

# Dynamics Of Real Exchange Rate And Three Financial Crisis: Purchasing Power Parity Relative Approach In Indonesia And Thailand

Suryaning Bawono, Zainuri, Regina Niken

**Abstrak:** This paper highlights the fluctuations in the exchange rate of the Rupiah and Baht against the USD with David Ricardo's purchasing power parity relative approach. We investigate whether fluctuations in the exchange rate of the domestic currency have an influence on the purchasing power of proxies with GDP per capita in the period of three financial crises namely the 1997 Asian financial crisis, the 2008 Subprime Mortgage Crisis and the 2011 European debt crisis. domestic money to people's purchasing power in Indonesia and Thailand. This analysis is based on the non-linear (dynamic) time series Threshold Autoregressive (TAR) model in the period 1994-2017. Our estimation results show that the fluctuations in the exchange rate of the domestic currency have a strong influence on people's purchasing power in Indonesia and Thailand.

**Keywords:** Exchange rate, crisis, Indonesia, Thailand

## 1. INTRODUCTION

The fluctuations in the domestic currency exchange rate against the US dollar have an impact on the impulse of exports and imports in international trade, the balance of payments and the behavior of economic actors. Theoretically, the currency exchange rate reflects the ratio of general prices due to the comparative advantage (Ricardo, 2018). The real sector and monetary sector influence each other in the concept of exchange rate dynamics so that the impact of exchange rate volatility on economic growth has the potential to have different impacts in each country influenced by various factors including exchange rate regime, balance of payments position and productivity of the country itself (comunale, 2017; Vindayani, et al, 2015). Refraction of the exchange rate against the ratio of general prices is also influenced by the behavior of entrepreneurs, investors and speculators including the encouragement and pull of the economic conditions of the large open economy. Indonesia and Thailand are countries in Southeast Asia that fall into the category of small open economics (Ramayandi, 2011). Small open economy, is a country with an economy that is influenced by the world economy and large open economic countries, but does not have a strong enough influence to affect the economy of other countries (Konya, 2018). In the theory of purchasing power parity the difference in inflation in different countries has an impact on the domestic exchange rates of each country (Syarifuddin, 2015). Empirical research that proves the influence of exchange rates on people's purchasing power proxied with GDP strengthens the theory of purchasing power parity. But there are countries that are in accordance with the theory and there are countries that are not in accordance with the theory. There is an empirical refraction of the exchange rate and price ratio forming a puzzle of purchasing power parity theory (Rogoff, 1996). A puzzle about purchasing power parity was examined by Cheung & Slai, 2000.

In his study he carefully analyzed the dynamics of adjusting real exchange rates through analysis of impulse responses. Large exchange rate volatility indicates the possibility of nominal shocks in the price of goods in the domestic market. The dynamic response pattern shows that the shocking response of the domestic exchange rate before the impact of the shock response disappears. The results of purchasing power parity investigations in Canada, France, Germany, Italy, Japan, the United Kingdom, and the United States by Lo & Morley, 2015. Shows the exchange rate refraction and general price ratio.

## 2. LITERATURE REVIEW

Turkey's economic growth has an effect on the exchange rate of Turkish lira currency. This, proves empirically there is a relationship between currency exchange rates and economic growth in Turkey (vural, 2018). Strengthened by the research of Guzman, et. Al., 2018, which concluded that exchange rate policies in Africa and South America had an impact on economic growth. However, the results of the communal study, 2018 stated that the euro exchange rate volatility was not strong in influencing GDP growth in 27 EU countries for period 1994–2012. The results of the communal research show that there is an interesting influence of the real and monetary sectors in the dynamics of exchange rates which is reinforced by the research of Jovic, et al, 2019 which measures economic growth using exchange rate analysis. Research on exchange rates and economic growth has also been carried out by Zhang & Zhang, 2018 who found a long-term correlation between economic growth, exchange rates and foreign direct investment (FDI). The relationship between the real sector and the exchange rate was strengthened by the Ouyang & Pau study, 2018 using the one price law approach which concluded that there was an impact of the exchange rate on the price and income of skilled workers working across countries. Habib, et al, 2017 in the form of investigating the impact of real exchange rate movements on economic growth based on five-year average data for panels of more than 150 countries in the post-Bretton Wood period. In this study using external instruments to deal with the possibility of back causality from growth to real exchange rates. Found that the dynamics of exchange rates affect the annual real GDP growth. There is a tug of force that influences the exchange rates between the monetary sector against the

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background of the central bank's interest rate policy and the exchange rate regime, with the real sector motivated by entrepreneurial motives, production, distribution (trade) and investment (Allman, 2015). The real exchange rate reflects the level of competitiveness of the country in international trade. Interest in attracting demand and supply of currencies is reflected in the dynamics of the exchange rate of the currency (Montiel & Jahjah, 2003; Syarifuddin, 2015; Spilimbergo & Vamvakidis, 2000). The dynamics of the exchange rate are based on various factors that can be approached with three approaches, namely the goods market approach, the asset market approach and the microstructure approach. The three approaches are closely related to economic growth. The goods market approach makes the approach of international trade an approach to the determinants of currency exchange rates. The asset market approach uses an investment approach that has an impact on cash flow. The microstructural approach uses an information and institutional approach (Syarifuddin, 2015). International trade and investment are closely related to economic growth (Mankiw, 2015). Countries with the Large Open Economy classification are countries with capital movements in and out of the country which can affect international interest rates, for example the United States and China. While countries with small open economy classifications of capital out and in-country movements cannot influence international interest rates (Kónya, 2018). Indonesia and Thailand are included in the Small Open Economic country. International trade is a form of effort to provide goods and services of the same quality and lower costs due to differences in the advantages of each country. The difference in the advantages of different countries has an impact on the difference in the cost of producing the same goods in different countries so that the same price difference occurs in different countries (Ricardo, 2018). The existence of human needs, product value and product exchange value, builds the concept of meeting needs based on product value by providing these products based on the lowest exchange rate or the concept of production and trade efficiency. Where prices or exchange rates of products are formed from the process of production and distribution (Smith, 2018).

### 3. RESEARCH METHODS

This type of research is descriptive quantitative research with the Threshold Autoregressive (TAR) model. Descriptive quantitative research is based on positivism philosophy which emphasizes objective phenomena and is assessed quantitatively. Descriptive quantitative research begins with the process of collecting data. The data is examined and used to determine the relationship between the variables under study, so that researchers can develop the results of the study in accordance with the purpose of the study (Bahri & Zamzam, 2015). The threshold autoregressive (TAR) model is one of the nonlinear autoregressive (AR) time series models with segmented models so that between different segments it is possible to have different AR (autoregressive) models. In this study, there were three segments namely the 1997 Asian financial crisis, The 2008 subprime mortgage financial crisis, and the European financial crisis in 2011. We examined the dynamics of exchange rates with these three segments of economic growth. The use of the type of data used in this study is secondary data, namely in the form of time series data with the research period used from 1994 to 2017 with the main objects of research, namely Indonesia and Thailand. The

definition of operational variables in this study is summarized in table 1.

**Table 1. Variable definition**

Variable	Definition	Data source
Real per capita GDP	PPP is converted to GDP per capita	WDI
Real exchange rate (RER) vs. USD	Purchasing Power Parity (PPP) of GDP in units of national currency per USD is divided by nominal exchange rate against USD	IMF IFS
CPI-based Real Effective Exchange Rate (REER)	Appreciation (Increased exchange rate) of the national currency. Based on the consumer price index	IMF IFS
Net Trade in Goods and Services	Net balance of exports and imports	WDI
Net capital inflows	Total financial liabilities less total financial assets, excluding foreign exchange reserves	IMF IFS & WDI

The research model in this study was adopted from the Habib, et al., 2017 research model. The model in the study of Habib, et al., 2017 is as follows:

$$Y = f(RER, R, Z)$$

Where Y is the real GDP per capita that reflects economic growth as the proxy of domestic purchasing power, RER is the Real Exchange Rate as a Purchasing Power Parity (PPP) proxy for GDP in national currency units per USD, R is a Real Effective CPI-based Exchange Rate (REER) and Z are the sum of the direction of the influence of Net Trade in Goods and Services and net capital in flow towards the real GDP per capita.

And it becomes the econometric model as follows:

$$Y_t = \beta_0 + \beta_1 RER_t + \beta_2 REER_t + \beta_3 NT_t + \beta_4 NC_t + \epsilon_t$$

Where :

Y = GDP per capita

RER = Real Exchange Rate

REER = CPI-based Real Effective Exchange Rate

NT = Net Trade in Goods and Services

NC = Net capital inflows

### 4. RESEARCH RESULTS

In this study using secondary data with World Bank and International Monetary Funds data sources. To see the impact of the dynamics of value with three segments in the form of a financial crisis, in this study using the Threshold Autoregressive (TAR). This study estimated each country one by one after that compared the results of estimates of the three countries.

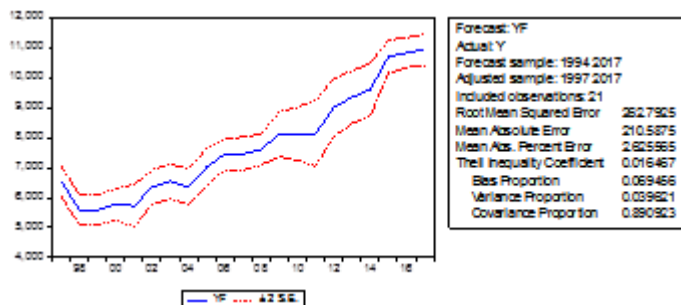
#### A. Estimated results of TAR Indonesia's GDP Model with RER Variable Threshold and REER Non Threshold Variables:

$$Y = (Y(-3) < 5934.137) * (1051.53414787 + 0.108107763108 * RER) + (Y(-3) > 5934.137 \text{ AND } Y(-3) < 7792,629) * (-2626.35851381 + 0.565847306906 * RER) + (Y(-3) > 7792,629) * (-408.204058721 + 0.447033319636 * RER) + 49.4648130347 * REER$$

From the results of the TAR model estimation with the threshold of the RER variable and the non- threshold REER variable, it is known that the direction of the RER and REER relationship to Y is positive so that it can be said that there is a positive correlation between real exchange rates and CPI-based Real Effective Exchange Rate against the purchasing

power of Indonesian people meaning that the stronger the rupiah the purchasing power of Indonesian people is getting stronger.

**Figure 1. Results of the TAR Forecast of the Indonesian GDP Model with RER Variable Threshold and REER Non Threshold Variables:**

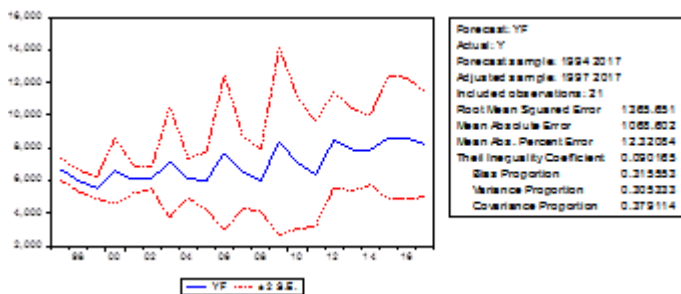


From the results of the forecast in the 1994 to 2017 period, the 1997 Asian financial crisis had a significant impact on the rupiah and the purchasing power of the Indonesian people. With a forecast value of 0.069456 and Covariance Proportion of RER on GDP per- capita (Indonesian people's purchasing power) 89% or 0.890923

**B. Estimated results of the TAR Model of Indonesian GDP with NT Variable Threshold and NC Variable Non Threshold:**

$Y = (Y (-3) < 6319.67) * (7016.07460626 - 0.0703191990567 * NT) + (Y (-3) > 6319.67 \text{ AND } Y (-3) < 6824.606) * (2981.86307735 + 0.202846513346 * NT) + (Y (-3) > 6824.606 \text{ AND } Y (-3) < 8044.97) * (7103.41154365 + 0.0592920384221 * NT) + (Y (-3) > 8044.97) * (9976.36489797 + 0.0997149842433 * NT) + 0.0579268250892 * NC$  From the estimation results, the effects of the crisis bias the impact of Net Trade in Goods and Services or Indonesia's trade balance by 7% or 0.0703191990567 during the 1997 Asian financial crisis. This explains how badly the influence of the 1997 Asian financial crisis on Indonesia's international trade impacted the purchasing power Indonesian society. But in the 2008 crisis period, Indonesia's purchasing power strengthened, confirmed by the strengthening of the rupiah on the results of the Indonesian TAR model estimation of the TAR with a threshold of RER variables and a non-threshold REER variable of 5% or 0.565847306906.

**Figure 2. Results of the TAR Forecast of the Indonesian GDP Model with NT Variable Threshold and NC Variable Non Threshold:**

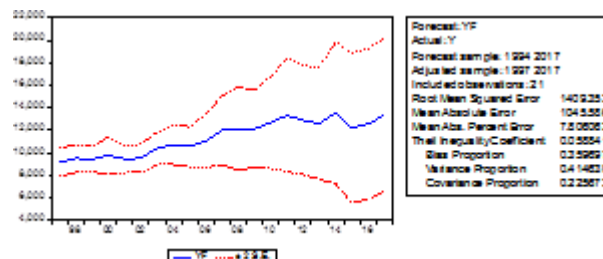


From the results of the TAR forecast, the impact of international trade with Indonesia's purchasing power fluctuates. In the 1997 crisis period formed a valley in 2000 and continued to be bumpy in the face of the 2008 crisis and the 2011 crisis in which valleys were formed in the crisis period and began to stabilize in mid of 2014/2015.

**C. Estimated results of the Thai GDP Model TAR with RER Threshold Variables and REER Non Threshold Variables:**

$Y = (Y (-3) < 9914.43) * (29764.4176225 - 158.847585655 * RER) + (Y (-3) > 9914.43 \text{ AND } Y (-3) < 13486.56) * (47141.6077777 - 555.474875498 * RER) + (Y (-3) > 13486.56) * (27118.3913287 + 161.601812876 * RER) - 153.26329973 * REER$  In contrast to Indonesia, in Thailand the strengthening of the baht or domestic currency against the US actually reduced the purchasing power of Thai people except in the 2011 crisis period. This implies Thailand's export sector with the American market after the Asian financial crisis until the European financial crisis period significantly dominated economic growth Thailand in 2011 with the ACFTA (Asean China Free Trade Agreement) implied that the market for Thai export products was absorbed outside the United States and ASEAN countries (the Association of Southeast Asian Nations) and China, including the potential trading partners of Thailand.

**Figure 3. Results of Thailand's TAR Forecast Model with RER Threshold Variables and REER Non Threshold Variables:**



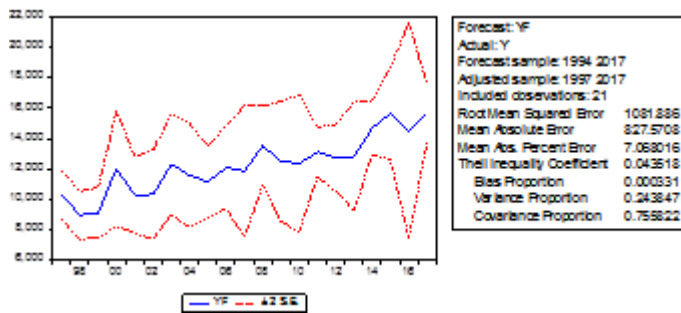
Based on the results of the forecast with TAR, it is illustrated that Thailand's economic growth after the crisis grew quite well and reflected the stronger purchasing power of Thai people.

**D. Estimated results of the Thai TAR GDP Model with NT Variable Threshold and NC Variable Non Threshold:**

$Y = (Y (-3) < 9914.43) * (10602.7927585 - 0.091989935952 * NT) + (Y (-3) > 9914.43) * (12780.2786892 + 0.0482313381053 * NT) - 0.101655164265 * NC$  During the 1997 Asian financial crisis there was a 9% refraction or 0.091989935952 on the impact of Thailand's trade balance on the purchasing power of Thai people. However, the trade balance in the long run has a positive effect of 5% or 0.0482313381053 and the effect of the balance of payments has a negative effect on purchasing power due to the encouragement of the baht which is negatively correlated with purchasing power as estimated by the TAR Thai GDP model with the RER threshold and non-threshold REER variables. This confirms the finding that Thailand is a country with export dominance over its GDP.



**Figure 4.** Results of TAR Forecast Thailand GDP Model with NT Variable Threshold and NC Variable Non Threshold:



Similar to Indonesia, Thailand's trade balance fluctuates but tends to increase. The 1997 crisis was illustrated quite hard to suppress Thailand's International trade. And it continues to fluctuate until 2017 with the proportion of covariance (the effect on purchasing power of 76% or 0.755822 is greater than the influence of RER on purchasing power which is 22% or 0.225673. in the International market which caused a decline in international demand for Thai export commodities.

## 5. DISCUSSION

From the results of the TAR estimation, it was found that Indonesia and Thailand had differences in the impact of RER on people's purchasing power. This is based on differences in the dominance of economic variables on the purchasing power of people proxies with GDP per capita. Where Indonesia is dominated by the consumption sector, so the impact of RER on purchasing power is a positive effect, meaning the stronger the rupiah, the stronger the purchasing power of the Indonesian people. However, on the contrary in Thailand, with export domination over GDP, the impact of RER on the purchasing power of Thai people is negatively related, which means the stronger the baht, the weaker the purchasing power of Thai people. This is motivated by the decline in Thai exports due to the strengthening of the baht or when the baht strengthens the price of Thai export commodity goods to be more expensive, thereby reducing demand for export commodities in the international market. As a result, the income of Thai people, which are dominated by exports or the production sector, has decreased, so that people's purchasing power has declined. As which is explained by Keynes  $Y = C$ , which means that people's purchasing power is proportional to their income. Aggregate  $Y = GDP$  where  $GDP = C + I + G + Nx$  (Mankiw, 2015). The 1997 Asian financial crisis had the hardest impact on Indonesia and Thailand among the three crises faced by Indonesia and Thailand in the period 1994 to 2017. The Asian financial crisis in Indonesia and Thailand had a very bad impact on the economy as a whole. But the subprime mortgage crisis reduced Thai exports so that people's purchasing power was disrupted. However, in Indonesia, the rupiah has strengthened, which means that goods entering Indonesia from abroad are getting cheaper so that the power of the Indonesian people is increasing because the dominance of the economic sector that dominates Indonesia's GDP is the consumption sector. The European debt crisis did not have a hard impact on the Indonesian and Thai economies because of the ACFTA (Asean China Free Trade Agreement) so that the decline in Thai export demand in America and Europe could be absorbed in East Asia, especially the ASEAN (Association of Southeast Asian

Nations) and China. In Indonesia alone can receive imported goods from ASEAN countries (Association of Southeast Asian Nations) and China apart from America and Europe so that the euro debt crisis actually strengthens Indonesia's purchasing power.

## 6. CONCLUSIONS

The impact of the three crises in the period 1994 to 2017 is different in each country depending on economic conditions and advantages that differ in each country. So that the impact of the dynamics of real exchange rates on people's purchasing power also differs in each country including Indonesia and Thailand. Where Indonesia is dominant in the consumption sector with a population of more than 200 million and Thailand is more dominant in the production sector.

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