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Monetary Policy Shocks and Exchange Rate Changes in Korea

Heonyong Jung* and Myunghoon Han**

** Namseoul University, Chungcheongnam-do, Korea*
*** Kangwon National University, Gangwondo, Korea*
E-mail: 96332472@kangwon.ac.kr

Abstract

This paper examines whether the exchange rate respond differently to monetary policy shocks in Korea using regression model. We find an asymmetric response of the monetary policy shocks to the monetary policy shocks in the context of Korea. Over the whole period sample, we do not find the effect of an actual interest rate on exchange rate. But we find that the estimated coefficient on the expected and unexpected change in the policy rate are negative and statistically significant. In the period of monetary policy easing, the estimated coefficient on the expected and unexpected change in the policy rate are negative but not statistically significant. In contrast, the period of monetary policy tightening, the estimated coefficient on the expected and unexpected change in the policy rate are negative and statistically significant.

Keywords: *Monetary policy, Exchange rate, Interest rate differential, Foreign exchange reserves*

1. Introduction

In the case of small open countries, it is known that monetary policy decisions affect the exchange rate. This issue is of importance to both policy makers and investors as monetary policy can be used in conjunction with exchange rate intervention to manipulate exchange rate movements. We choose Korea as a small open and capital markets fully open country.

The monetary authorities in a country will promote economic growth by stabilizing its exchange rate. [1] report that accommodative monetary policy can stimulate economic growth by reducing market interest rates. And these lower interest rates will increase the employment and economic growth. [2] assess the relevant importance of each of the variables to exchange rate volatility in the case of selected EMU members and candidate countries. They show that a substantial deviation of the exchange rate from the equilibrium rate results in volatile exchange rate movements. They show that forex markets in France, Italy and Spain had been influenced, during the pre-EMU era, by monetary and real shocks. [3] investigate the impact of US monetary policy on exchange rate and show that both news about monetary policy stemming from policy decisions and from balance of risk statements have economically large and highly significant effects on the exchange rates. They also show that exchange rates tend to absorb FOMC monetary surprises within 30-40 minutes from the announcement release. [4] find that exchange rate respond to only the surprise component of an actual US monetary policy and show that failure to disentangle the surprise component from the actual monetary policy change can lead to an underestimation of the impact of monetary policy. The uncovered interest-rate parity hypothesis means that exchange rate movements should equal to the spread between domestic and foreign

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Corresponding Author: 96332472@kangwon.ac.kr
Tel:+82-10-8632-2472
Kangwon National University, University-Industry Cooperation Foundation
(Division of Business Administration & Accounting), Gangwondo, Korea.

interest rates [5]. [6] find that monetary policy surprise tends to affect the return and volatility of the Thai baht. They examine whether the interest rate differentials explains the volatility of the exchange rate on the monetary policy announcement date. Therefore, we examine monetary policy surprise in Korea tends to affect the return and volatility of the Korean won.

The balance of the paper is laid out as follows. Section 2 presents the data and methodology. Section 3 presents the empirical results and section 4 offers some conclusions.

2. Data and Methodology

This study examines the monetary policy surprise in Korea tends to affect the return and volatility of the Korean won for the period from 2013 to 2017. We use the Bank of Korea's base rate as a proxy for its monetary policy. Similar in spirit to [6-7], we estimate an unexpected component of the base rate change using the Bond Market Survey Index (BMSI) of Korea Financial Investment Association (KOFIA). An unexpected component of the monetary policy is derived from BMSI estimates.

Table 1. Descriptive Statistics

Variables	Mean	Std. Dev.	Skewness	Kurtosis	J-B
ΔER_t	-0.0003	0.0178	-0.1386	2.3344	1.1047
ID	1.5063	0.8607	-0.3850	1.7405	4.6307*
TS	0.6170	0.2210	-0.5335	2.3609	3.2876
FER	0.1134	0.0069	0.1482	2.6801	0.4041
SMA	19.7227	0.0303	-0.8447	3.6951	7.0915**
ΔR_t^a	-0.0196	0.0843	-1.3891	7.8246	65.86***
ΔR_t^e	0.1497	0.3917	4.0041	20.4884	786.2***
ΔR_t^u	-0.1693	0.4595	-3.5559	17.0645	527.8***

*, **, *** indicate significance at the 10%, 5%, and 1% levels, respectively.

Similar to [6], we define monetary policy shock as an actual change in the base rate less an expected change in the base rate. Therefore, the decomposition of a change in the base rate is as follows:

$$\Delta R_t^a = R_t - R_{t-1} = (R_t^e + R_t^u) - R_{t-1} = \Delta R_t^e + R_t^u \quad (1)$$

where ΔR_t^a is the change in the base rate from time t-1 to time t. Thus, the expected and unexpected changes in the base rate at time t are given as follows:

$$\Delta R_t^e = \Delta R_t^a - R_t^u,$$
$$\Delta R_t^u = \Delta R_t^a - R_t^e, \quad (2)$$

where ΔR_t^e is the expected change in the base rate at time t, and ΔR_t^u is the unexpected change in the base rate at time t.

Similar to [6, 8], we estimate the effect of Korea monetary policy shocks on exchange rate change by estimating the following regression:

$$\Delta ER_t = \beta_0 + \beta_1 ID_t + \beta_2 TS_t + \beta_3 FER_t + \beta_4 SMA_t + \beta_5 \Delta R_t^a + \varepsilon_t \quad (3)$$

where t refers to the monetary policy announcement on date t. ΔER_t is the first difference in the natural logarithm of the monthly exchange rate (i.e. KRW/USD). ID_t, interest rate differential, is measured as the difference between the domestic interest rate and the foreign interest rate at time t. TS_t is the term spread and is measured as the difference between the 10-year government bond yield and the 1-month government bill yield at time t. FER_t, foreign exchange reserves, is measured as the natural logarithm of the Bank of Korea's international reserves at the end of the month. SMA_t, the domestic stock market attractiveness, is defined as the KOSPI index to the S&P 500 index.

Unlike model 1, the following model 2 is a model for examining the effects of an unexpected change in the policy rate on exchange rate change.

$$\Delta ER_t = \beta_0 + \beta_1 ID_t + \beta_2 TS_t + \beta_3 FER_t + \beta_4 SMA_t + \beta_5 \Delta R_t^e + \beta_6 \Delta R_t^u + \varepsilon_t \quad (4)$$

According to Table 1, ΔER_t, ΔR_t^a and ΔR_t^u showed negative figures. The skewness recorded negative values for all except for FER and ΔR_t^e. The kurtosis was higher than 3 for all except for ΔER_t, ID, TS and FER. Jaque-Bera values for all except for ΔER_t, TS and FER at a 10% significance level. Therefore, it can be concluded that most of the variables display the leptokurtic distributions.

3. Empirical Results

Table 2 presents the OLS results for regression model 1 and model 2 using the Korea Won against US dollar as the dependent variable. In model 1, the results show that interest rate differential (ID) is positively related with exchange rate movements. And the domestic stock market attractiveness (SMA) is also positively related with exchange rate movements. But the results in model 1 do not indicate that the effect of policy rate on KRW/USD. This finding is consist with [4, 6], who report that the effect of an actual interest rate on exchange rate is not significant.

Table 2. The Effect of the Bank of Korea Base Rate on KRW/USD

Variables	Model 1	Model 2
β_0	-6.3484**	-7.5381**
ID	0.0115**	0.0130**
TS	0.0152	0.0158
FER	-0.1250	-0.0562
SMA	0.3212**	0.3811**
ΔR_t^a	-0.0438	
ΔR_t^e		-0.1098**
ΔR_t^u		-0.0946**
Adjusted R^2	0.1168	0.1451

*, **, *** indicate significance at the 10%, 5%, and 1% levels, respectively.

Table 3. The Effect of the Bank of Korea Base Rate on KRW/USD For the Period of Monetary policy Easing

Variables	Model 1	Model 2
β_0	-5.4381	-6.4899*
ID	0.0130	0.0135*
TS	0.0330**	0.0344**
FER	-0.9936	-0.8693
SMA	0.2795	0.3321*
ΔR_t^a	-0.0285	
ΔR_t^e		-0.0967
ΔR_t^u		-0.0825
Adjusted R^2	0.1743	0.1966

*, **, *** indicate significance at the 10%, 5%, and 1% levels, respectively.

In model 2, the results show that both interest rate differential (ID) and the domestic stock market attractiveness (SMA) are positively related with exchange rate movements. However, we find that the estimated coefficient on the expected and unexpected change in the policy rate are negative and statistically significant.

The response of exchange rate on the monetary policy shocks in small open countries might be different between the period of monetary policy easing and the period of monetary policy tightening. So we analyze the whole analysis period by dividing it into two periods of the period of monetary policy easing and the period of monetary policy tightening. Table 3 presents the effect of the Bank of Korea base rate on KRW/USD for the period of monetary policy easing. In model 1, the results show that the term spread (TS) is positively related with exchange rate movements. And foreign exchange reserves (FER) is also positively related with exchange rate movements. In model 2, the results show that interest rate differential (ID), the term spread (TS) and the domestic stock market attractiveness (SMA) are positively related with exchange rate movements. And we find that the estimated coefficient on the expected and unexpected change in the policy rate are negative but not statistically significant.

Table 4. The Effect of the Bank of Korea Base Rate on KRW/USD For the Period of Monetary policy Tightening

Variables	Model 1	Model 2
β_0	-6.7564	-6.8139
ID	0.0016	0.0029
TS	-0.0534*	-0.0664**
FER	1.7396**	1.9295**
SMA	0.3345	0.3368
ΔR_t^a	-0.0672	
ΔR_t^e		-0.9042**
ΔR_t^u		-0.4782**
Adjusted R^2	0.2816	0.2921

*, **, *** indicate significance at the 10%, 5%, and 1% levels, respectively.

Table 4 presents the effect of the Bank of Korea base rate on KRW/USD for the period of monetary policy tightening. In model 1, the results show that the term spread (TS) is negatively related with exchange rate movements. And foreign exchange reserves (FER) is also positively related with exchange rate movements. In model 2, the results show that the term spread (TS) is negatively related with exchange rate movements, and foreign exchange reserves (FER) is also positively related with exchange rate movements. And we find that the estimated coefficient on the expected and unexpected change in the policy rate are negative and statistically significant.

4. Conclusion

This paper analyzes the effect of monetary policy shocks on exchange rate movements in Korea. In model 1, we do not indicate that the effect of policy rate on KRW/USD. But in model 2, we find that the estimated coefficient on the expected and unexpected change in the policy rate are negative and statistically significant. The response of exchange rate on the monetary policy shocks in small open countries might be different between the period of monetary policy easing and the period of monetary policy tightening. So we analyze the

whole analysis period by dividing it into two periods of the period of monetary policy easing and the period of monetary policy tightening. In the period of monetary policy easing, we find that the estimated coefficient on the expected and unexpected change in the policy rate are negative but not statistically significant. In contrast, in the period of monetary policy easing, we find that the estimated coefficient on the expected and unexpected change in the policy rate are negative and statistically significant. The findings reveal an asymmetric response of exchange rate to the monetary policy rate in Korea.

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