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GCBER 2017
August 14-15, UPM, Malaysia
Global Conference on Business and Economics Research

Governance and Sustainability of Global Business Economics

Global Conference on Business and Economics Research (GCBER) 2017
14-15 August 2017, Universiti Putra Malaysia, Malaysia

Exchange Market Pressure and Monetary Policies

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Abstract

High currency pressure in exchange market might bring adverse effect to the economy and inaccurate policy will exacerbate the pressure condition and transform the downturn of economies to full-blown crisis. In order to examine the accurate policy response for currency crisis in four countries, namely Indonesia, Korea, Malaysia and Philippines, Structural Vector Autoregression (VAR) estimation model is used. The results of SVAR suggested that the expansionary monetary policies help to reduce currency pressure. In addition, domestic credit is dominant tool of monetary policy for managing exchange market pressure.

Keywords: Exchange market pressure, monetary policies, Structural VAR

1. INTRODUCTION

Currency crisis which defined as episodes of large volatile swings in the exchange rate is one of the major types of financial crises. The sudden rise in exchange rate volatility is a key transmission channel of a financial sector meltdown to a wide spread slowdown in real sector. Asian financial crisis and global financial crisis which erupted in the middle of 1997 and end of 2008 have caused most of the Asia economies experienced large volatility in the exchange rate, dramatic drop in gross domestic product growth and investment rate, and declined in stock price. While some predicted Asia's emerging economies will experience a lengthy period on the floor as Asian financial crises, recovery from global financial crisis in Asia was surprisingly faster and stronger than expected. Some studies argued that one of the major factors supporting the rapid recovery is accurate policy responses of monetary stimulus measures in Asia, contrast to tight monetary policy during 1997 Asian financial crisis.

Exchange Market Pressure (hereafter EMP) which refers to the magnitude of money market disequilibrium arising from international excess demand or supply of domestic currency, is developed to measure the condition in the foreign exchange market. Since currency crises widely defined as episodes of sharp increase of pressure on the foreign exchange market, exchange market pressure index have been widely used to investigate the effectiveness of monetary policies. This paper tried to examine the impact of monetary variables on currency pressure using the EMP framework in four economies, namely Indonesia, Korea, Malaysia and Philippines.

The reminder of this study is organized as follows. Section 2 is a review of literature; section 3 briefly discuss the theoretical model of the determination of EMP and the Structural Vector Autoregression approach; section 4 reported empirical results; and section 5 presented the summary and conclusion.

2. LITERATURE REVIEW

Girton and Roper (1977) constructed EMP index by summing up its components, namely exchange rate and reserve change as shown in Equation (1):

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$$EMP_t = \Delta e_t + \Delta r_t \quad (1)$$

where EMP_t is the exchange market pressure at time t, Δe_t is changes in the exchange rate at time t, and Δr_t is changes in the foreign reserves. However, Weymark (1995, 1998) argues that Girton and Roper (1977) model's definition of EMP are too narrow and model specific. Weymark (1995, 1998) proposed a general, model-independent definition of concept of EMP and expressed the EMP in the small open economy as

$$EMP_t = \Delta e_t + \eta \Delta r_t \quad (2)$$

where $\eta = -\partial \Delta e_t / \partial \Delta r_t$. Weymark's definition of EMP measures the excess demand for a currency associated with exchange rate policy actually implemented by policy authorities in a given time period in terms of exchange rate equivalent measure. Therefore, it viewed as a good measure of the size of external imbalances and is a useful measure of the magnitude of speculative attacks.

The early stage empirical testing on EMP was focused on determination of EMP. Many studies have been applied extensively with certain modifications for different countries. These application includes Girton and Roper (1977), Burdekin and Burkett (1990) and Weymark (1995) for Canada; Mah (1998) for Korea; Thornton (1995) for Costa Rica; Bahmani-Oskooee and Shiva (1998) for Iran; Parlaktuna (2005) for Turkey; Ziramba (2007) for South African. Most of the studies deliver similar results and findings are consistent with monetary model of EMP.

Since EMP index has been argued providing more complete picture than either exchange rate or reserve movements in isolation in investigating the effectiveness of monetary policies, empirical testing of the EMP model is tended to examine the degree of intervention and interrelationship between monetary policy and EMP. Several studies have applied the various approaches to analysis innovation in monetary policy and the macroeconomic effects of their own countries. For example, Tanner (2001, 2002) examined the relationship between monetary policy and EMP to six East Asian countries and 32 emerging markets in East European and Asian countries later. Bautista and Gochoco-Bautista (2005) examined the inter-relationship between monetary policy and EMP in Philippines; Garcia and Malet (2007) focuses on the interaction between EMP and monetary policy for the case of Argentina; Khawaja (2007) analysed monetary policy and EMP in Pakistan; and Kurihara *et al.* (2011) examined the relationship between EMP and monetary policy for Indonesia, Korea and Thailand.

Most of the studies found that contractionary monetary policy with a hike in interest rate help reduce currency pressure, which is in line with traditional theory (Tanner, 2001, 2002;and Bautista and Gochoco-Bautista, 2005) . Nevertheless, Khawaja (2007), Garcia and Mallet (2007), found that an increase in interest rate was associated with high pressure. In addition, some studies also found that monetary policies is effective and has powerful impact in ending recession and strengthening recovers (Tanner, 2001, 2002; and Khawaja, 2007). On the other hand, Kurihara *et al.* (2011) found that monetary policy is less effective during period of floating exchange rate.

3. METHODOLOGY

This paper adopts Weymark (1995) approach to construct EMP index for four selected countries. The EMP model in this paper is expressed as

$$EMP_t = \Delta e_t + \eta \Delta r_t \quad (2)$$

where $\eta = -[a_2 + b_2]^{-1}$. The construction of EMP index requires the estimation of elasticity, η and this necessitates the estimation of parameter a_2 and b_2 from money demand function and price equation.

$$m_t^d = p_t + b_1 y_t - b_2 i_t + \nu_t \quad (3)$$

$$p_t = a_0 + a_1 p_t^* + a_2 e_t \quad (4)$$

where m^d_t is money demand; p_t is price level ; y_t is output; i_t is interest rate; p^*_t is foreign price level; and e_t is exchange rate. As suggested by previous studies[1], taking the contemporaneous and one month lagged values of exogenous variables and one month lagged values of all endogenous variable as possible instruments. The regressors with sufficient statistical significance were selected as instrument. The validity of the instruments is tested by Sargan test. After obtained the estimates of parameter a_2 and b_2, model consistent elasticity, η can be computed and thus EMP index.

[1] See Weymark (1998); and Spolander (1999).

To examine the interrelationship between monetary policy and EMP, this paper adopts a SVAR approach. Be simpler, the SVAR model can be writing as

$$X_t = A_0 + A_1 X_{t-1} + ... + A_p X_{t-p} + Be_t \quad (5)$$

where X_t is an n×1 vector of the variables enter the model; A is an n×n matrix describing the variables' contemporaneous correlations; A_t for i=1 …..,*p* is an n×n matrix of parameter; *p* is the order of the VAR model; and e_t is an n×1 vector of structural shocks where E(e)~(0,I_n). By multiplying Equation (5) with A^{-1}, the reduced form VAR is written as:

$$X_t = \Gamma_1 X_{t-1} + ... + \Gamma_p X_{t-p} + u_t \quad (6)$$

where $\Gamma_1 = A^{-1}A_i$ and $u_t = A^{-1}Be_t$ is the reduced form error terms. In order to identify the structural shocks from reduced-form innovations, restrictions are imposed on matrices A and B. Cushman and Zha (1997) suggested that include foreign variable represents open economy and is essential for correct specification, improve identification of contemporaneous relationships and for capturing underlying impulse responses of variables to various shocks. Thus, this paper also include three foreign variables, namely foreign price level, foreign interest rate and foreign output growth. The restrictions in SAR of this paper are shown as follow:

$$u_t = \begin{bmatrix} 1 & 0 & 0 & 0 & 0 & 0 & 0 \\ a_{21} & 1 & 0 & 0 & 0 & 0 & 0 \\ a_{31} & a_{32} & 1 & 0 & 0 & 0 & 0 \\ 0 & 0 & a_{43} & 1 & 0 & 0 & 0 \\ 0 & 0 & 0 & a_{54} & 1 & 0 & a_{57} \\ 0 & 0 & a_{63} & a_{64} & a_{65} & 1 & a_{67} \\ a_{71} & a_{72} & a_{73} & a_{74} & a_{75} & a_{76} & 1 \end{bmatrix}^{-1} \begin{bmatrix} e_{y*} \\ e_{p*} \\ e_{i*} \\ e_y \\ e_d \\ e_i \\ e_{emp} \end{bmatrix}$$

It is well known that the shocks to small open economies have very little impact on foreign countries and it is proper to treat foreign variables as exogenous to domestic economic variables (Cushman and Zha, 1997). Foreign output growth is assumed to be completely exogenous to all the other variables in the model and to react in the short run only to its 'own' supply shocks. Following Kim (1999), foreign price level is assumed to be contemporaneously affected by demand driven fluctuations in output and react to its 'own' supply shocks. Since foreign interest rate is determined by monetary authorities, it is assumed to be contemporaneously affected by foreign output shocks, foreign price level and own shocks. The order of the domestic variables is based on following assumptions. First, output growth is assumed to be exogenous to all the other variables in the model except foreign monetary shocks (Kim, 2001) and its own supply shocks. Second, domestic credit is assumed to be contemporaneously affected by domestic output, EMP and own shocks. The identification scheme does not allow foreign variables to affect domestic credit and monetary authority is likely to respond quickly to change in exchange rate as suggested by Cushman and Zha (1997). Third, the interest rate is assumed affected by money shocks, output growth, EMP and own shocks. Finally, EMP is fully endogenous and all of the foreign and domestic shocks are allow having an impact on the domestic exchange market contemporaneously.

Monthly data[2] are employed which cover the period from from 1990:1 to 2014:9. Data are obtained from International Financial Statistic, IFS. The variables used in this study are changes in exchange rate, Δe_t; reserved scaled by lagged monetary base, $\Delta r_t/M_{t-1}$; changes in domestic consumer price index, Δp_t; changes in US consumer price index, Δp_t^*; changes in domestic policy rate[3], Δi_t; changes in narrow money measure,Δm_1; changes in broad money measure, Δm_2; changes in US federal fund rate, $\Delta i*$[4] ; changes in US industrial production index, Δy_t^*; changes in domestic industrial production index, Δy_t[5]; and changes in domestic credit scaled by lagged monetary base, $\Delta d_t/M_{t-1}$. All variables are in logarithm form.

4. EMPIRICAL RESULTS

The preliminary unit root tests for four selected countries, namely Indonesia, Korea, Malaysia and Philippines are shown in Table 1. The ADF and PP tests results suggest that all variables are stationary at first differences. Thus the subsequence estimations were undertaken using first- differenced data.

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[2] The variables used in this paper have dynamic properties and can be best captured with high frequency data.

[3] Policy rate used are interbank overnight rate for Malaysia, Philippines, and South Korea; BI rate for Indonesia.

[4] As suggested by Li *et al.* (2010), Wang *et al.* (2013), federal fund rate is a good indicator of US monetary policies and as an informative nominal interest rate for future real economic variables.

[5] Monthly data on real income is not available therefore industrial production is used as proxy for real income.

Table 1 Unit Root Tests

Series	Augmented Dickey- Fuller				Philip- Perron			
	Constant without trend		Constant with trend		Constant without trend		Constant with trend	
	Level	First Difference	Level	First Difference	Level	First Difference	Level	First Difference
A: Indonesia								
e	-1.78(0)	-1.74(0)	-14.26(0)[a]	-14.27(0)[a]	-1.78(0)	-1.82(1)	-14.16(3)[a]	-14.17(4)[a]
r	-0.46(0)	-2.06(0)	-15.13(0)[a]	-15.10(0)[a]	-0.53(7)	-2.56(8)	-15.36(7)[a]	-15.34(7)[a]
p	-2.31(0)	-3.04(0)	-17.75(0)[a]	-17.73(0)[a]	-2.18(2)	-2.95(1)	-17.83(5)[a]	-17.83(5)[a]
i	-2.31(1)	-3.09(1)	-8.42(0)[a]	-8.40(0)[a]	-2.07(8)	-2.71(8)	-8.35(4)[a]	-8.33(4)[a]
i*	-0.47(1)	-2.03(1)	-9.49(0)[a]	-9.53(0)[a]	-0.45(8)	-2.00(8)	-9.37(1)[a]	-9.41(1)[a]
m_1	-1.67(12)	-1.86(12)	-4.23(11)[a]	-4.49(11)[a]	-2.21(11)	-2.67(6)	-19.14(9)[a]	-20.09(10)[a]
m_2	-2.43(0)	-1.78(0)	-16.27(0)[a]	-16.52(0)a	-2.45(7)	-1.77(6)	-16.27(3)a	-16.52(6)a
p*	-0.96(2)	-2.89(2)	-10.63(1)[a]	-10.64(1)[a]	-1.08(7)	-2.70(5)	-8.52(17)[a]	-8.52(17)[a]
y	-4.09(12)	-4.09(12)	-4.36(11)[a]	-4.27(11)[a]	-5.17(1)	-5.24(1)	-25.62(9)[a]	-27.12(0)[a]
B: Korea								
e	-2.24(0)	-2.14(0)	-16.55(0)[a]	-16.56(0)[a]	-2.26(1)	-2.14(0)	-16.55(4)[a]	-16.59(4)[a]
r	-1.17(1)	-1.19(1)	-11.71(0)[a]	-11.75(0)[a]	-1.10(4)	-1.07(4)	-11.72(7)[a]	-11.74(7)[a]
p	-4.72(3)[a]	-3.16(3)[c]	-10.94(2)[a]	-12.04(2)[a]	-5.29(16)[a]	-3.85(18)[b]	-10.58(17)[a]	-10.57(33)[a]
i	-1.10(1)	-3.15(1)[c]	-11.91(0)[a]	-11.90(0)[a]	-1.10(8)	-3.06(8)	-12.05(5)[a]	-12.03(5)[a]
i*	-0.60(1)	1.69(1)	-10.20(0)[a]	-10.21(0)[a]	-0.62(9)	-1.73(9)	-10.18(2)[a]	-10.18(2)[a]
m_1	-2.31(0)	-1.70(0)	-19.15(0)[a]	-19.40(0)[a]	-2.54(12)	-1.61(10)	-19.07(5)[a]	-19.46(9)[a]
m_2	-4.67(3)[a]	-2.11(3)	-3.00(5)[b]	-6.66(2)[a]	-6.74(8)[a]	-2.05(8)	-18.04(11)[a]	-18.58(9)[a]
p*	-1.56(2)	-3.46(2)[b]	-11.27(1)[a]	-11.37(1)[a]	-2.21(13)	-2.97(11)	-9.25(23)[a]	-9.36(25)[b]
y	-1.24(12)	-2.55(13)	-5.76(22)[a]	-5.86(11)[a]	-1.60(72)	-7.31(8)[a]	-40.75(74)[a]	-52.11(67)[a]
C: Malaysia								
e	-1.55(0)	-1.41(0)	-16.26(0)[a]	-16.25(0)[a]	-1.68(8)	-1.60(8)	-16.32(7)[a]	-16.31(7)[a]
r	-1.67(2)	-2.64(2)	-8.74(1)[a]	-8.79(1)[a]	-1.52(9)	-2.36(9)	-13.75(8)[a]	-13.76(8)[a]
p	-1.73(1)	-2.39(1)	-13.07(0)[a]	-13.17(1)[a]	-2.06(8)	-2.38(7)	-12.80(10)[a]	-12.80(12)[a]
i	-1.55(2)	-2.23(2)	-11.18(0)[a]	-11.17(1)[a]	-1.64(7)	-2.57(8)	-20.62(8)[a]	-20.59(8)[a]
i*	-0.60(1)	1.69(1)	-10.20(0)[a]	-10.21(0)[a]	-0.62(9)	-1.73(9)	-10.18(2)[a]	-10.18(2)[a]
m_1	-0.67(12)	-3.87(13)[b]	-3.15(11)[a]	-3.52(11)[a]	-0.33(11)	-2.87(4)	-17.51(11)[a]	-17.48(11)[a]
m_2	-2.24(0)	-1.07(0)	-14.79(0)[a]	-14.98(0)[a]	-2.05(2)	-1.21(2)	-14.84(2)[a]	-15.01(2)[a]
p*	-1.56(2)	-3.46(2)[b]	-11.27(1)[a]	-11.37(1)[a]	-2.21(13)	-2.97(11)	-9.25(23)[a]	-9.36(25)[b]
y	-2.26(13)	-2.32(13)	-4.47(12)[a]	-4.65(12)[a]	-1.09(3)	-3.01(8)	-28.72(5)[b]	-28.75(5)[a]
D: Philippines								
e	-1.88(0)	-1.03(0)	-15.81(0)[a]	-15.91(0)[a]	-1.85(8)	-1.31(8)	-16.12(7)[a]	-16.17(7)[a]
r	-3.17(1)[b]	-3.84(1)[b]	-19.42(0)[a]	-19.65(0)[a]	-2.63(12)[c]	-3.26(11)[c]	-19.25(6)[a]	-19.48(8)[a]
p	-4.43(1)[a]	-3.80(1)[b]	-11.51(0)[a]	-12.37(0)[a]	-4.30(9)[a]	-3.52(8)[b]	-12.59(10)[a]	-12.87(8)[a]
i	-1.54(1)	-5.34(1)[a]	-24.77(0)[a]	-24.76(0)[a]	-1.62(7)	-7.57(10)[a]	-30.58(8)[a]	-31.50(9)[a]
i*	-0.60(1)	1.69(1)	-10.20(0)[a]	-10.21(0)[a]	-0.62(9)	-1.73(9)	-10.18(2)[a]	-10.18(2)[a]
m_1	-0.09(12)	-2.46(12)	-4.42(11)[a]	-4.40(11)[a]	-0.37(26)	-4.54(0)[a]	-24.96(25)[a]	-24.97(25)[a]
m_2	-1.01(6)	-1.95(6)	-5.87(5)[a]	-5.91(5)[a]	-1.28(18)	-2.05(15)	-18.45(13)[a]	-18.48(14)[a]
p*	-1.56(2)	-3.46(2)[b]	-11.27(1)[a]	-11.37(1)[a]	-2.21(13)	-2.97(11)	-9.25(23)[a]	-9.36(25)[b]
y	-2.53(12)	-2.08(12)	-4.88(12)[a]	-6.39(11)[a]	-2.24(23)	-3.71(3)[b]	-31.03(27)[a]	-35.44(30)[a]

Note: superscript a and b indicate the significance of the variables at 1%, and 5 % critical values. Figures for ADF are the t-statistics for testing the null hypothesis that the series is not stationary. For constant with trend, the critical values for rejections are -4.09 and -3.47 at 1% and 5%. For constant without trend, the critical values of rejection are 3.53 and -2.90 at 1% and 5%. Meanwhile, for PP, for constant with trend, the critical value for rejection are -4.07 and -3.46 at 1%and 5%. For constant without trend, the critical values for rejection are -3.51 and -2.90 at 1% and 5%. * denotes the foreign counterparts of the domestic variables. Figures in parenthesis are lag length for ADF and bandwidth for PP. All variables are transforming in log form. e is exchange rate; r is international reserve; p is price level, i is interest rate; m_0 is reserve money; m_1 is narrow money measure; m_2 is broad money measures and y is output.

Two stage least squares estimation of parameter a_2 and b_2 for all four countries are presented in Table 2. The estimation of money demand equation were found to have no significant serial correlation and standard errors of parameter estimates are corrected for heteroscedasticity in the error terms by Newey- West procedure. Figure 1 is the monthly measures of EMP over the period 1990:01 to 2014:09. The pressure on the exchange rate closely to zero and it showed a period of relatively tranquillity before 1997s. However, pressures on currency were highly fluctuated for mid of 1997 to end of year 2002 and year 2008. This might due to Asian financial crisis in 1997 and global financial crisis in 2008. The EMP index also revealed that the depreciation pressure (positive sign of EMP) in 1997s were higher than 2008s.

Table 2 Estimation of elasticity

	Indonesia	Korea	Malaysia	Philippines
a_2	-0.4148	0.2475	0.3923	0.6953
b_2	0.2393	0.0532	0.0315	0.01869
Elasticity, η	-1.9008	-3.3239	-2.3596	-1.4006

Notes: a_2 is the interest sensitivity of money demand; b_2 is the price sensitivity of exchange rate.

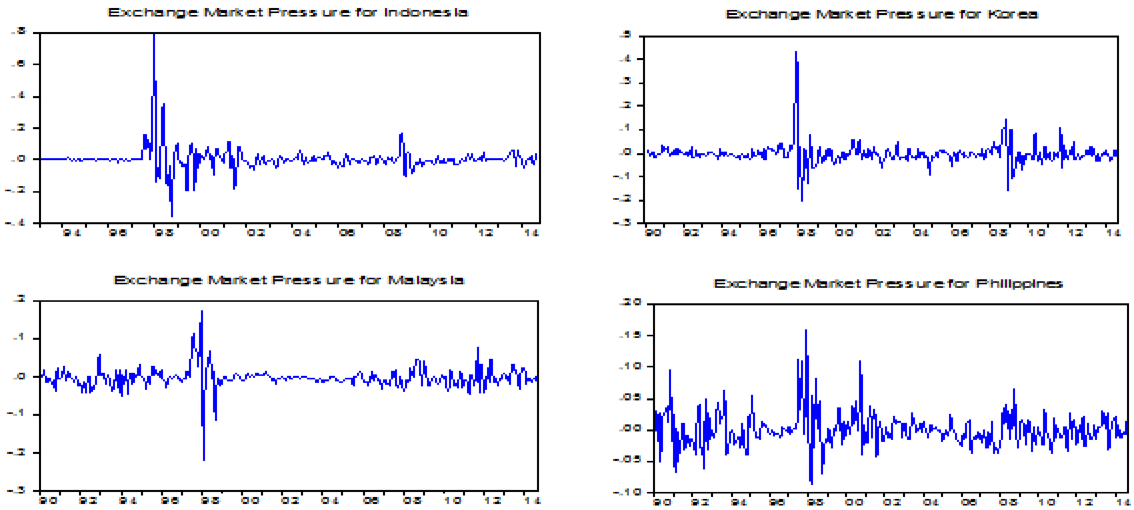


Figure 1 Exchange Market Pressure for Indonesia, Korea, Malaysia and Philippines.

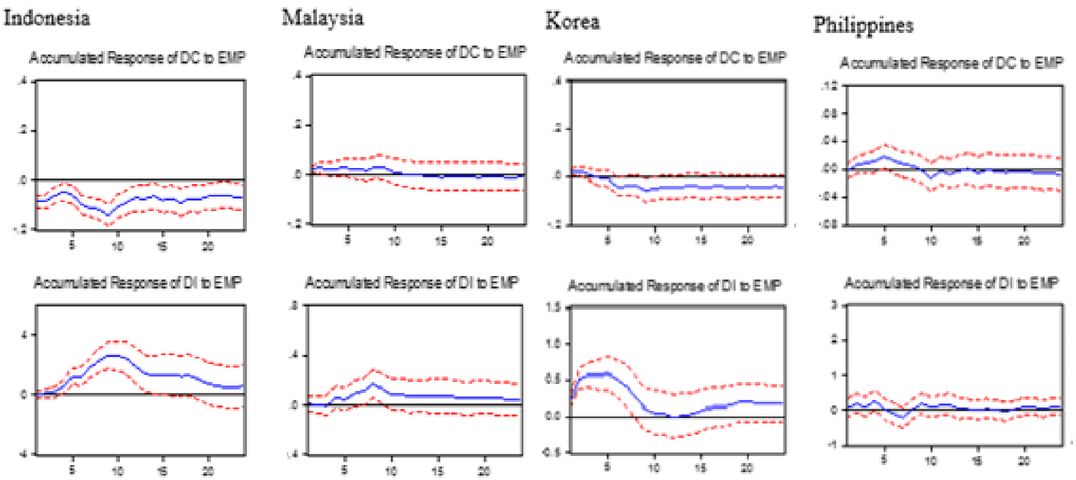
This study selected the lag length that renders the VAR residuals serially uncorrelated (suggested by Mansor, 2006). The short run structural VAR estimates for Indonesia, Korea, Malaysia and Philippines are 12, 8, 9, and 12, respectively. Since the Chi-Squared test for over-identifying restrictions are not rejected for all four countries, thus there is no over-identifying problem (Table 3).

Table 3 Chi-squared test for over-identifying restrictions.

	Chi-square	probability
Indonesia	5.0035	0.4155
Korea	3.9808	0.5522
Malaysia	0.8877	0.9711
Philippines	3.9789	0.5525

Figure 2 showed the accumulated impulse response of domestic variables to shock on EMP. The accumulated impulse response functions (IRFs) of domestic credit to EMP shocks for all four countries (as shown in Figure 2) indicate that a positive innovation in EMP generates an increase in domestic credit except for Indonesia. The findings suggest that monetary authorities responded to the increasing EMP with sterilization intervention.[6] This positive feedback from EMP to domestic credit growth suggests that the government sterilized the changes in reserve in order to preserve enough liquidity in economic system (Tanner, 2001, 2002; and Bautista and Gochoco-Bautista, 2005). For Indonesia, there is negative reaction of domestic credit to EMP shocks.[7] This suggested that monetary authority chose not to sterilize and implemented contraction money policy responded to the increasing EMP. The accumulated IRFs of the interest rate to a structural deviation interest rate shocks which reported in Figure 2 showed that all four countries' monetary authorities attempt to raise interest rate when faced with higher currency pressure.

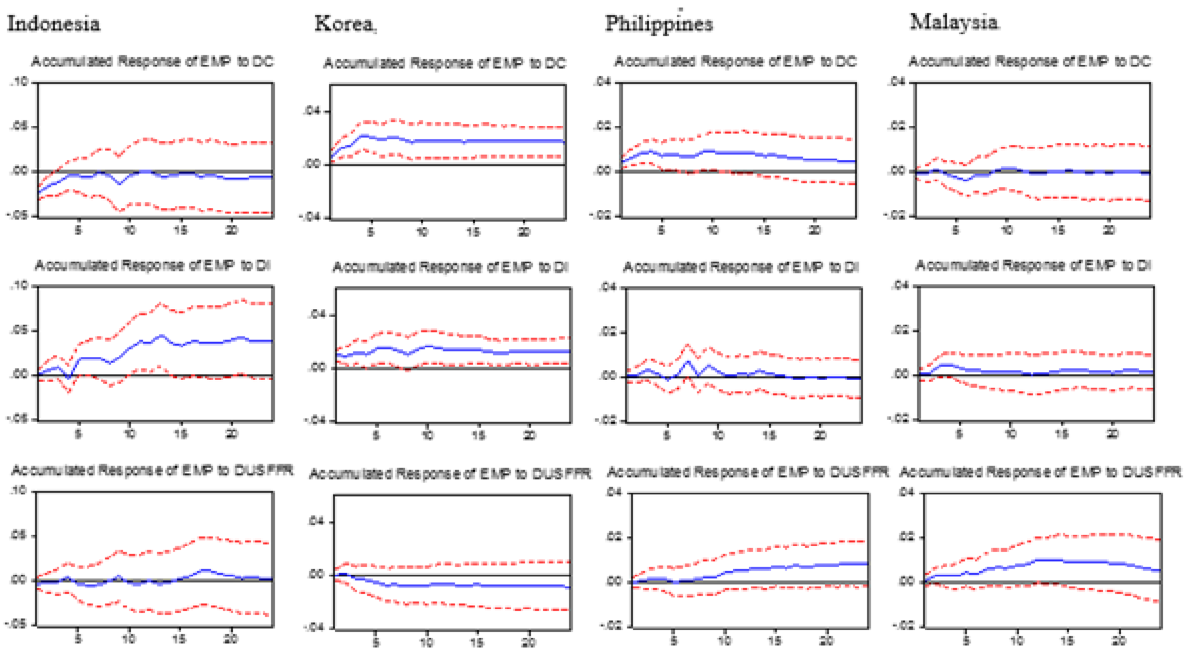
[6] Sterilization intervention occurs when the central bank simultaneously sells foreign reserves against the domestic currency position of commercial banks, thereby reducing their liquidity positions, and sterilizing the effect of the bank's squeezed position by temporarily increasing the commercial bank's liquidity.
[7] The negative relationship result is similar to Tanner (2001, 2002)



Notes: DC is domestic credit growth ; DI is changes in interest rate; EMP is exchange market pressure; and DIPI is output growth

Figure 2 Accumulated Impulse Response of Domestic Monetary Variables to shocks on EMP

Figure 3 reported the accumulated impulse response of EMP to foreign and domestic monetary policy shocks. The reaction of the EMP to the shock of US interest rate is positive for the first two month for Korea, positive for all 24 months for Malaysia and Philippines. The findings suggest that a hike in US interest rate may cause investment in US's financial asset tend to be more competitive than domestic financial investment, thus increase demand for the US currency and depreciates domestic currency (Zulkefly and Bakri, 2016). However, the reaction of EMP does not exhibit a clear and consistent pattern. The accumulate IRFs revealed that the effect of domestic credit on EMP is negative for Indonesia and Philippines (only for first three months). The negative effects suggest that an expansion in domestic credit or rapid economic growth will cause an increase in the value of the domestic currency and/or its foreign reserves, and thus decrease the EMP. The reaction of EMP to domestic credit for Korea and Malaysia are positive. The positive effects suggest that increase in domestic credit might increase the supply of local currency and other thing being equal, fall in value of currency and thus, EMP increase. There is an important evidence that the responses of EMP to interest rate shocks are positive in all four countries. The findings provide evidence of existence of exchange rate puzzle, that higher interest rate does not provide confidence in the domestic currency and cause currency depreciate.



Notes: DUSFFR is changes in US federal fund rate; DC is domestic credit growth ; DI is changes in interest rate; EMP is exchange market pressure; and DIPI is output growth

Figure 3 Accumulated Response of Exchange Market Pressure to Foreign and Domestic Monetary Policy Shocks

Table 4 reported variance decomposition of EMP model for Indonesia, Korea, Malaysia and Philippines. The variance decomposition analysis reported that most of the shocks in monetary policy stance, namely domestic credit and interest rates are mostly self-determined. The findings suggest that the fluctuations in monetary policy are not related to EMP. However, the variance decomposition of interest rate in Indonesia and Malaysia found that EMP played role in domestic credit variance. For Indonesia, the fluctuation in interest rate is accounted for by own-innovation in interest rate itself with 48.11 percent share and EMP is second largest source of interest rate fluctuation with 37.43 percent share. Meanwhile, the variance decomposition of interest rate in Malaysia indicate that own shock accounted for most of the shocks at 68.08 percent, and followed by EMP with 14.90 percent. The findings suggest that Indonesia and Malaysia are very responsive to currency pressure. The variance decomposition of EMP indicate that domestic credit played significant role in explaining the fluctuations of the EMP by accounting for 18.12 percent, 7.45 percent, 7.27 percent, and 5.29 percent for Indonesia, Korea, Philippines and Malaysia, respectively. Meanwhile, the fluctuation in EMP also affected by interest rate by 20.74 percent for Malaysia, 16.89 percent for Indonesia, 9.18 percent for Korea, and 3.04 percent for Philippines, respectively. This suggested that monetary policy is effective and has impact in affecting currency pressure. Indeed, role of domestic credit in managing currency pressure is higher than interest rate.

Table 4 Variance Decomposition of EMP Model

		DUSY	DUSP	DUSFFR	DIPI	DC	DI	EMP
Indonesia	Variance Decomposition of domestic credit							
	1	1.7315	0.8045	0.5866	0.1608	96.7167	0	0
	6	1.6381	1.5402	1.3568	6.8610	73.9639	6.6303	8.0096
	12	2.9120	2.3324	4.5992	6.3823	65.1334	8.8407	9.7995
	Variance Decomposition of domestic interest rate							
	1	0.0362	1.0629	1.9002	0.1749	1.0658	95.7599	0
	6	0.9296	2.8099	1.9517	1.2303	5.4225	63.0192	24.6366
	12	2.7793	2.8299	1.6346	3.3943	3.8185	48.1129	37.4301
	Variance Decomposition of EMP							
	1	0.7238	0.0008	0.0544	0.0090	20.2572	0.1889	78.7656
	6	1.2880	3.4423	2.4830	0.7669	16.6828	15.1697	60.1672
	12	2.8801	3.9210	4.4449	4.0762	18.1199	16.8926	49.6650
Korea	Variance Decomposition of domestic credit							
	1	0.0007	1.7123	1.3729	1.4866	95.4274	0	0
	6	1.1567	2.3274	1.5559	2.3753	82.9953	1.3052	8.2843
	12	2.7627	4.1214	3.8701	3.8611	74.6227	1.8600	8.9015
	Variance Decomposition of domestic interest rate							
	1	0.2561	0.3119	0.2788	0.0243	0.1022	99.0265	0
	6	3.7609	1.0384	2.2262	1.4155	3.7919	75.8371	11.9298
	12	4.9644	1.7252	3.5875	2.4061	4.3251	68.0872	14.9041
	Variance Decomposition of EMP							
	1	00304	0.2382	0.0080	2.1331	1.7768	7.3387	88.4744
	6	3.8536	2.4507	1.6739	2.2689	7.1937	7.6896	74.8695
	12	3.7858	2.4826	1.7778	3.6065	7.4556	9.1885	71.7029
Malaysia	Variance Decomposition of domestic credit							
	1	0.1069	0.0643	0.0004	1.7530	98.0750	0	0
	6	2.2620	1.6661	1.9994	2.0149	90.4615	0.5271	1.0688
	12	3.5820	2.1808	2.1209	2.6574	83.1718	1.7338	4.5530
	Variance Decomposition of domestic interest rate							
	1	0.2508	0.0166	0.0805	0.0140	3.8268	95.8111	0
	6	1.8827	1.1451	0.7861	0.5750	5.9502	87.6170	2.0437
	12	2.5300	1.7888	1.8981	0.8227	6.3889	82.7116	3.8595
	Variance Decomposition of EMP							
	1	0.0093	0.1439	0.0022	0.0875	4.3900	0.0374	95.3294
	6	3.2799	0.3997	0.9606	2.2592	6.4128	3.7976	82.8900
	12	2.9856	1.8963	1.8378	5.0746	5.2978	20.7439	62.1636
Philippines	Variance Decomposition of domestic credit							
	1	0.7031	4.2243	0.0114	1.0821	93.9788	0	0
	6	3.3162	6.7398	3.8126	1.9637	77.2839	4.5655	2.3183
	12	5.0575	9.1640	5.2786	4.0051	65.2637	5.2011	5.1297
	Variance Decomposition of domestic interest rate							
	1	0.3911	0.0618	0.2231	0.8911	2.2065	96.2261	0
	6	1.9542	3.6851	2.0124	1.2755	6.2168	83.3314	1.5245
	12	2.8436	3.9678	3.7987	3.3771	6.6592	76.6320	2.7211
	Variance Decomposition of EMP							
	1	0.3742	0.2585	0.3070	0.0370	0.2043	0.0744	98.7442
	6	3.1794	1.8811	2.2651	0.5025	3.5362	2.5766	86.0592
	12	4.3617	4.2791	4.9308	2.4056	7.2771	3.0458	73.6997

Notes: DUSY is US output growth; DUSP is US price index; DUSFFR is US federal fund rate; DIPI is domestic output growth; DC is domestic credit; DI is domestic interest rate; and EMP is exchange market pressure.

5. SUMMARY

One of the common feature of most crises is economies were triggered by turbulence in the foreign exchange market, typically resulting in discrete devaluation of the domestic currency. Thus, exchange rate stabilization through foreign exchange market intervention is regarded as one of the most important policy goals for most monetary authority. However, inaccurate policy responses were transformed what had stated as currency crises into full- blown financial crises and into crises of real economy. Since EMP which convey a more informative and reasonable measures the extent of currency pressure, it has been widely used to monitor the condition of foreign exchange market and investigate the effectiveness of monetary policies. This paper has examine the inter-relationship between EMP and monetary policy in four selected Asian Countries, namely Indonesia, Korea, Malaysia and Philippines. Monthly data for the period 1990:01 to 2014:09 were used and SVAR was employed. The results can summarized into few manners; first, expansionary monetary policies help to reduce currency pressure; second, monetary policy is more effective in Malaysia and Indonesia compare to Korea and Philippines; third, domestic credit is a useful instrument in managing higher currency pressure, thus, policy makers should emphasized domestic credit rather than interest rates as monetary policy tool.

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