The Effects of Additional Monetary Tightening on Exchange Rates

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Abstract

Since the global financial crisis, Central Banks have used various policy tools to sustain financial stability besides price stability. Additional Monetary Tightening is one of these tools that the Central Bank of the Republic of Turkey used in 2011-2012. The effects of this tool on the exchange rate are the main theme of this paper. Our analysis indicates that additional monetary tightening has a significant role in reducing volatility in the exchange rate. It is also shown that during the days of additional tightening Turkish Lira appreciated against the emerging market currencies.

Keywords: Additional Monetary Tightening, Turkish Lira, Exchange Rates, Central Bank of the Republic of Turkey's New Policy Mix, GARCH.

JEL Codes: C12, C58, E58, G10.

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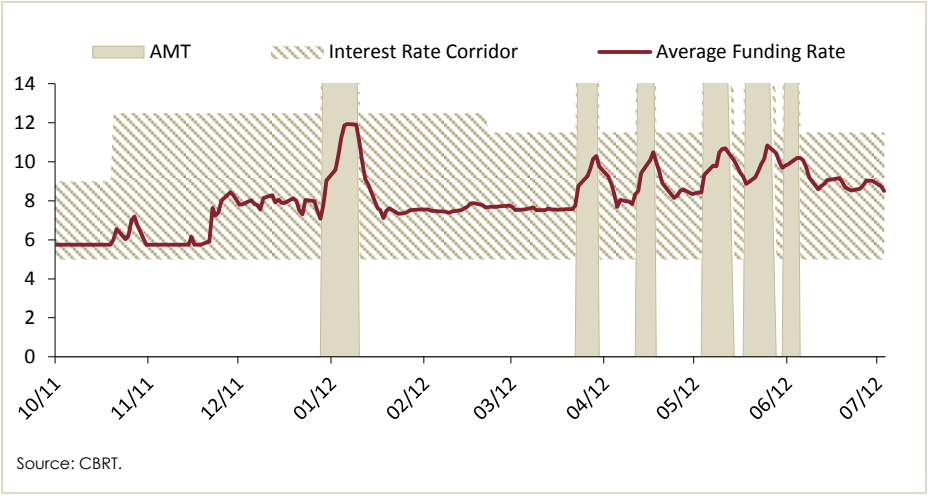
1. Introduction

Before the 2008 global financial crisis, monetary policies exclusively focused on price stability across the globe while financial stability has been mostly faded into the background, and sometimes completely ignored. The crisis proved the inefficiency of the monetary policies conducted without considering financial risks and signified the need to observe financial stability along with price stability (Borio, 2011). To that extent, it was well understood that a policy rate that yields price stability may not necessarily provide financial stability. Therefore, it has become essential for central banks to utilize more than one policy instrument.

Accordingly, since late 2010, the Central Bank of the Republic of Turkey (CBRT) has started to implement its new policy mix. In this framework, required reserves and other macro prudential tools as well as weekly repo rates, interest rate corridor and liquidity policy[1] are jointly used. As part of the liquidity policy, a pillar of the new policy mix, O/N interest rates are adjusted according to the course of economic and financial developments without changing the weekly repo rates, i.e. the policy rate.[2] Accordingly, the CBRT has occasionally delivered additional monetary tightening (AMT) in order to prevent temporary price movements from deteriorating the inflation outlook via expectations. On the days of AMT delivering, funding supplied via quantity auction method at the policy rate is reduced (or given none at all). Instead, market is funded via market price based auctions, and hence, O/N rates settle close to the upper bound of the interest rate corridor. AMT has been delivered 6 times so far, where the longest and the shortest duration were 8 and 3 days, respectively.[3] In accordance with the policy design, AMT has been aimed to be strong, effective and temporary (Figure 1).

Figure 1: Additional Monetary Tightening



Source: CBRT.

[1] For liquidity management of central banks, see Goodhart (2009).

[2] For details of the CBRT's policy mix, see Başçı and Kara (2011); Akçelik, Başçı, Ermişoğlu and Oduncu (2013).

[3] These days are the following; 29.12.11-09.01.12, 23.03.12-29.03.12, 12.04.12-17.04.12, 04.05.12-11.05.12, 18.05.12-25.05.12 and 31.05.12-04.06.12.

This study analyzes the effects of the additional monetary tightening on exchange rates through GARCH models. Although there are studies about the impact of central bank interventions on FX, to the best of our knowledge, this is the first empirical study on analyzing the effects of AMT on exchange rates. It is found that AMT is statistically significant in reducing the volatility of Turkish Lira. Moreover, our analysis shows that during the days of AMT, Turkish Lira appreciated against the emerging market currencies.

The remainder of the paper is organized as follows. Next section gives details about the data and the methodology used. Section 3 shows the empirical results and Section 4 concludes the paper.

2. Data and the methodology

The study uses the daily change in the currency basket where it is calculated as 0.5*(Euro/TL) + 0.5*(USD/TL). The data set covers the period between 21.10.2011 and 19.07.2012.[4] The GARCH framework is used in order to examine the impact of AMT on exchange rates. The GARCH model has been developed by Bollerslev (1986) from the ARCH model previously introduced by Engle (1982). One of the most appealing features of the GARCH framework, which explains why this model is so widely used in the literature, is that it captures persistence and volatility clustering in the data. Thus, GARCH(1,1) models shown below are used to estimate the effectiveness of AMT on exchange rate volatility. In both models, the change in VIX, which is widely used as an indicator for the global risk appetite, and the daily amount of FX sold by CBRT through auctions and interventions are used as control variables.[5,6,7] In both models, a dummy variable for Additional Monetary Tightening is used as an independent variable while in Model 1 the change in the currency basket and in Model 2 the change in the TL against the mean of emerging market currencies[8] is used as the dependent variables.

Model 1:

$$R_t = \beta_0 + \beta_1 D_{AMT} + \beta_2 FXS_t + \beta_3 RVIX_t + \varepsilon_t \quad (1.a)$$

$$\varepsilon_t \sim N\,(0, h_t) \quad (1.b)$$

$$h_t = \alpha_0 + \alpha_1 \varepsilon_{t-1}^2 + \alpha_2 h_{t-1} + \alpha_3 D_{AMT} + \alpha_4 FXS_t + \alpha_5 RVIX_t + u_t \quad (1.c)$$

[4] At the Monetary Policy Meeting (MPC) of CBRT on October 20, 2011, the upper bound of the interest rate corridor was raised, thus laying the ground for additional monetary tightening. At the MPC of CBRT on July 19, 2012, the disclosure on AMT was left out and no AMT was conducted starting from this date. Hence, these dates are selected as the starting and ending dates for the analysis.

[5] VIX is included as a control variable in similar studies analyzing exchange rate volatility (Cairns et al., 2007). The significance of $RVIX_t$ in model results show that not including this variable to the model may result in omitted variable bias.

[6] Even though other studies in the literature include interest rate spread between domestic and international rates, this study excludes this variable as the AMT directly affects interest rates and so including the interest rate spread may lead to multicollinearity problem.

[7] To normalize the series of the daily amount of FX sold by CBRT through auctions and interventions, the series are divided by Gross FX Reserves of the CBRT.

[8] Emerging markets are Brazil, Chile, Czech Republic, Hungary, Mexico, Poland, South Africa, Indonesia, South Korea and Colombia.

Model 2:

$$REM_t = \beta_0 + \beta_1 D_{AMT} + \beta_2 FXS_t + \beta_3 RVIX_t + \varepsilon_t \quad (2.a)$$

$$\varepsilon_t \sim N(0, h_t) \quad (2.b)$$

$$h_t = \alpha_0 + \alpha_1 \varepsilon_{t-1}^2 + \alpha_2 h_{t-1} + \alpha_3 D_{AMT} + \alpha_4 FXS_t + \alpha_5 RVIX_t + u_t \quad (2.c)$$

Model variables are defined as below:

$$R_t = \ln\left({}^{p_t}/_{p_{t-1}}\right) * 100 \qquad p_t = 0.5*(Euro/TL) + 0.5*(USD/TL)$$

$$REM_t = \ln\left({}^{EM_t}/_{EM_{t-1}}\right) * 100 \qquad EM_t : Mean\ of\ emerging\ market\ currencies/TL$$

$$RVIX_t = \ln\left({}^{VIX_t}/_{VIX_{t-1}}\right) * 100 \qquad VIX_t : value\ of\ the\ VIX$$

$$FXS_t = \frac{\text{The daily amount of FX sold by CBRT through auctions and interventions}}{\text{Gross FX Reserves of the CBRT}}$$

$$D_{AMT} = \begin{cases} 0, other\ days \\ 1, days\ of\ AMT \end{cases}$$

3. Empirical Results

Table 1 presents the results.[9] The results of Model 1 show that AMT is statistically significant at 5% in reducing the volatility of the exchange rate while the daily amount of FX sold by CBRT through auctions and interventions is insignificant in the variance equation. These both variables are insignificant in the level equation. On the other hand, the change in VIX is significant at both the level and the variance equation of the currency basket of TL. According to the Model 2, AMT has a negative and significant coefficient at 5% in the level equation. This result shows that during the days of AMT, Turkish Lira appreciated against the emerging market currencies.

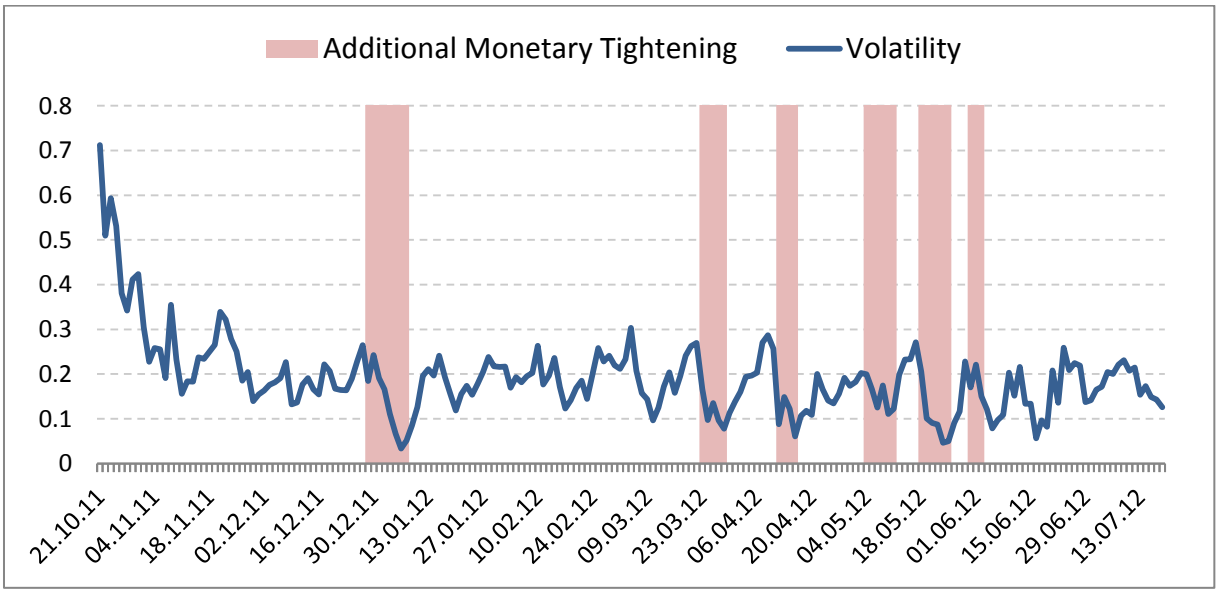
Table 1: Results

	Model 1		**Model 2**	
	Coefficient	P-Value	Coefficient	P-Value
Level Equation				
C	-0.008	0.824	0.016	0.649
D_{AMT}	-0.112	0.140	-0.186	0.003
FXS_t	-35.010	0.255	-24.000	0.116
$RVIX_t$	0.023	0.000	-0.008	0.043
Variance Equation				
C	0.057	0.006	0.092	0.008
ε^2_{t-1}	0.067	0.357	0.344	0.005
h_{t-1}	0.661	0.000	0.207	0.349
D_{AMT}	-0.046	0.038	-0.048	0.118
FXS_t	2.654	0.654	2.379	0.873
$RVIX_t$	0.006	0.027	0.005	0.026

[9] The Q statistics of lagged auto correlations are insignificant in the correlogram of the standardized residuals and square standardized residuals. Thus, it can be said that the selected GARCH models fits well to the data.

Figure 2 shows the FX volatility obtained from the Model 1 (h_t). This figure clearly shows the reduction in FX volatility during periods of AMT.

Figure 2: FX Volatility and Additional Monetary Tightening



4. Conclusions

After the global financial crisis, it was well understood by both academicians and policy makers that price stability is not sufficient for maintaining macroeconomic stability by itself and financial stability is integral to the well-functioning of the domestic and global financial markets. Therefore, finding a solution on how to incorporate financial stability in the implementation of monetary policy without diluting the price-stability objective has become a significant concern for central bank authorities. In view of that, CBRT has implemented a new policy mix in which required reserves, weekly repo rates, interest rate corridor and liquidity policy are used in cooperation. On the days of Additional Monetary Tightening, CBRT reduced the funding supplied via quantity auction method at the policy rate or did not fund at all. Instead, CBRT funded the market via market-price based auctions, and hence, led O/N rates to be materialized close to the upper bound of the interest rate corridor.

To the best of our knowledge, this is the first empirical study about the effectiveness of AMT on exchange rates. After controlling for other factors, it is found that AMT is significant in reducing the volatility of Turkish lira. Furthermore, this study finds that Turkish Lira gained value against the emerging market currencies during AMT days. Therefore, AMT can be considered as an effective monetary policy tool in preventing the temporary price movements from deteriorating the inflation outlook and complement other policy tools implemented by CBRT under the new policy mix.

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