INFLUENCE OF PETROLEUM PRICE, GOLD PRICE, INFLATION AND EXPPORT GROWTH ON EXCHANGE RATE
(Study at Indonesia Stock Exchange Corner Economic Faculty Brawijaya University and Bank Indonesia Period 2005-2014)

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ABSTRAK

Penelitian ini bertujuan untuk menguji pengaruh dari harga-harga komoditas ekonomi seperti harga minyak dan harga emas, juga indikator makro-ekonomi seperti tingkat inflasi dan pertumbuhan ekspor terjadap nilai tukar Rupiah terhadap Dollar. Dengan menggunakan metode kuantitatif, data yang digunakan adalah data time series dalam bentuk kuartal selama 2005 – 2014 dengan metode sampling jenuh. Hasil dari metode ini menggunakan 40 sampel yang digunakan dalam metode regresi linier berganda. Hasil uji simultan (uji F), menunjukkan bahwa harga minyak, harga emas, tingkat inflasi dan pertumbuhan ekspor berpengaruh signifikan terhadap nilai tukar Rupiah terhadap Dollar secara bersama-sama. Hasil uji parsial (uji t), menunjukkan variable harga minyak, harga emas, tingkat inflasi dan pertumbuhan ekspor berpengaruh negative signifikan terhadap nilai tukar Rupiah, sedangkan pertumbuhan ekspor berpengaruh positif signifikan terhadap nilai tukiar Rupiah.

Kata Kunci: Harga minyak, harga emas, tingkat inflasi, pertumbuhan ekspor, nilai tukar Rupiah terhadap Dollar

ABSTRACT

This research is aimed to examine the effect of economic commodities' price such as petroleum prices and gold price, also macroeconomic indicator such as inflation rate and export growth toward Rupiah exchange rate against US Dollar. Using quantitative approach, the data applied is time series quarterly data during 2005 – 2014 selected through saturated sampling method. This method resulted 40 samples which then applied into multi linear regression. The F test result indicates that petroleum price, gold price, inflation rate and export growth has significant effect on Rupiah exchange rate against US Dollar simultaneously. Partial test result (t test), indicating that variable of petroleum price, gold price, inflation rate and export growth has significant effect on Rupiah exchange rate against US Dollar.

Keywords: Petroleum prices, gold price, inflation rate, export growth, Rupiah exchange rate against US Dollar

INTRODUCTION

International trade involves a country with other countries and makes the countries in the world become more attached. Therefore, interaction with abroad is unavoidable by any country, including Indonesia. In order to facilitate international trade transactions, the use of money in economy is set by using agreed currency. This can lead to occurrence the risk of changes in currency exchange rates that arise due to uncertainty of exchange rate itself. This exchang e rate itself. This exchange rate changes take effect directly against development of goods and services prices within the country. Any change in currency exchange rates also impact on the appreciation and depreciation of the currency. Appreciation is a rise in exchange rate of a given country against the currencies of other country. Whereas, the currency depreciation is the decrease in currency exchange rates of given country against the currencies of other country (Berlianta, 2005:8). The currency used as a comparison in exchange currency is US dollar, because the US dollar is a strong currency and the currency's reference for most developing countries, including Indonesia. In addition, the United States is dominant trade partner in Indonesia therefore when Rupiah against US Dollar is not stable, it will disrupt trade that can cause economic losses due to trade votes with Dollar.

Changes in Rupiah exchange rate against the US Dollar currency is influenced by many factors. Some of which are economic commodity price and macroeconomic indicators. Economic commodity price and macroeconomic indicators that used as independent variables in this study that affect Rupiah exchange rate are petroleum price, gold price, inflation and export growth.

Petroleum price is expected have major impacts on exchange rate. According to Inggrid (2006) the specific characteristics that are owned by a country, outside monetary characteristics, have a very important role in determining its currency. In this research its mean a petroleum price. According to Aziz, Izraf and Bakar (2011) indicate that any increase in petroleum price that occurred will cause depreciation of real currency exchange rates.

Second economic commodity price that is used in this research as independent variable is gold price. According to Shafiee and Topal (2010:180) there are three main reasons for increasing gold prices, namely mine production is decreased constantly, institutional and retail investments have rational expectations when uncertain markets, and investing in gold has become easier due to gold Exchange Traded Funds (ETFs). World gold price movements have a direct relationship on exchange rate from every major world currencies, either the importer or exporter country of gold, because the value of country's currency is related with supply and demand of domestic currency (Sjaastad, 2005:12).

One of macroeconomic indicators used to know or measure the economic stability in a country is inflation. Inflation shows the increasing prices of goods and services generally in a given period. The increase in prices of goods and services make purchasing power decreased. Consequently, the impact on consumption of domestic goods and services decreased. (Djohanputro, 2008:151). The relationship between inflation and exchange rate are explained with purchasing power parity concept. When inflation occurs, the money supply rapidly, increase in price of goods and services in general occur continuously, and country's currency will depreciate (Mankiw, 2012:199).

Last independent variable is export growth. As known, export is the legal transport process of goods or commodities from one country to another country, generally in the trading process. Export activities in country can be implemented when the country was able to produce goods or services that can compete in international market. These capabilities are determined by many factors such as natural resources, human resources, and technology (Sela.2009). According to study that done by Laksono and Amaliawati (2010) in export transactions, involving exchange rate has also become a necessity because each country uses a different currency. When the export growth in a country to another country increase, then the domestic currency's exchange rate would appreciate against foreign currencies because demand of domestic currency increase.

This study was conducted at Indonesia Stock Exchange Corner in Economic Faculty of Brawijaya University and Bank Indonesia. The researchers chose the research location because provides the complete and accurate data required. In addition, Bank Indonesia is an independent country institutions and have one sole purpose, achieve and maintain the stability of Rupiah value.

LITERATURE REVIEW

Petroleum Price

Petroleum price is petroleum values charged to consumers based on the benefits and use of petroleum (Kotler and Amstrong, 2000:59).

According to Amadeo (2012) petroleum price which often used as a reference in the petroleum trade is West Texas Intermediate (WTI). WTI petroleum price is higher petroleum price of Brent Blend and OPEC. This is because WTI is petroleum with the highest quality because it has low sulphur content, making it good for use as gasoline.

Zhang, Fan, Tsai and Wei (2008) in their research said that petroleum price has increased as the result of confluence of many factors, such as the change of global oil demand and supply conditions, responses to geopolitics, institutional arrangements (such as OPEC), and the dynamics of the financial markets. Given the energy sector still dominated by petroleum-sourced energy, then a very large role in moving its strategic economic (Tambunan, 2010:304). But, the energy crisis will continue if can not be shown the existence of large-scale petroleum discoveries or small-scale petroleum fields in large numbers because, lately the world face increasing of energy prices, therefore the energy prices imposes to economic turmoil in various sectors. To face it appears the opinions from experts and publics about what policy exactly needs to be taken.

Gold Price

Gold is a precious metal which is used both as a property and as a financial asset. Importance of gold has come until today increasing its value and the area of usage. Le and Chang (2011) in their research also explained that gold is also an investment asset and commonly known as a "safe haven" to avoid the increasing risk in financial markets. Using gold is one of risk management tools. Many investors also continue to use gold as an investment to hedge against currency weakness, and other economic disruptions.

Baur and Mcdermott (2010) explained that the composition of gold demand is rapidly changing, in the context of gold economic turbulence, while gold supply remains relatively fixed. The total demand for gold is made up of three categories: jewellery, industrial & dental, and investment demand. They also explained that gold has been used as particular goods. The gold standard system involves linking the value of currencies directly to gold. Central banks around the world continue to hold gold as one of the forms of reverse used to defend the value of their currencies.

Inflation

Inflation is defined as the tendency of increasing prices in general. The tendency is that increasing not happening shortly. Nanga (2005:237) defines inflation is a symptom where the general price level increased continuously. Inflation rate have some level of different affair in various countries and different time. According to Samuelson and Nordhaus (2006:311) inflation can classified into three categories: Moderat Inflation, Galloping Inflation, and Hyperinflation.

The most commonly used indicators to measure the level of inflation are the consumer price index (IHK).

Export growth

Definition of export according to Ahsjar (2007:1) is "trading by removing the goods trade from the inside to outside of customs territory of one country to another to meet the conditions". While, for doing the export activity required cost or money, therefore the meaning of export growth is the rate of a country's capability for selling domestic production goods to outside the customs. Both in quantity or quality of export growth could increases or decrease over time.

Export growth resulted in the opening of the economy, as well as the role of export against a country's domestic income (Kuncoro, 2006:167). Therefore the export growth increased became the things that very important for a country.

Exchange Rate

To be used in economic activities, the currency used to have a certain price in the currency of another country. These prices illustrated how much a currency to be exchanged to obtain a unit of the currency of other countries. The terms of this system is called exchange rate (Rahardja and Manurung, 2008:91).

A quotation can be interpreted as a rule or assessment procedures rate or price of foreign exchange rates. Direct Quotation, that's where one unit of foreign currency stated in one unit of local currency in the country (Berlianta, 2005:41). In general the assessment rate formula in direct is:

$$\text{Direct Quotation} = \frac{\text{amount of local currency unit}}{\text{one unit of foreign currency}}$$

Source: Joesoef (2008:25)

Indirect Quotation, that declares one unit of local currency in the country that stated in foreign currency unit (Berlianta, 2005:41). In general the assessment rate formula in indirect is:

Indirect Quotation = $\frac{\text{amount of foreign currency unit}}{\text{one unit of local currency}}$

Source: Joesoef (2008:25)

Sukirno (2006:402) stated that changes in the demand and supply of a further currency led to a change in the exchange rate. The most important of them are: changes in the desire of societies change the price of export and import goods, Inflation, and changes in interest rate and rate of returns on investment.

Petroleum Price and Exchange Rate

"Role of petroleum prices can explain the dynamics of selected developing countries exchange rates. Their study concludes that a rise in petroleum price is leading to a significant depreciation in developing economies currencies against the US dollar" (Turhan, Hacihasanoglu, and Soytas, 2012)

Lizardo and Mollick (2010) show that an increase in the real price of petroleum leads to a significant appreciation of the US dollar relative to oil exporting countries, however oil importer countries currency depreciated relative to US dollar in the same scenario. They also find that currencies of countries that are either oil exporter or importer have appreciated relative to US dollar when petroleum prices rise.

Gold Price and Exchange Rate

Gold prices could affect the country's currency, either the import or export of gold because the value of country's currency is related to what they import or export. When a country is more to import gold, then the value of its currency would decline. And for countries that export gold or have access to gold reserves will see an increase in strength of its currency when the gold price goes up, because it could increase the value of total exports in the country (Sjaastad, 2005:12).

Purchase gold also tends to reduce the value of currency used to purchase it, it affects the supply and demand for domestic currency. This is mainly due to the fact that banks choose to print more money to buy the gold. When the value of domestic currency declined therefore it will lower the exchange rate against US dollar, while gold price is determined based on world gold market price statutes in London and it purchased by using a dollar (1US$/oz) (Forex).

Inflation and Exchange Rate

Inflation closely related to currency exchange rates. Changes the inflation rate can affect the demand for currency in a country. According to Djohanputro (2008:172) relationship between inflation and exchange rate is explained by the concept of purchasing power parity (PPP). PPP is based on the law of one price. That is one the same product must have the same price though traded in two different places, and these laws assume that apply in the perfect markets.

Export Growth and Exchange Rate

Trade between countries, which each country has its own exchange tool, requires comparative figures a currency value with another currency, it's called foreign exchange rate or exchange rate (Salvatore, 2008: 67). At international trading especially for those that do export transactions, the increase in volume of export and management of currency values relatively stable become monetary factors which support the overall economy.

When exports increased the exchange rate appreciate, the value of domestic currency is rising and it means that the value of foreign currency decreased (price). Basically, the success of exports realized a region will be able to make foreign exchange contributions for exporter country (Angkow, 2013).

Hypothesis

H_1: Petroleum price, gold price, inflation and export growth have significant effect on exchange rate simultaneously.

H_2: Petroleum price has a significant effect on exchange rate partially.

H_3: Gold price has a significant effect on exchange rate partially.

H_4: Inflation has a significant effect on exchange rate partially.

H_5: Export growth has a significant effect on exchange rate partially.

RESEARCH METHOD

Type of Research

This research is explanatory research that uses quantitative approach.

Location of Research

This research was conducted on Indonesia Stock Exchange (IDX) corner in Economic Faculty of Brawijaya, Bank Indonesia Website, and indexmundi.com.

Source of Data

This research data is secondary data in the form of time series, taken in the form of quarter for 10 years.

Population

According to Darmawan (2013:137), population is the data source in specific research that has an extensive and much number or all elements or the elements examined. The population used in this research is the entire data time series quarterly petroleum price, gold price, inflation, export growth, and exchange rate during the period 2005-2014 as many as 40 (10 years x 4 quarters).

Sample

Sample is most members of population were taken using specific technique called sampling techniques (Usman and Akbar, 2009:43). Sample taking in this research is using saturated sampling method. Saturated sampling method is census was the sample determination technique using all members of population (Usman and Akbar, 2009:42). Based on the sampling technique, this research obtained the amount of samples (n) of quarterly time series data (1 year 4 quarterly) during the period January 2005 – December 2014, as much as 40 samples (4 quarterly x 10 years).

Variable and Measurement

1. **Petroleum Price**

   Petroleum price is a monetary value assigned to get 1 barrel of oil in US dollars. Petroleum prices using quarterly data in 10 years starting January 2005-December 2014 in units US$/barrel. The data is taken from www.indexmundi.com then changed into Log n (ln).

2. **Gold Price**

   Gold price is the amount of monetary value assigned to get 1 troy ounce gold in US dollar based on the world gold market price statutes. Gold price data is measured based on world gold prices London pm fix that taken from Indonesia Stock Exchange Corner in Economic Faculty of Brawijaya University, in the form of quarterly data for 10 years starting January 2005-December 2014 in units US$/troy ounce then changed into Log n (ln).

3. **Inflation**

   Inflation rate is the increase prices rate of common goods which occur on an ongoing basis. The inflation rate data used in this research is the inflation rate based on the consumer price index (CPI) is taken from is taken from Bank Indonesia website, in the form of quarterly data for ten years, January 2005–December 2014 in units of percent (%).

4. **Export Growth**

   Export growth is the rate of a country's capability for selling domestic production goods to outside the customs. Both in quantity or quality of export growth could increases or decrease over time. Export growth data used in this research is form of quarterly data of Indonesia's export growth for 10 years starting January 2005–December 2014 is taken from Indonesia Stock Exchange Corner in Economic Faculty of Brawijaya University in units of percent (%).

5. **Exchange Rate**

   Exchange rate is the currency exchange rate of a country with the currency of other countries. Exchange rates data in this research is form of quarterly data of Indonesia's currency exchange rate (IDR) against the United States currency (dollar) which stated with IDR/USD that used direct quotation. The data used is the Middle exchange rate (the rate that it was concluded based on the results of buy and sell exchange rate data) is taken from Bank Indonesia Website in January 2005–December 2014 with units of Rupiah per Dollar and changed into Log n (ln).

Data Collecting Technique

In this study, secondary data collection technique is done by documentation method. Documentation method is a method that usually performed to collect secondary data from variety sources, either in private or institutional. The data in the form of financial statements, personnel recapitulation, organizational structure, production data, letters and so on (Sanusi, 2011:114). This technique is done by looking at secondary data that has been provided by Indonesia Stock Exchange (IDX) corner in Economic Faculty of Brawijaya include gold price data and export growth data. Bank Indonesia Website include inflation data and exchange rate data, and indexmundi.com that provide petroleum price data.

Data Analysis Technique

Data analysis Technique used is multiple linier regression analysis. Multiple linier regression analysis or regression more than two variables, that learned about dependence of a dependent variable at two or more independent variable (Firdaus, 2011:58). The regression model in this research as follows:

$Y = a+b_1X_1+b_2X_2+\ldots..+b_nX_n + e$

Source: Gujarati (2007:181)

Given the magnitude of different variables (petroleum price- US$/barrel, gold price- US$/troy ounce, inflation rate-percent, exchange rate-IDR/USD) and has a wide range, then do the adjustments or simplifications of these variables data. In this study, the adjustment is done by transforming data in the form of a natural log (ln).

1. Classic Assumptions Testing

This Classic Assumptions Testing is intended to ensure that the obtained model really meet the set basic assumptions, in the multiple linear regression analysis in order to generate coefficient values as an unbiased gauge, which includes normality assumption, does not occur autocorrelation, does not occur heteroscedasticity, and does not occur multicollinearity.

2. Hypothesis Testing

a. Coefficient determination (R^2)

Multiple determination coefficients with the symbol R^2 is a value percentage of X_1, X_2, X_3, and X_4 to variant (up-downs) Y simultaneously. R^2 its value between zero to one: $0 \leq R^2 \leq 1$.

b. Simultaneous Test (F test)

F-Test Statistics used to show the magnitude of effect on independent variable simultaneously on dependent variable by using variance analysis.

c. Partial Test (t test)

Significantly test partially used to determine the effect of each independent variable (X) on the dependent variable (Y).

RESULT AND DISCUSSION

Multiple Linear Regression used to calculate the magnitude of influence between independent variables, namely petroleum price (X_1), gold price (X_2), inflation (X_3), and export growth (X_4) to dependent variable Rupiah's exchange rate (Y). The results of regression coefficient calculation by using SPSS 16.00 programmed obtained the following regression model:

Table 1 Analysis Result

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	10.511	.144		73.118	.000
	Petroleum Price	-.101	.044	-.290	-2.290	.028
	Gold Price	-.121	.030	-.485	-3.977	.000
	Inflation	-.036	.007	-.340	-5.192	.000
	Export Growth	.002	.001	.172	2.053	.048

Source: Data Process (2015)

Based on Table 1 obtained the equations of multiple linear regression analysis by the following models:

$Y = 10{,}511 - 0{,}101\ X_1 - 0{,}121\ X_2 - 0{,}036\ X_3 + 0{,}002\ X_4$

Constant in equation shows a=10,511 which means that if there is no change of variable petroleum price, gold price, inflation and export growth (X_1=X_2=X_3=X_4 fixed), then the exchange rate value is 10,511 points.

Table 2 Coefficient and Determination

Model	R	R Square	Adjusted R Square
1	0.925[a]	0.856	0.839

Source: Data Process (2015)

Determination coefficient Value (R^2) in table 2 obtained results of 0,856. It means that 85,6% exchange rate variable is affected by its independent variable, namely petroleum price (X_1), gold price (X_2), inflation (X_3), and export growth (X_4). While remaining 14,4% exchange rate variable is affected by other variables that are not discussed in this study.

Table 3 Simultaneous Test Results (F Test)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.320	4	.080	51.810	.000[a]
	Residual	.054	35	.002		
	Total	.374	39			

Source: Data Process (2015)

Based on Table 3 obtained that petroleum price, gold price, inflation and export growth effect simultaneously or together toward exchange rate. Based on F test results, obtained a significant value of 0,000 or less than significant level required (0,000 < 0,05). It is proved by first hypothesis that states there is a significant influence among

petroleum price, gold price, inflation and export growth toward exchange rate simultaneous acceptable.

Petroleum price partially had a significant influence on exchange rate. This is shown by coefficient X_1 of -0,101 with significant levels 0,028 that less than significant level required 0,05 (table 4). Based on partial test (t test) results, a hypothesis which stated that there was significant influence between petroleum prices toward exchange rate is partially acceptable.

Table 4 Partial Test Results (t Test)

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1(Constant)	10.511	.144		73.118	.000
Petroleum Price	-.101	.044	-.290	-2.290	.028
Gold Price	-.121	.030	-.485	-3.977	.000
Inflation	-.036	.007	-.340	-5.192	.000
Export Growth	.002	.001	.172	2.053	.048

Source: Data Process (2015)

It is similar with the research that has been conducted by Ferdiana (2012) that used petroleum price as independent variable and prove that petroleum price has significantly effect to exchange rates. Result of that research proves that the high petroleum price is inversely proportional to exchange rate. Based on research result that done by Ashfahany and Priyatna (2015) using ECM (Error Correction Mechanism) analysis that useful to analyze time series data for variables that indicate the existence of relationship or long-term equilibrium and balance the sort-term relationship on independent variable to dependent variable, and in their research there is enough evidence of increasing in the world oil price significantly affects the exchange rate depreciation in the long term but not in short term.

Gold price partially also had a significant influence on exchange rate. This is shown by coefficient X2 of -0,121 with significant levels 0,000 is less than significant level required 0,05 (table 14). Based on partial test (t test) results, a hypothesis which stated that there was significant influence between gold prices toward exchange rate is partially acceptable.

The reverse relationship between the value of U.S. dollar and that of gold is one of the most discussed about relationships in currency markets. Dollar is an internationally accepted currency and most of the international transactions take place in dollar equivalent. Therefore, for Indonesia when the value of gold increases it takes more Rupiah to buy gold. If the exchange value of a country's currency was too high relative to the dollar, its central bank would sell its currency in exchange for dollars, which will make the value of its currency to sink down (Nair, 2015).

Inflation rate partially had a significant influence towards exchange rate. This is shown by coefficient X3 of -0,036 with significant levels 0,000 is less than significant level required 0,05 (table 4). Based on partial test (t test) results, a hypothesis which stated that there was significant influence between inflation toward exchange rate is partially acceptable.

This research result prove that the higher inflation rate in Indonesia caused depreciation on Rupiah's exchange rate toward US Dollar, this is suitable with Ferdiana (2012) and Puspitaningrum (2013) research that inflation has negative significant effect toward exchange rate. Purchasing Power Parity (PPP) theory stated that changed in exchange rate will suitable with different amount of inflation rate between two countries because international trading pattern. When the domestic inflation rate higher than abroad inflation rate, it can depreciate the domestic exchange rate. This is caused the price of domestic goods and services has increased, therefore can trigger increasing consumer purchasing power toward domestic product. Based on PPP theory, can be known that the higher inflation rate can be caused the depreciation of exchange rate.

Export growth partially also had a significant influence against exchange rate. This is shown by coefficient X_4 of 0,002 with significant levels 0,048 is less than significant level required 0,05. Based on partial test (t test) results, a hypothesis which stated that there was significant influence between export growth toward exchange rate is partially acceptable.

This research result prove that export activities in a country that constantly growing can improve the exchange rate, this is suitable with study that done by Laksono and Amaliawati (2010) in export transactions, involving exchange rate has also become a necessity because each country uses a different currency. When the export growth in a country to another country increase, then the domestic currency's exchange rate would appreciate against foreign currencies because demand of domestic currency increase, therefore the trade balance become surplus, whereas when

the export growth decline then it will happen the deficit because domestic currency's exchange rate would depreciate against the foreign currency.

CONCLUSION AND SUGGESTION

Conclusion

Based on research result about influence of petroleum price, gold price, inflation and export growth toward exchange rate period January 2005 until December 2014 by using multiple linear regression analysis techniques can known that petroleum price, gold price, inflation and export growth has influence about 85,6% toward and export growth toward exchange movements indicated by the test results the coefficient determination. While the rest of 14.4% exchange rate variable is affected by other variables that are not discussed in this study.

Based on F test (simultaneously) show that petroleum price, gold price, inflation and export growth effect simultaneously (together) toward exchange rate. Based on hypothesis testing t test (partial), can known that petroleum price, gold price, inflation and export growth has significant effect toward exchange rate.

Suggestion

Oil has a very important role as the fuel that drives the economy around the world. Indonesia is one of the countries which have abundant natural resources including petroleum. Therefore, the Government is expected to put more effort like implementing the right policies for maintaining the availability of petroleum which regulate the utilization, provision, pricing policy and conservation of nature, leading to development of infrastructure, Government and private partnerships, and community empowerment.

Bank Indonesia as the central bank is expected to be cautious when issuing policies and remain mindful of inflation rate that has been established. These, in order to meet the main goal of the Bank Indonesia such as achieve and maintain a stable Rupiah value to drive economic growth.

Given the independent variables in this study are important in influencing the exchange rate, the expected results of this research can be used as a reference for the next researcher to develop this research by considering other variables that are not included in this research.

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