CBT RESEARCH NOTES IN ECONOMICS

The Effect of CBRT's New Policy Mix on the Volatility of Credit Growth*

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Abstract: The Central Bank of the Republic of Turkey has started to implement its new policy mix since late 2010. In this new approach expectations, credit growth and reel exchange rate are monitored closely as key indicators for financial stability on top of price stability. The effect of this new monetary policy framework on the volatility of credit growth is the main theme of this note. To the best of our knowledge, we are the first to analyze the impact of new policy mix on the credit growth volatility. It is shown that there is a significant decrease in the volatility of credit growth after the introduction of new policy framework at late 2010. Therefore, it can be said that this new monetary policy framework contributes to financial stability in Turkey by lessening the credit growth volatility.

Özet: Türkiye Cumhuriyet Merkez Bankası 2010 yılının sonlarından itibaren yeni politika bileşimini uygulamaya başladı. Bu yeni yaklaşımda beklentiler, kredi büyümesi ve reel efektif döviz kuru, fiyat istikrarı ve finansal istikrar açısından izlenen göstergeler olarak yer almaktadır. Bu yeni para politikası çerçevesinin kredi büyümesi oynaklığı üzerindeki etkileri bu çalışmanın konusunu teşkil etmektedir. Bildiğimiz kadarıyla, yeni politika bileşiminin kredi büyümesi oynaklığı üzerindeki etkilerini ampirik olarak inceleyen herhangi bir çalışma yoktur. Çalışmada, yeni para politikası bileşiminin uygulanmaya başlandığı 2010 yılının sonlarından itibaren, kredi büyümesi oynaklığında belirgin bir düşüş olduğu gösterilmiştir. Bu yüzden, bu yeni para politikası çerçevesinin kredi büyümesi oynaklığını düşürerek finansal istikrara katkıda bulunduğu söylenebilir.

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1. Introduction

Before the 2008 global financial crisis, the inflation targeting (IT) regimes had become the mainstream approach of central banks across the globe. IT exclusively focuses on price stability while financial stability is mostly faded into the background, and sometimes completely ignored. However, the global crisis in 2008-2009 proved the inefficiency of this approach and signified the need to observe financial stability along 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 been started to be questioned among academicians and policy makers.

Accordingly, the Central Bank of the Republic of Turkey (CBRT) has started to implement its new policy mix since late 2010. In this new policy framework, contributing to the financial stability becomes a secondary objective while price stability is the primary objective. This new approach is alternatively named IT++[1] in which credit growth and reel exchange rate are monitored closely as key indicators for financial stability on top of price stability (First plus stands for credit growth and the second one stands for reel exchange rate).Governor Başçı stated the reference point of 120 for real exchange rate and of 15% for annual credit growth for the year 2013.

Moreover, Governor Başçı stated that decreasing credit growth volatility and FX volatility is important to maintain price and financial stability (Başçı, 2013). Excessive capital flows poses significant challenges to emerging market economies since these flows makes credit more accessible due to low cost of funding that led to rapid credit growth. Then, the domestic demand grows faster than aggregate income and this situation negatively affects macroeconomic and financial stability. On the other hand, sudden weakening in capital flows leads to an abrupt contraction in credit stock which is also undesirable. Hence, capital flow volatility leads fluctuations in credit growth and this poses risks to macroeconomic and financial stability by distorting the resource allocation within the economy.

Excessive credit growth has increased the fragility of banking sector especially in emerging markets and this situation has been associated with economic and financial crisis according to Mendoza and Terrones (2008). After the global financial crisis, the volatility of capital flows has increased as a result of increased uncertainty. In order to deal with the adverse consequences of capital flow volatility, emerging market economies have utilized various policy measures in order to sustain macroeconomic and financial stability. Specifically, CBRT implemented new policy mix starting to smooth out the effects of capital

[1] Başçı (2013)

flow volatility. In this note, we will study the effects of new policy framework of CBRT on the volatility of credit growth.

2. Literature

2.1 Literature about New Policy Mix

After the 2008 global financial crisis, central banks of advanced economies have created abundant liquidity by monetary expansions in order to lift up the economy from their ravaged states. This abundant liquidity has increased the volatility of short-term capital flows that have adverse effects on the credit growth volatility and FX volatility in emerging markets. In order to reduce the adverse consequences of excessive capital flow volatility, CBRT has designed and launched its new monetary policy framework. In this framework, interest rate corridor, liquidity funding strategy and required reserves are used in cooperation to maintain price stability and to contribute to financial stability[2]. In the period of November 2010-August 2011, CBRT increased reserve requirement ratios to prevent excessive credit growth. During this period, the overnight interest rates were allowed to materialize near the lower bound of the interest rate corridor occasionally so that short term carry trade was discouraged. On the other hand, in late 2011, CBRT widened interest rate corridor upward; so overnight interest rates realized close to the overnight lending rate. Thus, the active use of liquidity policy and interest rate corridor played an important role in decreasing credit growth in 2012 (Binici et al., 2013).

The effects of this new framework have been analytically examined in a few studies. For example, Alper et al. (2012) show that required reserves ratio policy of CBRT is an important determinant of bank lending in Turkey. Ermişoğlu et al. (2013) conclude that additional monetary tightening, a new liquidity policy tool of CBRT, has a significant role in reducing volatility in the exchange rate. It is also shown that during the days of additional monetary tightening, Turkish Lira (TL) appreciated against the emerging market currencies. Oduncu et al. (2013) study the effectiveness of Reserve Options Mechanism (ROM)[3], which is the option to hold FX or gold reserves in increasing tranches in place of Turkish Lira reserve requirements of Turkish banks, on the volatility of TL. They claim that ROM, the unique tool that is designed and launched by CBRT, is an effective policy tool in decreasing the volatility of Turkish lira. Binici et al. (2013) focus on the interaction of asymmetric interest rate corridor with the credit-deposit spread reflexing banks' appetite for lending. They conclude that an asymmetric corridor policy together with an active liquidity management

[2] For details of this new framework, see Başçı and Kara (2011), Kara (2012) and Akçelik et al. (2013)
[3] For the design of the mechanism, see Alper et al. (2012).

strategy can be used to affect credit and deposit rates via different channels. Last but not the least, Değerli and Fendoğlu (2013) examine the potential effect of ROM on the volatility, skewness and kurtosis of TL. They show that the USD/TL expectations have exhibited lower levels of volatility, skewness and kurtosis after controlling for a set of domestic and common external factors.

2.2 Literature about Credit Growth Volatility

The literature on the volatility of credit growth has been limited and the factors affecting the credit growth volatility have been examined in a few studies. For example, Micco and Panizza (2005) focus on the relationship between credit growth volatility and bank concentration ratio by using yearly data with an unbalanced panel of 93 countries during the period 1990-2002. They conclude that in countries with higher bank concentration ratio, domestic credit are less sensitive to external shocks and bank concentration is associated with lower credit volatility. Akar and Çiçek (2009) analyzed the volatility of credit stock of deposit banks in Turkey through the use of SWARCH model and show that credit volatility is sensitive to interest rates of domestic government bonds. Haouat et al. (2012) uses ARCH methods in order to analyze the effect of existence of foreign banks on both the volatility and the level of real private bank credit in eight Latin American countries with use of quarterly data over the period 1995–2001. The empirical findings show that the presence of foreign banks has contributed to reducing real credit volatility and improving the role of banking sector as a buffer shock function.

3. Data and Methodology

The weekly bank credit stock data is used in this study. Stock of weekly total credit data includes total banking sector loans and credit cards; excludes non-performing loans and credit to financial sectors. Total credit can be divided into business loans and consumer loans. The data set covers the period between January 06, 2006 and June 28, 2013, with 389 total observations.

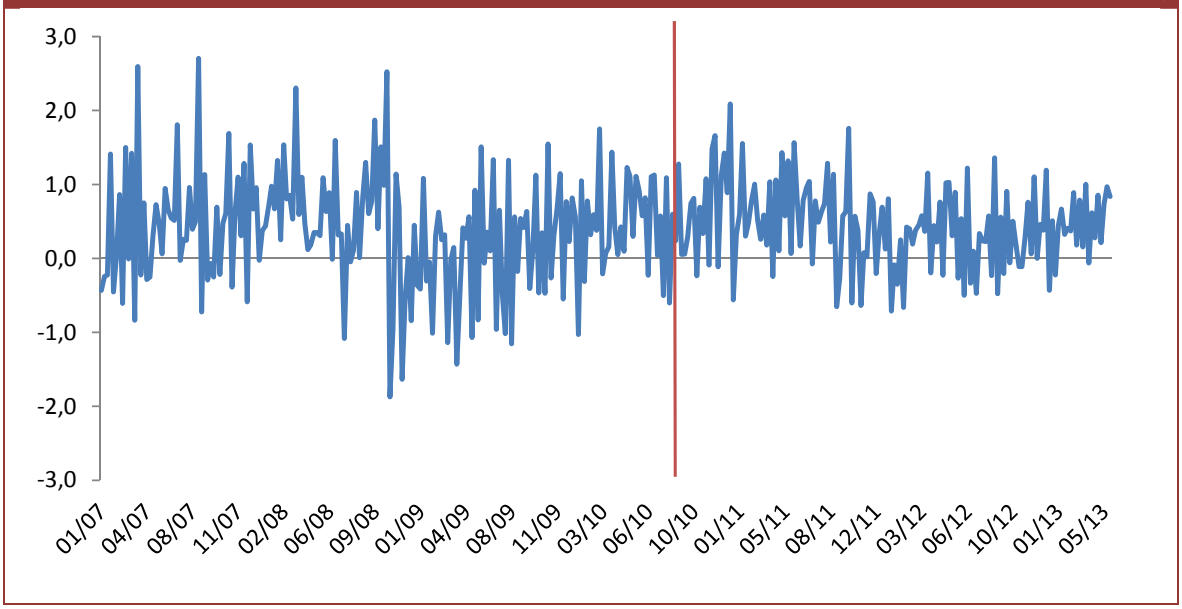
The GARCH framework is used in order to examine the impact of new policy framework on the volatility of credit growth. The GARCH model has been developed by Bollerslev (1986) from the Autoregressive Conditional Heteroskedastic (ARCH) model previously introduced by Engle (1982). In ARCH, the changing variance is included into estimation in order to obtain more efficient results. It is assumed that the error term of the return equation has a normal distribution with zero mean and a time varying conditional variance, so the forecasted variance of return equation varies systemically over time. 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 one of the well-known empirical regularities of the returns, the volatility clustering. The weekly credit growth of total loans is shown below (Graph 1).

The weekly credit growth is obtained as:

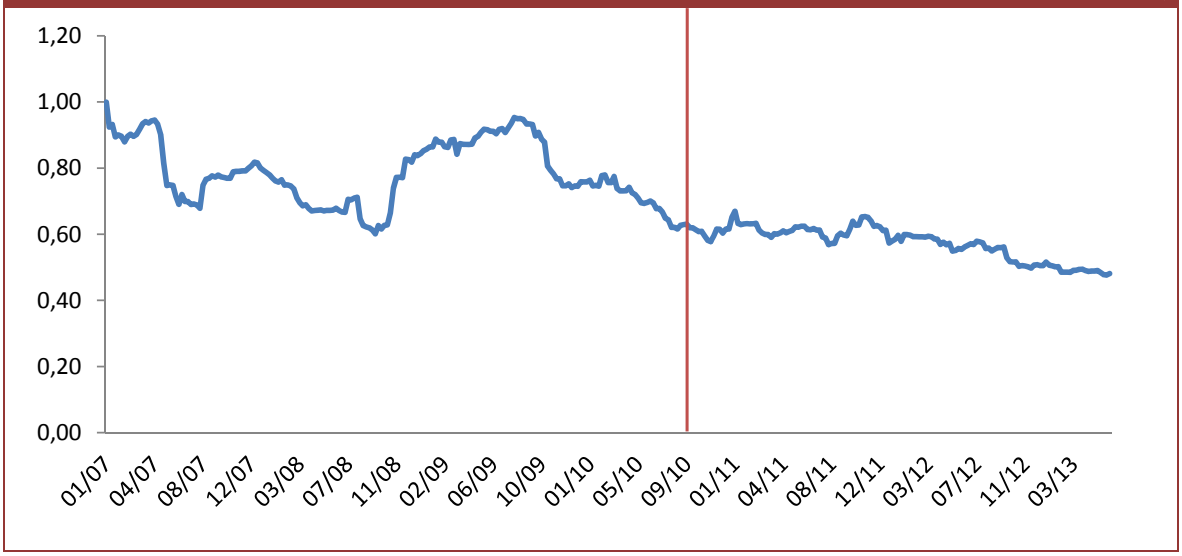
$$R_t = \left({CS_t}/{CS_{t-1}} - 1\right) * 100,\ CS_t\text{: Credit stock of week t}$$

Graph 1: The weekly credit growth of total loans



First, the volatility of credit growth is calculated as using annual standard deviation of credit growth to examine visually whether there is a change on the volatility of credit growth after the introduction of new policy framework. The annual standard deviation is used since there is a big seasonality in the credit data. Graph 2 shows that there is a significant decrease in the volatility of credit growth after late 2010, when CBRT has started to implement its new monetary policy framework.

Graph 2: The volatility of total loans growth



Secondly, this finding is examined by the GARCH framework. Therefore, GARCH (1,1)[4] model shown below is used to estimate the impact of new monetary policy framework on credit growth volatility. In the model, the credit growth is used as the dependent variable, while a dummy variable for the introduction of new monetary policy framework is used as an independent variable[5]. If the coefficient of the dummy variable is negative and significant, it implies that credit growth volatility is lower during new monetary policy mix is in effect.

Model 1:

$$R_t = \beta_0 + \sum_1^{13} \beta_i R_{t-i} + \varepsilon_t \qquad (1.a)$$

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

$$h_t = \alpha_0 + \alpha_1 \varepsilon_{t-1}^2 + \alpha_2 h_{t-1} + \alpha_3 D_1 \qquad (1.c)$$

[4] GARCH(1,1) is selected over other GARCH specifications according to Akaike Information Criterion (AIC) and Bayesian Information Criterion (BIC).
[5] The AIC and SIC criterion were used to select the number of lags of the dependent variable.

Dummy variable is defined as below:

$$D_1 = \begin{cases} 0, the\ days\ before\ the\ introduction\ of\ \text{new policy mix}\ (06.01.2006 - 19.09.2010) \\ 1, the\ days\ after\ the\ introduction\ of\ \text{new policy mix}\ (26.09.2010 - 23.06.2012) \end{cases}$$

Lastly, we fine tune our analysis of the introduction of policy mix on the volatility of credit by enriching our model with control variables which might also affect credit growth. The control variables in the new model are the difference in two year generic government bond interest rate of Turkey and weekly capital flows, include both bond and equity investments, to emerging markets. Both domestic interest rates and capital flows might have an impact on credit growth[6] as discussed in the introduction part. Hence, we construct two new versions of the model. In Model 2 control variables were added only into the mean equation and in Model 3 control variables were added both into the mean equation and into the variance equation. Similar to Model 1, credit growth is used as the dependent variable and the dummy for new policy mix is used as independent variable in both models.

Model 2:

$$R_t = \beta_0 + \sum_1^{13} \beta_i R_{t-i} + \beta_{14} \Delta INT_t + \beta_{15} CF_t + \varepsilon_t \quad (2.a)$$

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

$$h_t = \alpha_0 + \alpha_1 \varepsilon_{t-1}^2 + \alpha_2 h_{t-1} + \alpha_3 D_1 \quad (2.c)$$

Model 3:

$$R_t = \beta_0 + \sum_1^{13} \beta_i R_{t-i} + \beta_{14} \Delta INT_t + \beta_{15} CF_t + \varepsilon_t \quad (3.a)$$

$$\varepsilon_t \sim N\ (0, h_t) \quad (3.b)$$

$$h_t = \alpha_0 + \alpha_1 \varepsilon_{t-1}^2 + \alpha_2 h_{t-1} + \alpha_3 D_1 + \alpha_4 \Delta INT_t + \alpha_5 CF_t \quad (3.c)$$

$\Delta INT_t = (INT_t - INT_{t-1})$; INT_t: 2 year generic government bond interest rate of Turkey

CF_t: Capital flows to emerging markets

[6] EPFR data is used for capital flows to emerging markets.

4. Empirical Results

Table 1 presents the results for all three models. [7,8] According to the results of Model 1; the dummy variable for introduction of new monetary policy framework is statistically significant and negative. This result indicates that there is a decrease in the credit growth volatility after the introduction of new monetary policy framework. The results of Model 2 and Model 3 show that the inclusion of the control variables into the specification for the credit growth model does not change the result that the dummy variable is negative and significant. This finding implies that the new monetary policy framework have an impact on lessening credit growth volatility.

In order to test the robustness of our model specification, we conducted the same analysis with separately using of consumer and business loans data instead of total loan data and we obtained the similar results with our original analysis (Appendix Table 2 and 3). The results of this robustness check show that our findings are not dependent on the type of loans.

Table 1: Estimation Results of Variance Equation for Total Loans

	Model 1		Model 2		Model 3	
	Coefficient	Probability	Coefficient	Probability	Coefficient	Probability
C	0.101	0.018	0.129	0.011	0.148	0.006
ε_{t-1}^2	0.172	0.003	0.164	0.010	0.168	0.008
h_{t-1}	0.625	0.000	0.531	0.000	0.486	0.002
$\boldsymbol{D_1}$	**-0.055**	**0.043**	**-0.067**	**0.022**	**-0.072**	**0.017**
ΔINT_t					-0.004	0.422
CF_t					0.052	0.161

[7] Since the focus of this study is the volatility of credit growth, the results of the mean equation are omitted.

[8] The correlogram of the standardized residuals and square standardized residuals are examined in order to assess whether the selected GARCH model fits well to the data. The Q statistics of lagged auto correlations are insignificant, so the selected GARCH models capture volatility clustering and persistence existing in the data

5. Conclusion

The Central Bank of the Republic of Turkey has started to implement its new policy mix since late 2010. In this note, the impact of this new monetary policy framework on the volatility of credit growth has been examined. To the best of our knowledge, we are the first to analyze the impact of new policy mix on the credit growth volatility. It is shown that the new monetary policy framework have a significant contribution to decrease in the volatility of credit growth. This is an important finding since lower volatility of credit growth supports the financial stability. Therefore, it can be said that new monetary policy framework of CBRT contributes to financial stability in Turkey by lessening the credit growth volatility.

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Appendix

Table 2: Estimation Results of Variance Equation for Consumer Loans

	Model 1		Model 2		Model 3	
	Coefficient	Probability	Coefficient	Probability	Coefficient	Probability
C	0.051	0.002	0.050	0.002	0.044	0.008
ε_{t-1}^2	0.268	0.003	0.272	0.002	0.247	0.004
h_{t-1}	0.180	0.338	0.189	0.319	0.287	0.159
$\boldsymbol{D_1}$	**-0.024**	**0.026**	**-0.023**	**0.029**	**-0.019**	**0.046**
ΔINT_t					0.004	0.734
CF_t					-0.002	0.188

Table 3: Estimation Results of Variance Equation for Business Loans

	Model 1		Model 2		Model 3	
	Coefficient	Probability	Coefficient	Probability	Coefficient	Probability
C	0.203	0.033	0.303	0.011	0.384	0.004
ε_{t-1}^2	0.176	0.006	0.185	0.005	0.191	0.007
h_{t-1}	0.628	0.000	0.455	0.008	0.365	0.042
$\boldsymbol{D_1}$	**-0.112**	**0.059**	**-0.154**	**0.018**	**-0.181**	**0.010**
ΔINT_t					0.117	0.176
CF_t					-0.011	0.303

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