

Analysis of the Effect of Macroeconomic Variables to Joint Stock Price Index with Monetary Policy as Moderating Variables in Indonesia

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Abstract--This research is intended to know the influence of the macroeconomic variables to join the stock price index and detect the possibility of flypaper effect occurrences at joint stock price index with monetary policy as moderating variable in Indonesia. This research population is Indonesia, and 17 of them were selected to be the samples for this research through a purposive sampling technique. Estimates conducted by the multiple regression analysis and moderating variable test. The data used in this study were secondary, consisted of Economic Growth, Inflation, and World Oil Prices to joint-stock price index with an interest rate as the monetary policy for the year 2000-2017. This research shows that Based on the partial test (t-test), the Economic Growth variable has no significant effect. In contrast, the Inflation and World Oil Price variables have a significant effect on the variables of the Joint Stock Price Index in Indonesia. The SBI Interest Rate as a monetary policy variable cannot moderate the relationship between Economic Growth, Inflation, and World Oil Prices on the Joint Stock Price Index in Indonesia.

Keywords--Economic Growth, Inflation, World Oil Prices, Monetary Policy, Joint Stock Price Index

I. INTRODUCTION

Economic development in a more advanced direction will open people's minds towards more modern ones, including investing their funds. Investment is a commitment to the funds made at this time, to gain profits in the future. Today there are various investment facilities besides investment in banks, one of which is the capital market [1]. Capital markets are financial instruments that sell and buy securities. Indonesia Stock Exchange (IDX) is a capital market owned by Indonesia. Historical data on the movement of shares are needed by investors when trading on the IDX. Information about summary stock performance in an index called the stock price index (stock price index) [2].

The analysis of economic factors must begin with the

global economy [3]. The global economy can affect company prospects, price competition with competitors or profits derived from foreign investment and company stock prices. The macroeconomic variables that affect the JCI include economic growth, inflation, the money supply, interest rates, exchange rates, and foreign share price indices.

The macroeconomic environment is an environment that affects the operations of everyday companies. Investors ability to understand and forecast future macroeconomic condition will be instrumental in making profitable investment decisions. Thus, an investor must consider several macroeconomic indicators that can help investors make their investment decisions. Macroeconomic indicators that are often associated with capital markets are interest rate fluctuations, inflation, exchange rate, stock trading volume and GDP growth [4].

The JCI experienced a fairly dramatic increase from the beginning of 2006 to the beginning of 2009. However, in the middle of 2008, a global economic crisis originating from the United States had brought down the economies of the European and Asian Continents. Particularly developing countries, such as Indonesia, were affected by the global financial crisis, which has pushed the stock index to fall by 50% in a relatively short period (JCI) continued to decline, and peak occurred in early October 2008, where the JCI fell by 10, 38% to touch the level of 1,451,669. This prompted the IDX to suspend securities trading until it was reopened on October 13, 2008. The purpose of the suspension was to protect investors and markets more broadly. In the last three months of 2008, the JCI continued to decline, followed by a decline in the value of market capitalization on the IDX. This resulted at the end of 2008, the JCI closed at 1,340,892 or down by 51.17% from the 2007 closing level of 2,745,826 [5].

In theory, the interest rate and stock price have a negative relationship. The interest rate that is too high will affect the

present value of the company's cash flow so that investment opportunities will not be attractive anymore. High-interest rates will also increase the cost of capital that will be borne by the company and will also cause the return of an investment will increase [6].

Stock Price is the Crude Oil Price. Crude oil is a commodity that plays a vital role in all economic activities. In 2015 the Government of Indonesia decided to revoke the fuel subsidy fund, which means that World Crude Oil Prices will directly affect fuel price. The direct impact of non-subsidized fuel changes in operational cost is a corrected level of investment activity [7].

Based on the explanation above, it can be seen that Economic Growth, Inflation, Interest Rates, and World Oil Prices influence the Composite Stock Price Index in Indonesia (BEI). It means that the assumption that Economic Growth, Inflation, Interest Rates, and World Oil Prices can influence the Composite Stock Price Index in 2010 to 2018 is generally acceptable.

II. THEORETICAL FRAMEWORK

A. Joint Stock Price Index

The Composite Stock Price Index (abbreviated IHSG, in English is also called the Jakarta Composite Index, JCI, or JSX Composite) is one of the stock market indices used by the Indonesia Stock Exchange (BEI; formerly the Jakarta Stock Exchange (BEJ)). First introduced on April 1, 1983.

As an indicator of stock price movements on the JSX, this index includes the evolution of all prices of ordinary shares and preferred shares listed on the IDX. Information on stock price index movements is essential for investors. The Stock Price Index is an indicator that investors can use to determine market movements. The index serves as an indicator of market trends, meaning that the index movement illustrates market conditions that are bearish (sluggish) or bullish (active).

The JCI index calculation uses all shares listed as a component of index calculation. Therefore, JCI is a stock price index most often considered by investors in investing in the Indonesia Stock Exchange (BEI) [8].

B. Economic growth

Economic growth is the process of increasing output per capita in the long run. The definition includes three aspects, namely: process, per capita output, and long term. Economic growth is a process, not a financial picture at a time. It reflects the dynamic aspects of an economy, namely seeing how an economy develops or changes over time. Economic growth is related to the increase in output per capita. In this case, it relates to total output (GDP) and population, because output per capita is total output divided by population. So the process of increasing per capita output must be analyzed by looking at what happens to the total output on the one hand, and the

population on the other. In other words, economic growth includes GDP growth and population growth.

C. Inflation

In economics, inflation is a process of increasing prices in general that is related to market mechanisms which can be caused by various factors, among others, increased public consumption, excess liquidity in the market that triggers consumption or even speculation, to include inability to distribute goods. Inflation can be classified into four categories, namely mild, moderate, severe, and hyperinflation inflation. Benign inflation occurs when the price increase is below the 10% a year; moderate inflation between 10% -30% a year; weight between 30% -100% a year; and hyperinflation or uncontrolled inflation occurs when the price increase is above 100% a year. Inflation is a continuous increase in prices and price increases that occur in all groups of goods and services. It might even be possible to increase it, not simultaneously. The important thing is to improve the general price of goods continuously for a specified period.

D. Interest Rate as Monetary Policy

Interest rate is the amount of interest paid per unit of time. In other words, people must pay the opportunity to borrow money. The cost of borrowing money measured in Rupiah or Dollar per year for each Rupiah or Dollar acquired is the Interest Rate.

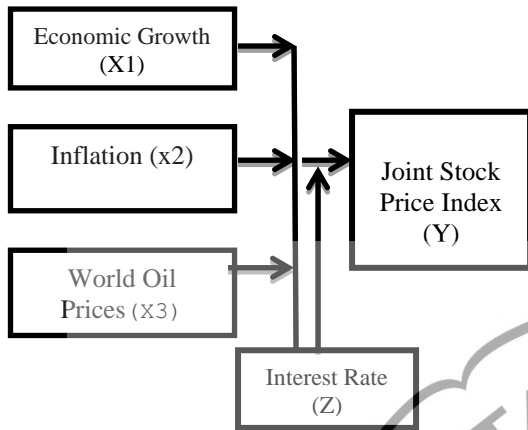
Interest Rates are prices that must pay if there is an exchange between one Rupiah now and one Rupiah later [9]. An abnormal increase in interest rates will make it difficult for the business world to pay interest and liabilities because high-interest rates will increase the burden on the company so that it will directly reduce the company's profits.

E. World Oil Prices

Crude oil or crude oil is one of the primary energy that is needed. The results of processing crude oil can be energy to carry out production activities. The types of crude oil traded in the world such as West Texas Intermediate (WTI), Brent Bland, OPEC Basket price, and Russian Export Blend [10].

The price of world crude oil is measured by the spot price of the world oil market; generally the price of oil used as the world standard price is West Texas Intermediate (WTI). West Texas Intermediate (WTI) is high-quality crude oil. The crude oil is a light-sweet type and has low sulfur content. This type of oil is very suitable for fueling energy because of the high quality of West Texas Intermediate crude oil is the price of world oil standards. West Texas Intermediate oil prices are generally five to six dollars higher than OPEC oil prices and one to two dollars a barrel higher than Brent Bland oil prices. It's why the price of WTI oil is a standard measure for the oil trade in America.

F. Thinking Framework The frame of mind is as follows



4. The World Oil Price is the spot price of the world oil market, generally, the standard used in West Texas Intermediate and Brent. Measurement of World Oil Prices using US \$.
5. The Composite Stock Price Index is a number that shows the movement of stock prices incorporated in the IHSG on the Indonesia Stock Exchange. JCI measurement uses unit points

C. Data Analysis Techniques

Data analysis method in this study is multiple regression analysis (Multiple Regression Analysis) and residual test for moderating variables. The research data was processed using the SPSS program (Statistical Package for Social Science). Multiple regression analysis intends to predict how the dependent variable's state is related to two or more independent variables. To test the moderating variable, it is selected using the residual test. With the multiple regression equation in a model I and residual test in model II.

Model I Multiple Linear Regression Analysis:

$$Y = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \mu \quad (1)$$

Residual Test Model II:

$$Z = b_0 + b_1 X_1 + b_2 X_2 + b_3 X_3 + e \quad (2)$$

Equation (2) aims to examine the effect of deviation (deviation) from a model.

$$|e| = b_0 + b_4 Y \quad (3)$$

Equation (3) aims to test whether the sanction variable can be said as a moderating variable.

Where :

- Y : Joint Stock Price Index
- α : Intercept
- $\beta_1, \beta_2, \beta_3$: Coefficient Regression
- X1 : Economic Growth
- X2 : Inflation
- X3 : World Oil Price
- Z : Interest Rate
- ϵ : error term
- |e| : Absolute residual value

G. Hypothesis

The hypothesis is a temporary answer to the problem that has been formulated. From the explanation of the theory and the formulation of the question above, the hypothesis is formulated as follows:

Economic Growth, Inflation, and World Oil Prices simultaneously and partially influence the Composite Stock Price Index. The SBI Interest Rate can moderate the influence between the variables of Economic Growth, Inflation, and World Oil Prices on the Composite Stock Price Index in Indonesia.

III. RESEARCH METHODS

A. Population and Sample

The population is all the objects to be studied [11]. The population in this study is Economic Growth, Inflation, World Oil Prices, SBI Interest Rates, and the Composite Stock Price Index in Indonesia. The sample is part or representative of the population that is the object of research. The samples in the study were Economic Growth, Inflation, World Oil Prices, SBI Interest Rates, and the Composite Stock Price Index in Indonesia from 2000 to 2017.

B. Operationalization of Variables

The variables used in this study are as follows:

1. Economic growth is all added value generated by various sectors or business sectors that carry out their business activities in a domestic or aggregate.
2. Inflation is the magnitude of changes in prices in general over a certain period expressed in units of percent
3. SBI Interest Rate is the benchmark interest rate determined by the central bank as the monetary policy's operational target to increase the effectiveness of monetary policy that is calculated in percentage units.

IV. ANALYSIS

TABLE I. REGRESSION RESULTS

Model	Unstandardized Coefficients		t	Sig.
	B	Std. Error		
1 (Constant)	5613.215	2765.320	2.030	.062

PDB	-609.235	646.862	-.942	.362
INFLATION	-389.009	121.126	-3.212	.006
WORLD OIL PRICE	48.814	22.474	2.172	.048

From the regression results above, the estimation model can be formed as follows:

$$Y = 5613,215 - 609,235 X_1 - 389,009 X_2 + 48,814 X_3$$

Model Interpretation

Based on the estimation model above, it can be explained the influence of independent variables, namely the interest rates on Economic Growth (X1), Inflation (X2) and World Oil Prices (X3) on the Composite Stock Price Index in Indonesia as follows:

1. Economic growth

Economic growth turned out to harm the Composite Stock Price Index in Indonesia. It is indicated by the regression coefficient X1, which is equal to 609,235. That is, every 1% increase in Economic Growth, the Composite Stock Price Index will decrease by 609.235% (ceteris paribus).

2. Inflation

Inflation turned out to have a negative effect on the Composite Stock Price Index in Indonesia. It is indicated by the regression coefficient X2, which is equal to 389,009. For every 1% increase in inflation, the Composite Stock Price Index will decrease by 389.009% (ceteris paribus).

3. World Oil Prices

World Oil Prices have a positive effect on the Composite Stock Price Index in Indonesia. It is indicated by the regression coefficient X3, which is equal to 48,814. Every 1% increase in World Oil Prices, the Composite Stock Price Index will rise by 48.814% (ceteris paribus).

Testing Individual Regression Coefficients (Statistic T Test)

1. Economic growth

For economic growth variables obtained by the value of t-count of -0.942 with a probability value (significance) of 0.362. Thus Ho is accepted, because the probability value is greater than the value of 0.05 (0.362 > 0.05) and - t-count > - t-table (-0.942 > -2.160). It means that it can be concluded that the Economic Growth variable has no significant effect on the joint-stock price index variable in Indonesia with testing at a confidence level of 95% (= 5%).

2. Inflation

For the inflation variable, the t-count value is -3.212 with a probability value (significance) of 0.095. Thus Ha, is accepted, because the probability value is smaller than the value of 0.05 (0.006 < 0.05) and the t-count < - t-table (-3.212 < -2.160). It means that it can be concluded that the Inflation variable has a significant (significant) effect on the Composite Stock Price Index variable in Indonesia by testing at the 95% (= 5%) confidence level.

World Oil Prices

For the World Oil Price variable, the t-count value is 2.172, with a probability value (significance) of 0.048. Thus Ha is accepted, because the probability value is smaller than the value of 0.05 (0.048 < 0.05) and t-count > t-table (2.172 > 2.160). It means that it can be concluded that the World Oil Price variable has a significant effect on the variable of the Composite Stock Index in Indonesia by testing it at a confidence level of 95% (= 5%).

Testing the Regression Coefficients Simultaneously (Statistic F Test) To prove the R-square value above, testing is done using the F test. The hypothesis is as follows:

$$H_0: \beta_1 = \beta_2 = 0$$

$$H_a: \beta_1 \neq \beta_2 \neq 0$$

Based on available data, it will be tested against 1 and 2 together, whether equal to zero, which means that there is no significant effect on the dependent variable or not equal to zero, which means having a substantial influence on the dependent variable.

TABLE II. TEST ANOVA

Model	F	Sig.
1 Regression	6.453	.006 ^b
Residual		
Total		

Based on the results of the SPSS program output, the F-count value is 6.453, with a probability value (significance) of 0.006. Thus Ha is accepted, because the value of F-count > F-table (6.453 > 3.41) and the probability value (significance) is greater than the value of 0.05 (0.006 < 0.05). It means that it can be concluded that the variable X1 (Economic Growth), variable X2 (Inflation) and variable X3 (World Oil Price) have a significant (significant) effect on the Composite Stock Price Index (Y) at a confidence level of 95% (= 5%).

TABLE III. COEFFICIENT DETERMINATION

Model	R	R Square	Std. Error of the Estimate
1	.762 ^a	.580	1395.86743

Based on the results of the SPSS program output, it can be seen that the R-square value is 0.580 which means that the variables X1 (Economic Growth), X2 (Inflation), X3 (World Oil Prices) are jointly able to explain of the Composite Stock Price Index in Indonesia by 58%. In comparison the remaining 42% is explained by new variables not included in the estimation model.

Moderating Test Results (Residual Test)

Residual Test is conducted to see whether the moderating variable can strengthen or weaken the influence of independent variables

on the dependent variable. The results of the residual motivation test (Z) can be seen in Table II and Table III below.

TABLE IV. RESIDUAL TEST

Model	Unstandardized Coefficients		t	Sig.
	B	Std. Error		
1 (Constant)	9.248	3.379	2.737	.016
PDB	-.630	.790	-.798	.438
INFLATION	.735	.148	4.965	.000
WORLD OIL PRICES	-.038	.027	-1.376	.190

TABLE V. RESIDUAL TEST RESULTS

Model	Unstandardized Coefficients		t	Sig.
	B	Std. Error		
1 (Constant)	1.272	.408	3.120	.007
IHSG	-.2963E-5	.000	-.245	.810

a. Dependent Variable: AbsRes_1

Based on the residual test results in Table IV and Table V the moderation regression equation is obtained as follows:

$$Z = 9.248 - 0.630 X1 + 0.735 X2 - 0.038 X3 \quad (1)$$

$$|e| = 1.272 - 2.963 Y \quad (2)$$

A variable is said to moderate if P-Value (Sig) < 0.05, and the coefficient value is negative. Based on Table 5.6 the results of the residual test show that the significant value of 0.810 is greater than $\alpha = 0.05$ ($0.810 > \alpha = 0.05$) and the negative coefficient value is (-2.963). It can be concluded that the Interest Rate is not able to moderate the relationship between Growth Economy, Inflation, and World Oil Prices on the Composite Stock Price Index. In other words, the SBI Interest Rate variable is not a moderating variable in this study (H2 is not acceptable).

V. CONCLUSIONS

A. Conclusion

Based on the results of research on the effect of Economic Growth, Inflation, and World Oil Prices on the Composite Stock Price Index in Indonesia, the following conclusions can be drawn:

- The F test, results concluded that Economic Growth, Inflation and World Oil Prices over the period 2000 to 2017 simultaneously had a significant effect on the Composite Stock Price Index in Indonesia at a 5% significance level. Thus the research hypothesis is accepted.
- Based on the partial test (t-test), the Economic Growth variable has no significant effect, while the World Oil Inflation and Price variables have a significant impact

on the Composite Stock Price Index variable in Indonesia by testing at a confidence level of 95% (= 5%).

- The coefficient of determination (R^2) is 0.580 which means that the variables X1 (Economic Growth), X2 (Inflation), X3 (World Oil Prices) together can explain the variation of the Composite Stock Index in Indonesia by 58% while the rest 42% is explained by new variables not included in the estimation model.
- Variable SBI Interest Rates are not able to moderate the relationship between Economic Growth, Inflation and World Oil Prices on the Composite Stock Price Index in Indonesia.

B. Suggestions

The suggestions in this study are as follows:

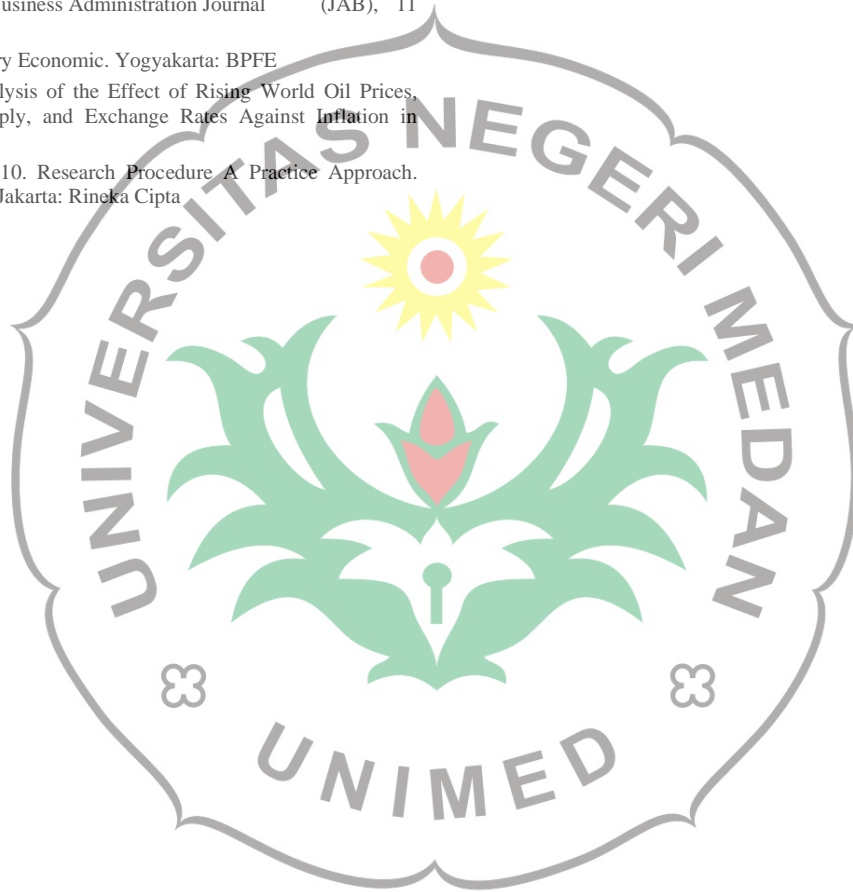
- Based on the limitations of this study, it is recommended that future researchers examine the Composite Stock Price Index. It is recommended to add other variables to the Macroeconomic and Macroeconomic Variables such as Export and Unemployment.
- The researcher only uses the CSPI as the dependent variable. In contrast, there may be other variables that can be influenced by Economic Growth, Inflation, World Oil Prices, or also there may be other variables that are between the independent and dependent variables (intermediate variables). And if the intermediate variables are included in the research model, it might provide more comprehensive results.
- Because macroeconomic variables are proven to affect stock price movements, there is a need for efforts from the government and monetary authorities to maintain the stability of these macroeconomic variables so that the movement of the stock price index is controlled and in line with expectations both in the short and long term.

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