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Reserve Options Mechanism: The New Monetary Policy Tool of CBRT and Its Effect on Exchange Rate Volatility

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Abstract

Purpose *– Reserve Options Mechanism (ROM) is a new policy tool of Central Bank of the Republic of Turkey (CBRT). In this study, it is aimed to examine the effect of the ROM on USD/TL exchange rate volatility.*

Design/methodology/approach *– The effects of the ROM and the direct foreign exchange interventions and auctions of CBRT on the USD/TL exchange rate volatility are analyzed by applying GARCH (1,1) model and using the data for the period 09.30.2011-06.03.2016.*

Findings *– It is found that the ROM significantly decreases the exchange rate volatility, which indicates the effectiveness of the ROM. The interventions of the CBRT also decrease the volatility but they do not play a significant role.*

Research limitations/implications *– Although all available data for the ROM since the beginning of the mechanism are used, one of the limitations of the study is that the ROM and also the interventions of the CBRT are not the only explanatory variables for the USD/TL exchange rate volatility. However, the results imply that the ROM is an efficient policy tool and contributes to the financial stability.*

Originality/value *– Since the ROM is introduced by CBRT recently, there are only a few empirical researches examining the effect of the ROM on exchange rate volatility. This study covers a longer and more recent time period than previous studies.*

Keywords: Reserve Options Mechanism, Exchange Rate Volatility, CBRT, Financial Stability, GARCH

Jel Classification: E58, F31, G15

1. Introduction

The price stability is the main concern of the CBRT, but the financial stability have also became a major goal after the last global crisis in financial markets. In the 2014-2018 strategic plan of CBRT, the strategic goals are separated into three areas as public, global, and institutional. The aims of the public area are explained; i) providing price stability and ii) contribution to the financial stability (CBRT, 2016a). Taken into account both the price stability and the financial stability as the new political compound, CBRT have started a flexible monetary policy since the fourth quarter of 2010 (Oduncu et al., 2013a).

Within the new monetary policy framework, Reserve Options Mechanism (ROM) is designed by CBRT as a new tool of monetary policy (Oduncu et al., 2013b). The ROM is developed to limit the effects of the volatility of capital flows on the financial stability. The ROM is developed to enhance the strength of the financial markets against the liquidity shocks of foreign currencies, and its structure enables to limit the exchange rate volatility (Alper et al., 2012). This mechanism provides an option to the commercial and participation banks to hold required reserves for the liabilities of Turkish Lira (TL) in form of US dollars (USD) or gold in a determined level. Hence, the mechanism enables banks to use their USD assets in exchange for TL required reserves. Benefits of the mechanism are; i) reducing the volatility created by short term capital flows, ii) strengthening the gross foreign currency reserves (GFCR) of CBRT, iii) providing flexibility to the banks to manage liquidity, iv) reducing the credit level sensitivity regarding the capital flows, and v) reducing the need to the other policy tools (CBRT, 2012).

The ROM has started in September 2011. Initially, the option for holding foreign currency was limited up to the 10% of TL required reserves. Then, it had been gradually increased to 20% and 40%. In May 2012, the option was increased to the 45% of TL required reserves and the mechanism were separated into two tranches as the first tranche up to the 40% and the second tranche between 40-45%. Increasing coefficients were assigned to the tranches. The coefficient of the first tranche was '1' and the coefficient of the second tranche was '1.4'. These

coefficients mean that the more the banks benefit in the mechanism, the more they hold USD in exchange for TL. As of October 2016, the option can be used up to the 60% of TL required reserves and there is 11 tranches in the mechanism. Table 1. shows the tranches and the coefficients in the ROM, after the last regulation in September 2016.

Table 1: Tranches and Coefficients in the ROM

Optional Tranches (%)	Coefficients
0-30	1.0
30-35	1.7
35-40	2.1
40-45	2.5
45-50	2.7
50-55	3.1
55-56	3.9
56-57	4.1
57-58	4.3
58-59	4.5
59-60	4.7

Source: (CBRT, 2016b)

Within the first tranche, because the reserve option coefficient (ROC) is '1', banks can hold up to the 30% of TL required reserves in form of USD as one to one, by calculating the amount via USD/TL rate. In the second tranche, to hold between 30-35% of the TL required reserves in form of USD, the amount of TL for this tranche is multiplied with the ROC '1.5', and then the TL sum of the first two tranches is converted into USD. Table 2. presents a calculation example about using the mechanism. In the example, the bank must hold 100 TL required reserves. Using upper limit of the first tranche means that the bank holds $10 in exchange for 30 TL. If the bank uses 40% of the option (to the upper limit of the third tranche) that means it holds $16.33 ($10+$2.83+$3.5) in exchange for 40 TL. Using full of the mechanism requires that bank holds $37.34 in exchange for 60 TL. Consequently, if the bank benefits from the last tranche to the upper limit, it holds 40 TL + $37.34 for 100 TL required reserves.

Table 2: A Calculation Example for the ROM

Optional Tranches (1)	Reserve Option Coefficients (2)	TL Required Reserves (3)	TL Required Reserves by Multiplying the Coefficient (2x3)	USD Value of Tranches (1 USD = 3 TL)
0-30	1.0	30	30.0	10.0
30-35	1.7	5	8.50	2.83
35-40	2.1	5	10.5	3.50
40-45	2.5	5	12.5	4.17
45-50	2.7	5	13.5	4.50
50-55	3.1	5	15.5	5.17
55-56	3.9	1	3.90	1.30
56-57	4.1	1	4.10	1.37
57-58	4.3	1	4.30	1.43
58-59	4.5	1	4.50	1.50
59-60	4.7	1	4.70	1.57
TOTAL			**112 TL**	**$37.34**

The use of the option is sensitive to the funding costs of the TL and USD. If the USD funding cost decreases (in the speeding period of capital inflow), banks may intend to use the option at the higher levels by holding a bigger fraction of their USD asset in exchange for TL required reserves. As a consequence, the increasing use of the option reduces the transformation of the foreign currency inflow into credit and also reduces the appreciation pressure on TL (Küçüksaraç and Özel, 2012). Conversely, if the USD funding cost increases (in the speeding period of capital outflow), the use of the option is expected to be affected negatively because the banks withdraw their foreign currency reserves from CBRT. Moreover, the ROM decreases the need to sterilization for CBRT (Demirhan, 2013).

Alper et al. (2012) define the breakeven coefficient leaving banks indifferent to use or not to use the ROM, and calculate the breakeven coefficient value as the ratio of the funding cost of TL to the funding cost of USD (including the expected change in the exchange rate). If the cost of TL funding is 3% and the cost of USD funding is 2% for a bank, the breakeven coefficient is equal to 1.5. If the ROC is equal to 1 and 1.3 in the first two tranches respectively, the bank is expected to use the mechanism at

the upper limit of the second tranche. Since the funding cost of USD decreases in the speeding period of capital inflow, the threshold ROC for the bank increases, which can lead the banks benefiting more in the ROM. As a result, the ROM works as an automatic stabilizer by giving the flexibility to the banks to adjust their foreign currency reserves (Oduncu et al., 2013b). However, automatic stabilizer mechanism works if the ROM is not fully utilized, hence, the ROC needs to be determined high enough in the upper tranches (Alper et al., 2012).

Aslaner et al. (2015) explain the differentiation in the use of the option between banks as i) cost related factors (relative funding cost of TL to USD and cost of ROM) and ii) other factors (such as foreign currency liquidity conditions, global risk appetite, and exchange rate movements). They find that the relative cost of TL to USD and the ROCs determined by CBRT are the main factors affecting the use of the ROM.

Depending on the market conditions (the speeding periods of the capital inflow or outflow), CBRT can review the mechanism by changing the highest using rate of the option or the ROCs. By reducing the coefficients, CBRT supplies liquidity to the market and by increasing the coefficients, it demands more foreign currency from banks. Consequently, the mechanism either works automatically in a passive situation or works in an active situation under the regulation of CBRT (Alper et al., 2012).

Figure 1. shows the maximum rates of the option and the using rates of the option starting from September 2011. It is seen that the mechanism have been used on a large scale since the beginning.

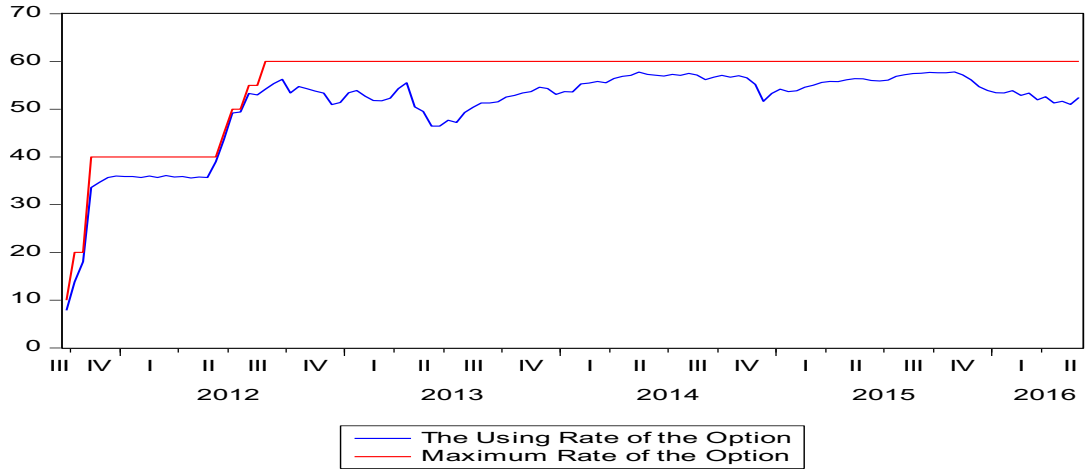

Figure 1: The Use of the ROM (%)

Figure 2. shows the timeline graph of the holding USD amount in exchange for TL in the mechanism. It is seen that the amount declines since the fourth quarter of 2015. The last amount is $26.2 billion in June 3, 2016.

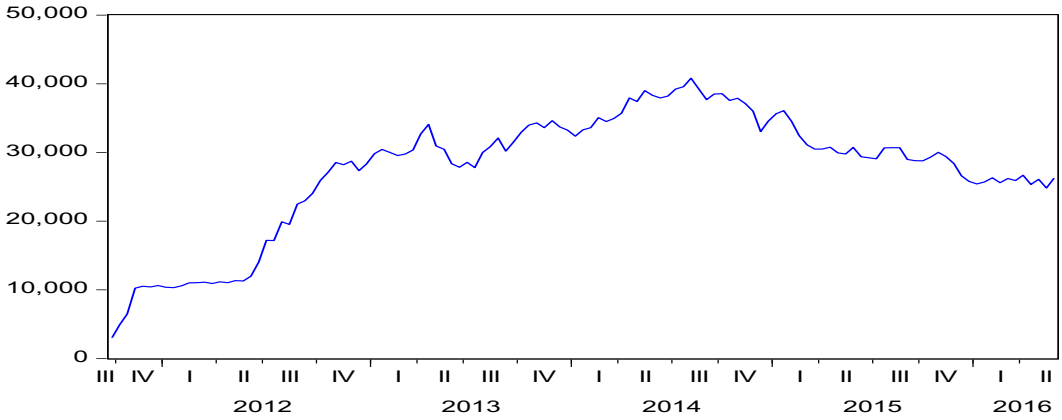

Figure 2: The USD Amount Holding in the ROM ($ Million)

Because the ROM is a new policy tool, there are a few empirical studies examining the effect of the ROM on the exchange rate volatility. Oduncu et al. (2013a) analyze the effects of the ROM, foreign exchange interventions of CBRT, and additional monetary tightening on exchange rate volatility. They use the data for the period from 10.15.2010 to 10.15.2012 and applied GARCH (1,1) model. They evidence that the ROM is efficient in decreasing the exchange rate volatility. In another study, Oduncu et al. (2013b) use dummy variable in GARCH (1,1) model to analyze the effect of the ROM on exchange rate volatility by giving '0' before the ROM between 10.15.2010-

09.29.2011 and '1' after the ROM between 09.30.2011-09.28.2012. They find that exchange rate volatility decreases significantly after the introduction of ROM. Also, Değerli and Fendoğlu (2013) examine the expectations of USD/TL rate's volatility, kurtosis, and skewness by using option prices and calculating the risk-neutral exchange rate probability density functions. They compare developing countries which give current account deficit including Brazil, Chile, Colombia, Czech Republic, Indonesia, Mexico, Poland, Hungary, Romania, South Africa, and Turkey. They document that after November 2011, USD/TL rate's skewness and especially the volatility and kurtosis decrease compared to other exchange rates, which indicates that the policy tools such as asymmetric interest rate corridor and the ROM are efficient.

This study aims to examine the effect of the ROM on the USD/TL exchange rate volatility. Also, the effect of the direct foreign exchange interventions and auctions of CBRT on the exchange rate volatility is examined. The major contribution of this study to the literature is that it covers a longer and more recent time period than previous studies. The data for the period from 09.30.2011 to 06.03.2016 are used and GARCH (1,1) model is applied. It is evidenced that the ROM is an efficient policy tool to contribute to the financial stability.

2. Data and Methodology

To examine the effect of the ROM on the exchange rate volatility, the ratio of the holding USD amount in the ROM to GFCR of CBRT is used as variance regressor in the GARCH (1,1) model. Return of the USD/TL rate level as the depending variable is calculated by using the indicative USD/TL ask rates announced at 03.30 pm by CBRT in every business day.

Required reserves are calculated by CBRT in two-week periods on Fridays. Maintenance period starts two weeks after the calculation day and lasts 14 day. Because TL required reserves of banks are calculated in a two-week period on Fridays, the amount of USD in exchange for TL in the ROM is a two-weekly time series. Hence, the two-weekly exchange rate return is calculated as the log difference of the exchange rate. The data are used for the period 09.30.2011-06.03.2016.

In the model, the ratio of net foreign currency interventions (NFCI) of CBRT to GFCR of CBRT is also used as variance regressor. NFCI of CBRT includes the direct foreign exchange purchase and sale interventions and purchase and sale auctions of CBRT. NFCI is derived for two-week periods. NFCI takes negative sign if the sum of the transactions in two-week is resulted as net sale. Conversely, it takes positive sign if the sum of the transactions is resulted as net purchase.

Mean and variance equations of GARCH (1,1) model are shown in equations 1. and 2., respectively. In variance equation, $ROM/GFCR_t$ represents the ratio of the holding USD amount in the ROM to gross foreign currency reserves of CBRT and $NETINTR/GFCR_t$ represents the ratio of net foreign currency interventions of CBRT to gross foreign currency reserves of CBRT.

$$R_t = \mu + \varepsilon_t \quad (1.)$$

$$\sigma_t^2 = a_0 + a_1 u_{t-1}^2 + \beta_1 \sigma_{t-1}^2 + \varphi_1 ROM/GFCR_t + \varphi_2 NETINTR/GFCR_t \quad (2.)$$

3. Empirical Findings

Descriptive statistics of the series are reported in Table 3. In panel B, it is seen that while return and NETINTR/GFCR series are stationary in level, ROM/GFCR series is not stationary.

Table 3: Descriptive Statistics of Series

	Return of USD/TL Rate	NETINTR/GFCR	ROM/GFCR
Panel A			
Mean	0.001643	-0.005983	0.269252
Median	0.001767	-0.003374	0.287468
Maximum	0.025049	0.000000	0.357903
Minimum	-0.021963	-0.061359	0.057216
Std. Dev.	0.008728	0.010610	0.067175
Skewness	-0.071978	-3.225057	-1.303782
Kurtosis	3.161386	13.49041	3.855116
Jarque-Bera	0.237742	770.9008***	38.28062***
Panel B			
ADF Test (Level)	-10.06302***	-6.783032***	-2.637202

Note: *** indicates significance at the 1% level. Critical values for ADF tests are -2.584214, -4.035648, -4.034997 for 1% level, respectively.

Although the ROM/GFCR series is not level stationary, first difference of this series is stationary and included in the GARCH model. For the error distribution in the GARCH model specification, Generalized Error Distribution (GED) is used. The correlation coefficient between ROM/GFCR and NETINTR/GFCR is -0.125, which indicates that there is no multicollinearity problem.

The results of GARCH (1,1) model are reported in Table 4. It is found that the reserve options mechanism significantly decreases the USD/TL rate volatility. On the other hand, the net foreign exchange interventions of CBRT do not play a significant role to decrease volatility. As a consequence, it is evidenced that the ROM is an efficient policy tool and contributes to the financial stability. This finding is in line with the findings of Oduncu et al. (2013a,b) and Değerli and Fendoğlu (2013).

LB-Q and LB-Q^2 tests results indicate that the null hypothesis of no autocorrelation for standardized residuals and squared standardized residuals cannot be rejected. Also, ARCH-LM test result indicates that the null

hypothesis of no ARCH effect cannot be rejected. Hence, diagnostic tests indicate that the model is well specified.

Table 4: Results of GARCH (1,1) Model

$$R_t = \mu + \varepsilon_t$$

$$\sigma_t^2 = a_0 + a_1 u_{t-1}^2 + \beta_1 \sigma_{t-1}^2 + \varphi_1 \mathrm{ROM/GFCR}_t + \varphi_2 \mathrm{NETINTR/GFCR}_t$$

α_0	α_1	β_1	φ_1	φ_2
3.48E-06	-0.079521	1.025381	-0.000960	-0.000319
(1.788070)*	(-1.941055)*	(13.96747)***	(-4.081502)***	(-1.195477)
LB-Q (10)	12.018 [0.284]			
LB-Q^2 (10)	9.1962 [0.514]			
ARCH LM (10)	1.0043 [0.445]			

*** indicates significance at the 1% level and * indicates significance at the 10% level. *z*- statistics are given in the parentheses. *p*- values are given in brackets.

4. Conclusion

Reserve Options Mechanism (ROM) is introduced in September 2011 in the context of the CBRT's new policy mix, which takes into account both price and financial stability. The ROM is an option for commercial and participation banks to hold USD or gold in CBRT in exchange for the Turkish Lira required reserves in a determined level. It aims to reduce the adverse effects of the volatility of the capital flow, which is a challenge to financial stability and also aims to increase the gross foreign currency reserves of CBRT. Generally speaking, the mechanism is adopted by banks and it is used on a large scale since the introduction.

This study empirically examines the effect of the ROM on the USD/TL exchange rate volatility. In addition, the effect of the net foreign exchange interventions of CBRT is analyzed. The data for the period 09.30.2011-06.03.2016 are used and GARCH (1,1) model is applied. It is found that the ROM significantly decreases the exchange rate volatility. The interventions also decrease the volatility, but they do not play a significant role. Hence, it is concluded that the ROM is an efficient policy tool and contributes to the financial stability.

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