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Analysis of The Effect of Growth Domestic Product Growth, Consumer Price Index, Inflation, BI Interst Rate, and The Rupiah-Dollar Exchange Rate on Gold Price

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ABSTRACT

This research aims to analyze macroeconomics factors that affect the Gold Price. The variables in this study are Gross Domestic Product Growth, Consumer Price Index, Inflation, BI Rate, Exchange Rate. The sample used in this research is secondary data of Gold Price in investing.com on the period from 2005-2020. Using SPSS (statistical package for the social science), methods of analysis used in this study include tolerance and VIF test, Kolmogorov- Smirnov test, multivariate cointegration tests: Test, SRESID and ZPRED estimation, t-statistical tests, F- statistical test, coefficient of determination (R2), and Pearson Correlation Product Moment. The result of this research shows Gross Domestic Product Growth, BI Rate, Exchange Rate have significant influence on the Gold Price, but Consumer Price Index and inflation have no significant influence on the Gold Price. All the independent variables simultaneously from a good model to explain the Gold Price since the magnitude of the effect value is 90,1% while 9,9% is explained by other variables besides Gross Domestic Product Growth, Consumer Price Index, Inflation, BI Rate, Exchange Rate. The formula that was found from this research could be used as a tool in predicting Gold Price. Keywords: Gold Price, Gross Domestic Product Growth, Consumer Price Index, Inflation, BI Rate, Exchange Rate.

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INTRODUCTION

Investment is an activity of placing funds in one or more places of one type of asset for a certain period with the hope of obtaining income and increasing investment value in the future. Yasa (2012) stated that investment has an important role to avoid a decline in the trade balance and even encourage economic growth, considering that Indonesia was a consumptive country in 2012 and not a productive country with a deficit trade balance. Investment has played a role in helping Indonesia's economic development by reducing the deficit after the 1998 monetary crisis.

Many countries use gold as a financial standard in the economic sphere. Gold is also used as an electronic raw material (such as a semiconductor material known as a chip) and many are used as jewelry with a variety of different grades. The monetary and financial sector

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generally uses gold based on the absolute monetary value of gold against various currencies around the world as a financial standard. World commodity exchanges use the official gold price to be listed in US dollars. Suharto (2013). Another thing that is commonly found in the global economy is gold and bullion bars which are used in monetary arrangements using a reference weight measuring grams to kilograms.

The references to the things above show that gold is an international medium of exchange which is used as a tool to maintain wealth and increase the economic strength of a country. On a smaller scale, namely for individuals, gold is used as a means of protection and guarantee for investment, depreciation of money, macroeconomic risks and also to store wealth. The classical economic view is that precious metals are a safe place to invest, which means buying gold is an investment that has the lowest risk of failure and it is believed that its purchasing power is not reduced by inflation or exchange rate fluctuations. The history of the world's central banks shows that gold deposits can be used to pay off debts, guarantee paper money, and maintain currency exchange rates.

Gold is one of the factors that affect the economy. Movements of the rise and fall of gold prices can be influenced by gross domestic product growth, the consumer price index, inflation, BI interest rates, and the rupiah exchange rate against the dollar. This research is important considering that the fluctuating gold price in the market will be influenced by several factors which need to be tested for the amount of their contribution to the gold price so that possible changes in the gold price can be predicted.

METHODS

The type of research used is quantitative, namely this research emphasizes analysis of data in the form of numbers (ratio) and is done using statistical methods. Basically, a quantitative approach is carried out in inferential research and relying on the conclusions produced on a null hypothesis error probability.

Data collection in quantitative research can be in the form of online surveys, online polls, and others. This study uses secondary data sourced from the Badan Pusat Statistik (BPS), the official website of Bank Indonesia, investing.com, and harga-emas.org. The results in the search for research data are generally in the form of numeric. After getting the results, then an analysis is carried out in accordance with the results that have been obtained

Dependent Variable

The dependent variable in this study is the price of gold. The gold price is the price used as a reference for gold prices in the world and has been determined by the London gold market standard, where the system used is known as the London Gold Fixing. The gold price data used in this study is quarterly for the period 2005– 2020 and comes from the official website harga-emas.org. Calculation of the price of gold using the price unit with rupiah per gram. The formula for calculating the price of gold per gram is:

$$Gold\ Price = \frac{\text{Gold Price per Troy Ounce}}{31{,}1\ \text{gram}} \times Rupiah\ to\ Dollar\ Exchange\ Rate$$

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Variabel Independen

The independent variables used in this study are:

1. Growth of Gross Domestic Product (GDP)
   GDP is the total value of production and services produced by all people or companies in one country, including added value, in a certain period of time, usually for one years. Is,

$$GDP = C + I + G + (X - M)$$

2. Consumer Price Index (CPI)
   CPI is an index that measures the average price of goods and services consumed by households. The CPI is used as a variable in measuring inflation rates and as a consideration in adjusting wages, pensions and other contracts.

$$\text{CPIn} = \sum_{i=1}^{k} \frac{\frac{P_{ni}}{P_{(n-1)i}} P_{(n-1)i} Q_{0i}}{\sum_{i=1}^{k} P_{0i} Q_{0i}} \text{X } 100$$

3. Inflation
   Inflation is a condition where the price level rises continuously. This means that inflation is a value at which the price level of goods and services generally increases. Inflation is an indicator of economic stability.

$$Inflation\ n = \frac{\text{IHKn} - \text{IHK(n} - 1)}{IHK(n-1)} X\ 1($$

4. BI interest rate
   BI Interest rate is the compensation or value paid by borrowers to lenders of funds or money. Interest rates are generally expressed as a percentage per year
5. Exchange rate
   The rate at which two currencies are traded against each other. In other words, the exchange rate is the rate at which one currency can buy another. Exchange rates are important because they identify the value between two or more goods and services from two or more countries.

Research Model

Multiple linear regression involves two or more independent variables and one dependent variable. The linear regression method is more often used in business practice because it is more relevant to use. The general equation of multiple linear regression for five independent variables is:

$$Y = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5$$

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RESULTS AND DISCUSSION

Result Of Descriptive Statistical Analysis

Table 4.1 Descriptive Statistics

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
X1_PDB	60	-.0532	.0689	.050400	.0216082
X2_IHK	60	104.56	159.45	127.9774	13.20021
X3_Inflasi	60	.0143	.1779	.061404	.0356512
X4_BI Rate	60	.0383	.1275	.071194	.0219014
X5_Kurs	60	8556	14763	11188.89	2094.813
Y_Harga Emas	60	128288	930833	440048.49	190820.897
Valid N (listwise)	60				

Source: Results of secondary data processing using SPSS

Based on the results of data processing as shown in table 4.1 above, it shows that this study has fulfilled the requirements, namely 60 data.

Classic Assumption Test

Normality Test

Table 4.2 Kolmogorov-Smirnov Test

NPar Tests

One-Sample Kolmogorov-Smirnov Test

		Unstandardized Residual
N		60
Normal Parameters[a,b]	Mean	.0000000
	Std. Deviation	57532.55211
Most Extreme Differences	Absolute	.079
	Positive	.061
	Negative	-.079
Test Statistic		.079
Asymp. Sig. (2-tailed)		.200[c,d]

a. Test distribution is Normal.
b. Calculated from data.
c. Lilliefors Significance Correction.
d. This is a lower bound of the true significance.

Source: Results of secondary data processing using SPSS

The results of the normality test after carrying out the data transformation give the Asymp value. Sig. (2-tailed) worth 0.200. This result represents that the value is more than 0.05, so it can be concluded that the research data has been normally distributed.

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Multicollinearity Test

Table 4.3 Multicollinearity Test

Coefficients[a]

Model		Collinearity Statistics	
		Tolerance	VIF
1	X1_PDB	.562	1.778
	X2_IHK	.687	1.456
	X3_Inflasi	.394	2.536
	X4_BI Rate	.371	2.694
	X5_Kurs	.554	1.804

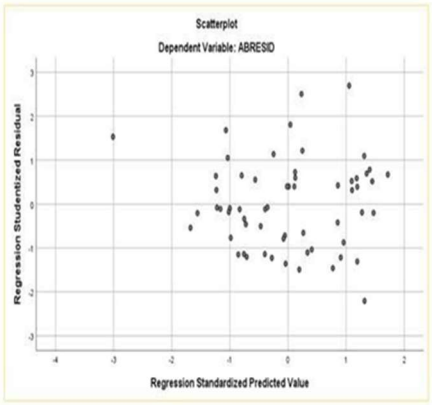
a. Dependent Variable: Y_Harga Emas

Source: Results of secondary data processing using SPSS

The data table 4.3 above shows the tolerance value for each independent variable is more than 0.10 as well as the variance inflation factor (VIF) value is still below 10. This shows that there is no element of multicollinearity between the independent variables, so the analysis can be continued.

Heteroscedasticity Test

Table 4.4 Scatter Plot



Source: Results of secondary data processing using SPSS

The table above shows that shows the distribution of research data, where the data spreads in all directions and does not create any pattern. These results indicate that the data is free from heteroscedasticity, so data analysis can be continued.

Multiple Linear Regression Analysis

Multiple linear regression analysis in this study is useful for finding the effect of gross domestic product growth, the consumer price index, inflation, BI interest rates, and the rupiah-dollar exchange rate on gold prices together. Multiple linear regression analysis is done by setting the equation:

$$Y = \alpha + \beta 1X1 + \beta 2X2 + \beta 3X3 + \beta 4X4 + \beta 5X5.$$

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The results of multiple linear regression analysis between the variables gross domestic product growth, consumer price index, inflation, BI interest rates, and the exchange rate of the rupiah against the dollar against the price of gold are presented in table 4.5

Table 4.5 Linear Regression Test Results

Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	596974.720	122161.725		4.887	.000
	X1_PDB	-1169772.072	483148.770	-.132	-2.421	.019
	X2_IHK	-1325.648	715.721	-.092	-1.852	.069
	X3_Inflasi	-90496.943	349701.004	-.017	-.259	.797
	X4_BI Rate	-4739953.149	586712.129	-.544	-8.079	.000
	X5_Kurs	37.063	5.020	.407	7.384	.000

a. Dependent Variable: Y_Harga Emas

Source: Results of secondary data processing using SPSS

The results of the multiple linear regression test obtained can be formulated as follows:

Gold Price =

596.974,720 – 1.169.772,072 X1 – 1.325,648 X2 – 90.496,943 X3 – 4.739.953,149 X4 + 37,063 X5

From formula above, we can conclude:

1. Gross Domestic Product Growth has a non-unidirectional effect on Gold Prices. This can be proven by the significance value of 0.019 which is smaller than 0.05 and the value tcount (2,421) > ttable (2,00048). These results are the same as the results of research conducted by Bapna in India where GDP growth affects gold prices. Stable GDP growth causes stable gold prices, but when GDP growth reaches a minus value (falls) it causes gold prices to rise.
2. The Consumer Price Index has no significant effect on the Gold Price. This can be proven by the significance value of 0.069 which is greater than 0.05 and the value tcount (1,852) < ttable (2,00048). This result is the same as the research conducted by Singh (2018).
   which stated that the CPI does not affect the price of gold in the short term, but gold investment can be used as a hedge against inflation. This is because the Consumer Price Index from 2010-2020 can be said to be stable, but the price of gold continues to increase every year.
3. Inflation has no significant effect on gold prices. This can be proven by the significance value of 0.797 which is greater than 0.05 and the value tcount (0,259) < ttable (2,00048). This result is not in line with research conducted by Worthington which stated that the price of gold has a strong co- integration relationship with inflation. This is because the inflation rate from 2016-2020 was relatively stable (+3.1%) but gold prices continued to increase every year due to rising exchange rates causing gold prices to continue to increase.

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4. Bank Indonesia's interest rate has a non-unidirectional effect on gold prices. This can be proven by the significance value of 0.000 which is lower than 0.05 and the
5. Valuethitung (8,079) > ttable (2,00048). These results are the same as research by Suharto (2012) which states that an increase in interest rates causes a decrease in gold prices and conversely an increase in interest rates causes investors to choose to invest their money in the money market or deposits compared to gold, so that the price of gold decreases. This is indicated by the average interest rate from 2005- 2007 of 10.2%, gold prices are low and stable, but when interest rates from 2016-2020 fell to around 5%, gold prices increased. This proves that when interest rates rise, gold prices fall and vice versa.
6. The exchange rate of the rupiah and the dollar has a direct effect on the price of gold. This can be proven by the significance value of 0.000 which is lower than 0.05 and the value tcount (7,384) > ttable (2,00048). These results are the same as research conducted by Sjaastad (2008) which states that the appreciation and depreciation of the US dollar are important factors in determining the price of gold. This is indicated by data for 2010-2020 where the exchange rate continued to increase as well as the price of gold which increased following the exchange rate.

Coefficient of Determination

The purpose of the coefficient of determination is to calculate how far the model's ability to explain the effect of the independent variables on the dependent variable. Table 4.6 shows the results of the coefficient of determination:

Table 4.6 Determination of Coefficient

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.953[a]	.909	.901	60137.139

a. Predictors: (Constant), X5_Kurs, X2_IHK, X3_Inflasi, X1_PDB, X4_BI Rate

b. Dependent Variable: Y_Harga Emas

Source: Results of secondary data processing using SPSS

The table above shows the adjusted R2 value of 0.901. This means that the percentage contribution to the influence of the independent variables Gross Domestic Product (GDP), Consumer Price Index (CPI), Inflation, Bank Indonesia Interest Rates, The Rupiah Exchange Rate with the Dollar has a simultaneous effect on Gold Prices.

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F Test

Table 4.7 F Test Result

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1.953E+12	5	3.906E+11	108.009	.000[b]
	Residual	1.953E+11	54	3616475530		
	Total	2.148E+12	59			

a. Dependent Variable: Y_Harga Emas

b. Predictors: (Constant), X5_Kurs, X2_IHK, X3_Inflasi, X1_PDB, X4_BI Rate

Source: Results of secondary data processing using SPSS

The results of multiple (simultaneous) linear regression as presented in table 4.7 obtained 0.000 < 0.05 according to the basis for taking the F test, so it can be determined that Gross Domestic Product Growth (GDP), Consumer Price Index (CPI), Inflation, Bank Indonesia Interest Rates, The Rupiah Exchange Rate with the Dollar has a simultaneous effect on Gold Prices.

T Test

Table 4.8 T Test Result

Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	596974.720	122161.725		4.887	.000
	X1_PDB	-1169772.072	483148.770	-.132	-2.421	.019
	X2_IHK	-1325.648	715.721	-.092	-1.852	.069
	X3_Inflasi	-90496.943	349701.004	-.017	-.259	.797
	X4_BI Rate	-4739953.149	586712.129	-.544	-8.079	.000
	X5_Kurs	37.063	5.020	.407	7.384	.000

a. Dependent Variable: Y_Harga Emas

Source: Results of secondary data processing using SPSS

From the results of the t test, the conclusion is that the consumer price index and inflation have a significance value above 0.05, which means that the Own Retention Ratio partially does not have a significant effect on the price of gold. Gross domestic product growth, BI interest rates, and the rupiah exchange rate against the dollar have a significance value below 0.05, which means they are significant to the price of gold.

CONCLUSION

The results of the research and discussion that have been carried out and described above can be concluded, that Gross Domestic Product (GDP), Consumer Price Index (CPI), Inflation, Bank Indonesia Interest Rates, Rupiah and Dollar Exchange Rates simultaneously have an influence on the Gold Price. The magnitude of the influence value can be seen from the calculation of the coefficient of determination with a result of 90.1% while 9.9% is explained by other variables besides the Gross Domestic Product (GDP) Growth factor, Consumer Price

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Index (CPI), Inflation, Bank Indonesia Interest Rate, Rupiah Exchange Rate to the Dollar. S. S. Sharma, (2016). The linear regression formula obtained from this study can be used as a tool to calculate the Gold Price, so that it can be used by various parties to calculate the Gold Price variable which can be used as an indicator of the condition of the Indonesian economy. The level of accuracy that reaches 90.1% can provide recognition for the good measurement of Gold Prices using this formula. The data used in the measurement is also available on the websites of Government Agencies/Institutions, so it is hoped that the simplicity of this measurement can become one of the benchmarks for measuring the condition of the Indonesian economy at a macro level. The suggestions that can be given after seeing the above conclusions are as follows: Investors in the gold sector in making decisions can consider the factors of Gross Domestic Product (GDP), Consumer Price Index (CPI), Inflation, Bank Indonesia Interest Rates, Rupiah and Dollar Exchange Rates. This is because the results of the study show that these variables have an influence above 90%, it will be a risk management analysis to reduce the risk of loss due to gold price fluctuations and will provide an empirical study for financial analysis related to gold investment. Regulators are expected to be able to pay attention to and make gold price movements one of the strong signals and indicators in predicting the condition of the Indonesian economy, so that they can make appropriate policies so that a good level of economic growth can be achieved. For future research, it is expected to be able to add and multiply variables, number of samples, and research period in order to obtain more accurate and precise research results. Based on the research results, the Consumer Price Index and Inflation variables have little influence on the Gold Price, so that future research can consider other variables that have not been discussed in this study.

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