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# Is Real Exchange Rate of Indonesian Domestic Rupiah to USD Really Affected by Fiscal and Monetary Policy?

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**Abstract**— This study attempts to examine the effect of fiscal and monetary policy on the real exchange rate of Indonesian domestic rupiah (IDR) to USD. The aim of this research is also to know whether the influence of the GDP growth difference between Indonesia and US can be considered to create misalignment on real exchange rate of IDR to USD. The data employed is secondary data from International Financial Statistic-IMF which processed by using Simultaneous Equation Model. The results showed that fiscal policy, i.e., tax received is negative and significant in overvalued real exchange rate (RER) and, on the other hand, government expenditure has positive and significant effect in undervalued RER. However, monetary policy, i.e., money supply (M1) has insignificant effect in overvalued RER, while the GDP growth difference between Indonesia and US is also not affecting to create misalignment of RER.

**Index Terms**—real exchange rate, GDP growth difference, fiscal and monetary policy

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## I. INTRODUCTION

The real exchange rate (RER) is generally defined as the nominal exchange rate for bilateral currency of two countries justified by the relative prices of goods in those countries [1]. Models of exchange rate determination based on macroeconomic policies have not had much success in explaining both nominal and real exchange rate (RER) movements. There are broad unanimous views between policy

makers and academics that predictions on nominal exchange rates are extremely challenging. However, agreement is in fact less unanimous on whether RER could really be estimated [2]. Indeed, all economic agents can only infer and observing the movement of nominal exchange rates rather than RER. As the economic incentives, an estimation of the RER is more crucial to measure the development of price competitiveness and export performance [3].

Indonesia had been several times decided to devalue the nominal exchange rate of IDR/USD. The devaluations of IDR/USD were considered only to turn back the RER into equilibrium value from overvalued of RER [4]. In the period of 1978-1997, Indonesia implemented a managed floating exchange rate regime and continuing to pursue a macroeconomic stabilization policy to enhance economic growth, exports, and the IDR/USD value that reached 2,450 IDR/USD in 1997. In Asian financial crisis era (1997-1998), the rupiah depreciated substantially by approximately 508% to a highest of 14,900 IDR/USD in 1998 [5].

During the post-1997 crisis, some important views emerged justify the rapid stockpiling of foreign exchange reserves, one of which is the mercantilist argument. This view claims that aside from the desire to maintain exchange rate predictability, reserve growth has been primarily motivated by desires to preserve an undervalued domestic currency and to

enhance the international competitiveness. Is the mercantilist policy being adopted by the most monetary authority of an economy evidently supported? The way to address this question is by evaluating whether systematic interventions by the monetary authority are successfully to keep undervalued of the domestic currency [6].

A slightly ignoring the effects of fiscal policy regime, the IMF provided a rescue scheme in 1998 to stabilize the IDR/US\$ exchange rate and the macroeconomic condition. In line of monetary policy to stabilize the exchange rate, the Bank of Indonesia then raised the overnight rate to a high of 80.01% in 1998, and the deposit rate and the lending rate followed suit to rise to a high of 54.64% and 35.68% in 1998. The high interest rates reduced investment spending, dampened consumption and investment credit purchases, and rapid increased business failures. As a result, GDP growth moved suddenly downward by approximately 19.3% during 1997–1998 [5]. The more recent fiscal policy regime (2016–now), Indonesian government expenditure seems to substantially increase in which more recently following a tax amnesty scheme and propaganda to attract capital inflow that needs further some incentives to undervalue of the RER too. The analytical tractability of the reduced form of simple macroeconomic policy model for RER determination is then interesting in the Indonesian context.

Since the task of exchange rate theory is to explain behavior observed in the real world, the analysis is then overall encouraging on the usefulness of exchange rates theory: by contributing to change the battlefield, i.e., turning to real rather than nominal exchange rate analysis [2]. This study attempts to determine the effect of fiscal and monetary policy as well as the GDP growth difference between Indonesia and US on the RER of Indonesian domestic rupiah (IDR) to USD.

## II. LITERATURE REVIEW

The long exerting influence to understand nominal exchange rates could help clarify why only a handful of studies have so far carried out officially inquiry on the predictability of RERs [2]. But some analysts remain rather skeptical on the scope for RER forecasting [7]. The standard theoretical reference on RER is the PPP hypothesis, one of the most prominent and controversial theories in the history of economic thinking. The common view is now back to what had prevailed before the 1970s, i.e. “that short run PPP does not hold, that long-run PPP may hold in the sense that there is significant mean reversion of the RER [1], although there may be factors interfering on the equilibrium RER through time” [8]. Empirical evidence however supports the view that productivity differentials are an important determinant of RERs, where the link between these variables is typically modeled as a long-run relationship. Unfortunately, models of exchange rate determination based on macroeconomic fundamentals have not had much success in explaining, let alone forecasting, exchange rate movements [9].

Modeling exchange rates that is worth mentioning is one that accords a central role to productivity differentials in explaining movements in the RER. Such models, based on work by Balassa and Mundelson, relax the assumption of PPP and allow the RER to depend on the relative price of non-tradable, itself a function of productivity differentials [10]. On the other hand, the monetary approach to exchange rate determination has come a long way too. The more recent

studies appear to find no long-run relationship between nominal exchange rates, money supply and income, which is the essence of the simple monetary model. The basic models developed in the 1970s received initial support but did not hold up under further empirical research [11]. With several advances in economic analysis and improved research design, a number of studies began to rebuild support for the model at least as a long-run phenomenon.

A shortcoming of the monetary approach to exchange rate determination so far in the literature is the effect of fiscal variables, as well as regime changes, on the demand for money. Suggestions on future research should use a more comprehensive demand for money in the exchange rate determination [12]. Several alternative models of the exchange rate emerge from a reduced-form expression of the condition of balance of payments equilibrium that is derived from an extended version of the standard two-country model of international trade and the extended Mundell-Fleming model [5]. These models, which focused on the RER and other real variables, embodies the essential ideas of the elasticity and absorption approaches to the balance of payments and the traditional partial equilibrium model of the foreign exchange market [13].

Several recent studies of exchange rate determination for Indonesia and related countries were well documented [5]. Five Asian currencies are consistent with the specifications of some types of monetary models, that exchange rates do most of the adjustments toward equilibrium for the Indonesian rupiah, the Korean won, and the Singapore dollar [14]. In another study, several different models were used to evaluate currency overvaluation for several Asian currencies. A monetary model reveals that the Indonesian rupiah is overvalued whereas the New Taiwan dollar, the Korean won, and the Singapore dollar are undervalued. The PPP model shows that the Malaysian ringgit, the Thai baht, the Hong Kong dollar, and the Philippine peso were overvalued [15].

Some evidences about the relationships among the exchange rate, the interest rate, and economic activity for five Asian countries including Indonesia, showed that a higher interest rate leads to exchange rate depreciation for Korea, the Philippines, and Thailand and that a higher interest rate leads to rupiah appreciation first but depreciation next and little impact later, and that higher interest rates and exchange rate depreciation would increase business failures and deepen the crisis. Hence, the IMF's recommendation to raise the interest rate sharply to stabilize the exchange rate may increase business failures and intensify the crisis [16]. Higher interest rates cause higher exchange rate volatility, that a higher interest rate policy would not defend the exchange rate, and that when the nominal interest rate is raised, the probability of a crisis regime increases [17].

Based on a monetary model, a study the interest rate-exchange rate relationship for Indonesia, Korea, and Thailand found that a higher interest rate leads to exchange rate appreciation and that there was lack of evidence that a premium would rise due to a higher real interest rate [18]. An increase in the interest rate differential would have a significant impact on the exchange rate appreciation and that the cost of a higher interest rate for a low-inflation and low-budget deficit country far outweighs the benefit [19]. The determination of the RER for five selected Asian countries revealed that the productivity-bias model applies to Indonesia

and the Philippines whereas the real interest rate-bias model applies to Indonesia, **K4**sa, Malaysia and the Philippines and that there was lack of support for the political risk premium model [20].

Evidences from the extended Mundell-Fleming model however describe several feature: **14**f RER. The RER in Slovakia is positively influenced by deficit spending/GDP ratio and the stock price index and negatively associated with real money supply (M2), the US Treasury bill rate **8** country risk, and the expected inflation rate [21]. The US dollar/kuna exchange rate for Cro**8**a is negatively associated with real money supply (M1). Deficit spending does not affect the exchange rate. Most of the variation in exchange rates can be explained by the open economy model and uncovered **4** interest parity [22]. For the case of Indonesia with **5**e extended Mundell-Fleming model indicate that the RER has a positive relationship with real money supply (M2), the domestic interest rate, and **2**y expected inflation rate and a negative relationship with the ratio of government consumption spending to GDP and the stock **1**rice. These results suggested that more real money supply or a higher domestic interest rate would cause the RER of IDR/USD to be undervalued. Hence, relying on a tight monetary policy with a relatively high interest rate to defend the rupiah against USD would not work [5].

### 15 III. METHODOLOGY

The data were collected from the *International Financial Statistics* published by the International Monetary fund. The nominal exchange rate is the average value during a quarter and measured as the Indonesian rupiah per U.S. dollar (IDR/USD). Simultaneous equation model in this research can be seen in the following functional equation and Figure 1:

$$y_1 = \alpha_0 + \alpha_1 x_1 + \alpha_2 x_2 + \alpha_3 x_3 + \mu_1 \quad (1)$$

$$y_2 = \beta_0 + \beta_1 y_1 + \beta_2 x_1 + \beta_3 x_2 + \beta_4 x_3 + \mu_2 \quad (2)$$

Where,  $y_2$  is RER, measured by nominal exchange rate of IDR/USD adjusted with CPI ratio of US to Indonesia;  $y_1$  is GDP growth difference, measured by growth of real GDP difference between Indonesia and US in absolute value;  $x_1$  is Tax, measured by total tax received of Indonesia in billion rupiah;  $x_2$  is Money Supply, measured by M1 in billion rupiah;  $x_3$  is Government Expenditure, measured by total Indonesian government expenditure in billion rupiah;  $\alpha_0$  and  $\beta_0$  are constants;  $\alpha_1, \dots, \alpha_n$  and  $\beta_1, \dots, \beta_n$  are each as parameters to be estimated;  $\mu_1$  and  $\mu_2$  are random error terms.

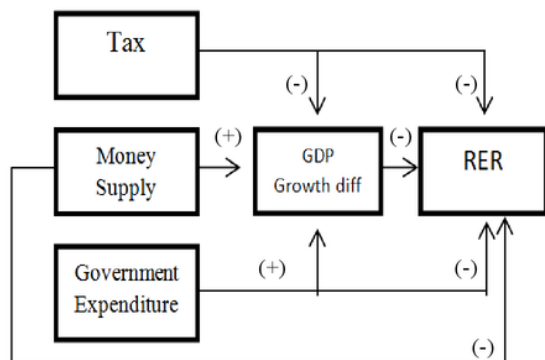


Fig. 1. Simultaneous Equation Model of the Research

The reduced form based on Equation 1 and 2 can be presented in the following equation:

$$y_1 = \alpha_0 + \alpha_1 x_1 + \alpha_2 x_2 + \alpha_3 x_3 + \mu_1 \quad (3)$$

$$y_2 = \gamma_0 + \gamma_1 x_1 + \gamma_2 x_2 + \gamma_3 x_3 + \mu_2 \quad (4)$$

Where,  $\alpha_0$  and  $\gamma_0$  ( $\beta_0 + \alpha_0 \beta_1$ ) are constants;  $\alpha_1, \dots, \alpha_n$  and  $\gamma_1$  ( $\beta_2 + \alpha_1 \beta_1$ ),  $\dots, \gamma_n$  ( $\beta_n + \alpha_n \beta_1$ ) are the total effects of variable  $x_1, \dots, x_n$  to variable  $y_1$  and  $y_2$ ;  $\mu_1, \mu_2$  ( $\mu_2 + \mu_1 \beta_1$ ) are composites random error.

### 5 IV. RESULTS AND DISCUSSIONS

Estimated regressions and related statistics are presented in Table 1. The reduced form of simple simultaneous equation method is employed in estimating the behavior of RER with three exogenous policy variables, i.e., total tax receive and government expenditure that representing fiscal policy, and money supply (M1) as monetary policy measured. GDP growth difference between Indonesia and US serves as endogenous variable that intervene the target variable of the RER. The direct coefficient **31** of the tax received and government expenditure are significant at the 5% level both to GDP growth difference and the RER whereas the direct coefficient of money supply is only significant affecting the GDP growth difference and insignificant to the RER. The direct coefficient of GDP growth difference is also insignificant to the RER.

TABLE 1. ESTIMATE RESULTS

Directions of Effect	Regression Coefficients	t-Statistic	Probability
$x_1 \rightarrow y_1$	1.641*	10.4744	0.000
$x_2 \rightarrow y_1$	-2.418*	14.290	0.000
$x_3 \rightarrow y_1$	0.751*	4.699	0.000
$y_1 \rightarrow y_2$	-0.007	-0.439	0.660
$x_1 \rightarrow y_2$	-0.244*	-7.356	0.000
$x_2 \rightarrow y_2$	-0.027	-0.624	0.532
$x_3 \rightarrow y_2$	0.081*	3.354	0.000

\*) Significant at  $\alpha = 5\%$

Unexpectedly, tax received has a significant with positive sign effect on GDP growth difference. However, tax received has a significant with negative sign in affecting the RER as expected. This tax received can then directly pushes an overvalued of IDR/USD. The higher tax received would increase the Indonesian CPI in which leads an overvalued the RER that lessen the competitiveness of Indonesian export [4]. Contrarily, this finding also suggests that Indonesian tax amnesty plan in which intended to increase capital inflow should really reduce tax receipt in order to create an incentive by undervaluing the RER. On the other side, government expenditure has positive and significant effect on GDP growth difference as expected. Government expenditure perversely has positive and significant in affecting an undervalued of the RER [21]. This finding is contrarily to former study of Indonesian exchange rate behavior, employed the extended Mundell-Fleming model, in which **2** described that the RER has a negative relationship with the ratio of government consumption spending to GDP [5]. In broad monetary policy sense, money supply (M1) is also unexpected that has a negatively and significant effect on GDP growth difference only and no effect on RER at all [22]. These results suggest that expansion of money supply or a lower domestic interest

rate would not cause the RER of IDR/USD to be overvalued. Hence, relying on an expansion monetary policy with a relatively low interest rate to defend the rupiah against USD and the competitiveness of Indonesian export would probably work [4].

#### V. CONCLUSION

There might be several areas for future research. The negative insignificant coefficient of the GDP growth differential and money supply may suggest that much work needs to be done in the study of RER movements for Indonesia. The fiscal policy plays important roles in the determination of the RER and would need to be constructed several modified models of RER determination with more advanced estimation for reduced form of simultaneous equation methodologies. Overall, this study finding showed that fiscal policy, i.e., tax received is negative and significant in overvalued RER and government expenditure conversely has a positive and significant effect in undervalued RER. Monetary policy however, i.e., money supply (M1) has insignificant effect in overvalued RER, while the GDP growth difference between Indonesia and US is also not affecting yet to create any potential misalignments of RER.

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