

# Effect of Exchange Rate and Foreign Capital to Domestic Price in Indonesia

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**Abstract** Based on the data analysis, the variables of exchange rates and foreign capital were integrated in the first degree. Meanwhile, the co-integration analysis shows that the data used were integrated. The results show that the variables of exchange rate and foreign capital have a positive effect on the domestic price index both in the short and long term. The effect of the exchange rate and on domestic prices in the long term was much greater than in that in the short term.

The aim of the research was to determine the effect of exchange rate and foreign capital on the domestic price in Indonesia. The data used in this study were the secondary data from 1997 to 2015 published by the Central Statistics Agency and International Financial Statistics. The data processing method used was regression analysis with Error Correction Model (ECM).

**Keywords:** exchange rate; foreign capital; domestic price; ECM.

## I. INTRODUCTION

An increasingly integrated world economy has consequences to the economic fundamentals of each country. The conditions of globalization have caused the flow of goods and services into a country to be easier [1]. When the goods and services entering a country are not accompanied by an increase in exports, it has an impact on greater deficit in the current account. In addition to the current transaction, the same thing also happens to capital flows into a country. The presence of liberalization and globalization has made capital flows move more easily from one country to another. When there is a movement of capital abroad is greater than the incoming capital in a country, it causes a deficit in capital transactions.

With inter-state capital movement paid in the form of foreign currencies, it will have an impact on domestic economy; one of which is on the changes in domestic prices. The changes in the exchange rate will affect the cost of the expenditure on capital imported by producers so that it will affect the production costs incurred by producers. This will affect domestic prices in a country through production costs or often known as cost push inflation.

There are two transmission paths for the impact of exchange rate changes on inflation, namely direct and indirect paths. Indirect transmission works through the demand pull

side. In this case, the increase in foreign exchange rate to domestic currency will cause an increase in the price of foreign goods (imports). In direct transmission, exchange rate will affect inflation through the rising prices of imported goods. The imported goods can be in the form of consumer goods, raw materials, and capital goods. The price increases in imported products will result in domestic inflation [2].

The research on the changes in exchange rates to domestic prices had been widely conducted. According to [3], [4], economists had studied changes in exchange rates to domestic prices since the 1970s. Economist's interest to see the relationship between price and exchange rate was based on the desire to test the basis of global monetarism called LOP (Law of One Price) and PPP (Purchasing Power Parity). However, there are various approaches to measuring domestic prices. Some researchers used import prices as a measure of domestic prices [5], [6]. Other researchers associated the changes in exchange rates with consumer prices [7], [8], [9]. Then, there were some other researchers who focused on the relationship of exchange rate with export prices [10], [11].

In contrast to the existing studies, this study measured domestic prices at wholesale price. This study examined the effect of foreign capital that represents the use of inputs by the producers in Indonesia affected by the changes in exchange rates to wholesale prices in Indonesia. This research was conducted in Indonesia, with the period of 1997.3 to 2015.4. The selection of the period after 1997 was based on the implementation of the free floating exchange rate exchange rate system in Indonesia. Meanwhile the analytical method used is Error Correction Model, with the reason that the error correction model method can determine the short-term effect and the long-term influence of independent variables on the dependent variable.

## II. DISCUSSION

The data in this research was the secondary data published by the Central Bureau of Statistic and Bank Indonesia. The Data used was quarterly data form 1997.3 to 2015.4. The domestic price data is the data of whole price

index in Indonesia, the exchange rate data is the exchange rate against the United States dollar, the foreign capital is foreign capital in Indonesia. In analyzing the data, the data were transformed in the form of log.

In this research, the basic model used is:

$$PPI = \alpha_0 + \alpha_1 S + \alpha_2 KF \dots\dots\dots(1)$$

Where : PPI is whole sale price index, S is exchange rate, KF is foreign capital.

The next step, model will be analyzed using a regression analysis tool. Regression analysis method chosen is Error Correction Model, the aim that the Error Correction Model will be able to see short term and long term effect.

Based on equation (1), the research model can be written in the Error Correction Model.

$$LPPI = \beta_0 + \beta_1 LS + \beta_2 LKF + \beta_3 LS + \beta_4 LKF + \beta_5 ECT \dots\dots\dots(2)$$

Where : ECT is Error Correction Term.

Before further analysis is carried out, it is necessary to conduct stationary tests on the data used in the study. To find out the stationary data, the unit root test and the degree of integration are needed. if there is a different degree of integration, the variables in the study cannot be co-integrated [12].

The testing of stationarity used Augmented Dickey Fuller.

**Table I Unit Root Test**

Variables	Constanta	Tren and Intersep	Without Tren and Intersep
LPPI	-3,1302***	-3,3334***	3,6177 <sup>#</sup>
LS	-4,8086*	-4,7410*	1,2858 <sup>#</sup>
LKF	-3,3794**	-3,3366***	-0,4583 <sup>#</sup>

Notes:

\*: stationary at 1%, \*\*: stationary at 5%, \*\*\*: stationary at 10%,

<sup>#</sup>: not stationary at 10 %

The results of the unit root test analysis shown in Table I show that the variables of exchange rate and foreign capital, if specified by ADF calculation considering the elements of intercept, trend and intercept, and not using intercepts and trends, are not stationary at 10%. For this reason, it is necessary to test the integration degrees to determine the degree to which the observed variables are stationary.

**Table II Integration Degree Test**

Variables	Constants	Trends and Intercepts	Without Trends and Intercepts	Notes:
D(LPPI)	-5,4179*	-5,7740*	-4,6108*	*: stationary at 1%, **: stationary at 5%, ***: stationary at 10%, <sup>#</sup> : not stationary at 10 %
D(LS)	-6,1984*	-6,1954*	-6,1018*	
D(LKF)	-10,1258*	-10,1105*	-10,1952*	

: stationary at 10%,

<sup>#</sup>: not stationary at 10 %

Based on the calculation results in Table II, it can be seen that the variables of wholesale price index, exchange rate,

and foreign capital are integrated in the degree 1, I (1). Having known that the variables used in this study have the same degree of integration integrated in the degree one.

The next test is the co-integration test. Co-integration test is done in order to know the long-term relationship between variables, even though individually these variables are not stationary. In this study, Johansen test was used to test co-integration between variables. Reciprocal relationships can be seen from the co-integration that occurs between the variables themselves. The steps in co-integration in this study are using a hypothesis to make sure that there is no relationship between variables in the long run.

The test was done by comparing the value of trace statistics with the critical value at  $\alpha = 5\%$ . If the null hypothesis cannot be rejected, it is concluded that the multivariate analysis equation of the relationship between the price of large trade, the exchange rate, foreign capital does not have a long-term relationship. Based on the data analysis obtained, the trace statistic value is 332.5032 which is greater than the critical value of 159.5297. Thus, it can be concluded that the variables of wholesale price index, exchange rates, and foreign capital are integrated in the long term.

After testing the stationarity and co-integration, the next step was the regression analysis to assess the effect of exchange rates and foreign capital on domestic prices in Indonesia. The Regression Analysis results are illustrated in Table III.

**Table III Regression Analysis Results Using Error Correction Model**

Dependent Variable :D(LPPI)		
Variable	Coefficient	t statistic
C	-6,1069*	-4,3450
D(LS)	0,2308*	4,6967
D(LKF)	0,0240**	2,4089
LS(-1)	0,8373*	12,3272
LKF(-1)	0,6669*	8,2163
ECT	-0,6598*	-7,9913
R <sup>2</sup>	0,7960	
F statistic	917,5740	

One important assumption built in OLS is that variants are homoscedasticity in nature. If this assumption is not fulfilled, heteroscedasticity problems will arise. In this study, the detection of heteroscedasticity was applied using ARCH that resulted in the conclusion stating that there is no problem with the heteroscedasticity in the model. The chi square probability value was calculated as 0.3924 greater than  $\alpha$  of 0.05.

Meanwhile, to detect autocorrelation, this study used the Serial Correlation LM test. From the analysis results, it was obtained that the probability value of Obs \*R square of 0.6790 exceeds the significance level ( $\alpha$ ) = 5%, so it can be concluded that there is no autocorrelation problem in the model used.

The detection of multicollinearity in the variables of wholesale price index, exchange rates, and foreign capital shows that the variables did not experience multicollinearity.

The empirical analysis results as shown in Table III show that the estimates using Error Correction Model can be used. It can be seen from the Error Correction Term (ECT) value of -0.009491 and significant at  $\alpha = 5\%$ . This indicates that the Error Correction Model specification used is correct. The significant error terms mean that the model specifications used are correct and indicate the co-integration between the variables used in the study. The negative sign of the error term shows the error term which gets smaller until it reaches equilibrium.

The effect of the changes in the variable of exchange rate (LS) on the variable of wholesale price index (LPPI) in Indonesia is the value of Exchange Rate Pass Through (ERPT). The value of ERPT in the short term is 0.2308 and in the long run is 0.8373 meaning that the exchange rate variable has a positive and significant effect on wholesale price index. From the results of the study indicate that the hypothesis proposed in this study can be accepted, namely the more depreciated the exchange rate, the whole sale price will increase. Thus the results of this study are to support the hypothesis proposed by Taylor that there is a positive relationship between the Exchange Rate Pass Through and the inflation rate [13].

When compared to the degree of Exchange Rate Pass Through, it seems that in the long run the degree of pass through is high. This shows the high level of sensitivity of exchange rate changes to wholesale price index. An increase in foreign currency (domestic exchange rate depreciation) will make foreign capital prices become expensive. With the increase in the price of foreign capital, it causes an increase in production costs. With the increase in production costs, it causes a rise in wholesale price. It is in line with the Purchasing Power Parity theory. According to the Purchasing Power Parity (PPP) theory, when there is an exchange rate appreciation, the price of imported goods becomes cheaper. With the decline in the prices of imported goods, it causes a decline in wholesale price index. It turned out to be valid during the study period in which in Indonesia there was a decline in exchange rate (depreciation). With the exchange rate depreciation, it caused the price of imported capital become more expensive. The increase in capital costs caused production costs to rise so that the wholesale price increased. It is in line with the results of a survey conducted by *Bank Indonesia* which showed that 40% of the respondents from the manufacturing sectors was worried about the sharp depreciation of the exchange rate because the portion of the manufacturing companies that used imported raw materials was quite large accounting for 35% of the total manufacturing industries. The weakening of the exchange rate will cause an increase in production costs [14].

Furthermore, the foreign capital variable (LKF) both in the short and long term has a positive and significant effect on wholesale price index. It means that when there is an increase in the use of foreign capital, it will cause an increase in Wholesale Prices Index.

When the foreign capital used in a production process is greater, it causes production costs to rise because the capital used must be paid in Rupiah that has depreciation against the Dollar. As a result, the Wholesale Price Index increases. It is known as cost push inflation. The results of this study are different from the results of the research conducted in developed countries. In developed countries, they show that there is a negative relationship between capital market openness and inflation [15].

Compared to the short-term and the long-term effect of the foreign capital variable on the whole sale price index, it appears that the short-term effect is small. It shows that the effect of the use of foreign capital in the short term does not have a major effect on the whole sale price index, but the long-term influence of the use of foreign capital on whole sale price index is very high.

The use of foreign capital is in the long run, so the influence of foreign capital on large trade prices is very influential in the long run. Based on the results of the analysis of the regression, coefficient regression foreign capital is 0.66, this shows the level of sensitivity of the use of foreign capital to the high trade prices in Indonesia is high.

### III. CONCLUSION

Based on the results of the study it can be concluded that:

1. The effect of the exchange rate variable on domestic prices in Indonesia in the short and long term is positive and significant. However, the effect of the exchange rate on domestic prices in the long term was much greater than in that in the short term.
2. The effect of foreign capital on domestic prices in the short and long term is positive and significant. In the long term, the effect of foreign capital on domestic prices is greater than that in the short term.

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