THE REPUBLIC OF TURKEY
BAHCESEHIR UNIVERSITY

MONETARY POLICIES OF CBRT BETWEEN 2008-2012

Master's Thesis

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İSTANBUL, 2014

THE REPUBLIC OF TURKEY
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SOCIAL SCIENCES INSTITUTE
CAPITAL MARKETS AND FINANCE

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ABSTRACT

MONETARY POLICIES OF CBRT BETWEEN 2008-2012

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Capital Markets and Finance

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The latest financial crisis in 2007 changed concepts about monetary policies that central banks should pursuit. Developed countries' central banks followed monetary policies that aimed quantitative easing and tempering whereas developing countries' central banks had to follow unorthodox monetary policies to succeed in volatility of capital inflows as a result of quantitative easing policies of developed countries.

During crisis and recovery period, CBRT aimed to implement macro prudential policies to ensure stability of the economic system. CBRT implemented several different monetary policy tools to gain flexibility and strength to direct economic agents through crisis and development period.

Keywords: CBRT, monetary policy, macro prudential

ÖZET

MERKEZ BANKASI 2008-2012 YILLARI ARASI PARA POLİTİKALARI

İsmail Engin YILDIZ

Sermaye Piyasaları ve Finans

Tez Danışmanı: Doç. Dr. Reşit Deniz GÖKÇE

Haziran 2014, 30 sayfa

2007 yılında yaşanan finansal kriz, merkez bankalarının izlemeleri gereken para politikaları konusundaki görüşleri değiştirmiştir. Gelişmiş ülke merkez bankaları mktarsal genişleme yönünde para politikaları izlerken gelişmekte olan ülke merkez bankaları ise gelişmiş ülkelerin miktarsal genişleme politikaları sonucu ortaya çıkan sermaye hareketlerine karşı geleneksel olmayan para politikaları izlemek zorunda kalmışlardır.

Kriz ve iyileşme döneminde TCMB ekonomik sistemin istikrarını sağlayabilmek için makro ihtiyati tedbirler uygulamıştır. TCMB, kriz döneminde ekonomik aktörleri etkileyebilmek için gerekli olan esneklik ve gücü, bazı para politikalarını uygulayamaya koyarak sağlamaya çalışmıştır.

Anahtar Kelimeler: TCMB, para politikası, makro ihtiyati

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ABBREVIATIONS

CBRT : Central Bank of Republic of Turkey
FED : Federal Reserve System
ECB : European Central Bank
USD : Unites States Dollar
TL : Turkish lira
MBS : Mortgage Backed Securities
CDO : Collateralized Debt Obligations
CDS : Credit Default Swap
CAR : Capital Adequacy Ratio
IMF : International Monetary Fund

1. INTRODUCTION

The purpose of the thesis is to understand the effectiveness and success of monetary policy tools implemented by CBRT during crisis period which are interest rate corridor, statutory reserves, reserve option mechanism and exceptional day application.

The reason why this topic is chosen is that financial crisis has affected every country in the world whether they are developing or already developed. Central banks developed unorthodox monetary policies and implemented them according to their perception of financial risks to sustain financial stability. This work explains monetary policies implemented by CBRT and evaluates effectiveness of these policies.

The method used in the study is descriptive method and this method is used to describe the policies implemented by CBRT and to reveal different perspective regarding these policy implementations.

There have been publications about the reasons, developments and results of this financial crisis. Borio (2012) stated "they put too much faith in markets' ability to self-correct. They failed to fully understand that the changing landscape called for adjustments in policy frameworks. And, even when they did understand, they found it too hard to change course: too much reputational capital was at stake and, anyway, why fix what ain't broken?"; Lane (2012) observed in his study that the effect of global financial crisis increased as a result of rapid growth in cross-border financial positions in the previous decade. Borio (2011) emphasized the importance of this interdependence by stating "the whole financial system is sound if and only if each institution is sound." Borio and Disyatat (2011) claimed that global current account imbalances are one of the key factors for global crisis. According to Clement (2010) "a core element of the international policy response to the crisis is to strengthen the macro prudential orientation of financial regulation and supervision, ie an enhanced focus on the financial system as a whole and its link to the macro economy."

In USA, Federal Reserve System (FED) kept the policy rate at low levels in the beginning of 2000. This resulted in an increase in credit volume and a sharp increase in housing prices. Plus, some financial institutions started to take more risks by using structured products in this low interest environment.

Banks had granted mortgages to people of low and middle income level without detailed credit assessments. These mortgages are bundled and structured as collateral. Mortgage back securities (MBS) and collateralized debt obligations (CDO) offered high yields and they were highly demanded by hedge funds. Monet obtained from sales of these structured products was again allocated to mortgage grants.

Haldane (2012, s.3) states;

> *As long as asset prices were rising, the cheap credit strategy seemed to be working like a dream. For those who had borrowed, debt was being inflated away, not by the traditional route of goods price inflation but by asset price inflation. The world was experiencing the biggest bank bubble, perhaps in its history.*
> *In 2007, that bubble burst. Asset prices and balance sheets collapsed. The dream turned into a nightmare, as asset price deflation combined with high debts to put many balance sheets underwater.*

When FED realized that the increase in housing prices started to influence the economy in a bad way, FED increased interest rate to 5,25 percent in 2006 from 1 percent in 2004 to control inflation rate.

This move resulted in decrease in housing prices and an increase for mortgages issued in floating interest rates. Sometime later, credit users began to have difficulty in making their mortgage repayments. Banks started to face difficulties and trust in financial system diminished. This lack of trust resulted in a shock for interbank credit market and the financial system nearly stopped.

When developed countries started to decrease interest rates almost to zero percent, liquidity and capital movements directed towards developing countries where yield for investment tent to be higher than developed countries. Developing countries were struggling with export volume decrease that resulted from decreasing demand from developed countries that were in recession. In addition, capital inflows increased value of local currencies. Developing countries tried to prevent local currencies getting overvalued to stop deterioration in export volume. Barlas and Kaya (2013) confirm this by stating “past experiences show that extensive capital inflows trigger overvaluation of local currency, volatility in financial markets, increase in current account deficit and some financial and macroeconomic risks like uncontrolled credit expansion in developing countries.”

The recent financial crisis changed the concept of tools that should be used for monetary policy. Before the crisis, the common concept of the monetary policy was price stability. Central Banks’ sole tool for achieving price stability was policy rates; central

banks increase and decrease policy rate to effect and regulate demand. Svensson (2011) stated “a lesson from the crisis is that price stability is not enough to achieve financial stability.” Yılmaz (2011) also added “In order to maintain a healthy financial system in which price stability occurs, financial stability should be considered as a complementary tool”. But, importantly, interest rate policy is not enough to achieve financial stability. A separate financial stability policy is needed for financial stability.” Moreno (2011) added “It may be noted further that supplementary instruments sometimes directly influence the quantity of financing as well as its cost, which may imply that they may be less “market-friendly” as well as more effective than interest rate policy.” IMF (2013) states “price stability, however, did not ensure macroeconomic stability and the crisis has strengthened calls for the use of financial regulation focused on macro-financial risks: macro prudential policies.” Üçer (2011, s.7) emphasized;

> *There are at least two reasons why we need macroeconomic stability prior to interest rate deregulation. First, when inflation is high and variable, the adverse selection problem becomes more acute. In contracting at any nominal interest rate substantially above the normal levels, the borrower must bet on what the future inflation will be and also determine the riskiness of his own project. He will then accept a riskier project in the hopes of a favorable high yield in case inflation does not bail him out and he has to default anyway. Second, ongoing macroeconomic instability or a disinflationary process reduces “borrowers’ net worth” which, in turn, increases defaults as well as aggressive high-risk borrowing; this important link between financial and real sectors must be taken into account. Macroeconomic stability would have given the corporate sector (the borrowers) the chance to restore its balance sheet.*

International Monetary Fund (2013) states that “in the decades prior to crisis, macroeconomic management evolved to assign a strong role to monetary policy, with a primary focus on price stability. The framework of monetary policy was broadly converging toward one with an inflation target and a short term interest rate as a tool.” The financial crisis forced central banks to follow unorthodox policies. Central banks have had to utilize more tools to achieve more than price stability. Both developed and developing countries have had to use different tools for securing financial stability.

The reasons for both developed and developing countries central banks to shift to unorthodox policies can be summoned as developed countries had to maintain economic stability during financial crisis; regular monetary policies are not very effective in some cases and developing countries had to deal with volatility in capital inflows and increase in credit volumes.

Moreno (2011, s.2) said:

> *Policy makers in EMEs have sought to limit these risks during the extended period of expansion in the 2000s by using what are traditionally seen as "monetary" or "micro prudential" tools but that are now applied with a "macro prudential" perspective. The consensus on what this means is still evolving but there appears to be a focus on; i) financial stability or containing systematic risks, rather than risks to individual financial institutions. (ie to improve financial system resilience in the face of shocks or during downturns) ii) the interaction between macroeconomic conditions and the financial system. iii) the possibility of dampening procyclicality in the financial system.*

IMF (2013, s.3) states;

> *Financial instability has undermined macroeconomic stability, despite low and stable inflation. This means that additional tools will be helpful in complementing monetary policy in countercyclical management. Macro prudential tools emerge as candidates. Because there is no single tool that influences all financial behavior consistently, a variety of tools is needed, from procyclical capital adequacy requirements to loan-to-value caps (LTV's), taxes/levies, and constraints on the composition of assets and liabilities of financial institutions. Several of these tools have a long history, but were mostly used for micro prudential or monetary objectives. Emerging market economies have been pioneers in refocusing those instruments on macro prudential uses.*

Figure 1.1: Macro versus micro prudential perspectives

Macro- versus micro prudential perspectives		
	Macro Prudential	**Micro Prudential**
Proximate objective	limit financial system-wide distress	limit distress of individual institutions
Ultimate objective	avoid macroeconomic costs linked to financial instability	consumer (investor/depositor) protection
Characterization of Risk	"endogenous" (dependent on collective behavior)	"exogenous" (independent of individual agents' behavior)
Correlations and common exposures across institutions	Important	Irrelevant
Calibration of prudential controls	in terms of system-wide risk; top-down	in terms of individual institutions; bottom-up

Source: Borio (2003)

Perotti and Suarez (2009) viewed macro prudential policy as aiming to discourage individual bank strategies which cause systemic risk, a negative externality on the financial system.

Hanson, Kashyap and Stein (2010) start from the observation that micro prudential regulation aims at forcing banks to internalize losses on their assets in an attempt to

protect deposit insurance funds and mitigating moral hazard. They discuss how capital regulation and the principle of prompt corrective action (PCA) do not distinguish whether troubled banks react to shocks by raising new capital or shrinking their assets. In their view, macro prudential policy instead aims at controlling the social costs of a generalized reduction of assets in the financial system.

Mainly developed countries used monetary policies to stimulate their economies and at the other hand developing countries implemented monetary policies to keep their economies stable in volatile capital inflow environment.

2. ECONOMIC OUTLOOK

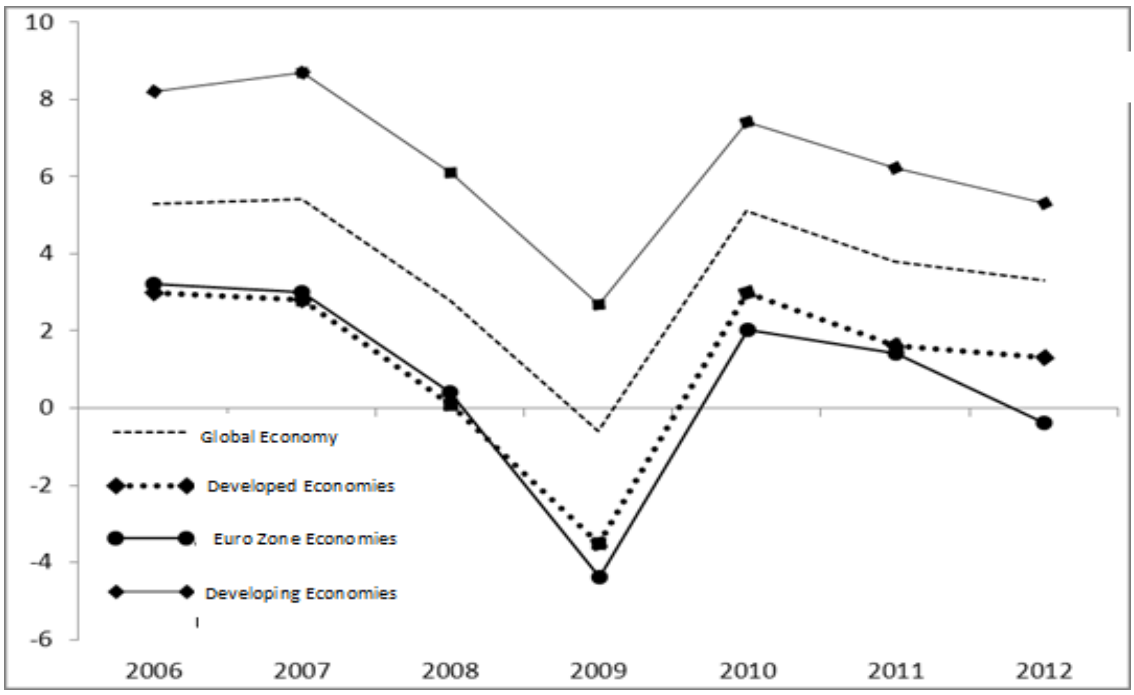
In 2008 US government took over Freddie Mac and Fannie Mae and provided support for AIG and let Lehman Brothers go bankrupt. This crisis which had started as a mortgage crisis in USA spread to other countries.

Çınar, Erdoğan, Gürgür and Polat (2010, s.2) state that;

> *We think that global crisis effect economies basically through three channels. These channels are (1) foreign trade, (2) foreign finance, (3) expectations. Turkish economy felt crisis's effects through all three channels. Our export destinations are mostly to countries that were relatively more affected by crisis and out export products are sensitive to cyclical movements of global economy. At the same time, due to our domestic saving deficit, Turkey was affected by disruption in foreign finance as other countries that depend on foreign finance to grow. Lastly, considering the effects of multiple crises in recent date, Turkey was relatively more affected than other countries when private sector's expectations over economy got worse.*

In the graph below, we examine the change in gross domestic production of developed, developing and European Union countries through years.

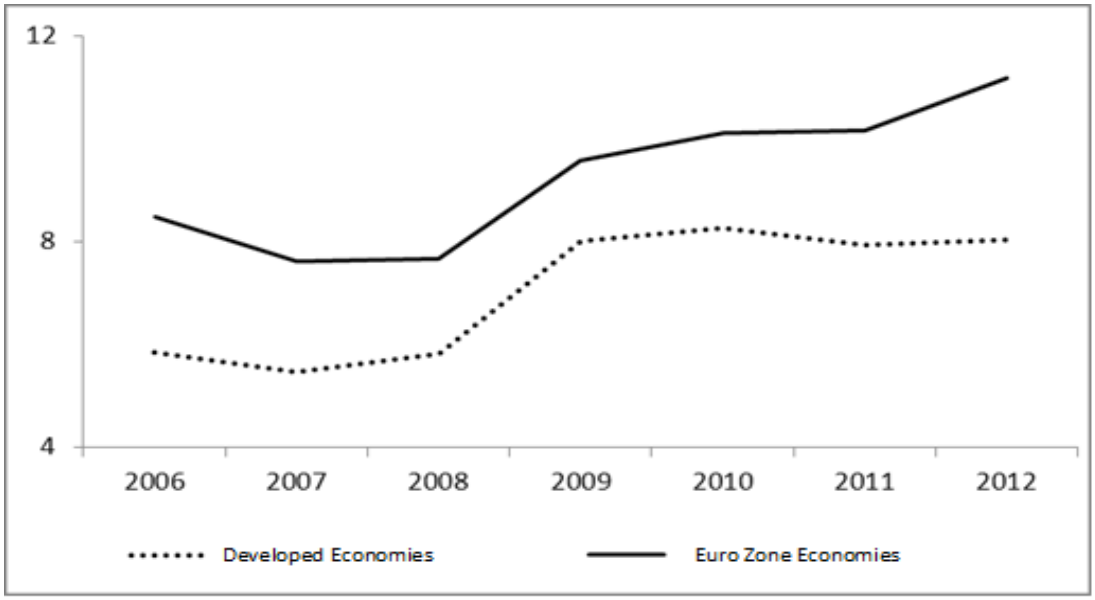
Figure 2.1: GDP growth ratio (%)



Source: CBRT (2012)

We have to examine unemployment rates to better understand the impact of crisis through 2006-2012. In the graph below, we examine that there is a slowdown in unemployment rates between 2006 and 2007; but a sharp increase with the impact of financial crisis in 2008.

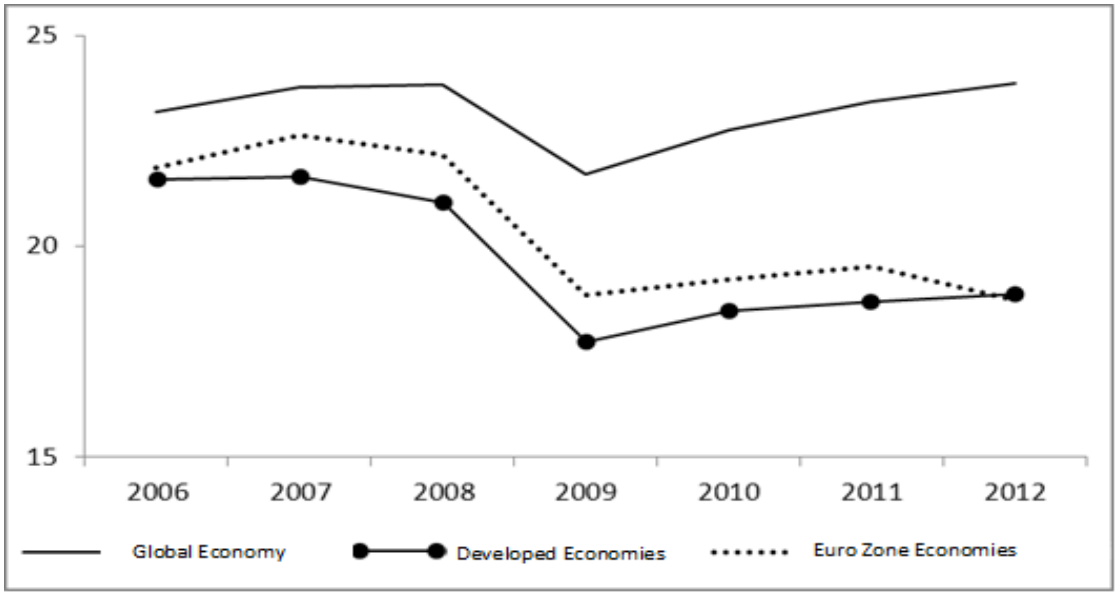
Figure 2.2: Unemployment rate (%)



Source: IMF 2012

The graphs about investment ratios and public debts of main economies reflect the difference between developing and developed countries. Investment ratios decline in Eurozone economies and in developed countries; whereas it seems rather horizontal in developing countries.

Figure 2.3: Investment ratio(%)



Source : IMF 2012

In this economic slowdown, FED decreased its policy rate very quickly to stimulate its economy. When this standard monetary policy was not effective enough, FED and some other central banks like Japan and England, decided to implement quantitative easing. These monetary policies led the global finance stay volatile through years with capital movements between developed and developing countries. Central Bank of the Republic of Turkey (CBRT) has implemented several unconventional policies to sustain financial stability in this very volatile and fragile environment. In the table below, we can examine quantitative easing decisions of FED and ECB through this period.

Figure 2.4: Quantitative easing decisions by FED and ECB

Date	FED	ECB	Explanation
November 2008	QE 1		First Quantitative Easing that contains USD 600 billion bond purchase
March 2008	QE 1 Extension		Extension of QE 1 that contains mortgage backed security of USD 750 billion and bond purchase of USD 300 billion.
June 2009		LTRO 1	First Longer-term Refinancing Operation that consists of EUR 442 billion
May.10		SMP	Securities Markets Programme that consists of EUR 209 billion
November 2010	QE 2		Second quantitative easing that consists of USD 75 billion per month and a total of USD 600 billion
September 2011	Operation Twist		Tenor exchange programme of USD 400 billion that aims to exchange bond with tenor less than 3 years with bonds with tenor 6 - 30 months
December 2011 & February 2012		LTRO 2	Second Longer-term Refinancing Operation that consists of EUR 1019 billion
June 2012	Extension of Operation		Extension of tenor exchange programme with USD 267 billion
September 2012	QE 3		Third quantitative easing that consists of USD 40 billion per month
September 2012		OMT	Outright Monetary transactions that consists of bond pruchase from European Region

Source : Barlas, Y. and Kaya. N.(2013).

2.1. UNORTHODOX MONETARY POLICY TOOLS

Monetary policy's main objective is to maintain price stability. Central banks use short term interest rates to effect and direct economic inputs. In this recent financial crisis, influencing economies through short term interest rates hasn't been as effective as desired. After Lehman Brothers went bankrupt, liquidity in financial markets was severely damaged. Using short term interest rates as the sole tool was not effective enough to change economic dynamics. This led central banks to use unorthodox policies to regulate and affect economies. Yılmaz (2011) stated that "when using short term interest rates for price stability, need for secondary policy tools become clear and obvious. These secondary group policy tools include macro prudential tools like capital adequacy ratio (CAR), statutory reserves ratios, loan asset ratio and tax regulations." Moreno added (2011, s.2)

> *The form of intervention broadly falls under the following four groups. i) Measures to control capital inflows; ii) Foreign exchange market intervention and foreign reserve accumulation; iii) Measures to strengthen bank balance sheets and capital; iv) Measures to maintain the quality of credit or to influence credit growth or allocation. Each may have a bearing on financial stability and thus have macro prudential dimensions but may also reflect other goals (eg stabilizing the exchange rate or controlling inflation)*

IMF (2013, s.9) states;

> *It has long been recognized that monetary policy rates can affect agents' decisions on leverage and on the composition of assets and/or liabilities, by affecting the cost of borrowing, domestic asset prices, and exchange rates. The literature on financial market imperfections has identified a number of channels by which policy rates can affect financial decisions: (i) by shaping ex-ante risk-taking incentives of individual agents, through leverage, short-term borrowing, or foreign-currency borrowing; or (ii) by affecting ex-post the tightness of borrowing constraints and possibly exacerbating asset price and exchange rate externalities and leverage cycles.*

In Figure 2.5, various channels that monetary policy can affect financial stability can be observed;

Figure 2.5: Channels through which monetary policy can affect financial stability

Channels Through Which Monetary Policy Can Affect Financial Stability

Changes in the monetary stance can affect the risk-taking behavior of financial intermediaries. With asymmetric information, low monetary policy rates can create incentives for banks to over leverage or reduce efforts in screening borrowers. Low rates can also lead other economic agents to seek more risks in order to achieve higher returns. These effects are likely to be worse if monetary policy is too accommodative for too long during expansions. Moreover, if monetary policy is expected to be eased during recessions to support not only the real economy but also the financial system, the effect may be stronger because this may give rise to additional incentives to correlate risks.

Changes in the monetary stance can affect the tightness of borrowing constraints and the likelihood of default. Monetary easing relaxes collateral constraints, as asset prices rise and borrowers' net worth increases, and lowers the costs of external financing, thereby easing overall credit conditions. Conversely, a tightening of rates can adversely affect borrowers' capacity to repay, possibly leading to higher default rates and financial instability.

Monetary policy can give rise to asset-price and exchange-rate externalities. By affecting asset prices and exchange rates, monetary policy affects the value of collateral, which influences the tightness of borrowing constraints. Low interest rate can increase asset prices, which can trigger excessive increases in leverage and lead to asset price booms, exacerbating the financial cycle. Conversely, a tighter monetary stance can cause collateral constraints to bind, fire sales to follow, with resulting adverse asset price externalities. In open economies, interest rate increases can attract excessive capital flows, appreciating the exchange rate, and leading to excessive borrowing in foreign currency and exchange-rate externalities in a subsequent depreciation.

These channels may be operating simultaneously, with their strengths varying with the stage of the cycle, financial structure, and other country characteristics. For example, incentives to correlate risks due to the expectation of future monetary easing can be stronger in upswings. Effects can also depend on financial structure and capital account openness. For example, structural changes modified the monetary policy transmission channels prior to the crisis in the United States and Europe. Securitization generally reduces the strengths of the effects of the monetary policy on credit extension by banks. In open and financially integrated economies, domestic monetary policy has a weaker influence on domestic long term rates and asset prices, but exchange rate externalities become more important.

Source: IMF (2013)

Also, in Figure 2.6, the interactions between monetary and macro prudential policies can be observed;

Figure 2.6: Interactions between monetary and macro prudential policies

Interactions Between Monetary and Macro Prudential Policies

A recent theoretical literature suggests that monetary and macro prudential policies are mainly complements, not substitutes, although results vary by type of shock. Theoretical (mostly Dynamic Stochastic General Equilibrium, DSGE) models with borrower collateral constraints and a banking sector generally assume monetary policy controls the risk free interest rate and macro prudential policy the risk premium, or the spread between lending rates and the risk free rate.13 The objectives are output and price stability, and also credit growth. Using different policy rules and shocks—financial, productivity or demand—the literature typically finds that it is optimal to use monetary policy together with macro prudential policy. Moreover, using macro prudential policy to achieve the same outcomes as monetary policy is inefficient, as it severely constrains the financial sector and output.

These models imply that in the wake of a financial shock leading to financial stability concerns, it is optimal to mainly use macro prudential policies. The macro prudential instrument is more targeted at the specific financial sector distortion and monetary policy is too blunt (in the sense of also affecting all other macro variables) to fight alone against a financial shock. This finding appears robust to open economy extensions. In open economies, financial shocks can originate abroad and, more importantly, lead to an appreciation of the domestic currency. While this limits inflation, when banks have foreign liabilities, it leads to financial amplification by strengthening banks' balance sheets, causing credit to expand. As a result, macro prudential policy needs to react more and monetary policy less, but the interplay between the two does not change markedly.

Following a productivity shock, conclusions depend on the nature of the financial distortions. Models with only borrower collateral constraints suggest that just monetary policy should be used.14 Limiting credit is misguided and runs counter to the stimulus provided by monetary policy. Models with endogenous financial distortions reach the opposite conclusions.15 As lending by individual banks affects overall riskiness, it is optimal to tighten macro prudential policy to rein in credit. But, the monetary policy response to inflation remains unchanged from what is traditionally found. In practice, the appropriate policy mix will vary depending on both the strength and expected persistence of the productivity shock, and the riskiness of balance sheets, including capital buffers and leverage.

Similar considerations apply for an aggregate demand shock. A monetary policy response alone is optimal

Source: IMF (2013)

In Turkey, volatility in capital inflows threatened macroeconomic balances and financial stability. CBRT decided to implement flexible policies to react quickly and more effectively to these shocks of capital inflows. CBRT decided to use more than one monetary policy to affect multiple inputs in economy and to regulate economic functions. CBRT's first intention was to ease effects of the severe economic crisis and then to reinstall financial stability. This was quite important in developing countries and it was more important especially in countries like Turkey where account deficit should be financed with short or long term capital inflows.

CBRT also focused on loan volume expansion through crisis period. Kara, Küçük, Tiryaki and Yüksel (2013) state "those especially in periods when capital inflows increase, loans became a balancing policy tool as efficiency of short term interest rate decreased. Limiting loan expansion during periods of increasing capital inflows supports both price stability and financial stability."

Before assessing monetary policies implemented by CBRT in this period, we should take a chronological look at the crisis period and reactions of CBRT in this timeline.

Between 2002 and 2005, CBRT was following Implicit Inflation Targeting. After this transition period in 2006 CBRT switched to Explicit Inflation Targeting. On April 18,2006 Durmuş Yılmaz was appointed as the president of CBRT.

2008 was a very difficult year for central banks in the world. They had to take immediate precautions and steps to influence and regulate their economies. In September 2008, Fennie Mae and Freddie Mac were bailed out by United States government. On September 15,2008 Lehman Brothers went bankrupt. On October 2, 2008 Emergency Economic Stabilization Act, commonly known as bailout plan was approved by United States Senate. This plan authorized United States Secretary of the Treasury to spend up to USD 700 million to supply cash to banks by purchasing distressed assets. On October 25, 2008 CBRT started monetary easing and started to decrease interest rates. On November 25, 2008 FED started first quantitative easing. On December 5, 2008 CBRT stopped paying interest to foreign currency statutory reserves.

On February 20, 2009 the tenor of foreign currency deposits that the banks could obtain from CBRT via Foreign Currency Deposit Market was extended to 3 months from 1 month. On June 19,2009 3 months tenor repo auctions started. On December 10,2009 debt stock of Greece reached its highest level and European Debt Crisis started. On

December 17,2009 CBRT ended quantitative easing and ended to decrease interest rates.

On April 14,2010 CBRT started implementing Monetary Policy Exit Strategy. On May 8, 2010 a bail-out plan of USD 100 billion for Greece was announced. On May 10, 2010 European Council formed European Financial Stability Mechanism to keep financial stability in Europe. On May 18, 2010 CBRT decided to use policy rate for one week tenor repo. On September 23, 2010 CBRT stopped paying interest for TL statutory reserves. On October 15, 2010 CBRT stopped 3 months tenor repo auctions. On November 3, 2010 FED announced second easing. On December 1, 2010 CBRT started implementing interest rate corridor. On December 17, 2010 TL statutory reserves were differentiated in accordance with tenor. On the same day, statutory reserves base was expanded.

On April 19, 201 Erdem Başçı was appointed as the president of CBRT. On April 21, 2011 foreign currency statutory reserves were differentiated with tenor. On September 12, 2011 Reserve Option Mechanism was implemented. On December 29, 2011 Extraordinary Period Implementation and Additional Monetary Tightening Policy started.

On September 13, 2012 FED announced third quantitative easing. On September 20, 2012 FED started Operation Twist.

With the law revised in 2001; taking necessary precautions for sustaining financial stability became one of the duties of CBRT in addition to its main objective which is sustaining price stability. CBRT has taken some precautions to sustain financial stability with some unorthodox monetary policies. In this chapter, we will study these policies.

2.1.1. Interest Rate Corridor

In period between 2008 and 2012, CBRT added financial stability as a target to its main target which is price stability. Then, CBRT determined that account deficit which was caused by very fast paced growth rates, threatened financial stability. CBRT also determined that short term capital inflows supported that very fast paced growth rates. Given these findings, CBRT started to decrease interest rates to decrease the difference

between abroad and local interest rates in order to decrease yield for short term capital inflows. CBRT implemented this strategy by means of interest rate corridor.

Interest rate corridor can be described as the interval between CBRT's lending and borrowing interest rates. Lending interest rate explains the interest rate that a bank pays to CBRT in case that bank gets into a liquidity deficit and borrows in a short term from CBRT. Borrowing interest rate means the interest rate CBRT pays to a bank that has liquidity surplus and wants to lend this liquidity surplus to CBRT.

The main objective of interest rate corridor is to control the effects of capital inflows over exchange rate and over economy. Kara (2012) states that "the average funding cost of funds provided by CBRT is used as a control element on the economy."

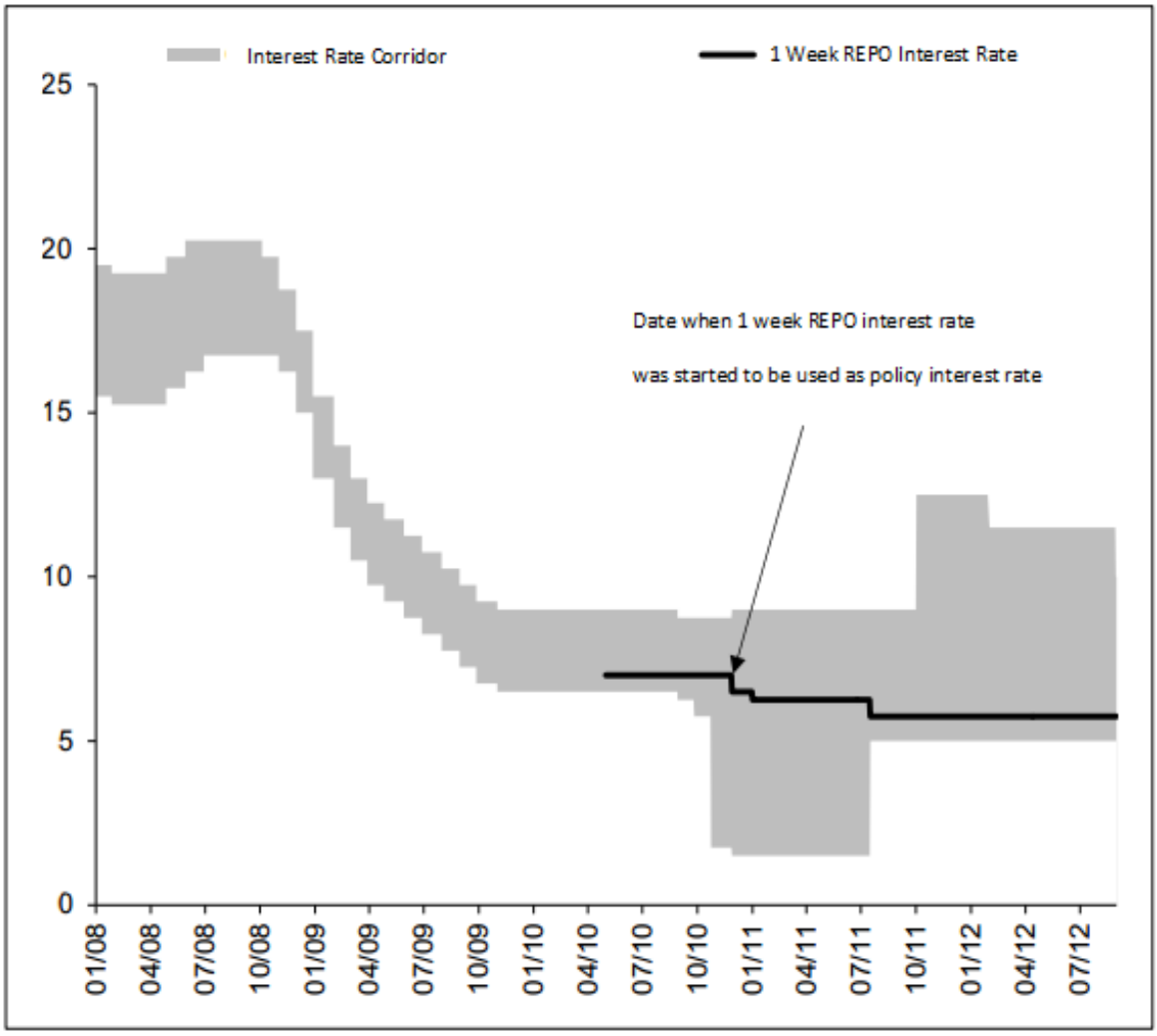
CBRT announced interest rate corridor rates every month with the decision of Money Market Committee. CBRT aimed to control market interest rates by regulating borrowing and lending interest rates and at the same time by policy interest rate which was the interest rate for one week repo. CBRT's goal was to sustain market interest rates close to CBRT's policy rate.

Structure of the interest rate corridor let market interest rates vary between low and high ends of the corridor. Thus, this interval created uncertainty for banks' funding costs. This uncertainty became an important tool for CBRT to regulate market interest rates when capital inflows changed dramatically.

When capital inflows increased, CBRT moved the interest rate corridor downward to prevent increase in credit volume via relatively cheap liquidity. When capital inflow decreased, CBRT moved the interest rate corridor upward to control changes in exchange rates.

CBRT changed upper and lower limits of interest rate corridor according to volatility in capital inflows.

Figure 2.7: CBRT interest rate corridor



Source : CBRT (2012)

Alper, Kara and Yörükoğlu (2012, s.12) state the relation and interaction between interest rate corridor and reserve option mechanism as follows;

> *Interest rate corridor has different roles as loan transfer mechanism and efficient liquidity management. Apart from reserve option mechanism, interest rate corridor can also be utilized as a tool over TL loan conditions as interest rate corridor directly effects loan and deposit interest rate difference. Interest rate corridor can be considered as an important tool as banks prefer using upper limit of interest rate corridor while they do pricing for loans granted. Besides, interest rate corridor bears a different characteristic from reserve option mechanism by providing high flexibility in accordance with capital inflows.*

2.1.2. Statutory Reserves

Alper and Tiryaki (2011) state the reasons for statutory reserves implementation as "historically, there are three reasons for statutory reserves implementation: prudence, liquidity management and monetary control."

Banks and other financial institutions keep a portion of deposits in CBRT. CBRT has used statutory reserves often to control liquidity in the market. CBRT had used statutory reserves often to control liquidity in the market to effect banks' lending costs. When liquidity increased with capital inflow, banks tend to increase their loan volume with the help of liquidity with lower cost. As a part of macro prudential policy, CBRT paid great attention to total credit volume of financial system and the rate of increase in credit volume.

Kara (2012) states;

> *Statutory reserves effect loans basically through two channels: (i) direct cost channel, (ii) liquidity channel. It is anticipated that changes in ratios for statutory reserves will have a limited effect on loans through direct cost channel. Statutory reserves mainly effects loans through liquidity channel. This channel works in interaction with interest rate corridor and effective liquidity management.*
> *Besides CBRT allows a portion of statutory reserves to be kept in foreign currency and uses this as an additional tool. This flexibility bears a potential to ease effects of volatilities in capital inflow over foreign currency exchange rate and financial markets. For example, in periods when capital inflows increase foreign currency liquidity increases and at this situation banks can prefer to keep larger portion of statutory reserves in foreign currency. This will ease overvaluation pressure on currency and at the other hand this will limit banks' tendency to grant loans in foreign currency; these outcomes can support financial stability.*

In order to control the transitivity between cheap liquidity and credit volume, CBRT used statutory reserves as an effective way of controlling liquidity. Alper and Tiryaki (2011) state "statutory reserves play an important role in central banks' liquidity management. When liquidity is lower or higher than demand in the market, central banks manage statutory reserves to control surplus or deficit in liquidity in order to prevent pressure on interest rates or foreign currency caused by liquidity imbalance."

Apart from changing percentages for statutory reserves, CBRT used another measure to regulate. CBRT stopped paying interest for statutory reserves. CBRT took this

precaution for foreign currency statutory reserves as of December 5,2008 and for TL statutory reserves as of September 23,2010.

Alper and Tiryaki (2011, s.7) state about statutory reserves;

> *Statutory reserves' being a monetary policy tool and playing a complementary role to policy interest rate depends on the fact that policy interest rate should be changing all interest rates in the same direction and that statutory reserves can only be used to effect some interest rates. When strong capital inflows affect foreign currency exchange rates and increase amount of liquidity that banking system can reach, current account deficit increases in this economic situation. In this situation, central banks have to control overheating in economy and inflationist pressure. But, increasing interest rates in order to cool the economy can increase capital inflows. On the other hand, decreasing interest rates in order to ease capital inflows will create an increasing pressure on overheating in economy and inflationist pressure. Statutory reserve implementation can help controlling domestic demand by increasing the gap between bank deposit interest rate and loan interest rate. Again, loan expansion can be effected through liquidity channel. Statutory reserves provide central banks an opportunity to implement tightening monetary policy without increasing capital inflows.*

Kara (2012) states "on the contrary to conventional monetary policies, implementation of interest rate corridor, statutory reserves and other liquidity management tools make it possible for CBRT to effect loan and foreign currency channels independently."

Alper, Kara and Yörükoğlu (2012, s.11) state the relation between foreign currency statutory reserves and reserve option mechanism as below;

> *Another tool for effecting foreign currency liquidity is foreign currency statutory reserves. Since implementation of this policy will not affect TL liquidity conditions, it does not contain negative effects over sterilization. But, on contrary of Reserve Option Mechanism that lets banks to decide proportion of foreign currency to keep against TL statutory reserves, changes in foreign currency statutory reserves will force all banks in same degree to regulate their foreign currency liquidity. Banks with temporary access problems to foreign currency can face serious foreign currency liquidity problems in this situation. Accordingly, Reserve Option Mechanism can offer more useful outcomes in perspective of financial stability. Besides, changes in foreign currency statutory reserves may form unintended signals about monetary policy and level of foreign currency exchange rate.*

2.1.3. Reserve Option Mechanism

CBRT began implementing Reserve Option Mechanism, which can be described as a different view of statutory reserves in 2011. CBRT used Reserve Option Mechanism as a tool to ease negative effects of volatility of financial inflows over macroeconomic balances and financial stability.

CBRT gave the banks the possibility of keeping foreign currency and gold as statutory reserves. CBRT determined the proportion of foreign currency and gold that could be kept as statutory reserves with Reserve Option Ratio. Reserve Option Coefficient also determined the amount of foreign currency and gold that could be kept as statutory reserves against a unit of TL statutory reserves.

Alper, Kara and Yörükoğlu (2012, s.2) explain Reserve Option Mechanism as;

> *Reserve Option Mechanism is an implementation that gives the banks possibility to keep a portion of their statutory reserves in foreign currency. Amount of portion that can be kept in foreign currency is determined by reserve option coefficient. Foreign currency or gold that can be kept against an unit of TL statutory reserves is determined with coefficients called as reserve option coefficients.*

CBRT used Reserve Option Mechanism to regulate foreign currency liquidity in the market. When capital inflow increased, TL tends to overvalue and loans granted in foreign currency tend to increase. In this circumstance, banks tend to use Reserve Option Mechanism more often because cost of keeping foreign currency as statutory reserves decrease with capital inflow. Thus, CBRT managed to withdraw foreign currency liquidity from the market that had entered with capital inflow. Reserve Option Mechanism managed to prevent overvaluation of TL and the increase in loan volume in foreign currency.

Alper, Kara and Yörükoğlu (2012, s.2) explain Reserve Option Mechanism model as;

> *It will be useful to begin with a simple example to understand how Reserve Option Mechanism works. Let's assume that statutory reserves that a bank has to keep against its liabilities is TL 100 and reserve option ratio for foreign currency is 90 percent(in other words, 90 percent of TL statutory reserves can be kept in foreign currency) and that reserve option coefficient is one (in other words, we can keep TL 1 worth of foreign currency against TL 1 statutory reserves). Also let's assume that USD/TL exchange rate is 1.80. In this case, banks that want to use whole advantage of TL 90 will have to keep USD 50 that is equal to TL 90. In other words, banks can keep USD 50 instead of TL 90.*

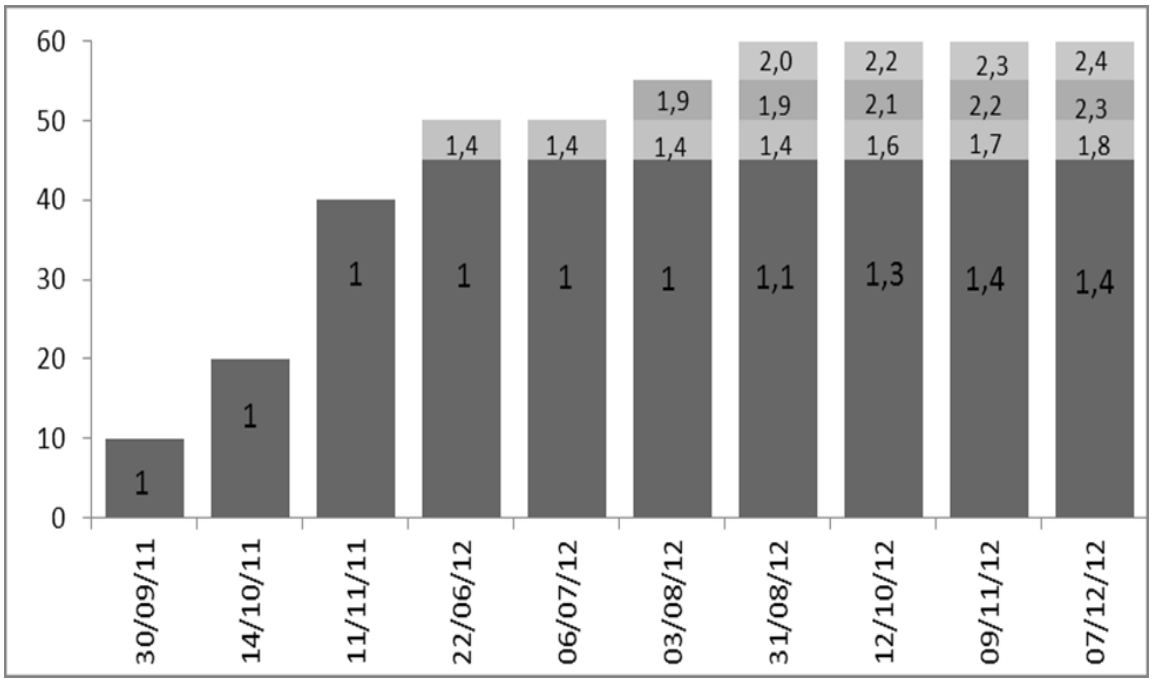
When capital inflow decreased, banks tend to decrease their statutory reserves in foreign currency in CBRT because in lack of capital inflow funding cost of foreign currency increased. In this situation, statutory reserves provided the market with foreign currency liquidity.

CBRT used Reserve Option Mechanism to gain multiple advantages such as restricting expansion in loan volume in foreign currency, regulating liquidity with easing and tightening policies, decreasing volatility in foreign currency exchange rate, increasing CBRT's foreign currency reserves.

CBRT began implementing this policy tool in 2011 with 10 percent at the beginning. In August 2012, the percentage was 60 percent for foreign currency and 30 percent for gold.

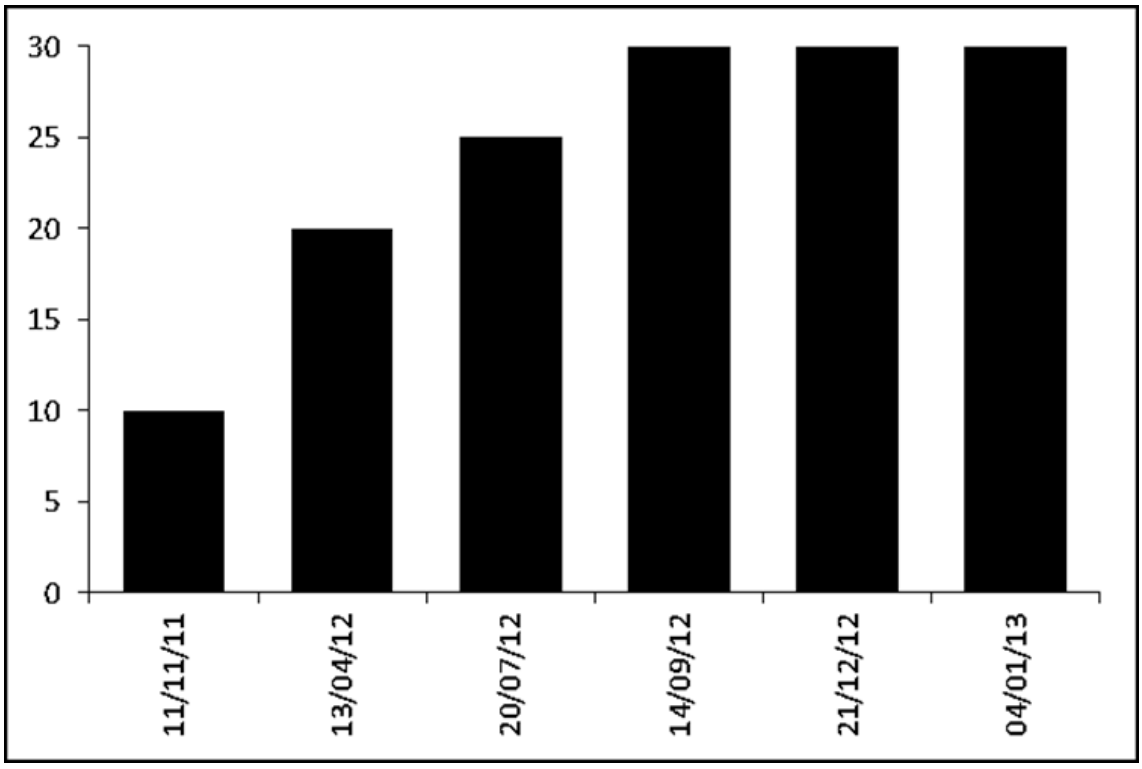
Banks tend to use Reserve Option Mechanism depending on the cost of TL and foreign currency. CBRT announced on September8,2012 that banks used Reserve Option Mechanism with 92,3 percent and on October 18,2012 with 89 percent, on November 20,2012 with 90,2 percent in gold statutory reserves.

Figure 2.8: Reserve option coefficients for TL statutory reserves to be kept as foreign currency



Source: CBRT 2012

Figure 2.9: Reserve option coefficients for TL statutory reserves to be kept as gold



Source: CBRT 2012

2.1.4. Exceptional Day Application

CBRT announced the day that CBRT didn't organize weekly repo auctions as exceptional days. In exceptional days, CBRT organized foreign currency sales auctions and from time to time CBRT sold foreign currency directly to market.

CBRT used exceptional day method to increase TL's exchange rate value. CBRT aimed to move market interest rate towards the upper limit of interest rate corridor by means of auctions. This way interest rates increased without changing policy interest rate and at the same time TL gains value.

In this method, CBRT didn't commit any exchange rate for foreign currency. CBRT tried to limit volatility of foreign currency exchange rates in order to sustain financial stability. CBRT sometimes used exceptional day application over consecutive days to reinforce its impacts over the market.

Exceptional day application became a vital part of CBRT's communication policy to affect market's dynamics. Sometimes CBRT announced beforehand the dates for exceptional day application and sometimes kept this application to create uncertainty to reinforce its effectiveness.

3. EVALUATION OF CBRT'S UNORTHODOX POLICIES

Clement (2010) stated "the term macro prudential has risen from virtual obscurity to extraordinary prominence following the recent financial crisis. Since its origins in the late 1970s, the term has always denoted concerns over the financial system's stability and its link with the macro economy."

As Goodhart (2010) stated "the years ahead will be a period of experimentation in central banking" CBRT implemented new monetary policies to sustain stability in this new environment. Borio (2012) added "the immediate global policy challenge is to return to self-sustaining and sustainable growth. Seen through the lens of the financial cycle, this raises different issues across countries, depending on their specific situation." IMF (2013, s.14) states the difficulty of implementing macro prudential policies and using these policies in balance as follows;

> *Limited knowledge on the quantitative impact of macro prudential policies makes calibration difficult. Designing macro prudential policies requires determining how large a buffer should be built up during boom periods and when and how much it can be released safely during periods of financial stress. However, experience still needs to be gained on how to best calibrate and adjust macro prudential policy tools in the face of changing economic conditions, and quantitative research faces a range of obstacles. Some suggested macro prudential tools have never been tried in practice. Another unknown is how different financial distortions and tools to address them interact with each other. It may be the case that addressing one improves others, reducing the need for multiple tools. It can also be the opposite, by mitigating one distortion, others are worsened, increasing the need for multiple tools. Greater clarity is consequently needed on the exact transmission and effectiveness of many macro prudential instruments, including on their interactions among themselves. Much of this work will be country specific in nature, and is the subject of ongoing efforts by country authorities and Fund staff, in the context of surveillance and technical assistance.*

CBRT tried to develop and implement customized monetary tools to ease effects of financial crisis.

Between the period 2008 and 2012 CBRT kept floating currency rate regime and implemented innovative and unorthodox monetary policies to ease and control effects of capital inflows. CBRT began implementing these unorthodox monetary policies before other developing counties' central banks and CBRT forms an example for other banks. Kara, Özlü and Ünalmış (2012, s.11) state;

> *The unprecedented sequence of events following the global financial crisis and the ensuing volatility in cross-border financial flows prompted the CBRT to adopt*

> *financial stability as a supplementary objective besides price stability. To this end, CBRT modified its conventional inflation targeting regime and designed a new monetary policy framework in order to contain macro-financial risks arising from global imbalances and the post-crisis spillovers. Unlike the previous "single instrument" regime, the new setup utilizes multiple instruments involving both credit and liquidity policies in the conduct of monetary policy.*

Kara (2011, s.1) explains CBRT's policies in this period as follow;

> *Under the conventional inflation targeting framework, which we have been implementing since 2006, the CBRT uses a single policy instrument to attain a unique ultimate goal—price stability. Nevertheless, the global crisis has taught us that ignoring financial stability can be harmful for macroeconomic stability and thus for price stability in the medium to long run; therefore, the central banks should also pay attention to financial stability from a macro perspective. However, the level of policy rate required to ensure price stability is not necessarily the same as the level of interest rate needed to preserve financial stability in many circumstances.*

Kara (2011, s.2) continues to explain CBRT's implementation of unorthodox monetary policies by stating;

> *In order to cope with these challenges, we decided to modify our existing framework of inflation targeting by explicitly highlighting the increasing role of financial stability in our objective function since mid-2010. The idea is to bring the economy to a soft landing (avoid a "sudden stop") and to rebalance the composition of growth, without hampering the price stability objective. To achieve this task, we geared our policies towards two intermediate objectives: discouraging short term capital inflows and containing domestic credit growth. This approach necessitated utilizing alternative policy instruments and macro prudential measures to supplement our conventional instrument, the short term interest rate. Accordingly, we decided to adopt a new policy mix by using alternative policy tools at our disposal. To this end, we added two more instruments into our toolkit, namely the required reserve ratios and the interest rate corridor, to help secure financial stability without hampering price stability.*

After financial crisis, both developed and developing countries began implementing monetary policies to ease the effects of financial crisis and to rebalance the stability of macroeconomic balances in their countries. In this regard, some monetary policy decisions taken by developed countries' central banks influenced global markets and economic balances. Quantitative easing policies of some of developed countries' central banks increased liquidity in global markets in a dramatic way. This increase resulted in capital inflows towards developing countries and including CBRT, central banks of developing countries like Brazil, Indonesia, South Korea and Mexico had to take precautions against volatile capital inflows to sustain their macroeconomic balance and stability.

One of the main problems increase in liquidity via capital inflow was the increase in loan volume. Capital inflow and decrease in interest rates increased banks' accessibility

to liquidity and this capability provided banks to grant more loans to increase their profitability. CBRT used macro prudential policies to decrease foreign debt and to deter granting loans in foreign currency. The goal was to stop credit risk in foreign currency.

There had been some critics about CBRT's monetary policies and their frequency. Because of CBRT's intention of creating uncertainty, IMF and press criticized CBRT for the way of using these policies and intended goals.

IMF had criticized CBRT for making too many changes in very different areas. Main criticized subjects were frequency of changes in statutory reserves in TL and in foreign currency and foreign currency auctions. IMF criticized that CBRT took both easing and tightening monetary policies in a short time period and that CBRT changed its monetary policies very often. IMF defended that these policies created disturbance and uneasiness in money markets. IMF stated that results of monetary policies took some time to be observed and the frequency of change in monetary policies in periods in less than a year prevents market actors to hedge themselves from possible risks.

Also, in press some complaints raised about Turkey's economy policies. Goldman (2012, s.25) stated in his article;

> *Turkey's high flying economy, which expanded at a 10 percent annual rate of gross domestic product growth during the first half of 2011, will crash-land in 2012. Prime Minister Recep Tayyip Erdoğan's "economic miracle" to use the Daily Telegraph's admiring words, depended on a 40 percent annual rate of bank credit expansion, which in return produced a balance of payment deficit as wide as that of southern Europe's crisis countries. Markets have already anticipated a sudden turn around in the Turkish economy.*

One of the critics about CBRT's monetary policy was about Reserve Option Mechanism and CBRT's way of changing Reserve Option Coefficients. CBRT increased Reserve Option Coefficients especially in 2011 to withdraw liquidity from banks to limit banks' capacity to grant more loans. That policy created two outcomes. First critic about this policy was that CBRT was forcing banks to create liquidity by foreign debt via syndication and securitization from abroad because CBRT was withdrawing a big portion of banks' deposit via Reserve Option Mechanism. Foreign debt detoriated banks' liability structures. Right at this point, another argument raised about consistency and accord between CBRT and Banking Regulation and Supervision Agency (BRSA). In 2011, CBRT was rapidly increasing Reserve Option Coefficients, but banks began to increase their foreign debt to by-pass this precaution to continue increasing their credit volume. BSRA took place at this very moment to limit credit

volume by forcing banks to spare more statutory reserves for loans granted. BSRA's direct move had a direct effect on loan volume because this precaution directly increased banks' cost. In 2011, this move of BSRA revealed the lack of accord between CBRT and BSRA, the two most influential regulatory actors in Turkish economy.

Svensson (2011, s.2) stated in his speech that:

> *However, the fact that financial stability policy and monetary policy are distinct and different does not mean that there is no interaction between them. This interaction needs to be considered. Monetary policy should be conducted taking the conduct of financial stability policy into account and vice versa. This is similar to how monetary policy is conducted taking fiscal policy into account, and vice versa. Importantly, under normal conditions, financial stability is handled by financial stability policy, not by monetary policy. Monetary policy should be the last line of defense for financial stability, not the first.*

The second argument about increase in Reserve Option Coefficients was that this policy was forcing banks to borrow again from CBRT. In inflation targeting regimes, central banks aim to sustain that short term interest rates in the money market are close to policy interest rate. Given this characteristic of inflation targeting regime, CBRT had to provide short term loans again to banks that had to keep most of collected deposits at CBRT as statutory reserves.

Another critic was about CBRT's policy of creating uncertainty. CBRT aimed to create uncertainty in interest rates via interest rate corridor application. Before this application, CBRT was announcing policy interest rate at Money Market Committee and CBRT was keeping the policy interest rate stable until the following Money Market Committee. This enabled money market actors to have a foresight and that this was transmitted to real economy and long term interest rates. Interest rate corridor application changed all concepts and created uncertainty. It became impossible to have foresight about daily interest rates and average funding cost until next Money Market Committee. In this regard, there were critics that this monetary policy effected CBRT's transparency.

Interest rate corridor policy aimed to decrease earning yields for foreign investors by creating uncertainty. The policy decreased the pace of capital inflow of foreign investors. Another complaint about the effect of this policy was that local investors and local market players were also affected by this policy as well as foreign investors.

4. CONCLUSION

Before the latest financial global crisis, primary role of central banks and expectations of central banks were limited and expectations could be reduced to one goal which was sustaining price stability. Central banks were using policy interest rate to influence and regulate markets to reach their primary objective which is sustaining price stability. Before crisis, global economic outlook and situation provided central banks conditions to sustain price stability with policy interest rate.

Global financial crisis changed concepts about expectations, implementations and roles of central banks throughout the world. Financial volatilities were tougher than before and central banks had to deal with new problems. The recent financial crisis can not be defined as a short term experience; instead it was a unique process with its own dynamics. In this period, macro prudential policies became important and both developed and developing countries' central banks implemented macro prudential tools to sustain their economies' financial stability.

Implementations and contents of macro prudential policies varied from one country to one another based on the country's economic balances, dynamics, strength and needs. Developed countries' central banks used these unconventional monetary tools mainly to stimulate economic activity that plummeted in global financial crisis. On the other hand, developing countries' central banks implemented these tools mainly to prevents negative effects of volatile capital inflows over their economy.

It can be observed that central banks implemented these tools by observing other countries' central banks' moves and by assessing possible outcomes of other central banks' implementations. Every country implemented unconventional tools after considering structure of their economy. There was not any certain set of policy that could be implemented for every country. Every central bank had to decide contents and volume of their implementations. That was a different policy view from pre-crisis period when a certain policy tool was used for a certain goal. Crisis period forced central banks to change their policies and to develop customized monetary tools to achieve their goals.

The main purpose of CBRT is to sustain price stability. Before crisis period, CBRT was achieving this purpose by decreasing inflation rate. During financial crisis, CBRT also realized that circumstances of financial crisis made it impossible to achieve sustaining financial stability with the sole tool of policy interest rate. CBRT designed a set of macro prudential tools by taking into account economic structure and economic fragilities of Turkey.

CBRT implemented unconventional monetary tools including interest rate corridor, statutory reserves, reserve option mechanism and exceptional day implementation.

CBRT used interest rate corridor to create uncertainty for financial institutions' funding costs and to influence financial market. CBRT changed the upper and lower limit of interest rate corridor and the interval between these limits to create uncertainty for the aim of preventing negative effects of volatility in capital inflows and loan volume expansion.

CBRT used statutory reserves policy in various ways. CBRT implemented policy that included using foreign currency and gold for statutory reserves, changing coefficients for statutory reserves, differentiation of statutory reserves in accordance with tenor, reserve option mechanism and quitting paying interest for statutory reserves.

CBRT used extraordinary day implementation to influence foreign currency exchange rate valuation and volatility.

Given the unconventional tools implemented by CBRT during recent financial crisis, we can say that CBRT implemented a set of various monetary tools designed by taking into account different macroeconomic goals and dynamics.

Main institutions and regulators that regulate and effect economic activity in Turkey are Banking Regulation and Supervision Agency, Ministry of Finance and ministry of Economy. During financial crisis, the level of cooperation between these institutions and CBRT were not as good as it should have been. While CBRT was trying to implement monetary tools to sustain macroeconomic stability of Turkish economy, other institutions did not take effective and punctual decisions in coordination with CBRT. Banking Regulation and Supervision Agency worked in coordination with CBRT in 2011 while CBRT was trying to limit loan volume expansion. Even this sole case proves the exponential effect of coordination between CBRT and other institutions and regulators.

Global economy and financial markets are getting more developed and more complex. Financial markets are getting more integrated via financially engineered derivative products and via transactions between countries. A crisis in any country affects other countries and this situation can easily transform into regional and global crisis.

Recent financial crisis proved importance of regulations over financial markets and it also proved importance of global cooperation for mitigating risks. Central banks' importance has increased with this emphasis on regulations.

Macro prudential tools implemented by CBRT during crisis period between 2008 and 2012 can be considered successful because CBRT seems to have reached results that are aimed by using these unconventional monetary tools. There have been critics about CBRT's policies during this period. Critics were mainly focused on uncertainty created by CBRT and lack of coordination between CBRT and other regulatory authorities. Unconventional monetary tools were implemented during crisis period and are still being heavily implemented at post crisis period. Further data, tool and research are needed for clearly assessing effectiveness of these tools and for clearly defining which tools should be used for obtaining anticipated result and for defining which monetary tools are more effective than other tools.

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