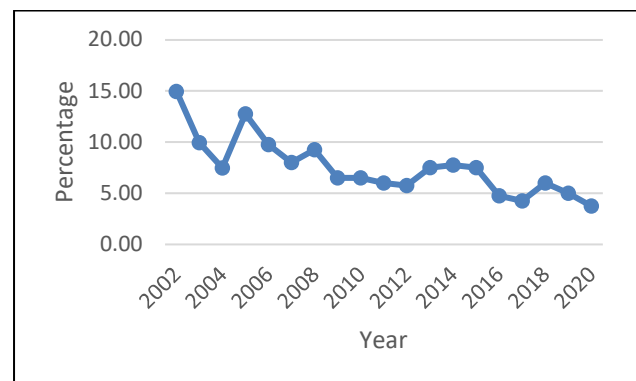
Figure 5. Graph of BI Rate 2002-2020

Source: Indonesian central bank processed, 2022

Meanwhile, at the macro level, rising world crude oil prices will of course make countries feel nervous because the higher world crude oil prices can cause pressure on a country's macroeconomic variables. (Ichsandimas & Cahyadin, 2014). High or increasingly expensive world crude oil prices make production decrease

so that it has an impact on bad loans that make the financial system unstable. Gaies et al., (1824) conducted a study on financial instability and fluctuations in oil prices using the explanatory variable of world oil prices.

The findings of this study indicate that world crude oil prices have a negative effect on financial stability, meaning that the increase in world crude oil prices will have an impact on the instability of the financial system. The increase in world crude oil prices can also have an impact on the weakening of the IDR exchange rate against the USD. This happened because the increase in oil prices made investors afraid to invest in Indonesia with changes in the current account balance so that the IDR exchange rate weakened (Handoyo et al., 2020).

The achievement of financial stability and price stability cannot be separated from the important role of exchange rate stability. The volatility of currency exchange rates relates to the supply and demand of domestic currency against foreign currencies. If the demand for domestic currency is less than the demand for foreign currency, it will cause the domestic currency to depreciate. Meanwhile, if the depreciation of the domestic currency is too large, it will have an impact on the instability of the financial system.

The IDR exchange rate against the USD has of course become a factor that is always related to the economy in Indonesia, the weakening of the IDR exchange rate has a very impact on the economy because it can slow down economic growth, decrease people's purchasing power, and increase unemployment and poverty. (Indonesian central bank, 2020). When the IDR exchange rate weakens, it can cause the price of imported goods to be high and trigger inflation so that the economy becomes unstable (Adrian & Liang, 2018). The IDR exchange rate is necessary and must be maintained and maintained stability by the government because the exchange rate is a very important factor in economic stability in a country.

The relationship with financing business activities, especially export and import-oriented companies in Indonesia, will be greatly affected by changes in the IDR exchange rate. In addition, the international business activities of domestic companies will be directly affected by changes in the exchange rate (Raraga, 2012). According to the results of previous research of Novella & Syofyan (2019) on the Effect of the Monetary Sector on Financial System Stability in Indonesia, shows that the exchange rate has a positive and significant effect on financial system stability in Indonesia in the short and long term.

If the exchange rate rises, it will increase the growth of bank credit. The exchange rate rises, which means it depreciates, causing financial system stability to rise and become unstable. In 2005 inflation was 18% which was the highest inflation during that period. In addition, in 2008 there was also an increase in inflation of 12%, but it was relatively stable in the following year. The increase in inflation occurred when Indonesia's non-performing loans were also in a crisis condition.

According to research results of Novella & Syofyan (2020) on the influence of the monetary sector on financial system stability in Indonesia, shows that inflation has a positive and significant effect on financial system stability in Indonesia in the short and long term. If there is an increase in inflation, the amount of credit disbursed will increase. Rising inflation causes interest rates to rise and credit supply increases

so that financial system stability increases, which means the financial system is unstable (Goldberg, 2013).

In addition, the existence of the BI rate policy also has an impact on the economy, marked by the influence of interest rates in all Indonesian banks so that it also affects the interest of investors and the public who want to save or borrow (credit) money in banks and affect the stability of the country's financial system. BI rate is the policy interest rate that reflects the monetary policy stance set by Indonesian central bank and announced to the public (Indonesian central bank, 2013).

The BI rate data from 2005 to 2020 shows low fluctuations, seen to experience a downward trend from year to year although it experienced the highest increase in 2005 by 12.75 percent and in 2008 by 9.25 percent. Where in 2005 and 2008 there were also financial crises, which can be seen from the data on the financial system stability index and Indonesia's non-performing loans, there is a link between the increase in the BI rate and the stability of the Indonesian financial system.

In theory, the increase and decrease in the BI rate is influenced by the inflation rate. In this case, Indonesian central bank lowered the interest rate because in the future inflation is estimated to be below the target so that it can open up financing opportunities for activities in the real sector and create a favorable investment climate. (Wiku, 2021).

Based on this description, it is necessary to conduct further research to find out how the influence of world crude oil prices, exchange rates, inflation, and the BI rate on financial system stability in Indonesia in the short and long term. So this study aims to determine "Analysis of the Effect of World Crude Oil Prices, Exchange Rates, Inflation, and BI Rate on Financial System Stability in Indonesia".

RESEARCH METHODS

This research is included in the type of This study uses a quantitative analysis approach, namely research that consists of formulating problems, compiling a model, obtaining data, analyzing results, and implementing the results of the research itself. (Kuncoro, 2013). The variables used in this study are Non Performing Loans (NPL) as the dependent variable which is an indicator of financial system stability, world crude oil prices, exchange rates, inflation, and the BI rate as independent variables.

This study uses secondary data obtained through Indonesian central bank (BI), Badan Pusat Statistik (BPS), as well as other documents from several reliable published sources. The type of data used is time series data for the period from 2003 to 2020. Monthly data on world crude oil prices with a time span from January 2003 to December 2020 obtained from id.investing.com. Meanwhile, data on the ratio of non-performing loans (NPL) were obtained from ceicdata.com, as well as exchange rates (exchange rates), inflation, and interest rates for the BI rate were obtained from the official website of Indonesian central bank (www.bi.go.id).

This study uses time series data regression with the ECM (Error Correction Model) method to determine the relationship and influence between variables. This study uses time series analysis with several variables (multivariate). Initially, the stationarity test was carried out to ensure that the time series data was stationary. If the data used is not stationary, it will result in a blunt regression analysis (Gujarati, 2003). After the data is stationary at the level or the degree of integration, the test carried out is the

cointegration test. In this cointegration test to determine whether this regression model is cointegrated or not.

After the cointegration test is carried out, the next analysis is carried out using the ECM regression model. Next is the classical assumption test to produce an estimated parameter value that matches the actual value so that the parameter value has the characteristics of being unbiased, consistent, and also efficient or BLUE (Best Linear Unbiased Estimator). Classical assumption test consists of normality test, multicollinearity test, heteroscedasticity test, and autocorrelation test.

RESULTS AND DISCUSSION

Regression with the ECM model can be done if all research variables are not stationary at the level and stationary at the first difference level. Based on the results of the unit root test, it can be seen in table 1.

Table 1. Unit Root Test

Variable	Level	1st Difference
NPL	0.2856	0.0079
World Crude Oil Prices	0.0803	0.0000
Exchange rate	0.8920	0.0000
Inflation	0.0809	0.0000
BI rate	0.1941	0.0000

Source: E-views processing results, 2022

Furthermore. based on the cointegration test. in this study there is a correlation between variables in the long term which can be seen in table 2. The results of the ECM regression in the long term and short term can be seen in table 3 and 4.

In the table 3 it can be concluded that the independent variable (X) has a short-term effect on the dependent variable (Y) because the value (ECT (-1)) in the short term has a negative and significant effect.

Table 2. Cointegration Test

Variable	t-Statistic	Prob.	Decision
Residual (ECT)	-3.757079	0.0002	Stationary

Source: Output E-views processed, 2022

World crude oil prices have no effect on NPL with the assumption of ceteris paribus in the short term. Exchange rate has no effect on NPL in the short term assuming ceteris paribus.

Table 3. Results of Short-Term Regression Error Correction Model

Variable	Coefficient	t-statistic	Conclusion
C	-0.013167	-0.725272	
D(HMD)	0.000531	0.188112	Not significant
D(EXCHANGE RATE)	-5.04E-05	-0.733699	Not significant
D(INF)	-0.064612	-3.480070	Significant
D(RATE)	0.255571	3.464524	Significant
ECT(-1)	-0.074531	-3.582116	Significant
R-squared		0.124263	
Adjusted R-squared		0.103313	
F-statistic		5.931242	
Prob(F-statistic)		0.000038	

Source: Output E-views processed, 2022

Inflation has a negative effect on NPL in the short term. with the results of the ECM inflation test having a coefficient of -0.064612 meaning that when inflation increases by 1% it will result in a decrease in financial system stability by 0.064612 percent with the assumption of ceteris paribus.

The BI rate has a positive effect on NPL in the short term. with the results of the ECM BI

rate having a coefficient of 0.255571 meaning that when the BI rate increases by 1% it will cause an increase in financial system stability by 0.255571 percent with the assumption of ceteris paribus.

World crude oil prices influence NPL in the long term with the results of the ECM test coefficient of -0.039393. meaning that when world crude oil prices increase by 1 USD per barrel it will result in a decrease in NPL by 0.039393 percent with the assumption cateris paribus. The exchange rate has an influence on the NPL in the long term with the results of the ECM test coefficient of -0.000325. meaning that when the exchange rate increases by 1 IDR per USD. It will result in a decrease in NPL by 0.000325 percent assuming cateris paribus.

Inflation has no effect on NPL in the long term with the assumption of cateris paribus. The BI interest rate influences NPL in the long term with the results of the ECM test coefficient of 0.476380. meaning that when the BI interest rate increases by 1% it will result in an increase in NPL of 0.476380 percent with the assumption of cateris paribus.

The results of the classical assumption test show that the model has passed the normality test because the Jarque-Bera value is 1.86 with a probability value of 0.39. The Jarque-Bera probability value of 0.39 is greater than the 0.05 significance level. So, it can be concluded that Ho is accepted, and the results of the hypothesis indicate that the data is normally distributed.

Based on the VIF value. it shows that the VIF value of all independent variables is below 10. So, it can be concluded that the model in this study does not have multicollinearity symptoms. Based on the results of the heteroscedasticity test. the Prob value was obtained. Chi-Square is 0.05024 which is greater than 0.05 (α = 5%).

meaning that there is no heteroscedasticity problem in the research model.

Based on the results of the autocorrelation test using the Breusch-Godfrey Serial Correlation LM Test. the Prob value was obtained. Chi-Square of 0.6842 which is greater than 0.05 (α = 5%). So it can be concluded that the regression model in this study is free from autocorrelation problems.

Based on the regression results using the ECM approach. it is found that world crude oil prices have no effect on financial system stability in the short term. The coefficient obtained is 0.000531 with a t-statistic of 0.188112 smaller than the t-table = 1.645. So that in the short term world crude oil prices will not affect the stability of the financial system.

Meanwhile. in the long term. world crude oil prices have an effect on financial system stability. The coefficient obtained is -0.039393 with a t-statistic value of -12.74203 which is greater than the t-table value = 1.645. So that the price of world crude oil affects the stability of the financial system in the long term.

The price of world crude oil has no effect on the stability of the financial system in the short term. because the increase or decrease in the price of world crude oil in the short term will not directly affect the country's financial system. Previous research by Dayong Zhang (2017) on world oil and stock market shocks to measure international financial market relations also found the same research result that oil shocks may be important for one market but do not have a strong or significant effect on major international financial markets in general. .

World crude oil prices have an effect on long-term financial system stability. this is in line with Addury (2019) research and research by Jing-Yu Liu. et al. (2015) which states that world

oil prices have a negative and significant effect on bank credit risk. World crude oil prices which have a negative effect on financial system stability indicate that. if world crude oil prices become more expensive or increase. financial system stability will decline and vice versa.

This is because the declining world crude oil prices have an impact on the decline in the prices of other mining commodities. The decline in world crude oil prices had a major impact on gas and oil companies. If there is a continuous decline in oil prices for a certain period of time. it is feared that some gas and oil companies will collapse. This condition will ultimately have an impact on increasing bank credit risk. which is an indicator of financial system stability.

Based on the regression results using the ECM approach. the exchange rate has no effect on financial system stability in the short term due to the need for a lag or time lag of the exchange rate to affect financial system stability. The coefficient obtained is -5.04E-05 with a t-statistic value of -0.733699 which is smaller than the t-table value = 1.645. Therefore. in the short term. the exchange rate has no effect on financial system stability.

Then in the long term. the exchange rate affects the stability of the financial system. The coefficient obtained is -0.000325 with a t-statistic value of -8.497490 which is greater than the t-table value = 1.645 so it is said to be significant. Therefore. the exchange rate affects the stability of the financial system in the long term.

The exchange rate has a negative effect on the stability of the financial system in the long term. If the exchange rate of the IDR against the USD increases. it will cause financial system stability to decline and vice versa. This is in line with research Addury (2019) which states that the exchange rate has a negative and significant effect on Non Performing Financing (NPF).

Based on the regression results with the ECM approach. inflation has an effect on financial system stability in the short term. The coefficient obtained is -0.064612 with a t-statistic value of -3.480070 which is greater than t-table = 1.645. therefore in the short term inflation will affect the stability of the financial system.

Furthermore. in the long term inflation has no effect on financial system stability. The coefficient obtained is 0.025256 with a t-statistic value of 0.689222 which is smaller than the t-table value of 1.645. So that inflation does not affect the stability of the financial system in the long term.

The regression test with the ECM approach in this study resulted in the inflation variable having no effect on financial system stability in the long term. but inflation negatively affecting financial system stability in the short term. Inflation causes the selling price of goods and services to rise. so that people limit their consumption of goods and services.

This causes producers or companies to experience a decline in aggregate demand so that it is difficult to return their credit to banks and the risk of non-performing loans increases. Inflation marked by rising prices will generally burden people with fixed incomes because the ability to repay loans or loans becomes more difficult and causes the NPL ratio to increase so that the financial system is unstable because the distribution of funds is not smooth.

Inflation is negative and does not affect the stability of the financial system in the long term. it can be explained using the inflation theory put forward by Mankiw (2013) that inflation is a continuous increase in the price of goods which has an impact on decreasing people's purchasing

power because in real terms their income level also decreases. with the assumption that the income level of the community is constant. Inflation has no significant effect on bad loans because there is a moderating variable. namely people's purchasing power.

Based on the regression results using the ECM approach. the BI rate has an effect on financial system stability. The coefficient obtained is 0.255571 with a t-statistic value of 3.464524 more than t-table = 1.645. So that the BI rate has an influence on the stability of the financial system in the short term.

Meanwhile. in the long term. the BI rate also has an influence on financial system stability. The coefficient obtained is 0.476380 with a t-statistic value of 7.103229 which is significant because it is greater than the t-table which is 1.645. Therefore. the BI rate affects the stability of the financial system in the long term.

BI interest rates have a positive influence on financial system stability in the short and long term. This shows that the increase in BI interest rates will also have an effect on the increase in non-performing loans in this study. which is an indicator of financial system stability. When interest rates are high. the risk of non-performing loans increases.

Increasing interest rates will push the number of credit payments that must be paid immediately to be higher. This condition occurs because when interest rates are raised. it indicates that economic conditions are experiencing problems such as high inflation. this situation certainly affects the business sector developed by debtors.

An increase in central bank interest rates certainly aims to attract local currency to circulate in the community. the tendency of the community will certainly prefer to save when interest rates are raised. but if we observe in the credit payment process. an increase in interest rates will certainly encourage a larger value for credit bills to be fulfilled. this situation certainly makes debtors panic and increases the value of non-performing loans as seen in the Non-performing ratio. Performing Loan owned by the bank.

Keynes's theory of interest rates or often called liquidity preference states that liquidity preference (demand for money) or credit depends on interest rates. When interest rates rise. people prefer to keep their money in banks. So that the demand for money decreases and the money supply decreases. and vice versa if interest rates fall. the money supply will increase and people who make loans will increase. (Nopirin. 1997).

CONCLUSION

Based on the results of research using the Error Correction Model (ECM) approach that: a) World crude oil prices have no effect on financial system stability in the short term. while in the long-term world crude oil prices affect financial system stability in Indonesia. b) The exchange rate (exchange rate) does not affect the stability of the financial system in the short term. while in the long term it affects the stability of the financial system in Indonesia. c) Inflation affects financial system stability in the short term. while in the long term it has no effect on financial system stability in Indonesia. d) The BI rate affects the stability of the financial system in Indonesia in the short and long term.

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