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Analysis of The Effect of Macro Economic Factors on Indonesian Export Value Fluctuation (Empirical Data in Period: 1990 To 2018)

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Abstract: *Export is a source of foreign exchange of a country that must be considered and sought as much as possible and as widely as possible by the government. This study aims to determine whether macroeconomic factors, especially the real exchange rate (rupiah against the USD), investment and inflation affect the value of exports in Indonesia, both long-term and short-term during the period 1990 to 2018. Research previously produced has gone through several stages of statistical testing. The results of research that have been done show that there has been an equilibrium long run relationship between these macroeconomic factors to fluctuations in Indonesia's export value, this is evidenced through several stages of statistical tests, but conversely there is no disequilibrium in sort run relationships meaning value real exchange, investment and inflation have no effect on the short run relationship to the value of exports, this is evidenced through the results of the cointegration test and error correction method (ECM) test, where all variable data are not stationary and not cointegration and the results show are not significant.*

Keywords: *Exchange Rate, Investment, Inflation, Value Export*

I. INTRODUCTION

Exports are part of international trade and are a source of foreign exchange of a country that must be sought as much as possible and as broad as possible, so this will affect the national income of a country and have an impact on improving the welfare of its people.

According to the concept of comparative advantage stated by David Ricardo, it is said that a country has a comparative advantage in producing goods if the cost of producing goods is more efficient (low cost) so that it can set prices lower (low price) than the country others, so this has become a comparative advantage for exporting countries in the international market.Ekspor itu sendiri merupakan bagian international trade yaitu kegiatan menjual barang dan jasa dari domestic country menuju foreign country.

Expors are goods and services produced in the country, which will then be sold abroad (Mankiw, 2006: 240). By making export activities in the long run it will provide income (foreign exchange) for a country that affects economic growth, in developing countries such as Indonesia, state revenue plays an important role in developing countries' economic development. Thus, the development of the Indonesian economy is inseparable from changes in the economy in other

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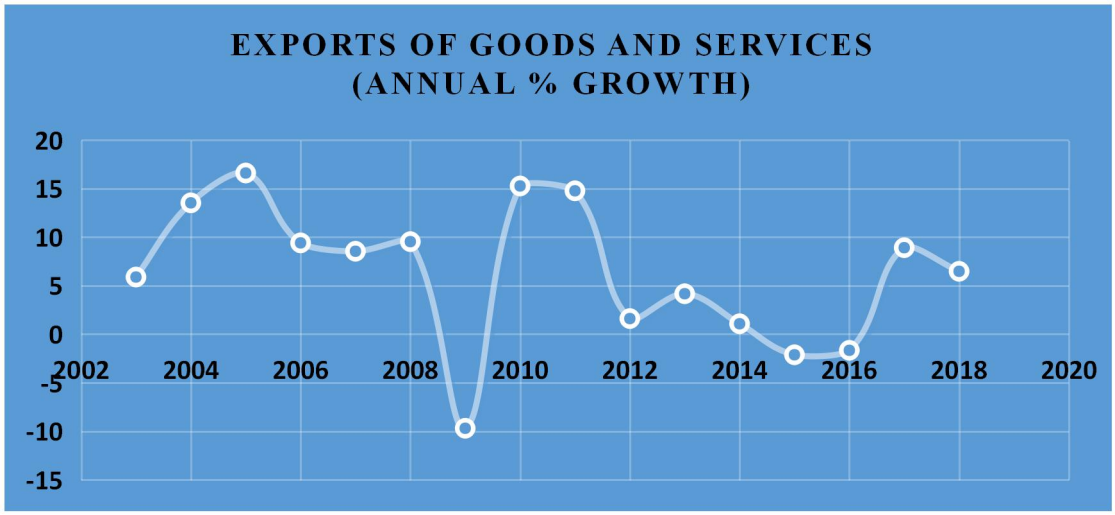
countries and the world in general. Indonesia as a developing country has opened itself up to take part in international trade (Pramana in A.A. Wife Sita Larasati and Made Twin Sri Budhi, 2013).

The Indonesian government is currently trying to increase the value and volume of exports as much as possible so that the Indonesian state is expected to achieve a trade balance surplus (Saudi, 2018). However, the condition of exports in Indonesia which fluctuated in 1990 to 2018 became very important to pay attention to the Indonesian government, especially when the decline in exports resulted in a trade balance deficit. Fluctuations in the value and volume of exports of a country are inseparable from macroeconomic factors that affect these exports. One of the macro-economic factors that influence fluctuations in exports is the real exchange rate, inflation in exporting and investment countries. According to Mankiw (2006: 231). According to Mahendra and Kesumajaya (2015) in their research explained that the factors that influence Indonesian exports are investment, inflation, exchange rates, and credit interest rates. Other economic factors that affect exports are consumer tastes, prices, exchange rates, consumer income and government policies on international trade.

Fluctuations in annual growth (in percent) of Indonesia's exports from 2003 to 2018 are displayed in the graph below:



Data Source : worldbank.org

Figure 1: **Exports of Goods and Services**

In the period 2003 to 2018 there has been a fluctuation in the growth of the value of exports of goods and services. From 2003 to 2005 there was an increase in the value of Indonesian exports while in 2006 - 2007 there was a drastic decrease in exports. In 2009 there was a sharp decline in exports so that Indonesia experienced a trade balance deficit (negative export growth). However, on the contrary, in 2010 there was a significant increase in Indonesia's export growth, but in 2012 there was a drastic decline in export growth, although not negative and the decline in export growth continued until 2015-2016 there was a trade balance deficit (export growth fell to negative), in 2017 Indonesia's export growth will gradually increase.

One of the macro economic factors that most influences export activities is the stability of the exchange rate. The exchange rate policy carried out by the central bank through monetary policy is used to maintain price stability which will then affect Indonesia's international trade (export) performance and will also affect other economic factors including GDP growth and inflation. The impact of the global economic crisis that hit some countries in the world including Indonesia in

1997 to 2000, one of which was the depreciation of the currency in a number of countries, has also affected the country's GDP growth rate and this will also affect the trade balance in these countries.

Other macroeconomic factors that influence export activities are inflation. According to Sukirno, 2002 that in general inflation would cause imports to develop faster but otherwise export growth would slow down. It is feared that if there is high inflation, the country will experience a trade balance deficit, because goods produced from that country are expensive (not competitive) and unable to compete in international markets. So the relationship between inflation and exports is inversely proportional (negative)

In addition to macroeconomic factors, another factor is the liberalization of international trade through free trade. Free trade is marked by the reduction of barriers which are usually done in international trade, especially the elimination of tariffs and non-tariffs. ASEAN Economic Community (AEC) and ACFTA (ASEAN-China Free Trade Area) is an agreement on the implementation of free trade areas between ASEAN countries and China is an example of global trade liberalization. So with the enactment of free trade each country is encouraged to compete to enter the international market or enter the global economy. This will also affect Indonesia's export performance because it is demanded to compete with other countries.

Seeing the phenomenon of the development of economic variables above, the question in the study is whether exchange rates, inflation and investment affect the value of exports in the period 1990 to 2018. These factors are macroeconomic variables that determine fluctuations in the value of exports achieved as foreign exchange.

Based on the description underlying this study, some of the cold objectives achieved in this study include: conducting a study / deepening to analyze the factors that affect fluctuations in export value. Conduct studies / deepening to measure the short-term and long-term relationship between exchange rates, inflation and investment on the movement of export values

II. LITERATURE REVIEW

Export

Export activities are part of international trade where one country needs commodities from other countries that are not in the country or the commodity can also be cheaper than other countries so that the country can export and compete in the international market.

According to (Okta Rabiana Risma, T. Zulham, Taufiq C. Dawood, 2018) export means international trade carried out by one country to be able to compete with other countries so that the country's economy will grow, especially for developing countries which are expected to be able to improve their economies such as developed countries in the world so that the state obtains state wealth which in turn will also increase the income of the people themselves. So that a very important function of exports is that the country gains profits and national income increases, so that it will increase the amount of output and the rate of economic growth.

Fluctuations in the value of exports depend on foreign income (Y *) and the real exchange rate (ε). The high income of a foreign country will increase the demand for commodities needed by the foreign country which will ultimately increase exports for the exporting country.

Meanwhile (Mankiw, 2006) argues that economic factors that influence the value of exports are consumer tastes, prices, exchange rates (exchange rates), consumer income and government policies towards international trade.

On the other hand the increase in the real exchange rate, the relative price of foreign goods in relation to domestic goods will also increase exports because the country's goods will be cheaper, more competitive in the international market. Exported goods (export commodities) produced by exporting countries must be competitive in the international market in

terms of price and quality. So that the price of export commodities is cheaper (low price), it will be influenced by several macroeconomic factors including inflation and investment.

Inflation

Inflation has a negative relationship with exports because when inflation occurs, commodity prices will increase, the increase in commodity prices is caused by high production costs because raw materials used to produce expensive output and most are still imported. The price of an expensive commodity will make it unable to compete in the global market. Ball (2005: 281) states that when the inflation rate is high it will cause the prices of goods and services produced or offered by a country to increase so that these goods and services become less competitive and exports will fall.

One of the causes of the rising inflation rate is too much money in circulation (excess money supply) which causes the price of goods in the country for example in Indonesia to increase compared to the price of goods abroad. So that foreign countries will reduce purchases of goods from Indonesia (domestic country). This can cause the value of the rupiah to depreciate against foreign currencies and will have an impact on the value of exports.

The definition of inflation itself (Dornbusch, 2004: 32) is the rate of change in prices and the price level is the accumulation of previous inflation, so that the measurement of inflation itself can be used from the Consumer Price Index (CPI), which can be written in the equation as follows :

$$\boldsymbol{\pi} = \frac{\boldsymbol{P_t - P_{t\cdot}}}{\boldsymbol{P_{t-1}}} \quad \text{.....} \quad 2.1$$

$\boldsymbol{P_{t-1}}$ is the price level of last year and $\boldsymbol{P_t}$ is the current price level of the year. So from the equation above we can determine the current price is: Where $\boldsymbol{P_{t-1}}$ is last year's price level and $\boldsymbol{P}$ is the current year's price level. So from the equation above we can determine the current price is:

$$\boldsymbol{P_t = P_{t-1} + \pi P_{\cdot}} \quad \text{.....} \quad 2.2$$

Influence of inflation on the domestic situation will affect the stability of prices, which in turn creates economic instability itself, which will cause domestic economic sluggishness. High domestic inflation has caused a slowdown in exports because the volume of production for exports has fallen and the prices of exported goods have become less competitive in the international market, which will reduce exporters' profits in real terms.

Exchange Rate

The exchange rate itself can be interpreted as the price of a country's currency (domestic currency) which is converted into another country's currency (foreign currency).

The relationship of exchange rates with fluctuations in export values is a positive relationship. This is because if the value of the domestic currency depreciates against foreign currencies, it will give an indication of the low price of Indonesian (domestic) products relative to foreign products, because with the same dollar it gives more rupiah. (Zuhroh, Idah, 2007) Changes in exchange rates between two countries can be formulated generally as follows:

In addition, if two countries experience different inflation rates between domestic and foreign countries, the exchange rate will move in the opposite direction in order to maintain the same price between the two countries. For example, if Indonesia experiences higher inflation to other countries, the exchange rate will change which will affect the value of

exports. This causes the export price of Indonesian goods and services to become relatively more expensive and unable to compete with foreign goods and services. Indonesia's exports will tend to decline while imports from other countries will tend to increase. As a result, the rupiah will experience pressure and depreciate against foreign currencies.

Investment.

Investment for a country is needed for capital for the business world. Investment in Indonesia can be in the form of foreign direct investment (PMA) and domestic investment. Investment or investment is the purchase of capital goods and production equipment to increase the ability to produce goods and services needed in the economy. So the increased investment will also improve the production process, so that it is also expected to increase export commodities.

III. RESEARCH METHOD

This research will use secondary data sourced from world banks, Bank Indonesia and the Central Bureau of Statistics. These data are data to find out and analyze macroeconomic factors that affect fluctuations in export value growth in Indonesia, particularly the real exchange rate, inflation and investment factors. While the data used in this study are time series data. The data collected includes all relevant variables for the purpose of estimation during the period 1990 - 2018.

3.1 Analysis Model

The analysis model is used to explain the relationship between independent variables and dependent variables. The analytical model used in this study is as follows:

$$\boldsymbol{logEX_t = \beta_0 + \beta_1 logExchRate_t + \beta_2 logINV_t + \beta_3 logINF_t^* + u_t} \quad \ldots\ldots\ldots\ldots 3.1$$

Information :

EX : Export Value

Exchange Rate: Nominal Exchange Rate

INV : Investment

IN : Inflation

Ut : White-noise process (disturbances or run errors)

Ln : Natural logarithm

- The coefficient value β1 can be negative or positive (β1 <0 or β1> 0), if β1 is negative, it indicates an increase in real income that occurs in Indonesia and this will increase the value of Indonesia's exports.
- The coefficient value β2 can also be negative or positive (β2 <0 or β2> 0) will depend on whether the investment in Indonesia, if negative, there will be a sluggish production of goods in Indonesia and will reduce the value of exports.
- The coefficient value β3 can also be negative or positive (β3 <0 or β3> 0) will depend on whether inflation occurs in Indonesia, if negative there will be a sluggish production of goods in Indonesia and will reduce the value of exports.

3.2 Method of Analysis.

Research conducted using secondary data and quantitative data, using time series data. Furthermore, the data from these variables are processed and analyzed using regression analysis with the help of the E-views version 6 program using the OLS (Ordinary Least Squares) method. The method of analysis in this research is to use cointegration analysis and error correction method (ECM).

3.2.1 Cointegration Method.

This cointegration method is used to explain the long-run relationship between economic variables, that is, the independent variable and the dependent variable in the form of the same trend direction of the non-stationary variables used in the model, so that the problem of the phenomenon of spurious regession not occur. Because basically that most economic model concepts are explaining the relationship of long-term behavior in accordance with the economic theory used in estimating the model. This cointegration method uses the Johansen test which is used to see the cointegration between variables in the model. To determine that the model used is cointegrated, in this case the Johansen test (Johansen Test) is used.

3.2.2 Error Correction Model (ECM)

This method is used to analyze multivariate time series data which is not stationary but there is a cointegration between the variables used in the research model. This method will also be used to see how much influence the real exchange rate has on the trade balance in this study.

If a cointegration variable occurs, it shows that in the long run a condition of equilibrium will be achieved, but in the short term it is not the case. So the error (deviation) in the short term will be corrected to return to its long-term balance. This correction process seen econometrically is called the error correction mechanism (Error Correction Method-ECM). So before conducting ECM, it must first be tested whether the cointegration variables have occurred as above.

3.3 Data Stationarity Testing.

This test intends to find out whether all the variables used in the analysis have mean and variant values that are constant over time. Time series data that does not meet the above is non-stationary data. ..... 3.1 :o stationary is through differentiation (difference) first level (1st difference), second level (2nd difference) and so on. which is done through a unit root test (unit root test). One statistical tool that can be used to test the root of this unit is to use the Augmented Dickey Fuller test (ADF-test). ADF can be tested with the following equation (Gujarati, 2009):

$$\Delta Y_t = \beta_1 + \beta_2 t + \delta Y_{t-1} + \sum_{i=1}^{m} \alpha_i \Delta Y_{t-1} + \varepsilon_t$$

where εt = pure white noise run error, ΔYt-1 = (Yt-1 - Yt-2) and so on.

3.4 Model Selection Criteria

The model used in this study is based on the regression analysis that is related to the study of the relationship between economic variables, which explain how strong the relationship between the dependent variable (dependent or explained) with the independent variable (independent or explanatory).

The method used to analyze this regression model is using the Ordinary Least Square (OLS) method, a method for generating an estimate of multiple regression equations using sample data. There are several model selection criteria used in this study, namely: R2 test (Goodness of Fit), the terminated coefficient (R2) provides a measure of goodness of Fit or the quality of the model itself in the estimated regression equation or measures how far the model's ability to measure the contribution of the independent variable to changes in the independent variable. However, in multiple regression regression we should use Adjusted R2 ((R ^ 2)), also called corrected R-squared. In addition, Akaike's Information Criterion test (AIC) is also used, the Akaike's Information Criterion (AIC) method is a method which is used to test the suitability of a model or choose a model, other than that other advantages of AIC are useful not only in samples but can also be used Forcasting performance is outside the sample of the regression model. The smaller the AIC value, the better the model (goodness of fit).

3.5 Test Statistics

The accuracy of the OLS function in estimating the actual value can be measured from the statistical value of existing data through statistical tests. Below there are a number of statistical tests that will be carried out in this study.

3.5.1 Normal Distribution Test.

This test is used to determine whether all variables, both independent variables and independent variables in the research model, are normally distributed or not. This relates to the regression equation model that is created in order to produce a BLUE equation. In this case the testing can be done by using several methods, one of which is the Jarque-Bera (JB) test.

3.5.2 t-Statistics Test (Partial Test)

This t test is intended to determine the significant level of influence of each independent variable (independent or regressor or explanatory) partially on the dependent variable (dependent or regressed or explained) on multiple regression. The hypothesis is as follows:

H0: $\beta i = 0$ that the independent variable I has no partial effect on

variable is not free.

H1: $\beta i \neq 0$ that the independent variable i partially affects the variable not free.

The rejection rule of the t test used in two-way testing is:

• p-Value approach: reject H0 if p-Value $\leq \alpha$

• Critical value approach: reject H0 if $t \leq -t\alpha / 2$ or if $t \geq t\alpha / 2$ or $|t| \quad |tc|$

3.5.3 F-Statistics Test (Simultaneous Test).

F test is intended to determine the level of influence of the independent variable (independent) as a whole (simultaneous) to the dependent variable (dependent). The hypothesis is:

H0: $\beta 1 = \beta 2 = \beta 3 = \ldots \ldots \beta k = 0$; all independent variables are hypothesized simultaneously

does not affect the dependent variable.

H1: $\beta 1 \neq \beta 2 \neq \beta 3 \neq \ldots\ldots \beta k \neq 0$; all independent variables are hypothesized simultaneously

affect the dependent variable.

The rejection rule is:

• p-Value approach: reject H0 if p-Value $\leq \alpha$

• Critical value approach: reject H0 if Fcount $\geq F\alpha$

3.6 Test the Linear Regression Model of Classical Assumptions

This test is needed to determine whether there are problems or deviations from the classical assumptions of the research model created, in order to produce an equation model that is BLUE. There are 3 classic assumption tests conducted, namely:

3.6.1 Multicollinity Test

Multicollinity is a condition where there is a linear relationship between the independent variables in the multiple regression model, it requires a multicollinity test. Multicollinearity test can be carried out by using Variance Inflatin Factor (VIF). The VIF limit is 10 if the VIF value is greater than 10 then multicollinearity occurs (Ghozali, 2002 in Thobarry, Achmad Ath, 2009)

Multicollinear testing can be stated with the following hypotheses:

H0: There is no multicollinearity in the model.

H1: Multicollinearity occurs in the model.

3.6.2 Heteroscedasticity Test.

To test for the presence of heteroscedasticity in the error run variant of a regression model can be done by several methods, namely the White 'Heteroscedasticity Test and Glejser test. With the following hypotheses:

H_0 : Homoscedasticity $\quad Var\left(u_i|X_i\right) = E\left(u_i^2|X_i\right) = \sigma^2$

H_1 : Heteroscedasticity $\quad Var\left(u_i|X_i\right) = \sigma_i^2 = \sigma^2\left(X_i\right)$

Tolak H_0 (Reject H_o) jika : $\quad \chi_{df}^{2*} > \chi_{df}^{2\ c}$

This autocorrelation test is used to test whether in a regression model there is a residual correlation of one observation with another observant. If there is a correlation, it is called an autocorrelation problem. There are several tests for this autocorrelation test that can be done, namely by using the Durbin-Watson (DW) test. The hypothesis of this autocorrelation test is as follows:

H0: r = 0 ; no autocorrelation

H1: r ¹ 0 ; Two-party test for autocorrelation whether positive or negative.

IV. FINDINGS AND ARGUMENT

This section describes the results of data processing from research that has been done with several stages that have been described in the research methodology so that the results of the research obtained are; Best, Linear, Unbias, Estimator (BLUE). Research carried out using the help of E-Views software.

4.1 Normalization Test

Normalization test results that have been carried out are as follows:

	Normality Test Against Model Variables				
No.	Variabel	Hasil	Jarque-Bera	Prob.	Keterangan
1	Value Export	Normal	2.646212	0.266307	Greater than α = 0.05
2	Exchange Rate	Normal	2.190296	0.334490	Greater than α = 0.05
3	Inflation	Normal	0.226612	0.892877	Greater than α = 0.05
4	Invesment	Normal	1.740877	0.418768	Greater than α = 0.05

Sumber : Output Eviews 6.0 (processed)

Seen from the results of the above output where the results of Jarque-Berra is greater than Prob. And Prob. Bigger than alpha. This shows Ho accept, which means that all data used in this study are of a normal distribution.

4.2 Estimasi Model Penelitian

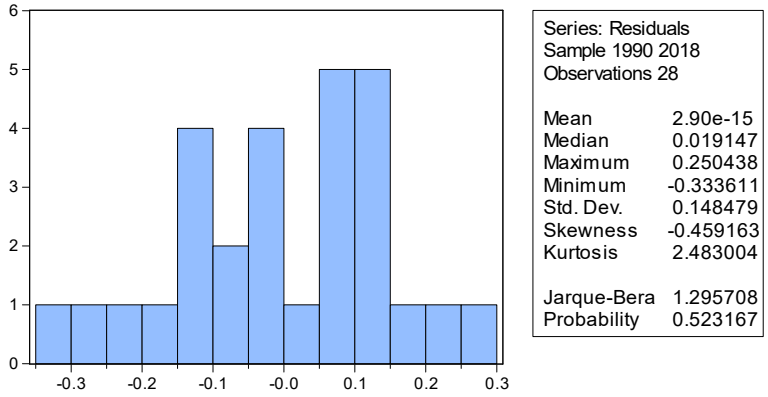
After the normalization test, the next step is the estimation of the long run research model. The estimation results of the research model that have been conducted with E-Views before cointegration and error correction model (ECM) tests are as follows:

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Log(Exchange Rate)	1.504734	0.046383	32.44116	0.0000
Log(Inflation)	-0.227685	0.077418	-2.941006	0.0071
Log(Invesment)	0.216474	0.024220	8.937730	0.0000
C	19.53023	0.468583	41.67936	0.0000
R-squared	0.987486			
Adjusted R-squared	0.985922			
F-statistic	: 631.2923			
Prob(F-statistic)	: 0.000000			
Akaike info criterion	-0.727402			
Schwarz criterion	-0.537087			
Hannan-Quinn criter.	-0.669221			
Durbin-Watson stat	1.211926			

From the estimation results (output) above, the research model can be obtained as follows:

Log(Value_Export) = 19.53023+ 1.504734*Log(Exchange_Rate) - 0.227685*Log(Inflation) + 0.216474*Log(Invesment) …..…… (4.1)

Normalization test results for the above research model are as follows:



From the results of the normalization test where the Probability of 0.523167 is greater than α = 5 percent and the Jarque-Berra results of 1.295708 are smaller than 2. This shows that the research model used is normal.

So from the results of the research model 4.1 above it can be explained that where the exchange rate factor occurs a positive relationship (directly proportional) to the export value with a coefficient of 19.53023, meaning that if the exchange rate depreciates by 1 rupiah then it will also increase the export value of 19.53023. Factor inflation occurs a negative relationship (inversely proportional) to the export value with a coefficient of 0.227685, meaning that if inflation has

increased by 1 percent then this will reduce the value of exports by 0.227685. While investment factors have a positive relationship (directly proportional) to the export value with a coefficient of 0.216474, meaning that if inflation occurs increases of 1 rupiah this will result in an increase in export value of 0.216474.

Besides that, from the estimation results on the output above, it can be seen that the partial relationship between the independent variables, namely the exchange rate, inflation and investment towards the dependent variable export value shows a significant relationship meaning that there is a relationship between these variables, this can be seen from the values of each Prob. (probability) is smaller than alpha of 0.05. This means that H0 is partially accepted for the independent variable on the dependent variable. While the relationship together (simultaneous) between the three independent variables (exchange rate, inflation and investment) with the dependent variable (export value) in this research model can be seen from the estimation results above are very influential (significant) this can be seen with the F test, where the probability value F is equal to 0 which is smaller than α = 0.05 (5 percent). This means that H0 is accepted for all independent variables together (simultan) of the dependent variable.

Also seen from the feasibility of the model (goodness of fit) used in very good research, this can be seen from the derivative coefficient of the Adjusted R-squared value of 0.985922 meaning the contribution or influence between the independent variables, namely the exchange rate, inflation and investment with the dependent variable that is, the export value is 98.5922%, very strong. The feasibility of the model can also be seen from the value of Akaike info criterion (AIC) that is equal to -0.727402, the smaller the AIC value, the better the research model used.

However, although the explanation of the results of the estimated output of the research model as shown above is very good, but in this study there needs to be caution of spurious or false regression ((Spurious Regression). This false regression is characterized by almost all the data that is used in research is not stationary but from the estimation of the research model goodness of fit is quite good which is characterized by having a coefficient of collateral (R ^ 2) greater than Durbin-Watson (D / W), each data has a significance value (t) is high but has a low Durbin-Watson (D / W) value, so to prove whether there has been a spurious or spurious regression (Spurious) Regression this needs a further process by conducting stationary tests for all research data used in research and cointegration test.

4.3 Classical Assumptions About the Research Model

So that the analysis carried out on the research model used is BLUE (Best, Linear, Unbias and Estimator), then the classical assumption test will be conducted first to find out whether there are problems with classical assumptions in the research model.

4.3.1 Autocorrelation Testing

Autocorrelation test was conducted on the research model using the Breusch-Godfrey Serial Correlation LM Test with the following results:

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	1.160764	Prob. F(2,22)	0.3317
Obs*R-squared	2.672644	Prob. Chi-Square(2)	0.2628

From the results of the above output where the value of Obs * R-squared is equal to 2.672644 and the value of Prob. F (2.22) is 0.3317, this value is greater than α = 0.05, so it shows that H0 is accepted, meaning that the research model used does not occur autocorrelation. Another method of autocorrelation testing is to use Durbin-Watson. Seen from the DW

results above amounted to 1.766348, this shows that these results do not occur autocorrelation

4.3.2 Heteroscedastic testing

Heteroscedastic test was conducted on the research model using: Breusch-Pagan-Godfrey with the following results:

Heteroskedasticity Test: Breusch-Pagan-Godfrey

F-statistic	1.656565	Prob. F(3,24)	0.2029
Obs*R-squared	4.803345	Prob. Chi-Square(3)	0.1868
Scaled explained SS	2.616752	Prob. Chi-Square(3)	0.4546

From the results of the output with Breusch-Pagan-Godfrey test above where the value of Prob. Obs * R-squared is 4.803345 and the value of Prob. F (3.24) is 0.2029, this value is greater than $\alpha = 0.05$, so it shows that H0 is accepted, meaning that the research model used does not occur heteroscedastic (homoscedastic).

4.3.3 Multicollinear Test

Multicollinearity tests are used to determine whether there is a high correlation between independent variables (predictors) in a multiple linear regression model. If there is a high correlation between the independent variables, then the relationship between the independent variables and the dependent variable (predictors) becomes disturbed. The condition of multicollinearity is characterized by where the value of the detemination coefficient (R2) is high but many independent variables are not significant

Multicollinear testing can be stated with the following hypotheses:

H0: There is no multicollinearity in the model.

H1: Multicollinearity occurs in the model.

The statistical tool used to test multicollinearity in this study is to use variance inflation factor (VIF).

4.3.4 Stationary Test

After conducting the classic assumption test above, the next step is the stationary test using the unit root test for each data used in the research model. This stationary testing uses the Dickey-Fuller (ADF test). If it is known that the data is not stationary at the level level, then the next step is to do a unit root test at the level of the 1st Difference or 2nd Difference, until the data is a statement. The hypothesis for this test is:

H0: $\delta = 0$ (there is a root unit, not stationary).

H1: $\delta \neq 0$ (no root unit, stationary)

The results of the root unit test output with the ADF-test for all variables used can be as follows:

Table 2: Unit Root Test Results (ADF-Test)

Variabel	Stationary Level					
	Level		First Difference		Second Difference	
	Prob.	**Keterangan**	**Prob.**	**Keterangan**	**Prob.**	**Keterangan**
Exchange Rate	0.7273	No Stasioner	0.0000	Stasioner	-----	-----

Value Export	0,9997	No Stasioner	0.0198	Stasioner	------	----
Invesment	0.4760	No Stasioner	0.9395	No Stasioner	0.0000	Stasioner
Inflation	0,0020	Stasioner	---	--		

Sumber : Output Eviews 6.0 (processed)

The output from the ADF-Test above is the critical value used as a statistical testing limit is the Mac Kinnon critical value with a limit α = 5%. The results show that all variables are not stationary at the level, except the inflation variable. This means that all the variable data used in the study contained a root unit. This can be seen from the value of Prob. greater than α = 5%, so this is continued in the next differentiation step, which is to the 1st Difference level where all prob. becomes smaller than α = 5%, showing all data in a stationary state.

4.4 Cointegration Testing

The next step in this research is to do the cointegration test. The purpose of this cointegration test is as explained in the previous section is to find out whether there is a long run equilibrium relationship between the independent variable (Exchange rate, inflation and investment) of the dependent variable (value export) with the cointegration test.

The first thing to do in the cointegration test is to see whether the residual from the output of the estimated model above used in the study has been stationary at the level or not. This test uses the Augmented Dickey-Fuller test (ADF-Test). The results from the stationary residual tests that have been carried out are as follows:

Null Hypothesis: RESIDUAL_1 has a unit root

Exogenous: Constant

Lag Length: 6 (Automatic based on SIC, MAXLAG=6)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-5.291672	0.0011
Test critical values:	1% level	-4.004425	
	5% level	-3.098896	
	10% level	-2.690439	

*MacKinnon (1996) one-sided p-values.

Warning: Probabilities and critical values calculated for 20 observations
and may not be accurate for a sample size of 14

From the results of the residual unit root test output of the research model at the level of the above results it can be concluded that H0 is rejected, this shows that there are no unit roots in the residual in the determination model indicated by a critical value (5%) of -3,098896 more greater than the ADF statistical test value that is equal to -5.291672, other than that it can be seen from the probability value of 0.0011 less than α = 5%.

The next step is cointegration testing on all data variables (groups) used in the research model by the Johansen Cointegration Test method, at this stage we will look for the number of rank cointegration equations that can be formed. With H0: rank r = 3 versus H1: rank r = 4, the Johansen test statistic results are obtained as follows:

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None	0.565164	38.89624	47.85613	0.2644

Trace test indicates no cointegration at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None	0.565164	19.98687	27.58434	0.3420

Max-eigenvalue test indicates no cointegration at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

**MacKinnon-Haug-Michelis (1999) p-values

The cointegration test output above shows that the trace statistic value of 38.89624 is much smaller than the critical value (5%) which is equal to 47.85613. In addition to strengthening the results of this cointegration test, we can also see the results of the Maximum Eigenvalue Statistics, with results of 19.98687 smaller than the critical value of 5%. 27.58434 and Prob value. of 0.3420 is greater than 0.05. From these results we can conclude that there is no cointegration (Max-eigenvalue test showing no cointegration at the 0.05 level) between the four variables namely exchange rate, investment, inflation and export value. It can be concluded that there has been a long run relationship equilibrium between economic variables in the study. Thus the multiple regression equation of this research model no longer contains the problem of *spurious regression*.

4.5 Estimasi Error Correction Model (ECM)

Although in long run there has been an equilibrium relationship as described above, but in a short run relationship there is not necessarily a balance (disequilibrium), this research will be continued using the error correction model (ECM) using the Engle-Granger test to analyze the movement of interest rates, inflation and GDP against the CSPI in the short term so that there is an equilibrium. In ECM we must enter an error correction variable to eliminate the problem of imbalance in the short term. This error correction variable is the previous period residual obtained from the estimated long-term residual. In order to obtain estimates for the model (ECM) using e-views are as follows:

D(LOG(VALUE_EXPORT3-1)) = 0.13019540221 + 0.371744045929*D(LOG(EXCHANGE_RATE-1)) - 0.0153775152497*INFLATION(-1) + 0.0331081494898*D(D(INVESMENT-1)) - 0.21340711739*RESIDUAL_1(-1)

…….. 4.2

Dependent Variable: D(LOG(VALUE_EXPORT3-1))

Method: Least Squares

Date: 02/10/06 Time: 01:34

Sample (adjusted): 1992 2018

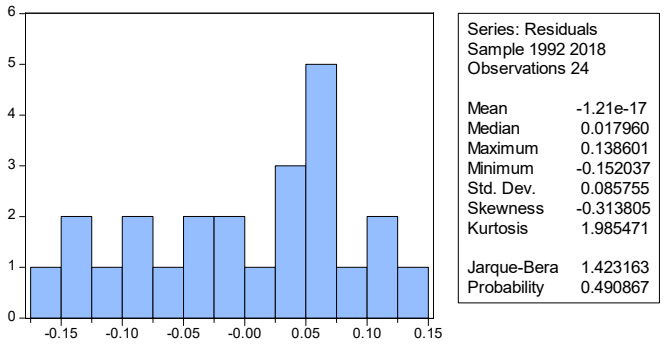
Included observations: 24 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.130195	0.118131	1.102129	0.2842
D(LOG(EXCHANGE_RATE-1))	0.371744	0.271066	1.371416	0.1862
INFLATION(-1)	-0.015378	0.057815	-0.265978	0.7931
D(D(INVESMENT-1))	0.033108	0.018928	1.749168	0.0964
RESIDUAL_1(-1)	-0.213407	0.165693	-1.287966	0.0213
R-squared	0.223452	Mean dependent var		0.112312
Adjusted R-squared	0.059968	S.D. dependent var		0.097315
S.E. of regression	0.094352	Akaike info criterion		-1.700526
Sum squared resid	0.169142	Schwarz criterion		-1.455098
Log likelihood	25.40631	Hannan-Quinn criter.		-1.635414
F-statistic	1.366814	Durbin-Watson stat		1.386039
Prob(F-statistic)	0.282581			

The error correction model (ECM) test above is where the lag of residual value is negative, that is -0.213407 (the result must be negative). This shows that the error correction run was 21.34% and the results were significant. The results of each independent variable (partially) on this ECM test, namely the exchange rate, investment and inflation turned out to show all the variables are not significant to the dependent variable (export value), including residuals. This shows that the independent variables do not have a short run equilibirium relationship to the dependent variable (value export), this is evidenced from the Probability value (Prob.) Of each variable greater than $\alpha = 5\%$, as well as all The independent variable has no effect on the

export value in the short run, this is evidenced from the Prob value. (F-statistic) of 0.282581, this value is greater than α = 5% which means accept H0.

normalization test results on the ECM model where the Probability of 0.490867 is greater than α = 5 percent and the Jarque-Berra results of 1.423163 are smaller than 2. This shows that the research model with the ECM test used is normal, as shown in the results below this :



V. CONCLUSIONS

From the results of research conducted on the influence of macroeconomic factors (exchange rate, inflation and investment) on Indonesia's export value in the period 1990 to 2018, it shows that there has been an equilibrium long run relationship, this is evidenced by the estimation results of the model that has been through several stages of statistical tests in which all independent variables are partially significant to the dependent variable besides that the feasibility of the research model (goodness of fit) in terms of the Adjusted R-squared value shows a very strong relationship, in terms of the value of the Akaike info criterion (AIC) is quite good . However, all variable data used in the study are not stationary except for inflation data so a cointegration test is needed, this is done to determine the short run relationship. The result is that in the short run relationship, these macroeconomic factors do not occur in a disequilibrium relationship, this is evidenced by the results of using the error correction method (ECM) that has been done where all independent variables, namely the exchange rate, investment and inflation including the residual, show all The variable is not significant to the dependent variable (value export). So that macroeconomic factors in this study will be very influential in the long term but the effect will not be felt in the short term.

However, fluctuations in the value of Indonesia's exports in addition to being influenced by economic factors as described above are also influenced by non-economic factors. Non-economic factors that are thought to influence fluctuations in export values include: national security, politics, cultural issues and security

The results of this study can provide input especially for the Indonesian government that in determining policies to increase the value of exports must pay attention to macroeconomic factors that will have a long-term impact to boost the country's economy. The Central Bank (Bank Indonesia) must be able to maintain the stability of the exchange rate so that export commodities are able to compete in the international market.

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