

THE EFFECT OF EXCHANGE RATE, EXCHANGE RATES VOLATILITY AND EXPORT PRICE INDEX ON EXPORTS IN INDONESIA FROM 2013 TO 2017 (CASE STUDY OF NON-OIL AND GAS COMMODITY)

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Abstrak

Makalah ini secara empiris menyelidiki dampak nilai tukar, volatilitas nilai tukar, dan indeks harga ekspor ke depan ekspor di Indonesia dengan objek yang digunakan adalah ekspor non-migas oleh komoditas untuk periode 2013:1 hingga 2017:12. Fokus utama adalah dampak nilai tukar, volatilitas nilai tukar, dan indeks harga ekspor terhadap ekspor dari Indonesia. Untuk mencapai tujuan ini, berbagai pendekatan telah digunakan sebelumnya. Sejalan dengan penelitian sebelumnya, metode Regresi Linier Berganda digunakan. Tes yang sesuai untuk memastikan keandalan analisis dilakukan seperti T-test dan F-test dan juga R² Square. Hasil kami menunjukkan bahwa nilai tukar memiliki pengaruh negatif yang signifikan terhadap ekspor, volatilitas nilai tukar memiliki efek negatif yang tidak signifikan terhadap ekspor dan indeks harga ekspor memiliki pengaruh positif signifikan terhadap ekspor. Namun, untuk volatilitas nilai tukar, hubungan itu tidak signifikan pada level 5%.

Kata Kunci : Nilai Tukar, Volatilitas Nilai Tukar, Indeks harga ekspor, Regresi Linier berganda

Abstract

This paper empirically investigates the impact of exchange rate, exchange rates volatility and export prices index forward export in Indonesia with the object used is export of non-oil and gas by commodity for the period from 2013:1 to 2017:12. The primary focus is the impact of exchange rate, exchange rates volatility and export prices index on exports from Indonesia. To achieve this purpose, various approaches were employed previously. In line with the previous studies, the Multiple Linear Regression method was employed. Appropriate tests to ensure the reliability of the analysis were undertaken such as T-test and F-test and also R² Square. Our results indicated that exchange rate has a negative effect that significant towards export, Exchange rates volatility has a negative effect that not significant on export and export price index has a positive significant toward export. However, for the exchange rates volatility the relationship was not significant at a level of 5%.

Keyword; Exchange Rate, Exchange Rates Volatility, Export Price Index, Multiple Linear Regression

1. Research Background

Governor of Bank Indonesia (BI) Agus Martowardojo stated that over the past five years, the rupiah exchange rate and inflation were relatively well maintained. Although at the beginning of the task, the economy was quite difficult [1]. Since May until August 2013 the flow of foreign capital has continued to emerge resulting in weakening of exchange rates and financial markets in developing countries including Indonesia. In terms of the rupiah exchange rate, Agus noted, in the last five years BI managed to maintain volatility in the rupiah exchange rate below 12%. In this case, foreign exchange reserves are still in a fairly good condition [2].

Foreign exchange it's one of the main factors in International trading activity, the volatility of foreign exchange can also beneficial to some corporate or even individual, it happens when a country has a demand and supplier to balance the economic growth. The impact of exchange rate changes on international trade has long been the concern of economists, analysts and policymakers [3]. In Indonesia itself the peak of the lowest US Dollar (USD) against Indonesia Dollar Rupiah (IDR) range from January 2013 to December 2017 happen on September 28th 2017 at reached of 14779 and the bottom of the strength US Dollar (USD) against Indonesia Dollar Rupiah (IDR) range from January 2013 to December 2017 happen on January 14th 2013 stop at point 9617.

Beside that the fluctuation of foreign exchange can measure the economics of a country based on how high the export and import is. This issue must be considered by any investor or any industry players who does export and import activity. The volatility and uncertainty of exchange rate movements after the breakdown of the Bretton-Woods agreement led policy makers and researchers to investigate the impact of exchange rate fluctuations on the volume of trade [4]. The volume of trade itself has increase in the market demand of trading partners countries of Indonesia.

Salvator said that exports are one of the driving machines economic growth and the study done by Salvator shows that export is one the main factor for developing countries were able to increase economic growth. Increased exports and investments made by developing countries can push output and economic growth [5].

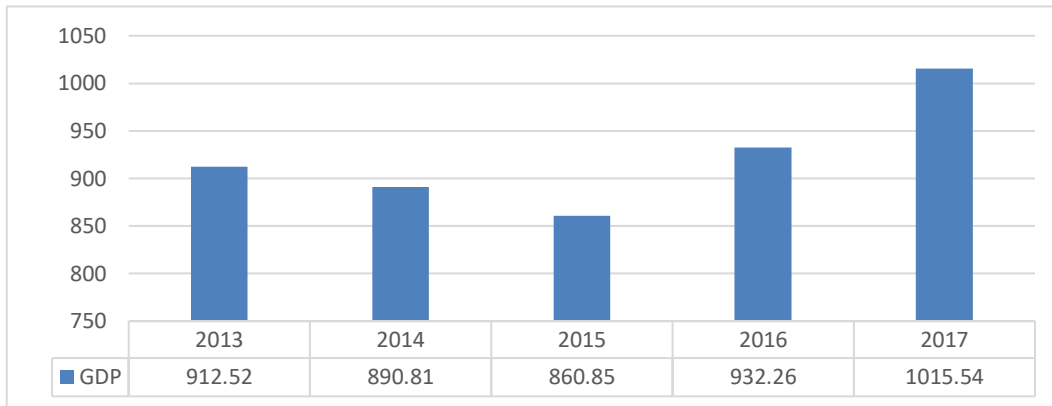


Figure 1.1 Indonesia GDP

Indonesia National Gross Domestic Product (GDP) over 5 years back has a fluctuate condition, the strongest position shown on the figure 1.3 it's in 2017 with the scale of GDP 1.1015,54 trillion USD. When the real exchange rate is high, the relative price of goods at home is higher than the relative price of goods abroad. In this case, import is likely because foreign goods are cheaper, in real terms, than domestic goods. Thus, when the real exchange rate is high, net exports decrease as imports rise [6].

it is a different result by (McKenzie & Brooks, 1997) that conclude of export has a positive correlation to foreign exchange volatility. This is also supported by (Kasman & Kasman, 2005) who in the research found a positive result that conduct exchange rate uncertainty to export in Turkey.

Based on previous research, author conclude that the main point under this research is **“The Effect of Exchange Rate, Exchange Rates volatility and Export Price Index on Exports in Indonesia from 2013 to 2017 (Case Study on non-oil and gas commodity)”**.

2. Related Theories

2.1 Foreign Exchange

2.1.1 Exchange Rates

Foreign exchange is an exchange rate of the number units of a given currency that can be purchased for one unit of another currency. It is a common practice in world currency markets to use the indirect quotation, that is, quoting all exchange rates (except for the British pound) per U.S. dollar [11]. Exchange rates have been highly volatile since the arrival of the flexible exchange rate system in the 1970's. [4].

The foreign exchange market was only available to larger entities trading currencies for commercial and investment purposes through banks, now online currency trading platforms and the internet allow smaller financial institutions and retail investors access a similar level of liquidity as the major foreign exchange banks, by offering a gateway to the primary (Interbank) market [7]

The real exchange rate between the two currencies of the two countries is calculated from the nominal exchange rate multiplied by the price level ratio in the two countries. The relationship between the real exchange rate and the nominal exchange rate can be formulated as follows:

$$REER = ER * \frac{FP}{DP} \quad (1)$$

2.1.1.2 Exchange Rates Volatility

Higher exchange-rate volatility leads to higher cost for risk averse traders and to less foreign trade. This is because the exchange rate is agreed on at the time of the trade contract, but payment is not made until the future delivery actually takes place. If changes in exchange rates become unpredictable, this creates uncertainty about the profits to be made and, hence, reduces the benefits of international trade [8].

While there is no specific calculation of exchange rate volatility, various statistical measures of exchange rate volatility have been calculated in the literature. In author research study, the exchange rate volatility variable is constructed by the moving sample standard deviation of the growth of the real exchange rate [4].

$$V_t = \left[\left(\frac{1}{m} \right) \sum_{i=1}^m (\log Q_{t+i-1} - \log Q_{t+i-2})^2 \right]^{\frac{1}{2}} \quad (2)$$

2.1.2 Real Export

2.1.2.1 Real Export

According to the Law of the Republic of Indonesia Number 17 years 2006, export is the activity of removing goods from customs areas. If the buyer comes from abroad and the seller comes from within the country, then the activity can be regarded as export [9].

Exports are one component of international trade. The other component is imports. They are the goods and services bought by a country's residents that are produced in a foreign country. Combined, they make up a country's balance. When the country exports more than it imports, it has a trade surplus. When it imports more than it exports, it has a trade deficit.[10].

As it has been stated above that for looking the profit of the whole export can be seen as formula below:

$$\text{Net Exports} = \text{Value of Exports} - \text{Value of Imports} \quad (3)$$

2.1.2.2 Export Price Index

Among several factors to see the overall export and import, it can be seen export price index as a value that provides a benchmark for price gains and vice versa. The export price decision is distinct from the domestic price decision in the home market. The export decision has to consider variations in market conditions, existence of cartels or trade associations, and the existence of different channels of distribution [11].

According to the Kenton [12], the import and export price indexes are used to deflate government trade statistics, or to look at them over time. They are used to predict possible future inflation in both domestic production, and prices charged. They are used to set fiscal and monetary policy, to measure the exchange rates, forecast future prices, and negotiate trade contracts. And finally, to identify specific industrial and global price trends.

Export Price Index as a tool for helping the international trader to see global market condition, to calculate the export price index with the formula given:

$$P_c^{0:t} = \frac{1}{n} \sum \left(\frac{p_i^t}{p_i^0} \right) \quad (4)$$

2.2 Theoretical Framework

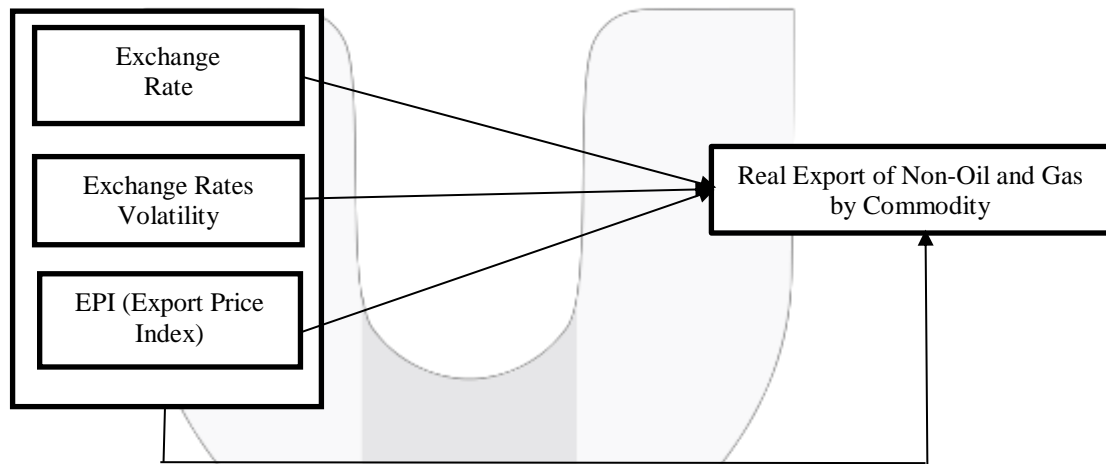


Figure 2.1 Theoretical Framework

Based on literature reviews, previous research finding, and research framework. There are several factors that affect Export in Indonesia. The independent variables are Exchange Rate, Exchange Rates Volatility and Export Price Index. The variables have been conveyed by several previous study have an effect on Export. Therefore, the hypotheses are aim as temporary answers of the research question, the hypotheses are:

1. Exchange Rates has significant influence on the export of non-oil and gas period 2013-2017.
2. Exchange Rates Volatility has significant influence on the export of non-oil and gas period 2013-2017.
3. Export Price Index has significant influence on the export of non-oil and gas period 2013-2017.
4. All the variable independent has significant influence on the export of non-oil and gas period 2013-2017.

Indonesia aggregate export was examined for the period of 2013:01 to 2017:12. The data set consisted of monthly observations for the interest variables used in the analysis. We obtained the monthly real effective exchange rate data from the Central Bank of Indonesia. Data for the exports, the export price index were obtained from the Statistics Indonesia (BPS). To calculate the volatility variable, Exchange Rates were taken from Statistics Indonesia (BPS) and calculated as the moving sample standard deviation of growth for the real exchange rate for each month for the specified period. SPSS 20 software was used in the analysis. This study is using quantitative research using statistical method form analysis from the data collection. In this research carried out with descriptive research. The investigation type of this research is causal research. The reason is because the researcher will examine the influence of Exchange Rates, Exchange Rates Volatility and Export Price Index. The unit analysis of this research is related organization. The time series is applied for the time period. The data analysis technique used in this study is multiple linear regression analysis and classical assumption test (Test for normality, multicollinearity, heteroscedasticity autocorrelation). This method of analysis expects to provide the right conclusion with this study. The multiple linear regression analysis used in this research is:

$$Y = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + e$$

Where:

Y = dependent variable (Real Export)

X = independent variable consisting of:

X1 = Exchange Rates

X2 = Exchange Rates Volatility

X3 = Export Price Index

α = constant

β = regression coefficient for each variable

e = error term

3. Results

3.1 Descriptive Statistics

In this research presented a study in descriptive analysis that aims to explain descriptively each variable. Explanation in descriptive analysis in the form of mean, median, maximum, minimum, standard deviation, and number of observations. Descriptive analysis is expected to be able to explain descriptively about dependent variable used in this research. According to table 3.1, it shows that the average of real export is 11.880,61 and for the independent variable real exchange rates has an average 12.543,06, exchange rates volatility has 0.003710 and export price index (EPI) has 136,50.

Table 3.1 Descriptive Statistic

	Real Export	RealExchang e	Volatility	EPI
N Valid	60	60	60	60
Missing	0	0	0	0
Mean	11880.61	12543.06	.003710	136.50
Median	11994.70	13184.15	.003500	136.68
Std. Deviation	1147.502	1276.446	.0020178	12.547
Minimum	8651	9735	.0008	111
Maximum	14039	14468	.0109	154

3.2 Classical Assumption Test

3.2.1 Normality Test

The first test is a normality test; a normality test is done to test whether the data is normally distributed or not

Table 3.2 Normality Test

Kolmogorov-Smirnov Z	.462
Asymp. Sig. (2-tailed)	.983

From the table above can be seen the result of Kolmogorof-Sminov is 0.462 with the significant result 0.983. Which mean the residual has normal distribution because its bigger than >0.05.

3.2.2 Multicollinearity Test

Multicollinearity test aims to detect the presence or absence of multicollinearity symptoms in multiple regression models, namely by looking at the value of Variance Inflation Factor (VIF) and tolerance value.

Table 3.3 Multicollinearity Test

Collinearity Statistics	
Tolerance	VIF
.173	5.797
.719	1.391
.167	5.974

Based on the results of data process can be seen the independent variable multicollinearity test at table 4.4 It is known that the result of Collinearity Tolerance is from X_1 has a tolerance within 0,167, has a tolerance X_2 0,173 and X_3 with the tolerance 0.719 and for VIF X_1 has a value 5,974, X_2 has 5,797 and X_3 has 1,391. From all the variables above has shown that there is no multicollinearity problem.

3.2.3 Autocorrelation Test

Autocorrelation test aims to see the correlation between once on a period with the previous period good regression model is a regression that not shown any problem with the autocorrelation.

Table 3.4 Autocorrelation Test

Durbin-Watson
1.525

Based on the table above there is no autocorrelation because the values of Durbin-Watson are higher than DU but also smaller than $4-DU$, which can be conclude as $1.468 < 1.525 < 2.532$.

3.2.4 Heteroscedasticity Test

The Heteroscedasticity test is a test that assesses whether there is an inequality of variance from the residual for all observations in the linear regression model.

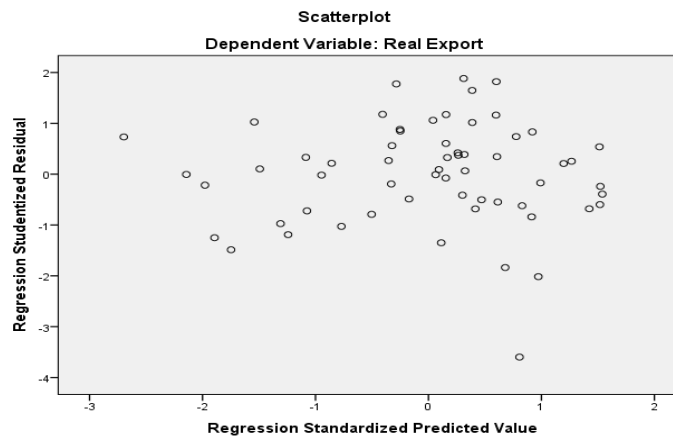


Figure 3.1 Scatterplot

Based on the figure above the points on the scatterplot spread on the left and right of point 0 on the X axis and spread below and above point 0 on the Y axis, and also did not form a specific pattern, this indicates that in the regression model there are no symptoms of heteroscedasticity.

3.2.5 Multiple Linear Regression

Multiple linear regression analysis is used to measure the influence of X on Y. Multiple linear regression analysis is used when the number of independent variables is at least two [13]

Table 3.5 Multiple Linear Regression

Model		Unstandardized Coefficients	
		B	Std. Error
1	(Constant)	13141.960	1595.520
	RealExchange	-.845	.257
	Volatility	-3574.574	79520.091
	EPI	68.463	26.506

$$Y = 13141.960 - 0.845 X_1 - 3574.574 X_2 + 68,463 X_3$$

Y = dependent variable (Real Export)

X1 = Exchange Rates

X2 = Exchange Rates Volatility

X3 = Export Price Index

e = error term

3.3 F-test

The F test is known as Simultaneous Test or Model / Anova Test, which is a test to see how the effect of all the independent variables together on the dependent variable.

Table 3.6 F-test

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	16517373.36	3	5505791.121	5.040	.004 ^b
	Residual	61171555.89	56	1092349.212		
	Total	77688929.25	59			

From the ANOVA test or F-test, it was obtained a value of 5,040 with real-export 0.004. Because the dependent variable is smaller than 0.05, the regression model can be used to predict Real export or it can be said that Exchange Rates, Export price Index and Exchange Rates Volatility together (simultaneously) have a significant effect on Real Export.

3.4 T-test

The t test is known as a partial test, which is to test how the influence of each independent variable individually on the dependent variable

Table 3.7 T-test

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	13141.960	1595.520		8.237	.000
	RealExchange	-.845	.257	-.939	-3.291	.002
	Volatility	-3574.574	79520.091	-.006	-.045	.964
	EPI	68.463	26.506	.749	2.583	.012

The exchange rates (X₁) variable has a negative effect that significant on Real Export (Y), because the significance is 0.002 which is below 0.05. The Exchange Rates Volatility (X₂) variable has a negative effect that not significant effect on Real Export (Y), because the significance is 0.964 which is above 0.05. The Export Price Index (X₃) variable has a positive effect that significant effect on Real Export (Y), because the significance is 0.012 which is far below 0.05.

3.5 Determination Coefficient Analysis (R²)

The coefficient of determination (R²) measures how far the model's ability to explain the variation of the dependent variable.

Table 3.8 Determinant Coefficient Analysis (R²)

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.461 ^a	.213	.170	1045.155

From the table above it can be seen that the Dependent variable or Real Export can be explained by Exchange Rates, Export price Index and Exchange Rates Volatility variables has the results 0.213 (21.30%) from the adjusted R square value. This shown that Real Export is influenced by Exchange Rates, Export price Index and Exchange Rates Volatility Size by 21.30% and 78,7% influenced by other factor or variables.

4. Discussion

4.1 Influence of Exchange Rates on Real Export

Based on the results of testing in this study, Exchange Rates has a probability value of 0.02 where this value is smaller than the significance level of 5% ($0.02 < 0.05$) and shown a positive value. It has a meaning that partially Exchange Rates has a negative effect that significant on Real Export of Non-Oil and Gas by Commodity.

This result is accordance with the theory that stated on [4], The exchange rate is an important determinant of export growth and its progress through time and high fluctuations in exchange rates create uncertainty about the profits to be made, thus reducing the gains of international trade and hampering the volume of trade.

Also, the results of this study are consistent and match with [16] that stated the value of Exchange Rates has a positive results or significant impact. Even though some of the researcher are found that Exchange Rates has no significant on real export.

However, the results of this study are consistent with the results of research by [4] which states that partial Exchange Rates has a significant effect on Real Export.

4.2 Influence of Exchange Rate Volatility on Real Export

Based on the results of testing in this study, Exchange Rate Volatility has a probability value of 0.094 where this value is much higher than the significance level of 5% ($0.094 > 0.05$) and shown a negative value. It has a meaning that partially Exchange Rate Volatility has a negative effect that not significant on Real Export of Non-Oil and Gas by Commodity.

The effects of exchange rate volatility on real export depend on the interactions among many different variables such that the final result is indeterminate [14]. Thus, there are a wide and conflicting variety of empirical results on top of no consensus at all on the theoretical relationship between exchange rate volatility and trade. Also, the results of this study are consistent and match with (Ozbay,1999), (Ozturk and Acaravci, 2002) (Vergil, 2002) and (Guloglu 2008) that stated on their own journal the probability value higher than 0.05 or not significant impact the real export.

4.3 Influence of Export Price Index on Real Export

Based on the results of testing in this study, Export price index has a probability value of 0.012 where this value is lower than the significance level of 5% ($0.012 < 0.05$) and shown a positive value. It has a meaning that partially Export price index has a positive effect that significant on Real Export of Non-Oil and Gas by Commodity.

This result is accordance to the theory that stated on [11]. Export prices should be high enough to make a reasonable profit and yet low enough to be competitive in the market, the export price index can be the indicator to make a decision within the price of the export commodity. However, the results of this study are not consistent with the results of research by [15] which states that partial of exchange rates are not significant effect on Real export, in his journal stated Export Price Index negative effect on export, this is because the price of the goods produced in the country becomes more expensive so that demand for imports increases, so cause domestic and manufactured goods to increase reduce exports.

5. Conclusion

This research aims to determine the effect of exchange rate, exchange rates volatility and export price index on exports in Indonesia which is proxies by each related organization unit period 2013-2017. The sample of this research is 12 by monthly observation, with 5 (five) years period, so there are 35 research sample units. The conclusion using descriptive statistics are Real Export of Non-Oil and Gas by Commodity that listed on Kemendag for period of monthly observation 2013-2017 has the average 11,880.61 with the standard deviation of 1,147.502 and the maximum value of Real Export of Non-Oil and Gas by Commodity is 14,039. Therefore, Exchange Rates that listed in Bank of Indonesia for period 2013-2017 has the average 12,543.06 with the standard deviation of 1,276.44 and the maximum value of an Exchange Rates with the value 14.468. Then, Exchange Rates Volatility for period 2013-2017 has the average 0.0037 with the standard deviation of 0.0020 and the maximum of the exchange rates volatility is on the level with a percentage of 1.09% and Export Price Index for period 2013-2017 have the average 136.50 with the standard deviation of 12.547 and the maximum export price index of 2013-2017 with the percentage of 154

Based on the result of testing using a multiple linier regression model that has been done, then obtained several conclusions there are exchange rates, export price index and exchange rates volatility together (simultaneously) have a significant effect on real export for monthly observation for period 2013-2017. therefore, exchange rates partially has a negative effect that significant on real export, exchange rate volatility has a negative effect that not significant on real export and export price index has a positive effect that significant on real export

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