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## Empirical Study of Scapegoat Theory Paradigm in the Exchange Rate Variable in the ASEAN 5

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### ABSTRACT

This paper attempts to explain empirically the effect of order flow as an unobserved variable on the exchange rate movements based on the theory of scapegoat. The theory of scapegoat appears as the answer to the imbalance in the relationship between macroeconomic fundamentals and the exchange rate. To analyze the validity of this theory in Indonesia, the Philippines, Malaysia, Singapore, and Thailand (ASEAN 5), we apply the two-stage least squares method. The empirical testing generates a fact that the paradigm of scapegoat theory works for four countries, namely Indonesia, Malaysia, Singapore, and Thailand. Another finding is that the theory of scapegoat does not work for the Philippines. The implication of policy based on the results is the emphasis of policy that enables intervention in the foreign exchange market, the enhancement of monetary policy transparency in each country, as well as the management of capital flows more efficiently.

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Theory of scapegoat; order flow; exchange rate; macroeconomic fundamentals; exchange fundamentals; Two-stage least squares

## 1. Introduction

Empirical debate about the relationship between exchange rate and macroeconomic fundamentals based on conventional exchange rate theories has increased more in the recent decades. Models of the exchange rate such as purchasing power parity theory, sticky price monetary model, and covered interest rate parity theory did not provide reliable evidence to predict exchange rate movements in several countries on different timescales (Engel & West, 2005; Cheung, Chinn, & Pascual, 2004; Ferreira & Dionisio, 2015). Dissimilar to these findings, the results of empirical testing in G7 countries, Central and Eastern Europe countries, several European countries, and Turkey provided evidence that the exchange rate movement in each country was appropriate with the conventional exchange rate theories (Cuaresma, Fidrmuc, & MacDonald, 2005; Dabrowski, Papiez, & Smiech, 2014; Engel, Mark, & West, 2007; Uz & Ketenci, 2008). Discrepancy in the empirical testing of conventional exchange rate theories in some countries indicated that there is an anomaly in the relationship between macroeconomic fundamentals and the exchange rate.

The theory of scapegoat explains that the exchange rate movements were influenced by an unobserved variable under the assumption of heterogeneity expectations of foreign

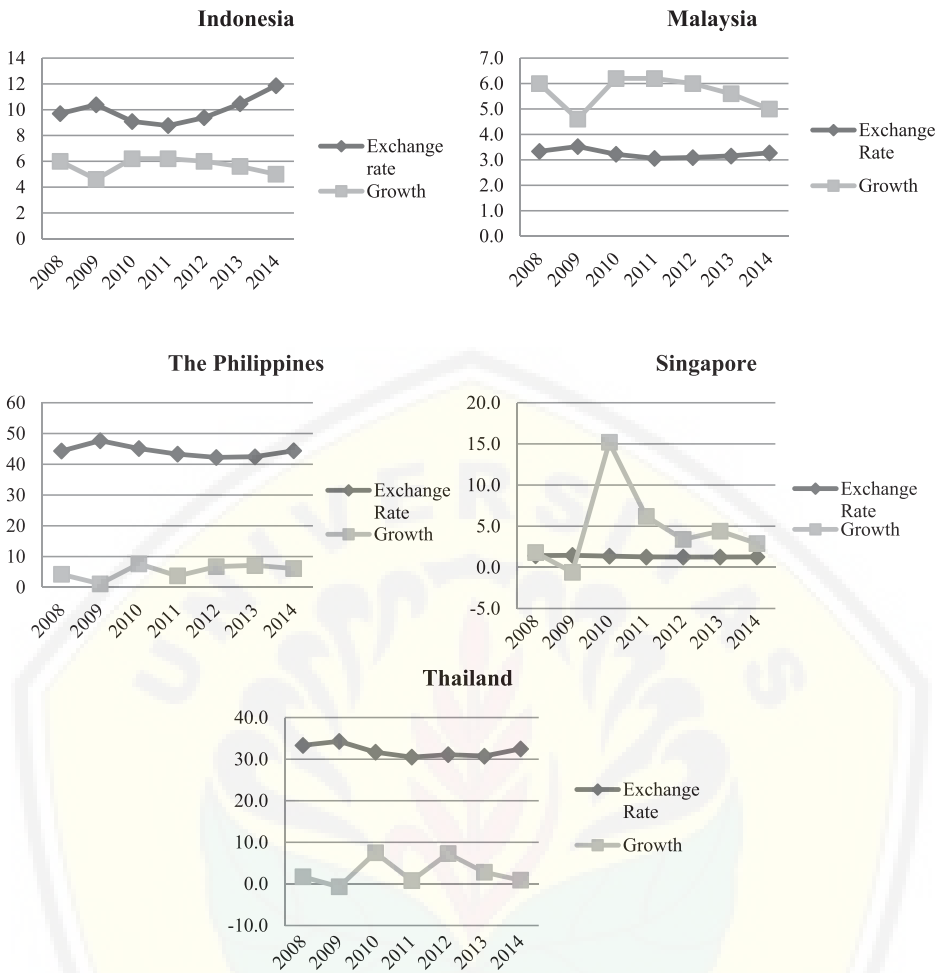
exchange market participants (Bacchetta & Wincoop, 2004, 2009). Expectation refers to the actions of speculative foreign exchange market participants that have a significant impact on exchange rate movements, and this is reflected by order flow. Order flow was a suitable proxy for the unobserved variable, because the buyer demand for foreign exchange was a source of important information for the sellers of foreign exchange or so-called dealers (Corte, Rime, Sarno, & Tsiakas, 2011; Evans & Lyons, 2002).

The paradigm theory of scapegoat in the exchange rate is able to explain the phenomenon that occurs in nearly each country today, especially since the composition of the currency in the foreign exchange market moved rapidly between 2010 and 2013. The massive movement of the foreign exchange market in 2010 and 2013 was dominated not only by active countries but also by emerging market countries Bank for International Settlement, 2013). Countries in the ASEAN, particularly Indonesia, the Philippines, Malaysia, Singapore, and Thailand (the ASEAN 5) were the emerging market countries which have a sizeable impact in the integration of world foreign exchange markets. The fluctuation in the exchange rate was a supporting factor behind the increased currency transactions in the ASEAN countries and it reflected the integration of foreign exchange market (Tsuyuguchi & Wooldridge, 2008). The exchange rate system transformation from a fixed exchange rate system to a free floating exchange rate system was one of the factors that triggered the exchange rate fluctuations. The determination of monetary policy by the monetary authority was also a driving factor in the occurrence of exchange rate fluctuations in a country (Rosa, 2010).

The appealing fact that occurred in the ASEAN 5 was the presence of unbalanced relationship between the exchange rate and macroeconomic fundamentals. This condition described about the existence of other factors beyond the macroeconomic fundamentals that greatly affected the exchange rate movements in the ASEAN 5, and it became a big question for academics and economists about the validity of scapegoat theory. Figure 1 provides the evidence for the unstable relationship between the macroeconomic fundamentals and the exchange rate movements in the ASEAN 5. The exchange rate movements of the ASEAN 5 in some years based on Figure 1 show that there was an anomaly in the relationship between economic growth and exchange rate in ASEAN 5. This anomaly can be evidenced through the condition of exchange rate that has depreciated, although economic growth has increased from the preceding year.

The existence of scapegoat theory paradigm has been found in some empirical testing in some countries at different times. The empirical testing done by Fratzscher, Sarno, and Zinna (2012) found that the scapegoat theory paradigm was in accordance with the phenomenon of exchange rate movements in 12 countries comprising six advanced countries and six emerging market countries. A similar research was done by Pozzi and Sadaba (2016) to examine the existence of scapegoat theory in 10 countries with a span of 34 years which also provided additional support for the existence of scapegoat theory in advanced and emerging market countries.

Dissimilar to the results of previous studies, Ojo and Alege (2014) stated that the panel data estimation results indicated a strong correlation between economic growth and the exchange rate in the case of African countries. Building upon the phenomenon and previous studies, there is a goal to be achieved in this study. The goal to be achieved in this study is to explain the influence of macroeconomic fundamentals (differentiation of growth of GDP, differentiation ratio of money supply, the differentiation of short-term interest rates,



**Figure 1.** Economic growth and exchange rate against US dollar of Indonesia, Malaysia, the Philippines, Singapore, and Thailand in 2008–2014. Source: World Bank (2015).

and differentiation of inflation on the exchange rate in ASEAN 5 based on the theory of scapegoat).

## 2. Theoretical framework

### 2.1. Theory of scapegoat

The scapegoat theory is the newest paradigm in the exchange rate theory, and this appears due to the ambiguity about the main cause of exchange rate fluctuations. There was another factor apart from macroeconomic fundamentals, and this factor was heterogeneity of information, so that the market participants have various expectations about the exchange rate in the future (Bacchetta & Wincoop, 2004; Sarno & Taylor, 2002, p. 24). This fact refers to the unstable parameter of exchange rate movements and reacts to the instability in the relationship between macroeconomic fundamentals and the exchange rate. The unstable

parameter could be explained through one way, that is, it created the assumption that the parameter changed massively and gradually, and this was also known by all the foreign exchange market participants (Bacchetta & Wincoop, 2009). Nevertheless, this assumption did not make sense, considering many structural changes in the economics that corresponded with the variation in the fund market and the development of fund market in the technology aspect (Bacchetta & Wincoop, 2009; Mohanty, 2013).

To illustrate the importance of scapegoat effect and its role in the unstable relation between exchange rate and fundamental, Bacchetta and Wincoop (2009) generalized the 'general' exchange rate models. Bacchetta and Wincoop (2009, 2011) built two dynamic models with the scapegoat theory. The first model created by Bacchetta and Wincoop (2009) related to the assumption that a parameter was not found and varies in time. The assumption in the first model was created based on the dynamic development of the fund market, both geographical distribution of exchange rate market integration and the development of technology (King, Osler, & Rime, 2011). The first model was formulated as follows:

$$\Delta s_t = \Delta f_t' \beta_t + (1 - \lambda) \Delta b_t, \quad (1)$$

where  $\Delta s_t$  is the log of nominal exchange rate;  $\Delta f_t' \beta_t$  is the observed variable differential; and  $\Delta b_t$  is the unobserved variable.

Dissimilar to the earlier assumption, Bacchetta and Wincoop (2011) showed that the various relations between the exchange rate and macroeconomic fundamental appeared on the unknown and constant parameter. Bacchetta and Wincoop (2011) were interested to elaborate the ambiguity of the parameters and Bayesian learning in the model of exchange rate after observing the previous empirical test. Lewis (1989) argued that the change of parameter in the fund market did not affect the attitude of prediction to the exchange rate as the available information directly. The unknown parameter model assumed that in the first period, all parameters were taken from the average distribution  $\bar{\beta}$  and standard deviation  $\sigma$ . The model based on the second model with the assumption of unknown parameter and constant could be explained by the following equation (Fratzscher et al., 2012):

$$\Delta s_t \cong f_t' ((1 - \lambda) \beta + (1 - \lambda) b_t), \quad (2)$$

where  $s_t$  is the log of nominal exchange rate;  $f_t = (f_{1,t}, f_{2,t}, \dots, f_{N,t})'$  is the vector of  $N$  observed macro fundamental (expressed in first differences);  $\beta = (\beta_1, \beta_2, \dots, \beta_N)'$  is the constant true structural parameters;  $E_t$  is the vector of expected structural parameters;  $b_t$  indicates observed fundamentals; and  $\lambda$  is the discount factor. Accordingly, the real value of the structural parameters  $\beta$  is constant, but not known by investors or market participants who study all the time about  $\beta$  through the observation of the exchange rate and macroeconomic fundamentals.

## 2.2. Order flow concept in theory of scapegoat

The theory of scapegoat provided a description about the exchange rate movements which are affected by two factors, i.e. observed variable and unobserved variable. The observed variable is a macroeconomic variable that can be observed directly. Distinct from the observed variable, the unobserved variable is a variable that could not be observed directly (Bacchetta & Wincoop, 2004). The unobserved variable came from the micro element or

the foreign exchange market participants that could be observed through the liquidity trade that was proxied with order flow and came from the intervention of foreign policy (Bacchetta & Wincoop, 2006; Cai, Cheung, Lee, & Melvin, 2001). The order flow was defined as the net value or volume of the transactions between the seller and buyer in the foreign exchange market as the tool to measure the purchase pressure of foreign currency in the foreign exchange market (Evans & Lyons, 2002).

The important point about order flow is the information that is independent and represents the private side information, in this context the traders or dealers in the foreign exchange market. The information from private side provides effect to the movement of exchange rate and that information cannot be gained easily. Order flow is a right proxy for the unobserved variable in the scapegoat theory paradigm because the demand of foreign exchange buyers is the source of important information for the exchange rate seller, for example, the dealer can find signals about the buyers' interpretation from published macroeconomic fundamental news and risk premium in the future (Bacchetta & Wincoop, 2006; Corte et al., 2011). The role of order flow as the transmission mechanism is able to give an understanding that macroeconomic fundamental contributes to judge the movement of exchange rate indirectly.

### 3. Data and methods

The original dataset contains monthly observations for Indonesia, the Philippines, Malaysia, Singapore, and Thailand, over the period from January 2008 until July 2015. The data consist of nominal exchange rate against the US dollar, money supply ratio of GDP, growth of GDP, Consumer Price Index (CPI) to represent the rate of inflation, short-term interest rate, and order flow.<sup>1</sup>

The model in this paper was adopted from the model that was used by Pozzi and Sadaba (2016). Nevertheless, Pozzi and Sadaba (2016) did not use a proxy for unobserved variables. This study uses a variable order flow as a proxy of unobserved variables such as the research of Lindahl, Moore, Rime, and dan Shehadeh (2014) and Fratzscher et al. (2012). The model that was used in the study of Pozzi and Sadaba (2016) is as follows:

$$f(\Delta s_t) = \Delta \tilde{m}, \Delta \tilde{y}, \Delta \tilde{i}, \Delta \tilde{\pi}. \tag{3}$$

Then, the economic model in Equation (3) is transformed into an econometric model in the form of Equation 4:

$$\Delta s_t = \Delta f_t \beta + \mu_t. \tag{4}$$

The next step is to transform the econometric model in the study that was done by Pozzi and Sadaba (2016) into Equation (5):

$$\text{LER}_t = \lambda_0 + \lambda_1 \widetilde{\text{LMS}}_t + \lambda_2 \widetilde{\text{GDP}}_t + \lambda_3 \widetilde{\text{INF}}_t + \lambda_4 \widetilde{\text{INTR}}_t + \mu_t. \tag{5}$$

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<sup>1</sup> The original data retrieved from Bank Indonesia, Bank Negara Malaysia (BNM), Bank of Thailand (BOT), Bangko Sentral ng Pilipinas (BSP), Monetary Authority of Singapore (MAS), and International Finance Statistic from IMF. Money supply ratio of GDP that used int this paper is M2 ratio of GDP.



Equation (5) is a shortened form of the Equation (6):

$$\begin{aligned} \text{LER}_t = & \lambda_0 + \lambda_1(\text{LMS} - \text{LMS}^*)_t + \lambda_2(\text{GDP} - \text{GDP}^*)_t \\ & + \lambda_3(\text{INF} - \text{INF}^*)_t + \lambda_4(\text{INTR} - \text{INTR}^*)_t + \mu_t, \end{aligned} \quad (6)$$

where  $\text{LER}_t$  is the log of nominal exchange rate; LMS is the log of M2 ratio of GDP in domestic;  $\text{LMS}^*$  is the log of M2 ratio of GDP in foreign; GDP is the growth of GDP in domestic;  $\text{GDP}^*$  is the growth of GDP in foreign; INF is the rate of inflation based on CPI in domestic;  $\text{INF}^*$  is the rate of inflation based on CPI in foreign; INTR is the short-term interest rate in domestic;  $\text{INTR}^*$  is the short-term interest rate in foreign;  $\lambda_0$  is constant;  $\lambda_{1,2,3,4}$  is parameter and  $\mu_t$  is the error term.

In the case of the ASEAN 5, exchange rate movements do not always reflect the macroeconomic fundamental conditions such as money supply, growth of GDP, rate of inflation, and interest rates that indicated the presence of other factors which affected the exchange rate movements. In keeping with the theory of scapegoat on the exchange rate, in addition to an observed variable, the exchange rate movements are also affected by an unobserved variable. The proxy of the unobserved variable is order flow. The existence of other variables outside the model which could affect the independent variables in a model is called the instrument variable (IV). Under these conditions, the independent variables have to be estimated using the two-stage least squares (TSLS) method, because the independent variables could be affected by IV. The first estimation stage on the TSLS method is as follows:

$$\widehat{\text{LMS}}_t = \lambda_0 + \lambda_1 \widehat{\text{GDP}}_t + \lambda_2 \widehat{\text{INF}}_t + \lambda_3 \widehat{\text{INTR}}_t + \lambda_4 \text{LOF}_t, \quad (7)$$

$$\widehat{\text{GDP}}_t = \lambda_0 + \lambda_1 \widehat{\text{LMS}}_t + \lambda_2 \widehat{\text{INF}}_t + \lambda_3 \widehat{\text{INTR}}_t + \lambda_4 \text{LOF}_t, \quad (8)$$

$$\widehat{\text{INF}}_t = \lambda_0 + \lambda_1 \widehat{\text{GDP}}_t + \lambda_2 \widehat{\text{LMS}}_t + \lambda_3 \widehat{\text{INTR}}_t + \lambda_4 \text{LOF}_t, \quad (9)$$

$$\widehat{\text{INTR}}_t = \lambda_0 + \lambda_1 \widehat{\text{GDP}}_t + \lambda_2 \widehat{\text{INF}}_t + \lambda_3 \widehat{\text{LMS}}_t + \lambda_4 \text{LOF}_t, \quad (10)$$

where  $\text{LER}_t$  is the log of nominal exchange rate;  $\widehat{\text{LMS}}$  is the estimation result of  $\text{LMS}$ ;  $\widehat{\text{GDP}}$  is the estimation result of  $\text{GDP}$ ;  $\widehat{\text{INF}}$  is the estimation result of  $\text{INF}$ ;  $\widehat{\text{INTR}}$  is the estimation result of  $\text{INTR}$ ;  $\widehat{\text{GDP}}$  is the differential of GDP;  $\widehat{\text{INF}}$  is the differential of INF; and  $\widehat{\text{INTR}}$  is the differential of INTR, and LOF is the log of order flow. After the model of independent variables that are affected by other variables was estimated, the next step is to substitute the results of these estimation into the  $\text{LER}_t$  model, so that the model is formed as follows:

$$\text{LER}_t = \lambda_0 + \lambda_1 \widehat{\text{LMS}}_t + \lambda_2 \widehat{\text{GDP}}_t + \lambda_3 \widehat{\text{INF}}_t + \lambda_4 \widehat{\text{INTR}}_t + \mu_t. \quad (11)$$

The TSLS is a method which is used to estimate the model that is affected by other variables that do not exist in the model (Greene, 2012). The purpose of TSLS in this study is to determine the indirect effect of unobserved variables (order flow) to variable exchange rates in the ASEAN 5. The position of observed variables in the model of exchange rate established in this study is as independent variables that affect the exchange rate as the dependent variable. The use of TSLS in this study is also as a differentiator from the previous studies. In previous studies, observed variables and unobserved variable were entered

simultaneously in the model of determination of exchange rate as an independent variable, or in other words, the unobserved variable influences the exchange rate directly.

#### 4. Results and analysis

The results in the first phase produced the estimation results of the main independent variables in the model which were affected by IV. The second-stage estimation of TSLS resulted in the estimated models which have incorporated IV into the main model. The TSLS estimation results in the first stage are shown in Tables 1–5.

Table 1 shows the results of TSLS estimation in the first stage for Indonesia. Based on the table, the estimation results show that the order flow positively and significantly provided impact on differentiation of GDP growth and differentiation of ratio of M2. The coefficient of the order flow in models of GDP is 0.38, which indicates any increase in the order flow as much as 1 billion Rupiah; it was followed by an increase in the growth of GDP as much as 38%. This finding suggested that economic growth in Indonesia was affected by the volume of transactions in the foreign exchange market, especially with the integration of the foreign exchange market on a large scale in 2010 and 2013. Meanwhile, the coefficient of order flow in the LMS models is 0.07, this value indicating that any increase in the order flow as much as 1 billion Rupiah was followed by an increase in the M2 ratio as much as 7%.

These results constituted a proof that there was a consequence for countries with the floating exchange rate system. The consequence was the more flexible exchange rate so that there was increasing transparency in the financial flows referring to the financial market

**Table 1.** Results of TSLS estimation in the first stage for Indonesia.

Variable	Coefficient	Standard error	t-statistic	Prob-value
Dependent variable is $\widehat{GDP}^*$				
INF	-0.009	0.032	-0.284	.776
INTR	-0.173	0.051	-3.351	.001
LMS	-2.818	0.478	-5.887	.000
LOF	0.378	0.095	3.974	.001
Dependent variable is $\widehat{INF}^{**}$				
GDP	-0.101	0.357	-0.284	.776
INTR	1.049	0.143	7.319	.000
LMS	3.828	1.835	2.086	.039
LOF	-0.091	0.343	-0.267	.790
Dependent variable is $\widehat{INTR}^{***}$				
GDP	-0.666	0.198	-3.351	.001
INF	0.365	0.049	7.319	.000
LMS	-4.406	1.004	-4.389	.000
LOF	0.050	0.202	0.247	.805
Dependent variable is $\widehat{LMS}^{****}$				
GDP	-0.101	0.017	-5.887	.000
INF	0.012	0.006	2.086	.029
INTR	-0.041	0.009	-4.389	.000
LOF	0.068	0.018	3.725	.003

$R^2 = 0.440^*, 0.468^{**}, 0.556^{***}, 0.401^{****}$ .  
 Adj.  $R^2 = 0.414^*, 0.443^{**}, 0.536^{***}, 0.373^{****}$ .  
 F-stat. = 16.927\*, 18.923\*\*, 27.032\*\*\*, 14.435\*\*\*\*.



**Table 2.** Results of TSLS estimation in the first stage for the Philippines

Variable	Coefficient	Standard error	t-statistic	Prob-value
Dependent variable is $\widehat{GDP}^*$				
INF	-0.543	0.154	-3.517	.007
INTR	-0.134	0.187	-0.716	.475
LMS	1.523	1.423	1.069	.287
LOF	0.710	0.875	0.810	.419
Dependent variable is $\widehat{INF}^{**}$				
GDP	-0.231	0.065	-3.517	.007
INTR	0.591	0.104	5.636	.000
LMS	0.832	0.931	0.893	.374
LOF	-0.729	0.568	-1.283	.202
Dependent variable is $\widehat{INTR}^{***}$				
GDP	-0.044	0.061	-0.716	.475
INF	0.456	0.080	5.636	.000
LMS	-2.191	0.787	-2.782	.006
LOF	-0.770	0.497	1.549	.124
Dependent variable is $\widehat{LMS}^{****}$				
GDP	0.008	0.008	1.069	.287
INF	0.011	0.012	0.893	.374
INTR	-0.037	0.013	-2.782	.006
LOF	-0.181	0.063	-2.862	.005

$R^2 = 0.287^*, 0.500^{**}, 0.462^{***}, 0.162^{****}$ .

Adj.  $R^2 = 0.253^*, 0.477^{**}, 0.437^{***}, 0.123^{****}$ .

F-stat. = 8.645\*, 21.51\*\*, 18.494\*\*\*, 4.158\*\*\*\*.

**Table 3.** Results of TSLS estimation in the first stage for Malaysia.

Variable	Coefficient	Standard error	t-statistic	Prob-value
Dependent variable is $\widehat{GDP}^*$				
INF	-1.268	0.122	-10.34	.000
INTR	0.268	0.504	0.532	.595
LMS	-21.88	2.902	-7.539	.000
LOF	2.538	0.885	2.865	.005
Dependent variable is $\widehat{INF}^{**}$				
GDP	-0.437	0.042	-10.34	.000
INTR	0.014	0.296	0.047	.962
LMS	-10.09	1.907	-5.288	.000
LOF	0.220	0.543	0.405	.686
Dependent variable is $\widehat{INTR}^{***}$				
GDP	0.012	0.022	0.532	.595
INF	0.001	0.039	0.047	.962
LMS	1.855	0.772	2.402	.018
LOF	1.012	0.165	6.136	.000
Dependent variable is $\widehat{LMS}^{****}$				
GDP	-0.018	0.002	-7.539	.000
INF	-0.024	0.004	-5.288	.000
INTR	0.033	0.014	2.402	.018
LOF	0.054	0.026	2.075	.041

$R^2 = 0.702^*, 0.636^{**}, 0.511^{***}, 0.504^{****}$ .

Adj.  $R^2 = 0.688^*, 0.619^{**}, 0.488^{***}, 0.481^{****}$ .

F-stat. = 50.71\*, 37.62\*\*, 22.51\*\*\*, 21.86\*\*\*\*.

developments (Gadanez, 2013). Financial market developments encouraged an increase in the M2 growth and the increase in the real GDP of Indonesia, because transactions on the financial markets, especially the foreign exchange market, were more massive.

**Table 4.** Results of TSLS estimation in the first stage for Singapore.

Variable	Coefficient	Standard error	t-statistic	Prob-value
Dependent variable is $\widehat{GDP}^*$				
INF	-1.112	0.431	-2.580	.011
INTR	-6.103	1.360	-4.486	.000
LMS	-34.06	8.268	-4.120	.001
LOF	11.294	4.381	2.577	.011
Dependent variable is $\widehat{INF}^{**}$				
GDP	-0.064	0.025	-2.580	.011
INTR	1.062	0.345	3.075	.002
LMS	1.486	2.173	0.684	.495
LOF	-1.693	1.080	-1.568	.120
Dependent variable is $\widehat{INTR}^{***}$				
GDP	-0.031	0.006	-4.486	.000
INF	0.093	0.030	3.075	.002
LMS	-3.916	0.488	-8.019	.000
LOF	1.271	0.294	4.322	.000
Dependent variable is $\widehat{LMS}^{****}$				
GDP	-0.004	0.001	-4.120	.001
INF	0.003	0.005	0.684	.495
INTR	-0.109	0.013	-8.019	.000
LOF	0.382	0.035	10.89	.000

$R^2 = 0.38^*, 0.35^{**}, 0.60^{***}, 0.74^{****}$ .  
 Adj.  $R^2 = 0.35^*, 0.32^{**}, 0.59^{***}, 0.72^{****}$ .  
 F-stat. = 13.39\*, 11.92\*\*, 33.46\*\*\*, 61.25\*\*\*\*.

**Table 5.** Results of TSLS estimation in the first stage for Thailand.

Variable	Coefficient	Standard error	t-statistic	Prob-value
Dependent Variable is $\widehat{GDP}^*$				
INF	-1.53	2.52	-6.08	.00
INTR	-5.84	5.98	-0.97	.33
LMS	4.76	4.11	1.15	.25
LOF	-7.96	1.63	-0.49	.62
Dependent Variable is $\widehat{INF}^{**}$				
GDP	-1.96	3.23	-6.08	.00
INTR	-1.10	0.18	-5.63	.00
LMS	7.72	1.22	6.30	.00
LOF	-1.38	0.56	-2.44	.01
Dependent Variable is $\widehat{INTR}^{***}$				
GDP	-1.88	1.92	-0.97	.33
INF	-0.26	0.04	-5.63	.00
LMS	3.43	0.64	5.33	.00
LOF	0.30	0.29	1.03	.30
Dependent Variable is $\widehat{LMS}^{****}$				
GDP	3.23	2.79	1.15	.25
INF	0.04	0.06	6.30	.00
INTR	0.07	0.01	5.33	.00
LOF	0.19	0.03	5.39	.00

$R^2 = 0.38^*, 0.62^{**}, 0.52^{***}, 0.59^{****}$ .  
 Adj.  $R^2 = 0.35^*, 0.60^{**}, 0.49^{***}, 0.57^{****}$ .  
 F-stat. = 13.12\*, 35.67\*\*, 23.35\*\*\*, 31.65\*\*\*\*.

In the first stage of TSLS estimations for the Philippines based on Table 2, it was known that the order flow negatively and significantly provided effect on the ratio of M2 in the Philippines. This condition reflected that the increase in the volume of transactions on the foreign exchange market did not trigger the ratio of M2 in the Philippines, but the



decrease in the volume of transactions on the foreign exchange market only increased M2. This condition was different from the estimation results in the first stage for Indonesia. The value of the foreign exchange market transaction volume in the Philippines is lower than that of four other countries and this is one of the reasons that could explain the results of order flow that does not affect the ratio of M2 in the Philippines.

In contrast with the Philippines, the estimation results for Malaysia in Table 3 show that order flow has a significant and positive effect on differentiation of GDP growth, differentiation of short-term interest rates, as well as the differentiation of ratio of M2. These results indicate that order flow has a role in affecting the macroeconomic fundamentals of Malaysia. The increase in in the volume of transactions in foreign exchange market was one of the factors that could improve money supply in the country (Krugman, Obstfeld, & Melitz, 2012). Accordingly, an increase in the liquidity of money was caused by foreign exchange market transactions volume increase and vice versa.

Similar to the results of the first stage for Malaysia, the results of TSLS estimation in the first stage for Singapore represent that order flow significantly and positively provided effect on the differentiation of GDP growth, differentiation of short-term interest rates, and differentiation ratio of M2. Singapore's economic conditions that have rapid development in the financial sector, particularly in the foreign exchange market, contributed greatly to the movement of order flow. This condition provided a great impact in the liquidity of Singapore, especially the value of M2 that represents money in a broad sense. Another impact that was caused by the increased order flow is the growth of GDP, especially in sectors related to the activity in the financial sector.

Empirical testing in Thailand on the first stage provided a conclusion that the order flow significantly and negatively provided effect on the differentiation of inflation and a positive effect on the differentiation ratio of M2. The results based on Table 5 reflected that the increase in the volume of transactions on the foreign exchange market in Thailand has an impact on the decline in the rate of inflation. Meanwhile, the increased volume of transactions in the foreign exchange market in Thailand has an impact on increasing the ratio of M2 in Thailand due to the more ill-liquid money circulating in that country.

The second step in the TSLS method is to estimate the main model in this paper and the results are presented in Table 6. The TSLS estimation in the second stage is to enter the estimation results of the first stage into the main model by replacing the initial variable value with a variable that has been estimated by IV.

Table 6 shows a finding which provides support to the scapegoat theory paradigm for Indonesia. Differentiation of GDP growth and ratio of M2 significantly influence the exchange rate of Rupiah. The significance level of real GDP and M2 ratio in influencing the exchange rate movements implicated that the order flow indirectly affects the Rupiah exchange rate movements. This condition was compatible with the concept that was built by Bacchetta and Wincoop (2004) who argued that macroeconomic fundamentals were variables which were supposed as the triggers of exchange rate movements in a country. This finding was also similar to a study from Pozzi and Sadaba (2016) which mentioned that in the case of developing countries, the growth of GDP has a negative and significant effect, while the M2 ratio has a positive and significant effect on the exchange rate movements.

In the second stage of the test in the Philippines, it was found that the differentiation of GDP growth negatively and significantly affected the Peso exchange rate. This result

**Table 6.** Results of TOLS estimation in the second stage for the ASEAN 5.

	Variable	Coefficient	Standard error	t-statistic	Prob-value
Indonesia*	$\widehat{GDP}$	-0.166	0.016	-10.22	.000
	$\widehat{INF}$	0.008	0.005	1.556	.123
	$\widehat{INTR}$	0.008	0.005	1.551	.124
	$\widehat{LMS}$	0.553	0.054	10.11	.000
The Philippines**	$\widehat{GDP}$	-0.065	0.014	-4.478	.000
	$\widehat{INF}$	0.021	0.004	4.866	.000
	$\widehat{INTR}$	-0.065	0.016	-4.107	.000
	$\widehat{LMS}$	0.002	0.052	0.057	.954
Malaysia***	$\widehat{GDP}$	-0.012	0.002	-5.237	.000
	$\widehat{INF}$	0.014	0.006	2.130	.036
	$\widehat{INTR}$	0.068	0.022	3.037	.003
	$\widehat{LMS}$	-0.283	0.134	-2.114	.037
Singapore****	$\widehat{GDP}$	0.001	0.002	0.069	.489
	$\widehat{INF}$	0.001	0.012	0.079	.936
	$\widehat{INTR}$	0.097	0.014	6.604	.000
	$\widehat{LMS}$	-0.38	0.048	-7.935	.000
Thailand*****	$\widehat{GDP}$	-1.36	2.44	-5.595	.000
	$\widehat{INF}$	-0.082	0.017	-4.770	.000
	$\widehat{INTR}$	0.411	0.077	5.335	.000
	$\widehat{LMS}$	-2.469	0.408	-6.050	.000

$R^2 = 0.87^*, 0.70^{**}, 0.46^{***}, 0.76^{****}, 0.53^{*****}$ .  
 Adj.  $R^2 = 0.86^*, 0.69^{**}, 0.43^{***}, 0.75^{****}, 0.51^{*****}$ .  
 F-stat. = 147.71\*, 51.65\*\*, 18.55\*\*\*, 71.58\*\*\*\*, 24.60\*\*\*\*\*.

was not compatible with the exchange rate theory, which explains that economic growth triggers capital inflow through any kind of fund instruments, one of them being foreign exchange rate that encourages the exchange rate in a country toward the other currency from other countries. Another finding was that the rate of inflation positively affected the exchange rate movements. This condition was not compatible with Dornbusch's (1976) models that explain that in the monetary model of flexible prices, the changing of interest rate reflects the changing of expected inflation. This statement indicates that the enhancement of inflation will cause depreciated currency. Nevertheless, the reality of inflation has a positive relation with the exchange rate movements.

Based on the results in Table 6 and in Appendix, especially in the case of Malaysia, we found a significant effect from four macroeconomic fundamental variables in Malaysia, i.e. differentiation growth of GDP and ratio of M2 negatively and significantly provided impact on the Ringgit exchange rate, while the differentiation of inflation and interest rate positively and significantly affected the Ringgit exchange rate. Negative effect of GDP growth toward exchange rate explained that order flow was one of the sources which caused the fluctuation of Ringgit exchange rate. It make sense since when the demand of domestic asset increases, return, or the level of expected returning from domestic currency demand also increases and hence the exchange rate is appreciated (Mishkin & Eakins, 2012). Meanwhile, a positive relation was found between the differentiation of short-term interest rate and the Ringgit exchange rate. The results of TOLS estimation in the second stage of Malaysia showed incompatible relation in differentiation of interest rate and conventional exchange rate theory. Dornbusch (1976) argued that there was a negative relation between the exchange rate and interest rate differentiation, but in the case of Malaysia, we found a positive relation between these factors. The empirical results incompatible



with theory in Malaysia implicated the existence of theory of scapegoat in the Ringgit exchange rate.

The existence of a positive relation between interest rate and Ringgit exchange rate is a consequence from the enhancement of interest rate differentiation that encourages Ringgit exchange rate to be appreciated toward the US dollar. This finding is compatible with the research by Cho and West (2003) that declared that there was a positive relation between interest rate differentiation and exchange rate in Korea and the Philippines. Nevertheless, this finding is incompatible with the results of Bautista (2006) research which argued that there was a negative relation between the exchange rate and interest rate differentiation and the exchange rate system of six ASEAN countries.

The second level of TSLS estimation for Singapore gains a result that the differentiation of short-term interest rate has a positive and significant effect on the Dollar Singapore exchange rate movements. Meanwhile, another variable that also has effect on that movement is differentiation of M2 ratio, but it also has a negative relation. This condition is compatible with the research from Lindahl et al. (2014) that found that money supply negatively provided impact on the exchange rate movements. The relation between interest rate and Dollar Singapore exchange rate is compatible with the monetary model of sticky prices. The monetary model of sticky prices has an explanation that the differentiation of interest rate has a negative relation with the exchange rate (Frankel, 1979). This condition implicated that the effect of differentiation of interest rate on the Dollar Singapore exchange rate was not only fully caused by the movement of interest rate itself, but also the positive effect of order flow toward the differentiation of Singapore interest rate as it was declared in the estimation results of first-stage estimation.

The second-stage test in Thailand produced a finding that all independent variables in the main model significantly influenced the Baht exchange rate movements. The differentiation of Thailand inflation negatively and significantly provided an impact on that movement too. This condition was compatible with the research of Fratzscher et al. (2012) that talks about Singapore and Korea. Nevertheless, this finding was incompatible with the determination model of exchange rate as stated by Dornbusch (1976) because in the sticky price of monetary model, it declared that consequence from sticky price assumption for short period caused a change in the interest rate, which reflected the tight monetary policy without a decrease in prices and make the exchange rate appreciated.

The second testing for Thailand also shows that there are negative relations between the differentiation of M2 ratio and the Baht exchange rate. This condition was compatible with Pozzi and Sadaba (2016) research that found a negative relation between money supply and exchange rate of Malaysia and South Africa. The empirical condition based on the research finding in Thailand reflected the existence of scapegoat theory paradigm as Bacchetta and Wincoop (2004) argued earlier. The incompatible fact between the empirical condition and determination theory of exchange rate indicates that there is another factor outside of macroeconomic fundamentals which has a vital role in influencing fluctuation of Bath Thailand exchange rate.

## 5. Conclusion and policy implications

This study that examined the scapegoat theory paradigm on the exchange rate variable in the ASEAN 5 provided a proof that there were four countries which supported the

theory of scapegoat paradigm. Four countries that supported its existence were Indonesia, Malaysia, Singapore, and Thailand. The existence of scapegoat theory paradigm in the four countries indicated that there was a mismatch phenomenon in each country with the conventional exchange rate theories. This statement indicates that the exchange rate is affected by observed variables and unobserved variables.

Order flow as a proxy for the unobserved variables which were used in this study has contributed in influencing macroeconomic fundamentals in the four countries that indicated that their order flow affected indirectly the movement of the Rupiah, Ringgit, Singapore dollar, and Baht against the US dollar. Meanwhile, empirical testing of the theory of scapegoat on the exchange rate variable in the ASEAN 5 obtained a result that the Philippines was a country which did not support the existence of scapegoat theory. This statement is supported by the results which indicated that the order flow has no direct effect on the movement of the exchange rate of Peso.

There are several policy strategies which are applied by the central bank in each country to reach the stability of exchange rate. One of those strategies that can be used to keep the exchange rate stable in the emerging market countries is the policy to intervene in the foreign exchange rate. Nevertheless, this intervention policy and the deciding of interest rate policy in each country are different because they are made to suit the domestic economic conditions and the monetary policy draft used. The intervention of Bank Indonesia in the foreign exchange rate is Operasi Pasar Terbuka/Openness Market Operation (OPT). There are two mechanisms in OPT which are done by Bank Indonesia. First, liquidity absorbency is done through the publishing of Bank Indonesia Certificates (SBI) / Shariah Bank Indonesia Certificates (SBIS), Surat Berharga Negara/Government Securities (SBN) outright sale, the publishing of BI deposit certificate, SBN reverse repo, and the purchase of foreign exchange in the swap market. Second, liquidity injection is done through the purchase of SBN outright repo securities letters and the sale of foreign exchange in the swap market.

Similar to Bank Indonesia, BSP also uses OPT as the intervention in the foreign exchange market in the Philippines. OPT in the Philippines is done through REPO transaction, outright transaction, and intervention in the swap market. Coincident with Bank Indonesia and BSP, Bank of Thailand also controls the Baht exchange rate movements through intervention in the form of participation in the foreign exchange market, especially spot market. These three countries have a tendency to apply a similar policy and the policy that was applied is the inflation-targeting framework (ITF). Just a little bit different from the policy which is defined by the monetary authority in the three countries previously, BNM does intervene to control the exchange rate through the deciding of short-term interest rate, which is transmitted to the interest rate of the fund market. Another policy that was applied by BNM to keep the stability of Ringgit exchange rate was the protection of exchange rate or better known as hedging (Azis, 2013). Meanwhile, the MAS intervention in controlling the exchange rate movements was done through the intervention in the swap market, repo transaction of securities letters from Singapore government, and MAS bills (Tee, 2013).

Policy in the form of intervention in the foreign exchange market has an important role to affect the exchange rate movements in a country. The important role of this policy was to make the exchange rate movement more stable and to minimize the exchange rate volatility as well as to manage the liquidity in the foreign exchange market. Intervention policy in the



foreign exchange market was not only limited to the real intervention or the participation in the transaction of foreign exchange market, but also it must be done through verbal intervention or appeals that were used to affect the expectation of foreign exchange market participants. Nevertheless, there was one thing that needs to be an interest for each country related to the foreign exchange intervention, i.e. the bigger effectiveness of intervention in the foreign exchange market depended on how big are the foreign exchange reserves owned by the country. This statement indicates that the central bank in each country of ASEAN 5 must enhance the amount of foreign exchange reserves in a country in order to intervene in the foreign exchange market easily.

Another important factor which gives contribution to exchange rate stability is transferring target and monetary policy in public. This transferring shows the transparency of central bank to the society, especially to the countries which apply the ITF. Transparency is an important indication that needs to be the attention of the central bank because through transparency, it can affect the expectation of society to the macroeconomic fundamentals in the future. Transparency was one of the main elements which was a part of the ITF framework. Therefore, the transparency of the central bank can be one of the strategies to control the exchange rate movement.

Another strategy which can be used as a tool to control the exchange rate movements is controlling or management of capital flow. Uncontrolled capital flow can cause uncontrolled capital movement, so it affects the exchange rate. The capital inflow, especially short period capital inflow, could cause the domestic currency appreciated and vice versa; if the capital outflow is enhanced, it triggers the exchange rate depression in the country (Cordero & Montecion, 2010). The effect of capital inflow and outflow to the movement of capital flow is a strong reason to create a policy which can manage the capital flow in a country. There are three principles that need to paid attention related to the management of capital in a country. First, it must be consistent with the principles about foreign exchange system that is used in a country. Second, the strengthening policy is related to the short period capital flow and speculative activity. Third, planning the right mechanism in order that the capital flow can be monitored and implemented effectively. Based on these principles, a policy that should be taken by countries in the ASEAN 5 related to the management of capital is to keep macroeconomic fundamentals stable, i.e. interest rate level, inflation level, economic growth, and the amount of money supply. In addition, the policy that can apply in ASEAN 5 is to consider the value of the flow of short-term assets or investments in or out by providing a safety for those foreign reserves in the balance of payments. This policy can give a great impact for the capital inflow and outflow in ASEAN 5, especially portfolio flows.

The application of financial risk mitigation is needed in ASEAN region, because financial risk can give a poor impact for the economy in each country, including the exchange rate movements. One of the forms of financial risk mitigation is the implementation of regulations and standards. Implementation of regulations and standards in international scope and provisions must be handled by the monetary authorities and financial market actors in each country simultaneously. In other words, there has to be collaboration between monetary authorities from the macro side and financial market actors from the micro side.

The policy of stable macroeconomic fundamentals can attract the investor's interest to invest in a country. The exchange rate stability becomes the main target for each country

in the ASEAN 5, which basically need a chain of effective policy that is not strict on the monetary policy. The global economic condition which is more dynamic and complex encourages the monetary authority in each country, especially ASEAN 5, to regulate the policy strategy which consists of monetary policy and macro-prudential policy. Morgan (2013) argued that Asian economy needs to be strengthened by its fund system in a country through minimizing the foreign debt, enhancing the monetary policy work, and macro-prudential policy. Related to this condition and statement, it needs to strengthen the monetary policy and macroprudential, especially in countries which have little foreign exchange reserves as in Indonesia, Malaysia, the Philippines, and Thailand.

## Disclosure statement

No potential conflict of interest was reported by the authors.

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## References

- Azis, N. B. (2013). Foreign exchange intervention in Malaysia. *BIS (Bank For International Settlements) Papers*, 73, 215–222.
- Bacchetta, P., & Wincoop, E. V. (2004). *A scapegoat model of exchange rate fluctuations* (NBER Working Paper No. 10245).
- Bacchetta, P., & Wincoop, E. V. (2006). Can information heterogeneity explain the exchange rate determination puzzle? *American Economic Review*, 96(3), 552–576.
- Bacchetta, P., & Wincoop, E. V. (2009). *On the unstable relationship between exchange rates and macroeconomic fundamentals* (NBER Working Paper No 15008).
- Bacchetta, P., & Wincoop, E. V. (2011). *On the unstable relationship between exchange rates and macroeconomic fundamentals*. Mimeo.
- Bank for International Settlement. (2013). *Triennial central bank survey*. Retrieved from [www.bis.org](http://www.bis.org).
- Bautista, C. C. (2006). The exchange rate-interest differential relationship in six East Asian countries. *Economic Letters*, 92, 137–142.
- Cai, J., Cheung, Y., Lee, R. S. K., & Melvin, M. (2001). “Once-in-a-generation” yen volatility in 1998: Fundamentals, intervention, and order flow. *Journal of International Money and Finance*, 20(3), 327–347.
- Cheung, Y. W., Chinn, M. D., & Pascual, A. G. (2004). *Empirical exchange rate models of the nineties: Are any fit to survive?* (Working Paper). IMF (International Monetary Fund).
- Cho, D., & West, K. D. (2003). Interest rates and exchange rates in the Korean, Philippine and Thai exchange rate crisis. In M. Dooley & J. Frankel (Eds.), *Managing currency crises in emerging markets* (pp. 11–30). Chicago: University of Chicago Press.



- Cordero, J. A., & Montecion, J. A. (2010). *Capital controls and monetary policy in developing countries*. Washington, DC: Center for Economic and Policy Research.
- Corte, D. P., Rime, D., Sarno, L., & Tsiakas, I. (2011). (Why) does order flow forecast exchange rates? (Working Paper).
- Cuaresma, J. C., Fidrmuc, J., & MacDonald, R. (2005). The monetary approach to exchange rates in The CEECs. *The Economics of Transition*, 13, 395–416.
- Dabrowski, M., Papież, M., & Smiech, S. (2014). Exchange rate and monetary fundamentals in CEE countries: Evidence from a panel approach. *Journal of Macroeconomics*, 41, 148–159. doi:10.1016/j.jmacro.2014.05.005
- Dornbusch, R. (1976). Expectations and exchange rate dynamics. *Journal of Political Economy*, 84, 1161–1176.
- Engel, C., Mark, N. C., & West, K. D. (2007). *Exchange rate models are not as bad as you think* (NBER Working Paper Series, No. 13318).
- Engel, C., & West, K. D. (2005). Exchange Rates and Fundamentals. *Journal of Political Economy*, 113(3), 485–517.
- Evans, M. D. D., & Lyons, R. K. (2002). Order flow and exchange rate dynamics. *Journal of Political Economy*, 110(1), 170–180.
- Ferreira, P., & Dionisio, A. (2015). Revisiting covered interest parity in the European Union: The DCCA approach. *International Economic Journal*, 29(4), 597–615.
- Frankel, J. A. (1979). On the mark: A theory of floating exchange rate based on real interest differentials. *American Economic Review*, 69, 610–622.
- Fratzscher, M., Sarno, L., & Zinna, G. (2012). *The scapegoat theory of exchange rates: The first tests* (European Central Bank (ECB) Working Paper No 1418).
- Gadanecz, B. M. A. (2013). *The exchange rate, real economy and financial markets* (BIS Paper No. 73).
- Greene, W. H. (2012). *Econometric analysis* (7th ed.). Boston, MA: Pearson Education and Prentice Hall Publishing.
- King, M. R., Osler, C., & Rime, D. (2011). *Foreign exchange market structure, players and evolution* (Working Paper). Norges Bank.
- Krugman, P. R., Obstfeld, M., & Melitz, M. J. (2012). *International economics: Theory and policy* (9th ed.). Boston, MA: Pearson Education.
- Lewis, K. K. (1989). Can learning affect exchange rate behavior? The case of the dollar in the early 1980s. *Journal of Monetary Economics*, 23, 79–100.
- Lindahl, A., Moore, M., Rime, D., & dan Shehadeh, A. (2014). Herding the scapegoats: Foreign exchange order flow and the time-varying effect of fundamentals. *SSRN Electronic Journal*. doi:10.2139/ssrn.2442742
- Mishkin, F. S., & Eakins, S. G. (2012). *Financial market and institutions* (7th ed.). Boston, MA: Pearson Education.
- Mohanty, M. S. (2013). *Market volatility and foreign exchange intervention in EMEs: What has changed* (BIS (Bank For International Settlements) Papers No. 73).
- Morgan, P. J. (2013). *Monetary policy frameworks in Asia: Experience, lessons, and issues* (ADB Working Paper Series No. 435).
- Ojo, A. T., & Alege, P. O. (2014). Exchange rate fluctuations and macroeconomic performance in sub-Saharan Africa: A dynamic panel cointegration analysis. *Asian Economic and Financial Review*, 4(11), 1573–1591.
- Pozzi, L., & dan Sadaba, B. (2016, July 29–31). *A direct test of the scapegoat model of exchange rates*. E-proceeding World Finance Conference.
- Rosa, C. (2010). The high frequency response of exchange rates to monetary policy actions and statements. *Journal of Banking and Finance*, 35, 478–489.
- Sarno, L., & Taylor, M. (2002). *The economic of exchange rate*. New York, NY: Cambridge University Press.
- Tee, O. C. (2013). *An exchange-rate-centred monetary policy systems Singapore's experience* (BIS Paper Series No. 73).
- The World Bank. (2015). *Statistics data*. Retrieved from <https://data.worldbank.org/>

Tsuyuguchi, Y., & Wooldridge, P. (2008). *The evolution of trading activity in Asian foreign exchange markets* (BIS Working Papers No.252).

Uz, I., & Ketenci, N. (2008). Panel analysis of the monetary approach to exchange rates: Evidence from ten new EU members and Turkey. *Emerging Market Review*, 9, 57–69.

## Appendix

**Table A1.** Results of TSLS estimation in the second stage for Indonesia.

Dependent variable: LER				
Method: least squares				
Date: 02/02/16 Time: 08:41				
Sample: 2008M01 2015M07				
Included observations: 91				
Variable	Coefficient	Std. error	t-Statistic	Prob.
C	1.222026	0.915375	1.335000	.1854
GDPEST	-0.166007	0.016236	-10.22454	.0000
INFEST	0.008944	0.005747	1.556290	.1233
INTREST	0.008624	0.005559	1.551203	.1245
LMSEST	0.553264	0.054722	10.11051	.0000
R <sup>2</sup>	0.872941	Mean dependent var		9.269211
Adjusted R <sup>2</sup>	0.867032	S.D. dependent var		0.123379
S.E. of regression	0.044990	Akaike info criterion		-3.311383
Sum squared resid	0.174071	Schwarz criterion		-3.173424
Log likelihood	155.6679	Hannan-Quinn criter.		-3.255725
F-statistic	147.7133	Durbin-Watson stat		0.687106
Prob (F-statistic)	0.000000			

**Table A2.** Results of TSLS estimation in the second stage for the Philippines.

Dependent variable: LER				
Method: least squares				
Date: 02/02/16 Time: 08:42				
Sample: 2008M01 2015M07				
Included observations: 91				
Variable	Coefficient	Std. error	t-Statistic	Prob.
C	4.883065	0.369932	13.19989	.0000
GDPEST	-0.065408	0.014604	-4.478718	.0000
INFEST	0.021251	0.004367	4.866343	.0000
INTREST	-0.065988	0.016064	-4.107778	.0001
LMSEST	0.002990	0.052370	0.057098	.9546
R <sup>2</sup>	0.706123	Mean dependent var		3.790911
Adjusted R <sup>2</sup>	0.692455	S.D. dependent var		0.048034
S.E. of regression	0.026638	Akaike info criterion		-4.359558
Sum squared resid	0.061025	Schwarz criterion		-4.221599
Log likelihood	203.3599	Hannan-Quinn criter.		-4.303900
F-statistic	51.65991	Durbin-Watson stat		0.701713
Prob (F-statistic)	0.000000			

**Table A3.** Results of TSLS estimation in the second stage for the Malaysia.

Dependent variable: LER  
 Method: least squares  
 Date: 02/02/16 Time: 09:26  
 Sample: 2008M01 2015M07  
 Included observations: 91

Variable	Coefficient	Std. error	t-Statistic	Prob.
C	2.753252	0.774867	3.553194	.0006
GDPEST	-0.012911	0.002465	-5.237375	.0000
INFEST	0.014705	0.006902	2.130558	.0360
INTREST	0.068946	0.022702	3.037008	.0032
LMSEST	-0.283433	0.134063	-2.114182	.0374
R <sup>2</sup>	0.463280		Mean dependent var	1.176609
Adjusted R <sup>2</sup>	0.438316		S.D. dependent var	0.062325
S.E. of regression	0.046710		Akaike info criterion	-3.236354
Sum squared resid	0.187634		Schwarz criterion	-3.098395
Log likelihood	152.2541		Hannan-Quinn criter.	-3.180696
F-statistic	18.55814		Durbin-Watson stat	0.608409
Prob (F-statistic)	0.000000			

**Table A4.** Results of TSLS estimation in the second stage for Singapore.

Dependent variable: LER  
 Method: least squares  
 Date: 02/03/16 Time: 23:38  
 Sample: 2008M01 2015M07  
 Included observations: 91

Variable	Coefficient	Std. error	t-Statistic	Prob.
C	2.750114	0.324124	8.484750	.0000
GDPEST	0.001469	0.002117	0.693827	.4897
INFEST	0.001028	0.012856	0.079984	.9364
INTREST	0.097246	0.014724	6.604758	.0000
LMSEST	-0.387787	0.048867	-7.935495	.0000
R <sup>2</sup>	0.769019		Mean dependent var	0.278408
Adjusted R <sup>2</sup>	0.758275		S.D. dependent var	0.062589
S.E. of regression	0.030772		Akaike info criterion	-4.071026
Sum squared resid	0.081436		Schwarz criterion	-3.933066
Log likelihood	190.2317		Hannan-Quinn criter.	-4.015368
F-statistic	71.58113		Durbin-Watson stat	0.331491
Prob (F-statistic)	0.000000			

**Table A5.** Results of TSLS estimation in the second stage for Thailand.

Dependent variable: LER  
 Method: least squares  
 Date: 02/02/16 Time: 19:41  
 Sample: 2008M01 2015M07  
 Included observations: 91

Variable	Coefficient	Std. error	t-Statistic	Prob.
C	17.57981	2.311724	7.604631	.0000
GDPEST	-1.36E-16	2.44E-17	-5.595972	.0000
INFEST	-0.082101	0.017209	-4.770797	.0000
INTREST	0.411372	0.077098	5.335670	.0000
LMSEST	-2.469706	0.408175	-6.050612	.0000
R <sup>2</sup>	0.533723		Mean dependent var	3.465966
Adjusted R <sup>2</sup>	0.512036		S.D. dependent var	0.048431
S.E. of regression	0.033831		Akaike info criterion	-3.881491
Sum squared resid	0.098431		Schwarz criterion	-3.743532
Log likelihood	181.6078		Hannan-Quinn criter.	-3.825833
F-statistic	24.60994		Durbin-Watson stat	0.603342
Prob (F-statistic)	0.000000			