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IMPLEMENTATION OF UNCONVENTIONAL MONETARY POLICIES: CASE
OF CBRT

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GELENEKSEL OLMAYAN PARA POLİTİKALARININ UYGULANMASI: TCMB
ÖRNEĞİ

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ABSTRACT

IMPLEMENTATION OF UNCONVENTIONAL MONETARY POLICIES: CASE OF CBRT

The new quantitative easing policies implemented by the developed countries after the global financial crisis has revealed financial stability concerns for many developing countries, such as Turkey. Apart from the effects of these policies applied by the developed countries, the continuation of the economic stagnation in these countries and the uncertainties about their future policies have led these concerns to deepen. Turkey aimed to reduce financial and macroeconomic risks by adopting a new monetary policy strategy towards the end of 2010. Conventional policies have been replaced by unconventional policies. CBRT diversified the set of tools with market-aligned policies such as asymmetric interest rate corridor, reserve option mechanism and required reserves. This study is to investigate the political effectiveness of macro prudential measures implemented in 2010 on volatile capital flow. Using Bruno, Shin (2013a, b) studies, the macro economic data set for the 1999Q2-2017Q4 period was analyzed. Structural Break tests developed by Bai-Perron had been used in this period for testing the presence of structural breaks. The structural break model which we have conducted by using Bai-Perron (2003) method, provided an insight for effectiveness of policies in different regimes. While Bruno, Shin (2013a, b) research has been using a dummy variable with known structural break point, in our research we have predicted structural break point by using Bai-Perron method. Following the prediction of break date, we have examined policies of CBRT have effects on cross border capital allocations. As a result of our research on the relationships between break date periods, we have find out macro prudential policies have positive effects on financial stability.

Keywords: Financial Crisis, Macroprudential Policies, Bai-Perron Test, Financial Stability, Capital Flows

ÖZET

GELENEKSEL OLMAYAN PARA POLİTİKALARININ UYGULANMASI: TCMB ÖRNEĞİ

Küresel finansal kriz sonrası gelişmiş ülkelerin uyguladığı yeni parasal genişleme politikaları Türkiye gibi birçok gelişmekte olan ülke için finansal istikrar endişeleri ortaya çıkarmıştır. Gelişmiş ülkelerin uyguladığı bu politikaların etkileri bir yana, bu ülkelerdeki ekonomik durgunluğun sürmesi ve gelecek politikalarına dair belirsizlikler bu endişelerin daha da derinleşmesine yol açmıştır. Türkiye, bu çerçevede 2010 yılı sonlarına doğru yeni para politikası stratejisine geçerek finansal ve makro ekonomik riskleri azaltmayı hedeflemiştir. Geleneksel politikaların yerini geleneksel olmayan politikalar olarak; asimetrik faiz koridoru, zorunlu karşılıklar ve rezerv opsiyon mekanizması gibi piyasaya uyumlu politikalar ile araç kümesini çeşitlendirmiştir. Bu çalışma, 2010 yılında uygulanmaya başlanan makro ihtiyati tedbirlerin oynak sermaye akımları üzerindeki hassasiyetini araştırmaktır. Bruno, Shin (2013a,b) çalışmalarından yararlanılarak 1999Ç2–2017Ç4 dönemi için makro ekonomik geniş veri seti ile analiz gerçekleştirilmiştir. Bu dönem içerisinde yapısal kırılmaların varlığını ortaya koymak amacıyla Bai-Perron (2003) tarafından geliştirilen yapısal kırılma testleri yapılmıştır. Bai-Perron (2003) yöntemi ile bulduğumuz yapısal kırılma modeli bize farklı rejimlerdeki politika etkinliği konusunda fikir vermektedir. Bruno, Shin (2013a,b) çalışması kukla değişkenle kırılma noktasını bilerek test yaparken bizim çalışmamızda kırılma noktası tahmin edilmiştir. Kırılma tahminini elde ettikten sonra TCMB'nin uyguladığı politikaların sınır ötesi sermaye hareketleri üzerinde etkisi incelenmiştir. Çalışmanın sonucu, kırılma periyotları arasındaki ilişkinin incelenmesi sonrasında makro ihtiyati politika tedbirlerinin finansal istikrar üzerinde olumlu etkileri olduğunu tespit ettik.

Anahtar Kelimeler: Finansal Kriz, Makroihtiyati politikalar, Bai-Perron Testi, Finansal İstikrar, Sermaye Hareketleri

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ABBREVIATIONS

BIS: Bank for International Settlements

BP: Bai-Perron

BRSA: Banking Regulation and Supervision Agency

CBRT: Central Bank Republic of Turkey

CPI: Consumer Price Index

DXY: Dollar Index Spot

ECB: European Central Bank

EM: Emerging Markets

FED: Federal Reserve Bank

GDP: Gross Domestic Product

GMM: Generalized Moments Method

IFS: International Financial Stability

IMF: International Money Fund

OLS: Ordinary Least Squares

REER: Real Effective Exchange Rate

ROC: Reserve Option Coefficient

ROM: Reserve Option Mechanism

US: United States

VAR: Vector Autoregression

VECM: Vector Error Correction Model

VIX: Volatility Index

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To wisdom...

INTRODUCTION

World economies have become more dependent on each other, especially with globalization. The financial crisis started at 2008 in the US has deeply affected the financial system (Kutlu, Demirci, 2011: 121). Initially started in the financial system, the financial crisis systematically and deeply affected the local and foreign markets. The financial crisis which initially occurred in the US has spread rapidly to other countries and had become a great problem to integrated economies and to system. The crisis in the financial system systematically affected both the domestic and foreign markets. From these negative effects, both developed country economies and developing country economies were directly affected. Emerging countries had been affected by negative condition of financial crisis as much as developed countries.

In order to recover from the effects of the crisis, Central Banks of developed countries, especially the FED, ECB, Bank of England have changed their monetary policies. FED was the first of quantitative easing, aimed to stimulate the economy by increasing liquidity in the market. Emerging countries had been affected by negative condition of financial crisis as much as developed countries. Actually, FED had been pumping money into markets and consequently devalued the currency. After the FED, other countries also adopted similar policies and changed their monetary policy.

There was a significant increase in short-term capital flows with the quantitative easing policies implemented by developed countries. In addition, the recessionary period in developed economies and the uncertainties in the policies they have applied have caused fluctuations in the global environment. In this case, the economies of developing countries were exposed to fluctuating capital flows by at great risk. These results led to the importance of the concept of financial stability (BIS, 2011). The emerging new conjuncture pushed Central Banks to become more proactive, leading to alternative politics and to financial stability supportive steps. As is known, the basic task of Central Banks is to ensure price stability (Aysan et al., 2014). They use the

inflation targeting regime to achieve price stability targets. The basic policy tool used when implementing this target is short-term interest rates (Basci, Kara, 2011: 3).

Undoubtedly, one of the most important lessons learned from the global crisis is that Central Banks should not focus solely on price stability. It has been understood that in monetary policies, price stability alone is not sufficient, price stability and financial stability must be complementary. In this respect, CBRT has designed and implemented a new policy framework that provides financial stability in addition to conventional policies such as price stability. This policy is called unconventional policies, namely macroprudential policies. In the conjuncture emerging after the 2008 crisis, interest in macroprudential policy has increased considerably through platforms such as the G20, IMF, etc. (IMF 2012, 2013 a,b). As we stated, maintaining a financial stability without abandoning a price stability is very important. As of 2017, we acknowledge that, CBRT is not as determined as in the past periods to fight against inflation. Continuation of monetary tightening policy is very important for sustainability of financial stability.

In this study, we analyze how effective the CBRT's new policy instruments are in limiting the effects of fluctuating capital flows on macroprudential policy frameworks after studying the functioning of these policies. The literature review on the tools and objective of macroprudential policies are given in chapter 2 and 3, the data set and econometric model in section 4, and the findings and conclusions obtained during the preparation of this work in chapter 5, references in section 6 and appendix in chapter 7.

2. MACROPRUDENTIAL POLICIES

We will review the process that led to the new policy framework in this section. Firstly, we will refer to the new policy framework, and then we will describe the objective of the new policy instruments. However, it is useful to provide information about the CBRT before going into the policy framework. The Central Banks are very important institutions in terms of the healthy functioning of the economy, responsible for printing money and implementing monetary policy. The policies and existing institutional structures implemented by the Central Banks can not be considered apart from the political and social developments of their respective countries and the whole of their economic policies. In recent years, with globalization, international markets and foreign economies have started to be effective in this structure. In this context, the duties and authorities of the Central Banks have changed over time in the course of time. In this direction, organizational structure and policies of the Central Bank of Turkey have undergone various changes over time depending on the needs of the economy. CBRT has both tool and objective independence. The CBRT is primarily responsible for managing monetary and exchange rate policies in our country. The missions and responsibilities of the Bank regulated by the Central Bank law are divided into 5 main areas.

“The principal aim of the Central Bank is to provide price stability. It means a low inflation rate that does not need to be taken into account in price stability and economic decisions. The bank directly identifies the monetary policy and the instruments it will use in the direction of this aim, in other words, it has vehicle independence. Second is Financial Stability. Financial stability has a supporting purpose feature for the Central Bank. In this context, the Bank for the stability of the financial system in Turkey is responsible for the regulatory measures relating to money and foreign exchange markets. Third is Exchange Rate Regime. Determining and implementing the exchange rate regime in our country together with the government; another task of the bank. In addition, the institution responsible for keeping gold and

foreign exchange reserves in Turkey and managing them in the interest of the country is the Central Bank. Fourth is Banknote Printing and Exporting concession. The Constitution of the Republic of Turkey in accordance with Article 87 authorized mintage of Parliament belongs. However, the Grand National Assembly handed over the issuance of banknotes to the Central Bank indefinitely. Fifth is Payment System. Central Bank is obliged to establish new systems for the safe and rapid transfer of funds and securities and to ensure uninterrupted operation of established systems, to perform supervision and to make necessary arrangements.” (<http://www.tcmb.gov.tr/wps/wcm/connect/TR/TCMB+TR/Main+Menu/Banka+Hakkinda/Genel+Bakis>)

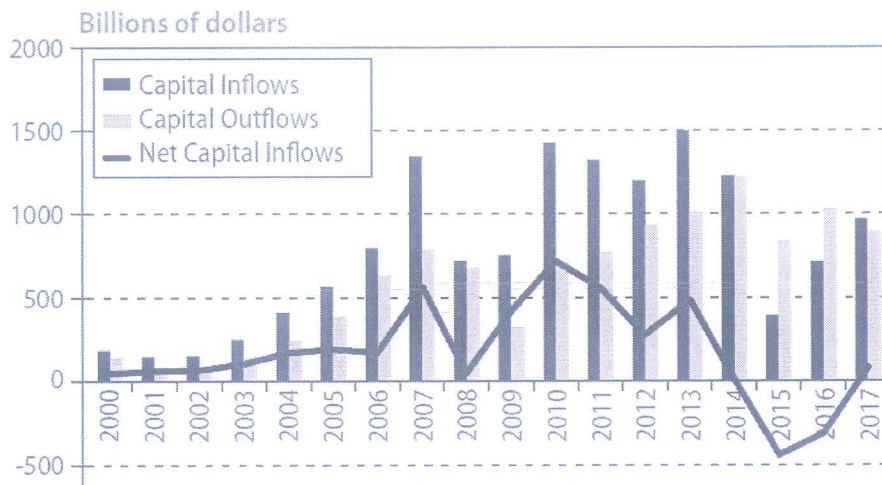
2.1 A New Policy of Framework

The changing approach in CBRT's new policy framework, global Central Banking and we see that the global economic conjuncture is also an important role. Central Banks in the world are shifting their monetary policy to reduce the effects of the crisis. Increased volatility in capital flows has led to the global Central Banks (such as FED, ECB, Bank of England) of these countries seeking alternative policies. Extraordinary global economic conjuncture had great impact on CBRT's search for new policy in addition to changing approach to economic policy and central banking. Deepening of financial crisis as a result of bankruptcy of Lehman Brothers at 2008 and following policies implemented by developed countries led to unusual dynamics (Kara, 2012:2).

At the beginning of the 2000s, global liquidity increased significantly due to the impact of globalization. The capital inflows to developing countries were US \$ 139 billion in 2002 and US \$ 1,237 billion in 2007. This high increase suddenly dropped to US \$ 679 billion in the wake of the 2008 financial crisis (Aysan et al., 2014: 3). Figure 1 and Figure 2 show that the abundance of short-term liquidity emerging as a result of ongoing quantitative easing policies in developed countries and ongoing fragilities in the global financial system lead to serious fluctuations in capital flows (Fratzscher, 2012: 2). From 2010 to 2014 we see that the capital flows to all emerging regions are

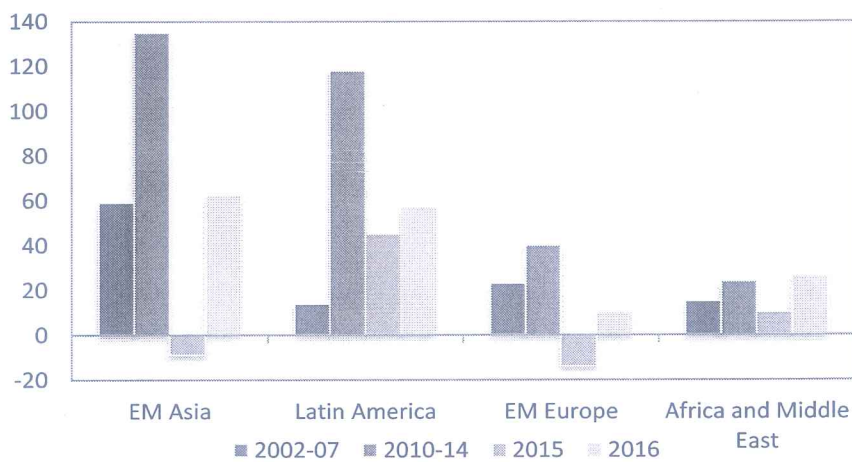
frequent. In addition, the momentum of capital flows during the 2002-2007 period attracts attention.

Figure 1: Capital flows in EM



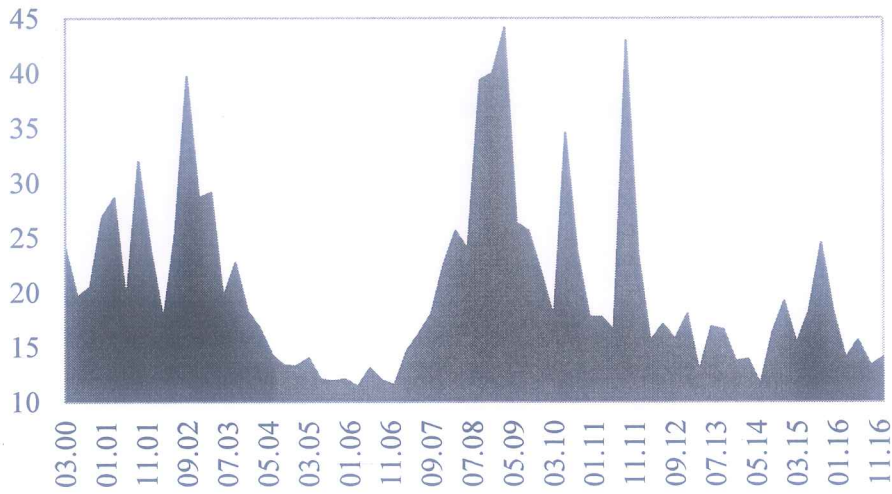
Source: Institute for International Finance, 2017

Figure 2: Portfolio Capital Inflows in EM (billion \$)



Source: Institute for International Finance, 2017

Figure 3: Volatility Index

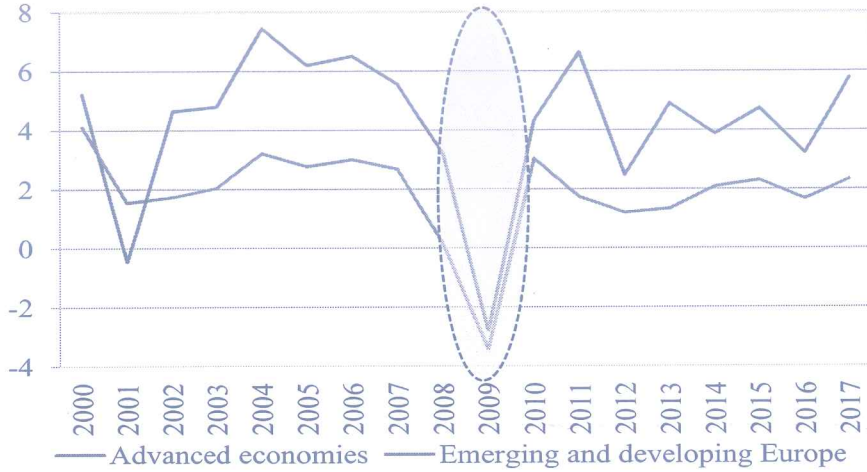


Source: Bloomberg

Figure 3 shows the values of the VIX, which is the global risk appetite indicator. The level of this index represents risk in general and fluctuation represents uncertainty. As can be seen in the figure, uncertainty in the time of global crisis 2008 has increased significantly. These developments are a threat to macroeconomic and financial stability in Turkey and other developing countries. In this respect, it is important to analyze the post-crisis economic dynamics in relation to macroeconomic risks in order to better understand the decisive role of capital flows on the economy.

As of 2008, Turkey's economy has registered a rapid growth of the economy mainly through domestic demand (Başcı, 2011: 4). Figure 4 shows the growth rates of advanced economies and developing economies. Especially after the crisis period, the growth rates between developed and developing countries are higher in developing countries. The reason is the capital flows to the developing countries.

Figure 4: World Output Growth Rate %

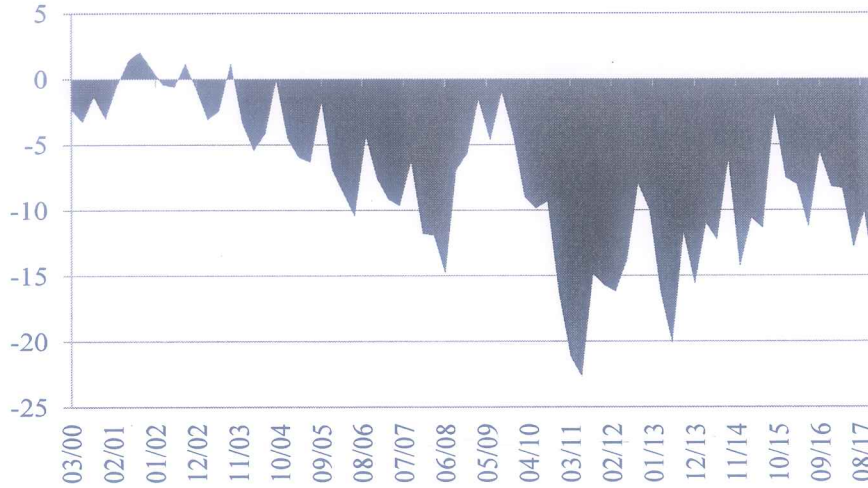


Source: IMF-IFS

Undoubtedly, the most important reason for this was the expansionist policies of developed economies. Thus, short-term capital flows have made this trend even more pronounced. Along with the increase in capital inflows, Turkish lira has been appreciated and domestic credit growth has increased. In this case, the current account deficit has deteriorated the balance. The high levels of current account deficits make the economy vulnerable to fluctuations in capital flows. As Turkey's structure, economic and financial stability requirements and the importance limitation of current account deficit to sustainable growth are emphasized (Kasman, Turgutlu, 2005: 88).

Figure 5 below shows the current account deficit in Turkey between 1999 and 2017. Similar, we see an increase when capital inflows accelerate. On the other hand, the increase in total loans affects economic activity. We see these developments in Figure 6 and Figure 7 below.

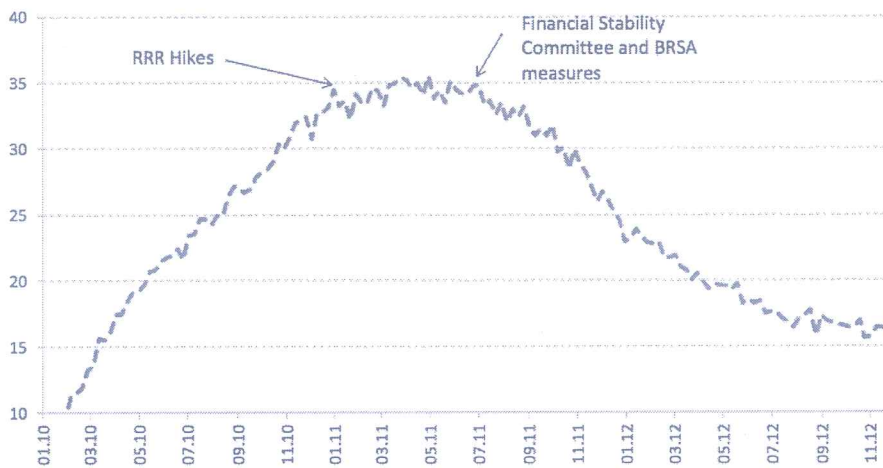
Figure 5: Current Account Deficit (million \$)



Source: CBRT

Figure 6 below shows the credit loans growth rate in 2010 and 2013. The increase in credit growth will push up the growth rate in the economy which will increase the current deficit. In this condition, the credit growth rate is closely related to the current account deficit (Güneş, Yıldırım, 2016: 49).

Figure 6: Total Credit Growth Rate in Turkey %



Source: CBRT

Along with all these considerations, the CBRT is seeking more flexible policy that allows it to respond quickly to shocks, apart from conventional monetary policy applications that also control macroeconomic risks. The new policy tools and targets that are implemented are shown in Table 1.

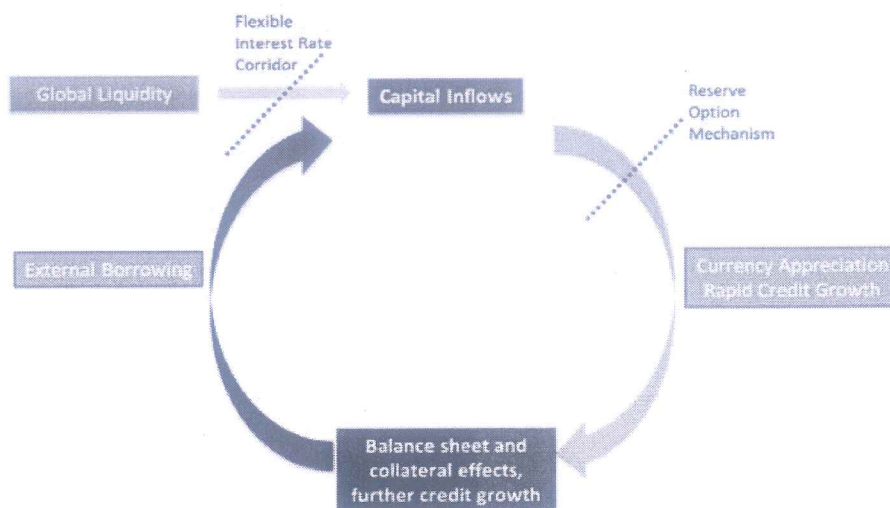
Table 1: CBRT Policy Instruments and Objectives

<u>TOOLS</u>	<u>OBJECTIVES</u>
-Interest Corridor Rate	-Price Stability
-Reserve Requirements	-Financial Stability
-Reserve Option Mechanism	

Source: CBRT

In the direction of conventional inflation targeting, the aim is only price stability while the new monetary policy instruments together with the objective include financial stability. Therefore, the general framework of the inflation targeting has been revisited and a framework including financial stability has been adopted. The new policy framework aims to create a framework that will increase the resilience of the economy, especially against the fragilities stemming from capital flows, foreign trade balance. The main target of CBRT in the direction of these policies is; to ensure a balanced growth of the economy by controlling current deficit and to make the composition of foreign finances healthier.

Table 2: The role of CBRT's monetary instruments scheme



Source: CBRT

Table 2 shows the new policy flow of CBRT. As shown in the table, the first target is to reduce the fluctuation of capital flows, and the second is to weaken the link between local macroeconomic variables and capital flows. It is thus intended to facilitate policy changes that will be implemented by alleviating the role of the rise in capital flows with unconventional tools. When we summarize conventional and unconventional policies, there are basically two differences. Unconventional policies will be examined in detail in the “macro prudential tools” section.

1. CBRT can influence credit and exchange rate channels separately.
2. While the level of short-term funding rate in the conventional system is assessed by the monthly monetary policy board decision, the average funding rate can be adjusted to the daily in order to react simultaneously to global fluctuations in the unconventional system (Kara, 2012: 8).

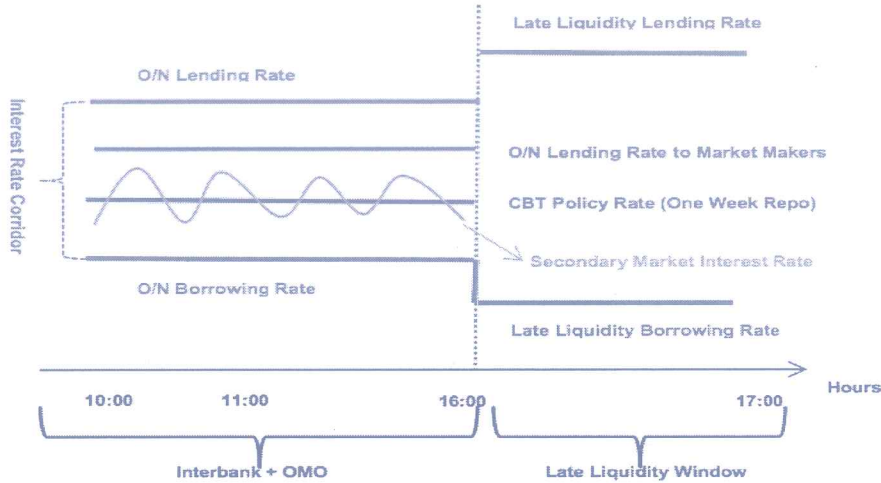
2.2 New Instruments

In this section we examine the tasks and targets of the instrument that contain macroprudential measures. The global financial crisis has seriously affected both developed and developing country economies. One of the lessons learned from the global crisis is that ignoring financial stability may threaten macroeconomic stability and price stability in the medium to long run. These global conditions have led Central Banks to search for alternative policies. At the end of the 2010, for limiting the negative effects of financial crises, no monetary policy framework has been created with aim of rapidly responding to economic shocks in addition to traditional policies. For this purpose, the conventional inflation targeting regime, which has been implemented since 2006, has been developed in a way that financial stability can be observed.

In this period, the CBRT also diversified policy instruments. In this section we will examine these policy tools. The first policy tool we will examine is the interest rate corridor. In short, interest rate corridor consists of an upper and a lower bound which control CBRT's overnight rate. These bounds are determined by the CBRT's overnight borrowing and overnight lending interest rates. The main purpose of the interest corridor is to prevent financial fluctuations that would lead to capital flows and exchange rate fluctuations (Binici et al., 2013).

It will be useful to discuss about the operational framework of the monetary policy to understand how mechanization works. Figure 7 shows the work of CBRT's new policy instruments. We explain what tools are used for this purpose in this frame. CBRT has various tools as many other Central Banks. Since the funding is mainly provided by weekly repo transactions, the one-week repo funding rate is called "policy rate".

Figure 7: Operational Framework of Monetary Policy



Source: CBRT

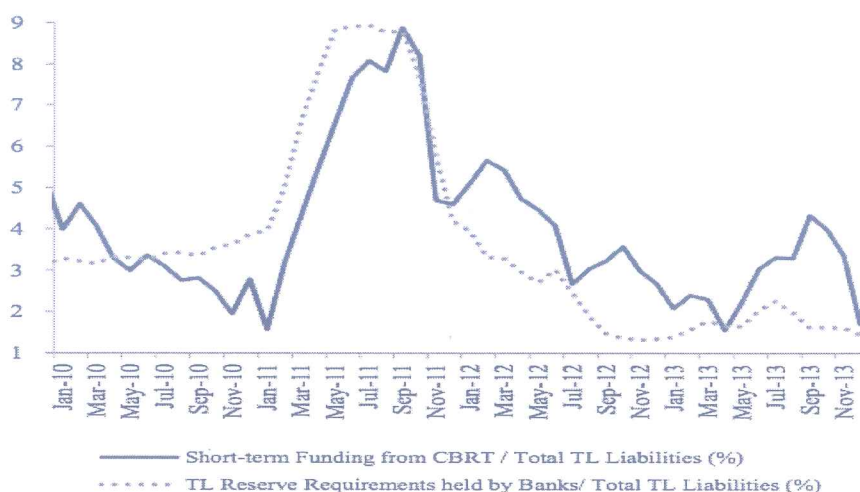
CBRT which is a bank with borrowing liquidity problems, can borrow and lend on a daily, weekly and as O/N basis. The difference between O/N borrowing and lending is called "interest rate corridor". Therefore, market interest rates are created within the interest rate corridor.

With this interest rate policy; by adjusting the short-term interest rates in the corridor in the event of excessive fluctuations in capital flows at Central Bank can reduce the effects on the exchange rate, which would arise from fluctuating capital flows. The interest rate corridor reduces both the negative effect on the exchange rate and the credit costs of the banks in terms of market funding. The effect on credit costs is mainly based on "weighted average funding cost" (Tüzün, 2014: 34). CBRT's direction towards the interest rates in the market is basically a "weighted average funding cost". Weighted average funding cost of CBRT is calculated by taking the weighted average "of the overnight" lending rate and policy rate (Eğilmez, 2015 : <http://www.mahfiegilmez.com/2015/06/tcmb-agrkl-ortalama-fonlama-maliyeti.html>). The interest rate corridor policy is primarily used at eliminating uncertainties in economy. Thus, while Central Banks provide liquidity to the market, they have the advantage of responding rapidly to perceptual differences in the direction of ever-changing conditions and being able to act flexibly in the sense of the interest rate

applied. In addition, the interest rate corridor is able to indirectly control credit expansion along with the tool (Vural, 2013: 31). Finally, the broad interest rate corridor implemented by the Central Bank, while at the height of global uncertainty, contributes to reducing the volatility of capital flows, as well as some difficulties in understanding the monetary policy stance. In conventional monetary policy, policy interest rate determines the monetary policy stance; while in the wide interest corridor, the monetary policy stance depends on different funding rates. This situation makes it difficult to understand the monetary policy stance.

Another macroprudential policy tool is Required Reserves. We describe the definition of the required reserves and for what purpose they are used.

Figure 8: Reserve Requirements and Short-Term Funding CBRT



Source: CBRT

Required Reserves are instruments of monetary policy that are being implemented by keeping deposits or deposit-like liabilities of banks and financial institutions at the rate determined by CBRT (Alper, Tiryaki, 2011:1). It is basically used to influence credit supply. As capital flows increase, credit growth may accelerate due to the increase in supply conditions and the decrease in interest rates, thereby increasing financial risks. In such a condition, credit supply can be limited with the increase of required reserve ratios. On the contrary, in the periods when capital flows are suddenly weakened, the reduction of required reserves also reduces the risk of a sudden slowdown in the loans

(Kara, 2012: 12). Required reserves play an important role in Central Banks liquidity management. If the liquidity in the money market is low or overpriced, the imbalance in the market can prevent the effects on currency exchange rates and interest rates by adjusting the reserve requirements to eliminate liquidity deficit or surplus (Alper, Tiryaki, 2011: 2). Figure 8 above shows the first stage of the transmittal of the liquidity channel. As one can see in the figure an urgent reaction to bank raising their reserve requirements is to increase their borrowing from the Central Bank in a similar account. In addition, to control the value of the Turkish lira in the market, it is possible to keep a certain proportion of the Turkish lira required reserves in foreign currency. In periods of high capital flows, foreign exchange liquidity will increase, and banks will prefer to keep the greater part of the required reserves in foreign currency. If this situation is applied, the overvaluation pressure on the exchange rate will be removed.

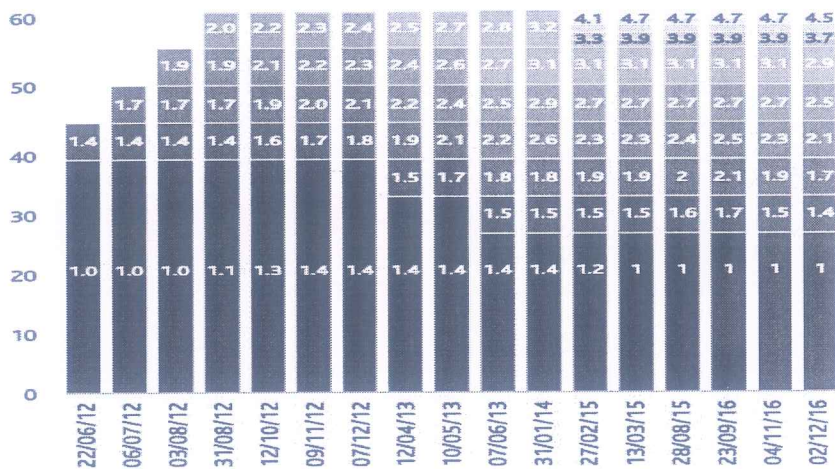
This will support financial stability as banks will reduce the tendency to lend foreign exchange (Binici et al.,2016). The most important feature of ROM is a self-functioning balancing mechanism. Finally, the policy tool we examine is ROM. The ROM is an application that ensures that a certain portion of the Turkish lira reserve requirements is kept in foreign currency or gold. As can be seen, it is linked to the application of the reserve requirement.

However, the condition under which this facility can be used is determined by the reserve option rate. Coefficients determining foreign exchange or gold reserve to be kept in the unit Turkish lira are defined as ROC (Alper, Tiryaki, 2012: 2). ROM is a policy tool developed to reduce fluctuations in exchange rates. The main purpose of this policy tool is to prevent the expansion of credit by controlling the effects of capital movements entering the country.

In this framework, ROM provides an indirect contribution to reducing the negative effects of volatility fluctuations in capital mobility. Therefore, ROC is a very important tool that increases the efficiency of the interest rate corridor (Alper, Tiryaki, 2012: 11-12). Figure 8 and Figure 9 show the ROC rates in the process. As a result, during periods when capital flows are accelerating; the cost of foreign currency resources will decrease according to the cost of Turkish lira resources, so the banks will want to keep

the higher rate of Turkish lira provisions as foreign currency. In this case, the pressure on the appreciation of the Turkish lira is limited and the rate of conversion of the foreign currency into the country will also decrease.

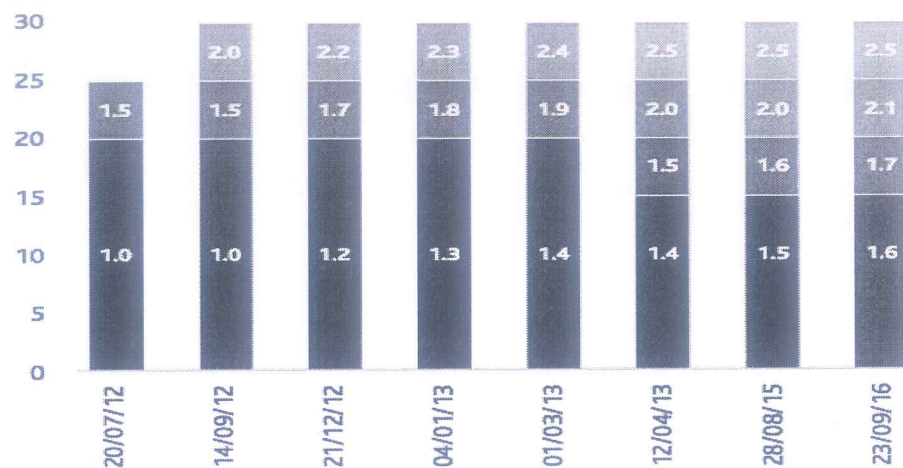
Figure 9: ROC for Required Reserves FX



Source: CBRT, Reserve option ratio (%) shown on left axis.

In contrast to this situation, when capital flows are slowing down; the cost of foreign currency resources will increase according to the cost of Turkish lira resources. Therefore, access to foreign funds will be difficult. Banks will be able to acquire some of the foreign exchange liquidity they need by reducing the use of reserve options. In this case, the depreciation of the Turkish lira will be partially mitigated. With the decrease in the use of reserve option, the demand for liquidity of the Turkish lira will increase as banks will hold most of their reserve requirements with Turkish lira resources. As a result, ROM is both an tool developed to limit both the volatility in the market liquidity and the volatility in the exchange rate (Alper et al., 2013: 5).

Figure 10: ROC for Required Reserves Gold



Source: CBRT, Reserve option ratio (%) shown on left axis.

Finally, While it is a well-known and widespread practice for a Central Bank to make reserve requirement reserves in its own currency a rule, the CBRT has to keep its required reserves in gold and foreign currency has been attracting attention as a means of accumulating an international reserve that has not been seen in Central Banking.

In this section, we discussed about macroprudential tools, their functioning and their purpose. In short, the use of the interest rate corridor, required reserve and ROM enables the credit growth and exchange rate channels to be affected separately, which are of great risk and importance to Turkey, unlike conventional monetary policy. It is technically impossible to give such a separating response in the practice of conventional monetary policy. In addition, CBRT presents all developed policies as an improved version of the conventional inflation targeting. We do not give up price stability, which is our main target; is aimed at ensuring financial stability together with a tight monetary policy stance.

3. REVIEW OF THE LITERATURE

Recently, due to the impact of the global crisis, macroeconomic policy activities within the financial system have increased. Especially, the negative impact of the developing countries on the global crisis and the resulting rise in the risks associated with the global economy have led to widespread academic work. After the financial crisis, the monetary expansion of the Central Banks of developed countries led to abundant liquidity in the financial market. As a result, this situation threatens developing countries. The view that financial stability should be given more importance is becoming increasingly widespread. Moreover, studies that emphasize the importance of responding to macroeconomic policies to prevent financial crises have gained increasing weight in recent economic literature (Bianchi, Mendoza 2011, Jeanne, Korinek, 2010).

Global factors are determinant in international capital flows (Asraf et al., 2010). Calvo et al. (1996) have extensively assessed the instability created by hot money flows in developing countries. By distinguishing global "pushing" factors for capital flows from country-specific "pulling" factors, they come to decision that at developing economies in the 1990s as a result of which external drivers, global factors are more decisive in explaining capital flows. Meanwhile, interest in capital flows, especially cross-border bank loans, has been of great interest. The monetary expansion imposed by developed country Central Banks has created excessive credit growth in cross-border capital flows. Bianchi, Mendoza (2011) concluded that during periods of excessive credit growth, there was large fluctuations in economic activity and a strong correlation between increased overdraft growth and financial crises. Jorda et al. (2010) pointed out that the leading indicator in the formation of financial crises is rapid credit growth. Similarly, Dell'Ariccia et al. (2012) found that the rise in credit boom is related to financial reform and economic growth. They also analyzed that this was more frequent in fixed exchange rate regimes. Macro prudential instruments have proved effective in managing increased credit booms. In this case, financial stability has been achieved especially for the developing countries (Magud et al., 2012). In parallel, Claessens et al. (2010) analyzed the rapid pace of credit booms and the resulting

current account deficit posed a significant risk for countries. As a result, they stated that these countries were highly influenced by the global crises.

Gourinchas, Obstfeld (2012) concluded that the appreciation of the local currency and the increase in bank leverage ratios were influenced by the increase in loans in the form of financial crises similar to Borio (2011). The Bank has reached the conclusion that the increase in leverage rates will turn into cross-border credit, which will have a significant impact on developing countries. Also, Taylor, Schularick (2012) also emphasize the role of bank leverage in financial stability, particularly in relation to the banking sector. He argued that the increase in leverage would be reflected in the credit growth, which would further increase the likelihood of crisis. In support of the literature, Bruno, Shin (2011) stated that the increase in bank leverage would cause the existing bank capital to give more credit, which in turn would lead to an increase in global lending. Bruno, Shin (2013a), one of the recent studies, has shown that international activities of global banks reflect the capital flows of global nature at a good level. Working in a theoretical model of the determinants of global capital flows, supply and demand of global fund has been shown to depend on the leverage ratios of global and local banks, and on the variation of these leverage ratios.

The need for macroeconomic policy was born with the impact of the global crisis in 2008, in addition to the microeconomic measures. Capital flows into emerging economies suddenly enter and exit, creating a danger to economic activity. Studies that emphasized the importance of responding to macroeconomic policies in order to prevent financial crises in this period have gained increasing importance in recent economic literature (Jeanne, Korinek, 2010). Ünsal (2011) emphasized that unconventional monetary policy measures alone would not suffice against rising and volatile capital inflows and that macroeconomic policies should be applied in complementary terms. Similarly, Lim et al. (2011) analyzed the countries where macro precautionary policies were applied. In this framework, they stated that macroeconomic measures applied are quite effective in preventing systematic risks. Developing countries that are similar to Turkey's economy has expanded monetary policy tools. As a result, developing countries have begun to develop policies aimed at

ensuring financial stability and macroeconomic policies. In order to limit the growth of Brazil's credit, they have implemented capital flow controls with instruments such as high credit rating limits and high reserve requirements (IMF, 2011). The government redesigned the financial transaction tax it received from transactions such as bonds before the crisis. After the crisis, the scope of the financial transaction tax was changed, and the rate was increased. The financial transaction tax has reduced portfolio flows and has been effective in increasing long-term flows by changing the composition of capital flows (IMF 2013). Yurdabak (2015) has examined the financial stability of the policies implemented by the CBRT towards the end of 2010. Compulsory provisions have shown that vehicles such as asymmetric interest corridors are quite successful in achieving macroeconomic stability. In addition, the supplementary instruments taken by regulator institutions such as the BRSA also support the policies implemented by the CBRT. Macroprudential policy studies continue comparatively on a country-by-country basis. Various studies support how effective these countries are in maintaining economic stability against other countries. Relevant work has focused especially on loan growth and capital movements.

In our study a similar path was followed as Bruno, Shin (2013a,b). We have used the dummy variable by knowing the breakpoint by itself. In our study a similar path was followed as Bruno, Shin (2013a, b). We have used the dummy variable by knowing the breakpoint by itself. Bruno, Shin (2013b), the authors analysed the effectiveness of macro precautionary measures applied in South Korea in 2010, using the theoretical model from their previous study (2013a). In the mentioned study, panel regression method was applied by including 48 developed and developing countries. Policy makers have banned long-term foreign exchange contracts, reduced many controls over capital outflows, and have developed many new tools, such as dynamic provisions and required reserves, to reduce South Korea's foreign outreach. The study concluded that the macro precautionary policy framework implemented at the end of 2010 was successful by reducing the sensitivity to capital flows.

Similarly, in these studies, break data were known and tested. Fendođlu (2015) measured the impact of macroeconomic policies on real credit growth in his study of

15 countries most affected by intense capital flows by panel regression analysis and the GMM method. As a result of the study, most of the macro prudential instruments (such as capital requirement, required reserves, credit growth limit) have lowered the capital flows' sensitivity to real credit growth. Eşsiz (2016) analyzed the impact of macro precautionary measures on the credit growth effect using primarily the GMM for 49 countries. Then these countries were divided into developing and developing countries according to IMF classification and the same analysis was repeated for country groups. At the end of the study the group of emerging market economies for all countries indicated that macro prudential policies show the effect on credit growth. As a result, it is appropriate to implement monetary policy support policies to reduce the rapid credit growth, which is a risky situation in terms of financial stability.

One of the methods applied in the analysis of monetary policies is the VAR analysis. In the study of Tüzün (2014), the effectiveness of the policies the CBRT implements to ensure financial stability under the price stability target has been tested with Bayesian VAR analysis. It is concluded that the CBRT's variables that reflect the financial stability are affected by some financial shocks and that the policy instruments should be used effectively under various conditions. Among the most recent studies Akca (2017), the VECM method has explored the relationship between financial stability and macroprudential policies in Turkey. The FSI indicator, which is a demonstration of financial stability, has been established during the period 2010 - 2017 using monthly frequency data. Credit volume, interbank money market net position, reserve requirements and capital buffer were used as macroprudential policy indicators. According to the results of VECM, the increase in credit volume and the capital buffer provided financial stability positively, while the leverage ratio and money market net position negatively affected financial stability. As a result, macro precautionary policies have contributed positively to financial stability.

When the studies in the literature are examined, the macro precautionary instruments such as; capital flows, and credit growth have the positive effect of eliminating the conditions that would adversely affect financial stability. As a result, the literature

shows us that monetary policy is supported by macroeconomic policy tools, showing that macroeconomic policy use contributes positively to financial stability.

4. ECONOMETRIC ANALYSIS

4.1 Data and Descriptive Statistics

Recently, the literature has shown that international activities of global banks reflect cross-border bank-based gross capital flows well (Shin, 2011). In order to understand these capital flows in Turkey we utilize the model developed by Bruno, Shin (2013b). In this methodology, we use both global and local variables in our model. These variables are affecting capital movements and are based on the results of previous studies in the literature.

The data set used in the analysis is quarterly and covers the period between 1999Q2 and 2017Q4. The following equation summarizes our model:

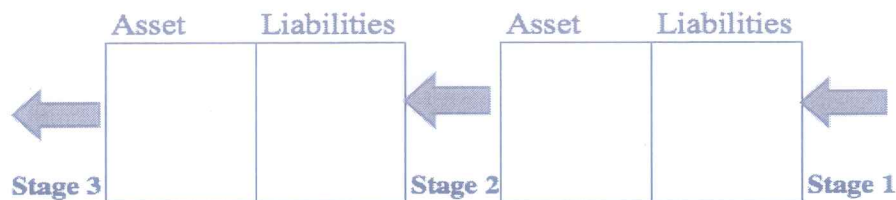
$$\Delta Loan_t = \alpha + \beta_1 \Delta DXY_t + \beta_2 \Delta VIX_t + \beta_3 \Delta USgov_t + \beta_4 control_t + \varepsilon_t$$

Our main variables are as the following. Firstly, cross-border bank-based gross capital flow is our dependent variable.

The regressors are VIX, DXY Index, US 10 Year Government Bond Yield and other control variables are CPI of Turkey, real GDP growth rate, Debt to GDP change of Turkey, Turkey 2 Year Government Bond Yield, REER of Turkey and World Money Supply (M2 stock in the US, European Union, Japan and M4 stock in the United Kingdom) as the worldwide control variable.

$\Delta Loan_t$ is the change in the cross-border bank-based gross capital flow entered into Turkey, which is published as a quarter by the dependent variable BIS. This variable was obtained from the BIS Locational Statistics. The difference between Table 6A (all borrowers) and Table 6B (non-bank borrowers) gives us cross-border bank-based gross capital.

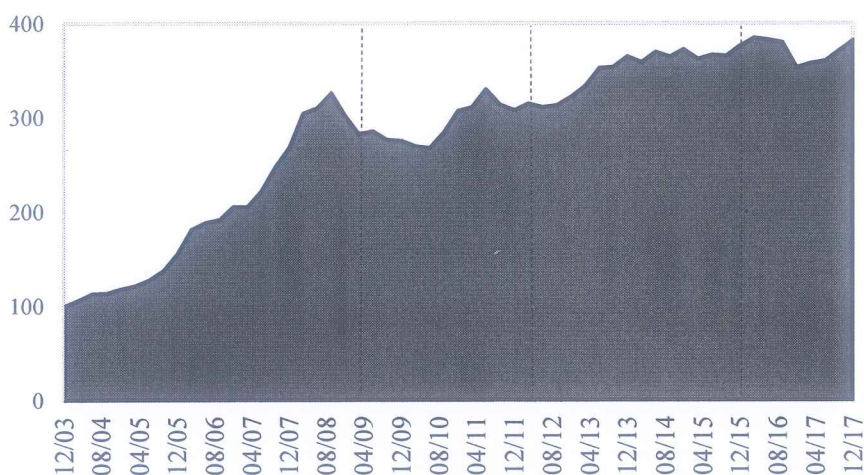
Table 3: Cross-border banking sector flows



Source: Bruno, Shin (2013b)

Banking activities are the most important factor that leads financial conditions both at domestic and abroad. As shown in Table 3, our empirical research is based on the interaction between local and global banks. Considering that assets are on the left side of the balance sheet and liabilities are on the right side, the direction of the financial currents goes from right to left. In stage 1 in Table 3, global banks provide wholesale financing and provide wholesale financing to other local banks. Stage 2 in Figure 1 refers to cross-border capital flows through the banking sector. Local banks use the advantage of cross-border funding (Stage 2) to lend to local borrowing areas (Stage 3). Stage 1 shows that global banks are borrowing from financial centers (Bruno, Shin, 2013: 5). Figure 11 shows the cross-border bank-based gross lending inflows of Turkey. The series was normalized in March 2003 (2003=100).

Figure:11 External Loans of BIS

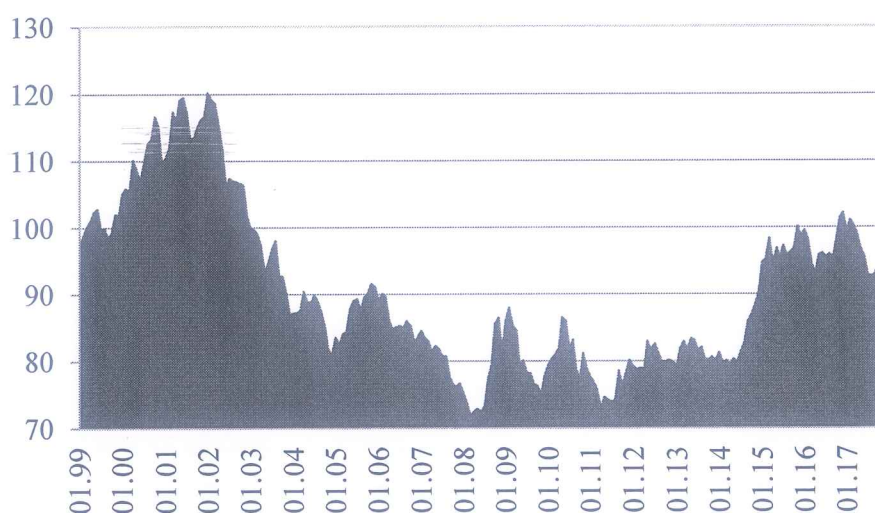


Source: BIS, Locational Banking Report.

Now we examine the global variables; VIX, DXY Index and US 10 year government bond yield. We presented the definition of VIX in the previous section. The main reason behind to use VIX is the close relationship between cross border banks and their cross-border leverages (Adrian, Shin, 2010, 2012). Leverage of banks is related to local and global factors. The leverage ratio calculation for a bank is determined by dividing short-term liabilities (debts) into equity. In other words, when leverage of banks is high, it's conversion to cross border credit would be accelerated and transferred to emerging countries as a capital. Every increase in leverage of banks would convert to more credits. Every change in VIX could be shown as an indicator for this type of capital. In our model, logarithmic difference of VIX is used. Data was obtained as a quarterly data from Bloomberg.

DXY index roughly represents the value of the US dollars of basket against other currencies. The base value of the DXY index is 100. For example, a DXY index of 150 would be interpreted as that the US dollar earned 50% of its time. Hence, DXY index indicates the dollar's appreciation or loss. This variable is indicative for capital flows as it is indexed. Data were taken from Bloomberg as quarterly. Similarly, quarterly logarithmic difference of DXY index is used.

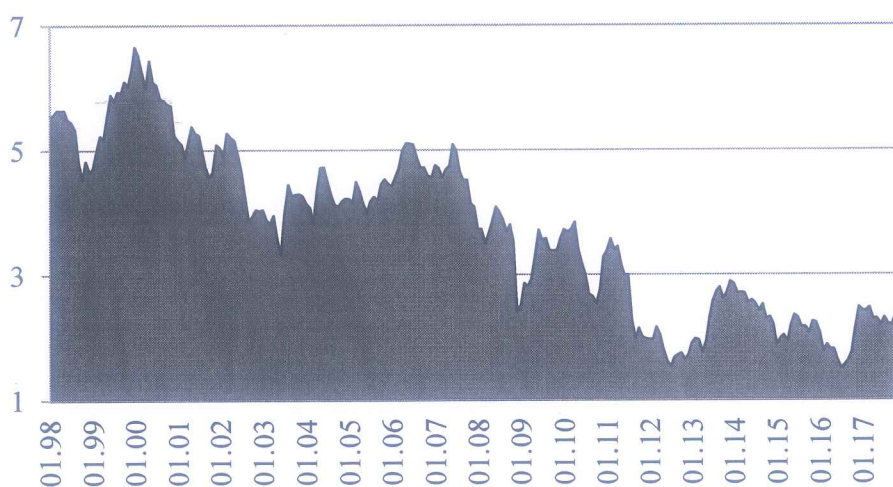
Figure 12: DXY Index



Source: Bloomberg

The last global variable is US 10 year government bond yield. This variable is highly related to global liquidity. The rising 10 Year Government bond yield in the past caused capital outflow from developing countries, including government borrowing and Eurobonds. We use quarterly percentage change in US 10 year government bond The data was taken from FED database.

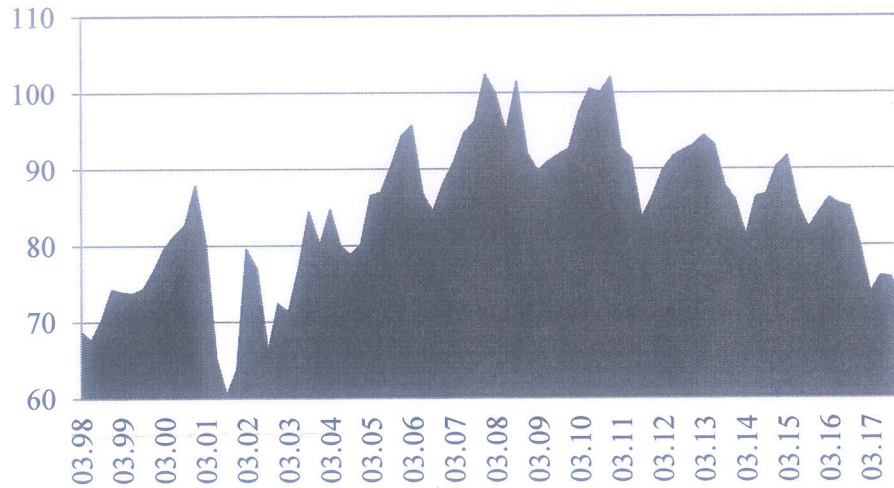
Figure 13: US 10 Year Government Bond Yield %



Source: FED

We control for a set of global and local variables. There are effective in explaining capital flows. In this direction; Turkey's REER data, the real GDP growth rate as an indicator of the real economy, Debt to GDP, CPI, interest rate indicator of financial market Turkey 2 year government bond yield and the global World Money Supply variables are included in our model. First, we want to explain Turkey's REER data which is the index value of local currency' against to basket which compromised by foreign currencies weighted under various criteria. It represents local currency' value in compare to its' price in financial markets. Real effective exchange rate series are taken from IMF-IFS database. We use quarterly logarithmic difference at data.

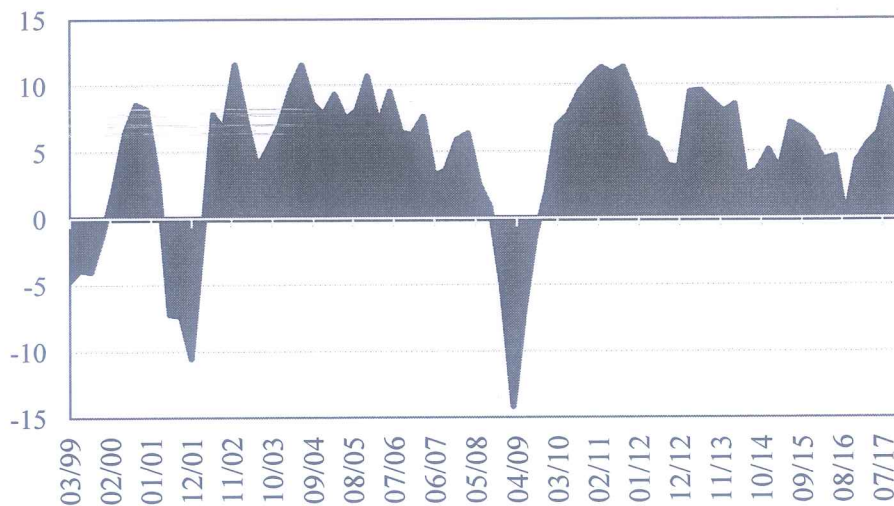
Figure 14: REER of Turkey



Source: IMF

Second global variable is Turkey's real GDP growth rate. Seasonally adjusted (SA) quarterly GDP series is calculated by the expenditure approach with constant price. We use real GDP growth as year on year percentage change (Base year 2009=100). Source of data is Turkstat.

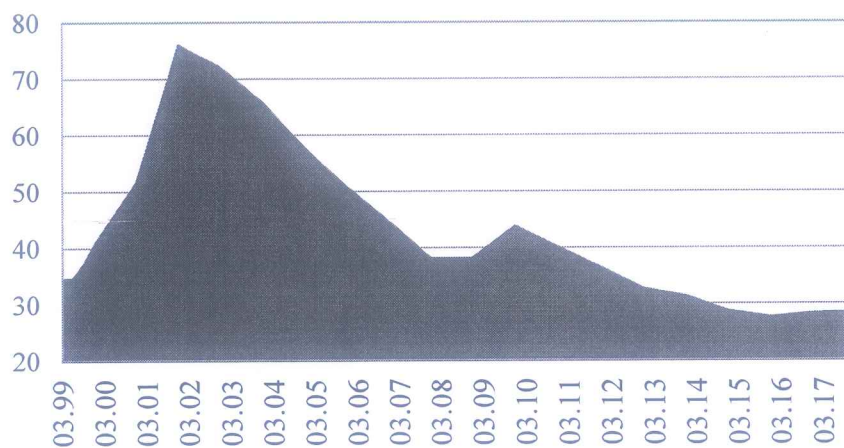
Figure 15 : Turkey Real GDP Growth (%)



Source: Turkstat

Third global variable is gross debt to GDP. The data was taken from IMF-IFS database. IMF database just contains Debt to GDP data in annual basis. Therefore, we have use linear interpolation method to change data to quarterly basis.

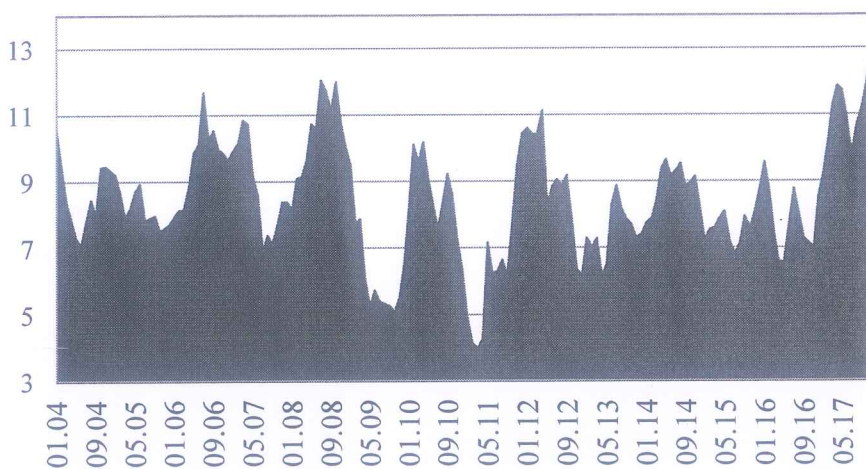
Figure 16 : Turkey Gross Debt to GDP %



Source: IMF-IFS

Fourth global variable is CPI. Source of data is Turkstat. The base year for this variable is 2003 (2003=100). Similarly, quarterly logarithmic difference of CPI is used.

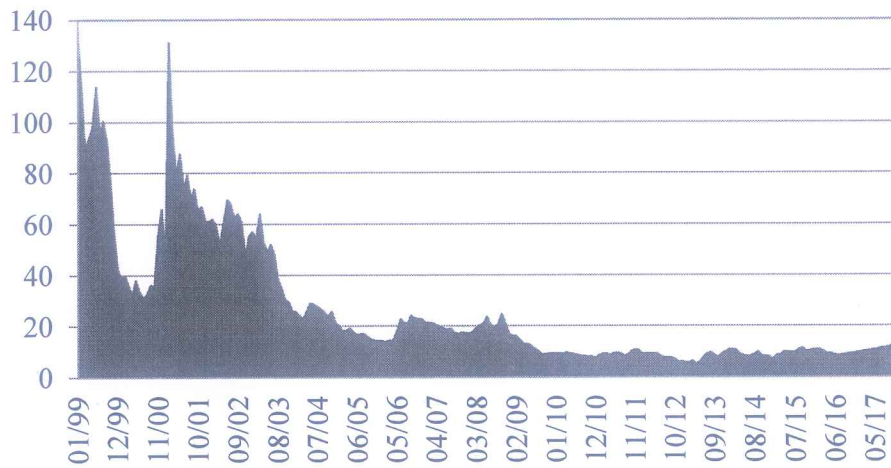
Figure 17: Turkey CPI %



Source: Turkstat

The last domestic variable is Turkey's 2 year government bond yield. The data was taken from FED database. We use quarterly percentage change in Turkey's 2 year government bond. Our last variable is World Money Supply. Data source of IMF-IFS database. The quarterly growth World Money Supply is calculated quarterly logarithmic difference of sum of the (M2 in US, European Union, Japan and M4 in United Kingdom). Also, all values dollar-denominated.

Figure 18: Turkey 2 Year Government Bond Yield %



Source: FED

While evaluating all these variables, we have modeled those that are particularly relevant to global funding. Related literature and studies support this view.

4.2 Empirical Analysis

In this section, the methods and the results we use will be summarized. In the first stage we run a multiple linear regression model which is used to explain one dependent variable with one or several independent variable (https://en.wikipedia.org/wiki/Linear_regression). Additionally, we use autocorrelation test for the residuals of our regression model. According to the test results, there is no autocorrelation problem in our model. The p-values are greater than 0.05 and the null of no autocorrelation. (Appendix 7.3). We try to strengthen our model against heteroscedasticity and autocorrelation by using HAC (Newey-West) in covariance calculation.

The main objective of this research is using a wide range of dataset in between 1999Q2 and 2017Q4 for structural break detection and with this objective our study differs from researches which examine macro prudential policies effects. The previous studies such as Bruno, Shin (2013a) and Aysan et al. (2014) assume a known break location in their testing procedures. However, unlike them, we both assume unknown break points and break locations.

At this stage, we present a literature on structural break. Both statistical and econometric literature contain several studies on structural change. Liu et al. (1997), Pesaran, Timmermann (1999), Lumsdaine, Papellv (1997), Morimune, Nakagawa (1997), Lee and Strazicich are important contributions to the literature. However, most of these studies are related to hypothesis testing topics in the sense of multiple changes. BP (2003) have studied if there is any structural change in time series at unknown locations with unknown numbers. BP (2003) use a methodology that can identify the number of breaks and their location. This method substantially differs from the previous studies. For example, in the Lee, Strazicich's (2003) study, the maximum number of break is allowed to be two (Weideman, Lotz, 2016).

Hence, BP (1998, 2003) proposed an alternative method of testing multiple structural breaks in their work. Firstly, it is useful to explain the methodology of the BP (1998, 2003) test. BP (1998, 2003) deals with multiple structural break. In their studies, they estimate structural break periods in the time series process and test the presence of unknown number of structural breaks appearing in unknown location. BP (2003) have

developed an algorithm that obtains the global minimum values of the sum of error squares. This algorithm is based on dynamic programming.

For m breaks ($m + 1$ different regime), the regression equation in each regime is given as:

$$Y_t = X_t' \beta + Z_t' \delta_j + \varepsilon_t \quad \forall t = T_{j-1}, T_{j-1} + 1, \dots, T_j \text{ and } \forall j = 1, \dots, m$$

Y_t shows the dependent variable, β and δ_j ($j=1, \dots, m+1$) are vector coefficients, X_t ($px1$) is the vector of covariates with non-breaking coefficients and Z_t ($qx1$) is the vector of covariates with breaking coefficients, ε_t represents the error term. As a result, the following tests are utilized in determining BP break numbers m and the break locations (Bai, Perron, 1998, 47). We let all global and control variables in the vector Z_t . The tests proposed by BP is as follows:

- *sup Ft (k) statistic*: there is no break under the null hypothesis and k is the number of breaks in the alternative hypothesis.
- *Ud max and WD max test*: there is no break in the null hypothesis, but there is an unknown number of break in the alternative hypothesis.
- *sup F(L + 1 /L) sequential break test*: The null hypothesis indicates that there are L number of breaks, and alternative hypothesis means that $(L + 1)$ is the number of breaks.

The most important feature of the BP method is that each break can be determined consistently by following from general strategy to specific method in determining the number of breaks in the case that the break time is not known (Göktaş, 2008: 57). By using 75 observations; BP structural break test found 5 break points in our case. These break points are respectively; 1999Q2, 2002Q4, 2006Q1, 2009Q2 and 2015Q2 (Appendix 7.5). The table below demonstrates the estimated location of the breaks. Also, according to BP sequential break test, we detect 5 structural breaks (Appendix 7.6).

The first regime in the model was between 1999Q2-2002Q3. The break length is found to be 14 quarters.

The second regime in the model was between 2002Q4-2005Q4. The break length is found to be 13 quarters.

The third regime in the model was between 2006Q1-2009Q1. The break length is found to be 13 quarters.

The fourth regime in the model was between 2009Q2-2011Q4. The break length is found to be 11 quarters.

The fifth regime in the model was between 2012Q1-2015Q1. The break length is found to be 13 quarters.

The sixth regime in the model was between 2015Q2-2017Q4. The break length is found to be 11 quarters.

In this context, we need to determine in which dates the structural break intensified. The findings show that similar breaks have been experienced in 5 periods. We have found out that financial crises are effective when time span of structural breaks are considered. In general, structural breaks are observed in Turkey when the 2000-2001 banking crisis, 2006 US mortgage crisis, 2008 global crisis and 2015 European Union crisis occurred.

In Turkey's case, examining differentiating political strategies in the scope of different regimes would be healthful for our analysis. For example, 2001 financial crisis had been a breaking point for Turkish economy and structural reforms has been key aims in the period following the financial crisis. In this period, Turkey has switched to floating exchange rate regime. Furthermore, 'transition to strong economy' program has been put in action. We could list the main objectives of this program as, ensuring the fiscal discipline, precaution on banking sectors, implementing structural reforms. Nevertheless, the most important decision has been taken in this period was deciding CBRT's main objective as fiscal stability. For reaching this objective, CBRT is independent to use any tool and objective.

“CBRT has switched to implicit inflation targeting in period between 2002-2005. The main objective in this tool is inflation stability. In this period, which is promoted as a transition period, base monetary aim, switching to new Turkish lira and change in Turkstat data had been materialized.” (<http://www.tcmb.gov.tr/wps/wcm/connect/TR/TCMB+TR/Main+Menu/Temel+Faaliyetler/Para+Politikasi/Para+Politikasi+Cerceve>)

“In scope conventional politics, 2006 period has been an inflation targeting period. In this strategy, implicit inflation targeting tools has been widened. CBRT had set inflation targeting for some periods. This means controlling inflation with expectations. In this period, Monetary Policy Committee has been established. Monetary Policy Committee has been having monthly meetings where it is examined developments occurred, these meetings have been shared with public via calendar. As a result, Monetary Policy Committee established its decision maker status.” (<http://www.tcmb.gov.tr/wps/wcm/connect/TR/TCMB+TR/Main+Menu/Temel+Faaliyetler/Para+Politikasi/Para+Politikasi+Cerceve>)

“The last policy strategy of CBRT has been the macro prudential policy which has been applied after global financial crisis (2010-...). We have mentioned of functions of this policy in Chapter 2. If brief mentioning is necessary, in addition to inflation control which is a traditional targeting tool, controlling capital allocations via foreign exchange rate and credits has become the objective of this policy. Without doubt, communication policy of CBRT is also has been an effective policy.” (<http://www.tcmb.gov.tr/wps/wcm/connect/TR/TCMB+TR/Main+Menu/Temel+Faaliyetler/Para+Politikasi/Para+Politikasi+Cerceve>)

It is possible to interpret break points found by BP with events happened in the economy. The banking crisis, one has become evident at the middle of 2001, immediately affected all economic activities in Turkey. 2006 has been a sort of indicator for the 2008 financial crisis. The process has been started at 2006 with US mortgage crisis has affected all around the world in 2008. The quantitative easing

policies, which initiated for eliminating effects of financial crisis by Central Banks of developed countries at 2009, provided surplus of liquidity to markets. This situation has affected especially the emerging countries. Last but not the least, we could interpret the break between 2015 and 2017 with both European Union crisis and Brexit. Especially, uncertainties on economics and social life of European Union and other countries caused by Brexit creates a risk profile.

The BP test allows us to analyze the coefficients over different time periods. In this respect, the variation of the coefficients of the independent variables will give an idea of the sensitivity on the dependent variable. In the analysis of the break test when we look at the coefficient; there are important findings. We are examining magnitude or signs of coefficients separately. There is a remarkable period. When coefficient magnitude and signs are examined, 2009Q2-2011Q4 period attracts our interest.

The analysis gives strong evidence for the statistical significance of global variables; DXY index, World Money Supply and VIX (at more than 99% confidence level) on the cross-border bank-based gross capital flow in the 2009Q2-2011Q4. This is a period where emerging markets used quantitative easing for economic recovery following the global crisis. In this period, there has been a great sum of liquid and it was flowing to emerging countries.

In 2009Q2-2011Q4, DXY index has the highest coefficient, i.e. 9.6, for all values in the break regime for its value. As a result of the new monetary policies in the global markets, global liquidity has also increased in dollar terms. We can explain this incremental increase as a result of this development. Similarly, World Money Supply has a high coefficient value of 15.4. This is also the result of the monetary policies implemented by central banks in developed countries. However, when the VIX is examined, it is observed that the VIX coefficient differentiate from others and has the lowest value among all regimes. Although, the US 10 year government bond yield has similar coefficient values within all regimes. When the value of the VIX increases and uncertainty prevails, the cross-border-bank-based gross capital flow decreases. Therefore, the VIX coefficient has the lowest value of -0.3 in all regimes (Appendix 7.5). Similarly, the increase in US 10 year government bond yield negatively affects

capital movements. Interest income is inversely proportional to price. Hence, each increase in US 10 year government bond yield decreases dependent variable. The rise of the US 10 year government bond yield leads to a decline in investment appetite. In our local variables, CPI has a coefficient value of 9.6, REER has a coefficient value of -2.62, and GDP growth has a coefficient value of 0.02. These coefficient values are quite high and statistically significant when compared to other regimens. In 2009Q2-2011Q4 period, coefficient values in our global variables are considerably higher than other regimes (Appendix 7.5). We consider the reason for these high values to be a result of the abundant liquidity that exists in the market, which is the result of the central bank's new monetary policies.

Bruno, Shin (2013b) was intentionally testing 2010, the date on which its policies began to be implemented. We estimate the break date point as 2009Q2-2011Q4 period in the analysis of the coefficients in all regimes. After our prediction, we will evaluate both the global and local variability of the vulnerability of macroprudential policies to the dependent variable, which is customarily implemented by CBRT towards the end of 2010. In this direction, we will analyze the 2012Q1-2015Q1 and 2015Q2-2017Q4 periods over the 2009Q1-2011Q4 period results. Between 2012 and 2015, the negative effects of the global crisis on the world economy have begun to decline somewhat.

The FED ended the monetary expansion by October 2014 and entered the normalization process in monetary policy. This has led to a slight decline in abundant liquidity in global markets. It is important to note, between 2012 and 2015 cross-border banking capital flow into Turkey is continuing to increase with global capital flows. In this respect, it would be beneficial to examine the coefficients of our global variables (DXY index, VIX, World Money Supply) which are important for global liquidity according to 2009Q2-2011Q4 period. In this period there is a serious decrease in DXY index and World Money Supply coefficients. It can be considered that the decline in global liquidity in the mentioned period may explain the decrease in global dependent variable coefficients. However, we see that cross-border bank-based flows entering the Turkey have increased in this period. Therefore, we understand that the decline in dependent variable coefficients is not related to the global liquidity decline.

It is observed that there is some increase in the VIX variable coefficient. This situation is explained as follows; the uncertainty in global markets is less than in the global crisis period. In this respect, we conclude that macroprudential policies implemented by CBRT are effective in reducing the coefficients of global variables. In other words, the sensitivity of global variables to the capital movements is significantly reduced.

When evaluating local variables, the coefficient changes in CPI, Debt to GDP, GDP growth rate and REER give an idea of the effectiveness of the applied policies. The high coefficient in the CPI declines significantly in the period 2012Q1-2015Q1. We anticipate that the implementation of financial stability supervisory policies in addition to CBRT's price stability policy, in particular, is effective. Similarly, the changes in the Debt to GDP, GDP growth rate and REER coefficient values indicate that the sensitivity to local variables against global funding is decreasing. Turkey was sacrificing fiscal discipline during this period. As a result of strong budget balance, vulnerability to global funding has decreased. The increase in GDP increases the capital flow entering the country. However, in this period, the GDP growth rate variable is less sensitive to global funding. The increase in REER increases the capital movement according to the previous period. This increase causes the valuation of Turkish lira, resulting Turkey's exports to decline and imports to incline. As a result, the current account deficit is negatively affected and causes uncertainties about the future. The increase in return on 2 year government bond yield in Turkey negatively affects capital flows. However, no significant difference was observed between the 2009Q2-2011Q4 and 2012Q1-2015Q1 regimes. As a result, the sensitivity of both local and global variables to capital movements decreases significantly in parallel to macroeconomic policies in 2012Q1-2015Q1 period.

The last break point in the 2015Q2-2017Q4 regime includes some differences compared to the previous two rounds. Capital flows into Turkey has experienced fluctuations towards the end of 2016. The same situation has been observed in other developing countries, as well. However, in the period 2015-2017, capital movements increased compared to the period of 2012-2015. In addition, our analysis of this period gives us strong evidence for the statistical significance of all variables; (at more than

99% confidence level) on the cross-border bank-based gross capital flow. In the course of these assessments, we continue to evaluate the coefficients of our global variables with regression coefficients after 2011. Are our global variables against increasing capital flows less sensitive to capital movements as in the previous period?

We see a significant decrease in the DXY index coefficient relative to the previous regime. World Money Supply also continues to decline significantly. The sensitivity of the VIX, which is a dependent variable, decreases in this regime. Each increase in US 10 year government bond yield reduces the capital flow. However, no significant difference was observed in this regime in this variable. In line with this analysis, the sensitivity of global variables to capital movements continues to decline significantly. We see that the effectiveness of the new monetary policy continues to be influential, especially on global variables in this regime.

When we evaluate our local variables, GDP growth rate does not change with respect to the previous two regimes. While the increase in Deb to GDP will slow down the capital flow, it significantly reduces the sensitivity of the capital movements, especially due to its tight stance in the budget discipline between 2015-2016. The increase in REER similarly caused a rise in capital flows, while the vulnerability of the variable to global funding decreased compared to the previous regime. Each increase in the Turkey 2 year government bond yield represents an increase in the global fund. No significant difference was observed in this variable compared to the previous regime. This regime also draws attention to the value of one of the important indicators of Turkey's economy; CPI. While the sensitivity of our local variables to capital flows in general is declining in line with applied policies, we must question the reasons for the increase in CPI. While the sensitivity of our local variables to capital flows in general is declining in line with applied policies, we must question the reasons for the increase in CPI. CBRT did not attain similar success for inflation targeting. CBRT has taken some steps back from the mid-2016 target price stability target. To control inflation, it is necessary to struggle independently and use the whole mechanism at hand. At this point, sacrificing the price stability policy, which is the main objective of CBRT, could not be possible. CBRT, which puts special meaning to tight monetary

policy under inflation targeting, should be able to take actions independently if there is a disturbance in price stability. Protection of gains on pricing stability which obtained following the 2001 financial crisis has special importance.

In this chapter, we examined the effectiveness of macroprudential measures in the context of reducing the sensitivity of capital-flows to global and local variables. Many developing countries resort to macroprudential measures to limit the effects of global capital flows and to support financial and macroeconomic stability. As a result, we see that macroprudential policies work effectively in the 2012-2017 period, with global variables less sensitive to global funding. Besides, the sensitivity of local variables to capital flows is generally reduced.

5. CONCLUSION

The financial crisis initially affected US in 2008, had affected all around the world in a short span of time. The crisis that started in the US has spread quickly to other countries with the help of globalization. Basically, the economies of developed countries were affected by the impact of the crisis first. Later, as the developing countries were also affected by this situation, rapid capital outflows occurred from these countries. The Central Banks of developed countries have changed their monetary policy to remove the negative effects of the global crisis and stimulate economic activity. With quantitative easing, interest rates were set at zero levels, giving large amounts of liquid currency support to the markets. As the interest rates in developed countries are low and the interest rates in developing countries are high, there has been a significant amount of capital movement into developing countries. Local currencies because of the significant amount of capital flows in emerging countries such as Turkey are valued. This situation has increased the demand for asset prices. This has led to a rapid increase in foreign trade and current account deficit. The global crisis adversely affected Turkey, including the real sector at first, and caused deterioration in macroeconomic indicators. The CBRT's policy to limit macro and financial risks in the policies it has implemented since late 2010 is to limit the cyclical component of the current account deficit by placing the economy on a more balanced growth path. Thus, it is aimed to increase the durability of the economy against the sudden movements to be experienced in capital flows.

The 2008 financial crisis, which is considered to be the second biggest crisis since the crisis of 1929, caused significant changes in monetary policy. The emergence of the crisis at a time when price stability was achieved brought to the fore the concept of financial stability by raising the question of how monetary policy, which was focused on price stability before the global crisis, could be rearranged in a way that will also take into account financial stability (Özatay, 2012: 51-75).

In this direction, the CBRT has followed a policy aimed at ensuring financial stability as well as price stability. CBRT expanded its policy framework by developing tools

such as required reserves, interest rate corridor and ROM. These policy tools are able to respond quickly to volatilities on capital flows by affecting the exchange rate and credit channel separately. Conventional policies were applied before macroeconomic policies. At this point, the tool was short-term interest rates and the aim was price stability. It was the only economic indicator to keep inflation under control as a reflection of the main objective of the CBRT. In the monetary policy application where short-term policy rate is the only tool, credits and exchange rate channels do not need to be affected separately. Because it is enough for a monetary authority that focuses only on price stability to predict the impact of the change in policy rate on inflation. In contrast, monetary authority alone, which considers financial stability, is not sufficient to use policy interest. The need to influence lenders and exchange rate channels separately will arise.

In this study; the effectiveness of macroprudential policies developed by the CBRT against the volatility of capital flows is investigate. This situation was assessed between 1999Q4 and 2017Q4. We first performed a BP structural break test on our large data set and tried to estimate the break points for the relevant periods. After finding out break dates for five periods and taking high coefficient values as a basis, we have estimated the relevant break point as happened in 2009-2011 period. Following our estimation, we have compared coefficients against to break dates happened after 2009-2011. We have determined, macro prudential policies as a reason to decrease in break date coefficients. After taking this period as a basis, we have analyzed macro prudential policies effect on capital mobilization via including periods where macro prudential measures have taken and not taken. As a result, we have find out, macro prudential templates, when they are coordinated with market generally has significant effects. The macroprudential framework compatible with the market being implemented in Turkey shows that majorly effective to sensitivity for capital flows.

However, it is also important to note that macroeconomic policies cannot hold firm structural reforms. In most cases, macroprudential policies, deeper structural adjustments can be regarded as the second-best solutions to save time as they happen. To the extent that structural policies are sufficiently able to improve the resilience of

the economy on their own, there may be a role for unconventional monetary policy as well as macroprudential policies. For this reason, it is imperative to take structural measures to improve the trauma caused by large and volatile capital flows in the long run.

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The missions and responsibilities of the Central Bank of Republic Turkey.
(<http://www.tcmb.gov.tr/wps/wcm/connect/en/tcmb+en>).

CBRT is independent to use any tool and objective.
(<http://www.tcmb.gov.tr/wps/wcm/connect/TR/TCMB+TR/Main+Menu/Temel+Faaliyetler/Para+Politikasi/Para+Politikasi+Cerceve>)

7. APPENDIX

7.1 Model Appendix 1

Dependent Variable: LOAN_LN_DIF

Method: Least Squares

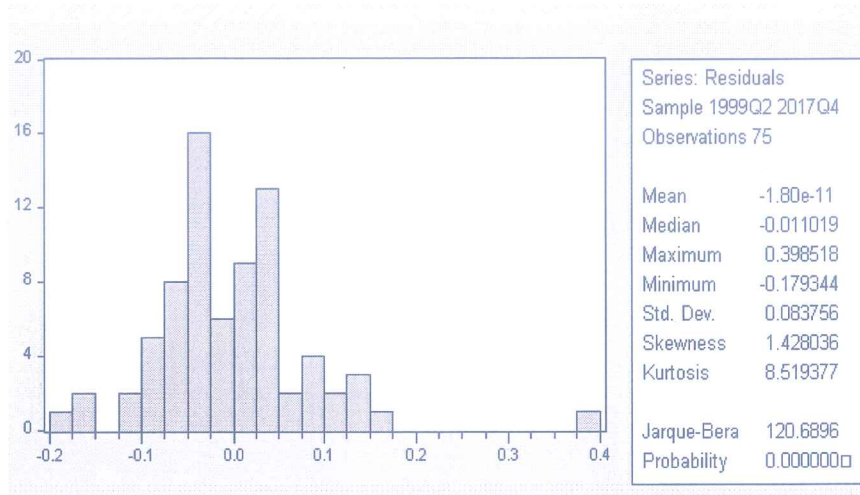
Date: 05/05/18 Time: 19:33

Sample (adjusted): 1999Q2 2017Q4

Included observations: 75 after adjustments

<u>Variable</u>	<u>Coefficient</u>	<u>Std. Error</u>	<u>t-Statistic</u>	<u>Prob.</u>
GDP__	0.008529	0.002273	3.751719	0.0004
DXY_LN_DIF	-0.710450	0.572909	-1.240074	0.2194
DEBT_TO_GDP__	-0.001827	0.001019	-1.792855	0.0776
CPI_LN_DIF	-0.940334	1.121416	-0.838524	0.4048
MONEY_LN_DIF	-0.814807	0.843146	-0.966389	0.3374
RER_LN_DIF	0.623017	0.181707	3.428694	0.0011
TUR2Y_GOV__	7.00E-05	0.000770	0.090914	0.9278
US10Y__	0.026259	0.012308	2.133451	0.0367
VIX_LN_DIF	-0.015752	0.046357	-0.339788	0.7351
C	-0.013651	0.043960	-0.310530	0.7572
<u>R-squared</u>	0.410916	<u>Mean dependent var</u>		0.025155
<u>Adjusted R-squared</u>	0.329351	<u>S.D. dependent var</u>		0.109674
<u>S.E. of regression</u>	0.089816	<u>Akaike info criterion</u>		-1.858547
<u>Sum squared resid</u>	0.524346	<u>Schwarz criterion</u>		-1.549549
<u>Log likelihood</u>	79.69553	<u>Hannan-Quinn criter.</u>		-1.735168
<u>F-statistic</u>	5.037868	<u>Durbin-Watson stat</u>		2.236113
<u>Prob(F-statistic)</u>	0.000037			

7.2 Histogram Normality Test_Appendix 2



Our model has meaningful and normal distribution.

7.3 Auto Correlation Test_Appendix 3

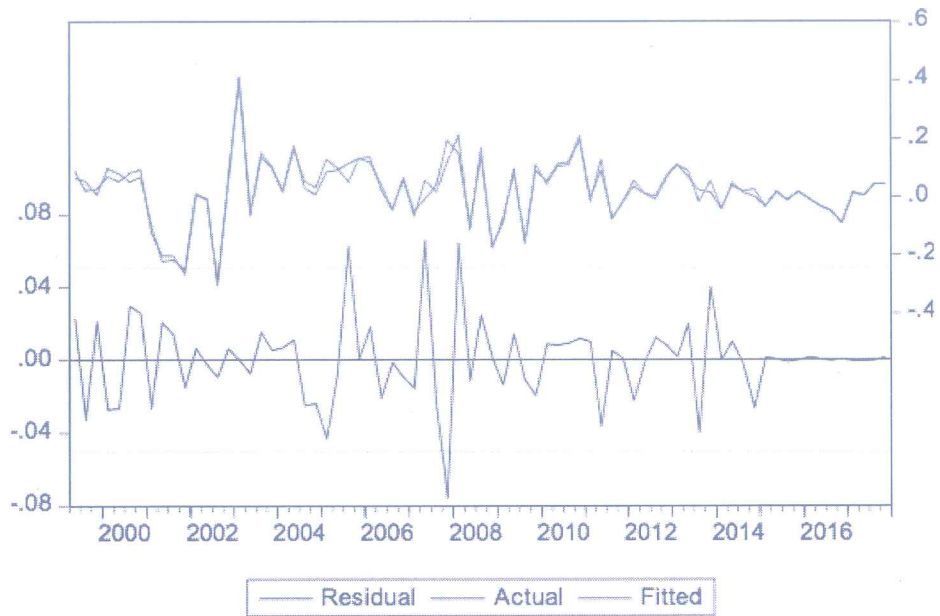
Date: 04/27/18 Time: 15:05

Sample: 1999Q1 2017Q4

Included observations: 75

Autocorrelation	Partial Correlation		AC	PAC	Q-Stat	Prob
. .	. .	1	-0.113	-0.113	0.9916	0.319
. *	. *	2	0.127	0.115	2.2622	0.323
. *	. *	3	0.141	0.171	3.8608	0.277
** .	** .	4	-0.263	-0.258	9.5027	0.050
. .	. .	5	-0.015	-0.119	9.5201	0.090
. .	. .	6	-0.098	-0.061	10.316	0.112
. .	. .	7	-0.047	0.040	10.501	0.162
. .	. .	8	-0.090	-0.133	11.201	0.191
. *	. .	9	0.076	0.051	11.701	0.231
. .	. .	10	0.039	0.057	11.839	0.296
. .	. .	11	-0.130	-0.149	13.369	0.270
. .	. .	12	0.025	-0.124	13.427	0.339
. .	. .	13	-0.140	-0.110	15.248	0.292
. .	. .	14	-0.155	-0.139	17.533	0.229
. .	. .	15	0.012	-0.053	17.547	0.287
. .	. .	16	-0.131	-0.122	19.215	0.258

7.4 Residuals Appendix 4



7.5 BP Structural Break Point Test Appendix 5

BP with multiple structural break test; we found 5 break dates. These are respectively; 1999 Q2,2002Q4, 2006Q1, 2009Q2 and 2015Q2. The results are shared below.

Dependent Variable: LOAN_LN_DIF
 Method: Least Squares with Breaks
 Date: 04/27/18 Time: 21:57
 Sample (adjusted): 1999Q2 2017Q4
 Included observations: 75 after adjustments
 Break type: Bai-Perron tests of L+1 vs. L sequentially determined breaks
 Break selection: Trimming 0.15, Max. breaks 5, Sig. level 0.05
 Breaks: 2002Q4, 2006Q1, 2009Q2, 2012Q1, 2015Q2
 HAC standard errors & covariance (Quadratic-Spectral kernel, Integer Andrews bandwidth)
 Allow heterogeneous error distributions across breaks

Variable	Coefficient	Std. Error	t-Statistic	Prob.
1999Q2 - 2002Q3 -- 14 obs				
GDP__	0.011786	0.004005	2.942871	0.0101
DXY_LN_DIF	-0.837664	0.775029	-1.080817	0.2969
DEBT_TO_GDP__	-0.000514	0.003503	-0.146630	0.8854
CPI_LN_DIF	0.489842	1.695853	0.288847	0.7767
MONEY_LN_DIF	-1.196759	0.898167	-1.332446	0.2026
RER_LN_DIF	0.405926	0.148909	2.725993	0.0156
TUR2Y_GOV__	0.001529	0.001163	1.314193	0.2085
US10Y__	0.148207	0.082249	1.801936	0.0917
VIX_LN_DIF	0.054495	0.109766	0.496465	0.6268
C	-0.921704	0.701926	-1.313107	0.2089
2002Q4 - 2005Q4 -- 13 obs				
GDP__	-0.014489	0.010102	-1.434214	0.1720
DXY_LN_DIF	0.223580	3.000536	0.074513	0.9416
DEBT_TO_GDP__	0.004648	0.005074	0.915986	0.3742
CPI_LN_DIF	12.86596	4.394946	2.927444	0.0104
MONEY_LN_DIF	-2.575533	4.575172	-0.562937	0.5818
RER_LN_DIF	-1.666798	0.191249	-8.715336	0.0000
TUR2Y_GOV__	-0.000163	0.003143	-0.051832	0.9593
US10Y__	-0.056106	0.047935	-1.170453	0.2601
VIX_LN_DIF	0.924732	0.171405	5.395003	0.0001
C	0.233916	0.424119	0.551533	0.5894

2006Q1 - 2009Q1 -- 13 obs

GDP__	0.026120	0.011232	2.325594	0.0345
DXY_LN_DIF	-1.772930	2.118683	-0.836808	0.4158
DEBT_TO_GDP__	-0.010308	0.011835	-0.870967	0.3975
CPI_LN_DIF	-14.48847	4.374288	-3.312189	0.0047
MONEY_LN_DIF	-2.956523	2.133588	-1.385705	0.1861
RER_LN_DIF	-0.118081	0.362913	-0.325371	0.7494
TUR2Y_GOV__	-0.019416	0.010561	-1.838503	0.0859
US10Y__	-0.045949	0.125480	-0.366185	0.7193
VIX_LN_DIF	0.083054	0.125477	0.661909	0.5181
C	1.032285	0.602844	1.712359	0.1074

2009Q2 - 2011Q4 -- 11 obs

GDP__	0.022671	0.003617	6.267788	0.0000
DXY_LN_DIF	9.559220	1.459141	6.551266	0.0000
DEBT_TO_GDP__	0.076461	0.019174	3.987822	0.0012
CPI_LN_DIF	10.34532	3.712671	2.786489	0.0138
MONEY_LN_DIF	15.44402	2.317030	6.665439	0.0000
RER_LN_DIF	-2.618969	0.776689	-3.371967	0.0042
TUR2Y_GOV__	0.022296	0.011502	1.938512	0.0716
US10Y__	-0.022683	0.065500	-0.346308	0.7339
VIX_LN_DIF	-0.377013	0.063451	-5.941789	0.0000
C	-3.558058	0.664299	-5.356105	0.0001

2012Q1 - 2015Q1 -- 13 obs

GDP__	0.003352	0.009359	0.358168	0.7252
DXY_LN_DIF	0.079160	1.558824	0.050782	0.9602
DEBT_TO_GDP__	0.015163	0.019031	0.796732	0.4380
CPI_LN_DIF	0.822577	3.341413	0.246176	0.8089
MONEY_LN_DIF	-0.920681	1.575016	-0.584554	0.5675
RER_LN_DIF	0.397358	0.760019	0.522827	0.6087
TUR2Y_GOV__	-0.033406	0.026224	-1.273837	0.2221
US10Y__	0.098722	0.120563	0.818840	0.4257
VIX_LN_DIF	0.037496	0.047871	0.783272	0.4457
C	-0.425271	0.652654	-0.651602	0.5245

2015Q2 - 2017Q4 -- 11 obs

GDP__	0.024496	0.000750	32.65503	0.0000
DXY_LN_DIF	-1.590711	0.072997	-21.79158	0.0000
DEBT_TO_GDP__	-0.089995	0.003172	-28.36737	0.0000
CPI_LN_DIF	7.063852	0.312304	22.61850	0.0000
MONEY_LN_DIF	-2.830728	0.175562	-16.12380	0.0000
RER_LN_DIF	-0.843748	0.031303	-26.95379	0.0000
TUR2Y_GOV__	0.037463	0.001316	28.46605	0.0000
US10Y__	-0.313330	0.013094	-23.93010	0.0000
VIX_LN_DIF	-0.038886	0.003838	-10.13164	0.0000
C	2.651664	0.096038	27.61062	0.0000
R-squared	0.956729	Mean dependent var	0.025155	
Adjusted R-squared	0.786529	S.D. dependent var	0.109674	
S.E. of regression	0.050673	Akaike info criterion	-3.136298	
Sum squared resid	0.038516	Schwarz criterion	-1.282307	
Log likelihood	177.6112	Hannan-Quinn criter.	-2.396020	
F-statistic	5.621214	Durbin-Watson stat	2.544329	
Prob(F-statistic)	0.000319			

7.6 BP Structural Break Point Test Appendix 6

Multiple breakpoint tests

Bai-Perron tests of L+1 vs. L sequentially determined breaks

Date: 05/10/18 Time: 17:09

Sample: 1999Q1 2017Q4

Included observations: 75

Breakpoint variables: GDP__ DXY_LN_DIF DEBT_TO_GDP__
CPI_LN_DIF MONEY_LN_DIF RER_LN_DIF TUR2Y_GOV__
US10Y__ VIX_LN_DIF C

Break test options: Trimming 0.15, Max. breaks 5, Sig. level 0.05

Allow heterogeneous error distributions across breaks

Sequential F-statistic determined breaks: 5

Break Test	F-statistic	Scaled F-statistic	Critical Value**
0 vs. 1 *	3.447483	34.47483	27.03
1 vs. 2 *	9.908210	99.08210	29.24
2 vs. 3 *	3.903464	39.03464	30.45
3 vs. 4 *	10.66521	106.6521	31.45
4 vs. 5 *	41.03973	410.3973	32.12

* Significant at the 0.05 level.

** Bai-Perron (Econometric Journal, 2003) critical values.

Break dates:

	Sequential	Repartition
1	2003Q1	2002Q4
2	2005Q4	2006Q1
3	2009Q2	2009Q2
4	2012Q1	2012Q1
5	2015Q2	2015Q2