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Determining the Exchange Rate: Purchasing Power Parity - PPP

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This study aimed to examine the effect of inflation on the issue of exchange rate determination of the forward exchange rate on the exchange rate of RMB (Renminbi) to Rupiah. Inflation has been chosen as an independent variable because of its close relation to PPP (purchasing power parity) theory. Analyses in this research have used logistic analysis with time series data. The data that has been used include exchange rate data with the period 2007-2017 with a sample size of 132 data. The results of this study have shown that inflation is effective in determining the exchange rate.

Keywords: inflation, exchange rate, the forward exchange rate, PPP, RMB, Rupiah

JEL Classification: F31, F37, G17

1. Introduction

International trade is a trade involving different countries. Because it involves different countries it also involves different currencies and the value of different currencies. The exchange rate differences if not accounted for properly can lead to reduced profits or even losses. In a system of floating exchange rate currency, the exchange rate is determined by the demand and supply of currency. The demand and supply of currency exchange rate often changes, resulting in frequent changes of the exchange rate uncertainty.

Indonesia and China are countries that have strong trade relations. The strong trade relations between these two countries can be seen clearly from the large number of Chinese products in the Indonesian market. Both countries are also equally involved in a floating exchange rate system. Changes in exchange rate uncertainty on the floating exchange rate system may pose a risk exposure. The types of exposure arising from changes in the exchange rate that transaction exposure, translation exposure, the exposure operation (Eitman et al., 2013, pp. 275).

To determine the appropriate hedging measures in overcoming the risk of such exposure, it is necessary to determine the appropriate method to determine the forward exchange rate. One method of forecasting, that is often used, is based on the theory of purchasing power parity (PPP). PPP theory is based on the purchasing power connection with the exchange rate, the purchasing power of being owned in PPP visits of inflation (Eitman et al., 2013, pp. 203).

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PPP theory in practice often encounters situations where sometimes it can be applied, and sometimes it cannot be applied. Bhatti (2000) found that the PPP theory applies in most countries, but not in other countries. Therefore, it is necessary to test the validity of PPP theory in determining Indonesia's exchange rate to China.

2. Literature Review

Research on the relationship of PPP conducted by Taylor (2002) found that the effect on the PPP theory applied in developed countries from Asia and Europe. Other studies that support the findings of Taylor (2002) are the research outcomes of Strong (2002) who argued that the PPP is very influential in G7 countries. Whereas in developing countries with developed countries, the PPP has an effect that is not much different as the findings belonging to Kemal (2004), which examines the PPP to the exchange rate of Pakistan with 4 currencies of developed countries found that the PPP is still significant effect.

Different results were discovered in the research directed by Bhatti (2000), which examines the influence of the PPP in Pakistan with currencies of developed countries and developing countries, showed that the PPP tends to affect the developed countries and some developing countries with good trade relations with Pakistan. The findings from other studies are also useful in explaining the research framework. Rogoff (1996) notes the unique nature of PPP not only arise from trade relations, but rather influenced by monetary policy prevailing in the country so that the effect of PPP is visible in a specific period.

2.1. Hypothesis

H0: PPP significant effect on the rupiah-Renminbi

The hypothesis in this study is based on the work of Krugman et al. (2012, pp. 394-396), who suggest that the PPP theory would apply to both countries, if the two countries have good relations in trade, legal policies that support trade, lower transportation costs that make a difference in price. The theory is reinforced by the findings of research by Bhatti (2000), which revealed that the PPP will affect the exchange rate in countries that have strong trade relations. Indonesia and China are the countries involved in this study, and they have strong trade relations with low transport costs so PPP will affect the rupiah-Renminbi.

3. Research Methodology

3.1. Data

For the data of this study, we use secondary data. These data was selected from several websites, such as on sites bi.go.id for Indonesian interest rate and sites that offered information on Chinese interest rates, namely Invest in China (2018) (for data exchange) and the site Inflation.eu (2018) (for inflation data from the two countries). The collected data included monthly data with a span from January 2007 until December 2017. Using this the time span, we aimed to examine the effect of inflation on the exchange rate regime across governments. That way we can observe the effect of inflation and exchange rate regardless of political conditions that occur on both sides of the country. Data retrieval involves a number of $n = 132$ observations.

Data inflation is based on the CPI (customer price index). CPI is used as a reference as the CPI has a significant impact on the consumer capable of affecting trade flows which, according to our close relation with the PPP. Inflation data management involved examining of the value ratio. The ratio of the value we obtain from the results is a comparison of inflation in Indonesian with China's inflation. The method we apply is based on the theory of PPP absolute contained in Madura (2008, pp. 214-216). As for the model equations in the process of inflation is:

$$R = \frac{ID}{IF}$$

where, R is the rate of China, ID is inflation in Indonesian and IF is the inflation in China

For the redirection of data exchange we achieve by way of binary encoding. The coding we apply with calculating the difference between the spot exchange rate and the previous exchange rate. If the difference is negative, it shows the rupiah strengthened and we assign it a code 0, while the difference is positive, it indicates a weaken effect, and we assign it a code 1.

3.2. Model Specification

For this study we used the model of logistic regression models, as approached by Gujarati (2009, p. 557). The model includes all the independent variables that affect the dependent variable. As for the method we choose, this method can help us identify the opportunities that are influential to inflation on the exchange rate. Our analysis models is presented as follows:

$$L_i = \left(\frac{P_i}{1 - p_i} \right) = \beta_0 + \beta_1 X_1$$

Y = Dependent variable is assumed to be equal to 1 so it is not written in the equation

X_1 = Independent variable inflation

β_0 = Constant

β_1 = Coefficient of inflation

4. Research Findings

In Table 1, we can examine the results of the logistic regression. The z value of inflation reached 2.213. This value is outside the range [-1.93, 1.93] of rejection. Because the z value is outside of the rejection range, it can be said that the PPP has a strong relationship with the exchange rate.

Table 1. Results of Logistic Regression

	Estimate	Std. Error	z value	Pr (> z)	odds ratio
(Intercept)	0.12782	0.25343	0504	0614	1.136348
PPP	0.20861	0.09428	2213	0.0269	1.231969

P values in this study show the number 0.0269. The figure was below 0.05, which means the initial hypothesis is accepted. So, based on these tests, we can note that the PPP has an opportunity to influence exchange rates. The magnitude of the opportunity to influence exchange rates derived from the value of the odds ratio, the magnitude of the likelihood of such PPP reached 1.231969 times every once yet.

5. Discussion and Conclusion

This research was conducted to address the enactment of the PPP theory of exchange rate determination between Indonesia and China. The applicability of PPP theory in this study does not necessarily indicate that PPP is safe to use in the determination of the forward exchange rate. This aspect is based on previous studies that showed different results from each case the exchange rate. As the research conducted by Taylor (2002), Strong (2002), Kemal (2004) shows that the PPP theory is feasible to apply as an absolute ideal as a reference in determining the forward exchange rate. Different studies, most notably Bhatti (2000), Rogoff (1996), indicate that the entry into force of the PPP is relative depending on the balance of trade, customs fees, and government policies in trade.

The applicability of PPP is relatively consistent with the theory expressed by Eitman (2013, p.180), that purchasing power parity does not always apply because they have to consider the costs of the customs of each country that caused the price difference that is not much different. So, PPP will be best used to show results when measuring the forward exchange rate with good trade relations and few trade barriers. Based on the above statement of the validity of PPP in forecasting the exchange rate of Indonesia-China, caused by the strength of Indonesia-China trade relations is supported by low costs of trading.

5.1. Conclusion

PPP has a significant effect on the exchange rate between Indonesia and China. So, as forecasting using the PPP can be used as a subject to the conditions of trade flows, transportation costs, customs fees, licensing, and other factors related to trade.

5.2. Research Limitations

This study took monthly data so as to examine the influence the PPP, so the data based on weeks or years cannot be known. To this end, further research can investigate the influence of the PPP in the daily or annual timeframes. In addition, this study also has limitations based on the inflation, which was examined only using the CPI, whereas other price indexes were not considered, as the study conducted by Groosman (2011)

who addressed the sellers' price index effect on the exchange rate. This limitation resulted in not knowing the appropriate indicators for the measurement of inflation that will be used in the calculation of PPP.

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