THE RESPONSES OF ASSET PRICES IN TURKEY TO MONETARY POLICIES
OF FEDERAL RESERVE AND EUROPEAN CENTRAL BANK

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ABSTRACT

THE RESPONSES OF ASSET PRICES IN TURKEY TO MONETARY POLICIES OF FEDERAL RESERVE AND EUROPEAN CENTRAL BANK

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This study aims to investigate the responses of asset prices in Turkey such as stock market indices returns, exchange rates and domestic interest rate to the monetary policy changes of the Fed and the ECB for the pre- and post- global financial crisis. The time period of the study between 2004 and 2013 is separated into two main parts as the pre-crisis period (January 2004 - September 2008) and the post-crisis period (October 2008 - December 2013) by considering the key event of the global financial crisis, which is the bankruptcy of Lehman Brothers in September 2008. The study employs event-study approach and standard instrumental variables approach proposed by Rigobon and Sack (2004) by utilizing appropriate monetary policy measures for the pre- and post-crisis periods. The monetary policy measures are based on short-term interest rates for the pre-crisis period while the monetary policy measures are retrieved from longer-term interest rates for the post-crisis period. The findings of the study offer that the most of the asset prices in Turkey react significantly to the monetary policy changes of the Fed and the ECB while the assets do not respond significantly in general in the pre-crisis period. The accommodative monetary policy actions during the post-crisis period increase most of the returns of the stock market indices in Turkey and lead to appreciation of

Turkish lira against U.S. dollar. Furthermore, the expansionary policy implementations of the Fed during the post-crisis period result in depreciation of Turkish lira against euro as well as a decrease in the domestic interest rate.

ÖZET

TÜRKİYE'DEKİ VARLIK FİYATLARININ AMERİKA MERKEZ BANKASI'NIN VE AVRUPA MERKEZ BANKASI'NIN PARA POLİTİKALARINA TEPKİLERİ

Bakın, Bilge

Doktora, Bankacılık ve Finans Bölümü

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Bu çalışmanın amacı Türkiye'deki hisse senedi getirisinin, döviz kurunun ve yurtiçi faiz oranının Amerika Merkez Bankası'nın ve Avrupa Merkez Bankas'nın para politikalarına olan tepkilerini küresel kriz öncesi ve küresel kriz sonrası dönemlerde için incelemektir. 2004 ile 2013 yıllarını kapsayan çalışmanın periyodu, küresel krizin anahtar olayı olarak görülen Lehman Brothers'ın Eylül 2008'deki iflasının açıklanmasıyla veri seti iki bölüme ayrılmıştır. Küresel finansal kriz öncesi dönem, Ocak 2004 - Eylül 2008 zaman aralığını kapsarken; küresel kriz sonrası dönem, Ekim 2008 - Aralık 2013 zaman aralığını kapsamaktadır. Çalışmada yöntem olarak olay çalışması yaklaşımı ve Rigobon ve Sack (2004) tarafından önerilen araç değişkenler yöntemi kullanılmıştır. Kriz öncesi dönem için para politikası ölçümleri kısa vadeli faizler üzerine kurulurken, kriz sonrası dönem için para politikası ölçümleri uzun vadeli faizler üzerine temellendirilmiştir. Çalışmanın sonucunda, varlıkların birçoğunun kriz sonrası dönemde bahsedilen merkez bankalarının para politikası değişikliklerine anlamlı tepkiler verdiği gözlemlenirken, kriz öncesi dönemde genel olarak varlıkların tepkileri istatistiki açıdan anlamlı bulunmamıştır. Amerika Merkez Bankası'nın ve Avrupa Merkez Bankası'nın kriz sonrası

dönemdeki genişletici para politikaları Türkiye'deki endeks bazlı hisse senedi getirilerinin birçoğunda anlamlı bir artışa neden olurken, aynı zamanda Türk lirasının Amerikan doları karşısında değer kazanmasına da yol açmıştır. Ayrıca, Amerika Merkez Bankası'nın genişletici para politikaları kriz sonrası dönemde Türk lirasının euro karşısında değer kaybetmesine yol açmış, yurtiçi faizin de düşmesine neden olmuştur.

Anahtar Kelimeler: Para Politikası, Varlık Fiyatları, Olay Çalışması, Araç Değişkenler Yaklaşımı

To My Family

TABLE OF CONTENTS

LIST OF TABLES

LIST OF ABBREVIATION

BOE	Bank of England
CBRT	Central Bank of the Republic of Turkey
CDS	Credit Default Swap
ECB	European Central Bank
EMEs	Emerging Market Economies
EMU	European Monetary Union
EU	European Union
EURIBOR	European Interbank Offered Rate
ESCB	European System of Central Banks
Fed	Federal Reserve
FTOs	Fine-tuning operations
FOMC	Federal Open Meeting Committee
GMM	Generalized Method of Moments
LSAPs	Large Scale Asset Purchases
LTROs	Long-Term Refinancing Operations
MENA	Middle East and North Africa
MBS	Mortgage Backed Securities
MROs	Main refinancing operations
NCBs	National Central Banks
OLS	Ordinary Least Square
QE	Quantitative Easing
PDCF	Primary Dealer Credit Facility
SMP	Securities Market Program
TAF	Term Auction Facility
TSLF	Term Securities Lending Facility
U.K.	United Kingdom
U.S.	United States
VAR	Vector Autoregressive

CHAPTER 1

INTRODUCTION

The responses of asset prices to the changes in the monetary policy have gathered considerable attention in the existing literature. The central banks steer the monetary policy in order to affect the real economic variables such as aggregate output, inflation, employment etc. through the channels of interest rates, exchange rates and equity prices (Ireland, 2005). Therefore, it is vital for central banks to examine how the asset prices respond to the monetary policy changes. The study of Cook and Hahn (1989) becomes the pioneer of this literature by employing ordinary least square (OLS) regression (also called event-study approach in the literature) in order to observe the impact of changes in the federal funds rate target made by the Federeal Reserve (Fed) on the market interest rates in the United States (U.S). In the light of the study of Cook and Hahn (1989), the impacts of changes in the federal funds rate target on various assets in the U.S. for various time periods are investigated (Roley & Sellon 1995; Thorbecke, 1997). Later, the following studies make valuable contributions to this literature by retrieving a surprise component of the federal funds rate target changes and using this component as monetary policy measure under event-study approach so as to obtain more reliable results (Bomfim & Reinhart, 2000; Kuttner, 2001; Cochrane & Piazzesi, 2002; Gürkaynak et al., 2005). In addition to event study approach, there also exist studies utilizing vector autoregressive (VAR) structures in order to examine the responses of the asset prices to the monetary policy changes (Thorbecke, 1997; Bernanke & Kuttner, 2005). However, even though event-study is the most prevalent approach used in the estimation of asset prices' responses to the monetary policy changes, the estimators of event-study could be biased due to the endogenity and omitted variables problems. In order to deal with these problems, Rigobon

and Sack (2004) propose a technique called identification through heteroskedasticity that can be implemented via standard instrumental variables and generalized method of moments (GMM) approaches. These approaches give more reliable results as they require weaker set of assumptions than the event-study approach does. In addition to these studies, there are also some studies that focus on the international spillover mechanism of monetary policy and investigate the reactions of asset prices in foreign countries to the U.S. monetary policy changes (Becker et al., 1995; Ehrmann et al. 2005; Wongswan, 2006; Valente, 2009; Rosa, 2011, Hausman & Wongswan, 2011).

Although a vast amount of research concentrates on the impact of U.S. monetary policy on the asset prices, there also exist some studies inspecting the responses of asset prices to the monetary policy announcements of the European Central Bank (ECB) by selecting euro area policy measures (Perez-Quiros & Sicilia, 2002; Bernoth & Hagen, 2004; Brand et al., 2006; Kleimeier & Sander, 2006; Both et al., 2008; Kholodilin et al., 2009).

The studies mentioned above investigate the impacts of the monetary policies of the U.S. and euro area on the asset prices for the period before the global financial crisis, in which conventional monetary policy tools are employed and the monetary policy proxies are based on short-term interest rates. However, when the banks and financial institutions were exposed to considerable losses resulting from subprime mortgage market loans in 2007, the U.S. and global financial markets encountered the likelihood of financial crisis (Cecchetti, 2009). The financial turmoil in the financial markets resulted from the subprime crisis intensified and turned into a global financial crisis with the collapse of Lehman Brothers in September 2008 (Mishkin, 2010). In order to provide stability and functionality for the financial markets suffering from the severe impacts of this crisis, the Fed had maintained overnight interest rate at zero lower bound during the period following the collapse of Lehman Brothers. Since the policy rates at zero lower bound were not sufficient to stimulate the economy alone, the Fed had also taken significantly unprecedented expansionary policy measures (also called unconventional policy measures) such as forward guidance, large-scale asset purchases and the maturity extension program (Labonte, 2014). On the other hand, the ECB had also implemented bold non-standard

2

measures in order to maintain the health of the banking system and to protect the effective role of monetary policy mechanism in the euro area. The supplementary long-term refinancing operations, Covered Bond Purchase Programs, Securities Market Program and Outright Monetary Transactions program were major non-standard measures of the ECB during the period aftermath of Lehman Brothers bankruptcy and the sovereign debt crisis (Cassola et al., 2010; Cour-Thimann & Winkler, 2013). By considering the period in which the Fed and the ECB implemented accommodative monetary policies by taking unprecedented monetary policy measures, the researchers are interested in the impacts of the unconventional monetary policy actions of the Fed and the ECB on various financial assets (Gagnon et al., 2011; Wright, 2011; Chodorow-Reich, 2014; Bowman et al., 2015; Rogers et. al., 2014; Eser & Schwaab, 2015). In addition to them, there also exist recent studies that compare the responses of asset prices to the conventional and unconventional monetary policy actions of the Fed and the ECB in the literature (Glick & Leduc, 2013; Unalmis & Unalmis, 2015; Haitsma et al., 2015). The significant point is that the monetary policy measures are based on the long-term rates for the unconventional period, whereas the monetary policy measures of the conventional period are based on the short-term rates. Wright (2011) states that since the Fed keeps the target rate at zero lower bound, and monetary policy announcements have little impact on the anticipations over the next few quarters, it is better to select monetary policy measures based on the changes in the longer-term interest rates during the unconventional policy period. Rogers et al. (2014) also support this view and claim that the monetary policy measures can be based on long-term government bond yields, as central banks could influence their own bond yields effectively when the monetary policy rates are at zero lower bound, and when they implement unconventional monetary policy tools.

The accommodative monetary policies with fragile recoveries in the U.S. and the euro area aftermath of the global financial crisis have resulted in abundant but extremely volatile global liquidity. These developments give rise to excessively volatile short-term capital flows towards emerging market economies (EMEs), such as Turkey. Hence, these extremely volatile short-term capital flows jeopardize the macroeconomic and financial stability in Turkey (Aysan et al., 2014). By considering these developments since the

collapse of Lehman Brothers in September 2008, this study aims to investigate the reactions of the asset prices, namely; stock market returns, exchange rates and domestic interest rate in Turkey to the monetary policy announcements of the Fed and the ECB for the pre-global financial crisis period (January 2004 - September 2008) and post-global financial crisis period (October 2008 - December 2013) separately by employing event-study approach and instrumental variables approach offered by Rigobon and Sack (2004). The main motivation of this study is to reveal whether the asset prices become more sensitive to the monetary policy changes in the advanced economies in the aftermath of the global financial crisis, which in turn may lead to Turkey's economy and financial system to become more sensitive against external shocks. By regarding this motivation, this study makes contribution to the existing literature in some aspects. Firstly, this study separately investigates the reactions of asset prices in Turkey to the monetary policy changes in the U.S. for the pre- and post-global financial crisis periods by employing the appropriate monetary policy measures for the periods in order to offer some empirical findings as to whether the asset prices become more responsive to the monetary policy announcements of the Fed during the post-crisis period when compared to pre-crisis period. Secondly, this study contributes to the literature by offering empirical evidence on how the asset prices in Turkey respond to the monetary policy changes in the euro area for the pre- and post-global financial crisis periods. It also reveals whether the asset prices in Turkey become more responsive to the monetary policy announcements of the ECB during the post-crisis period or not.

This study proceeds as follows: the overview of the transmission mechanism of monetary policy is given in Chapter 2 and the related literature review is provided in Chapter 3. The methodologies are presented in Chapter 4. The monetary policy actions, the data and the empirical findings for the Fed and the ECB are offered in Chapter 5 and Chapter 6, respectively. Finally, the conclusion is summarized in Chapter 7.

CHAPTER 2

OVERVIEW OF TRANMISSION MECHANISM OF MONETARY POLICY

2.1   Theoretical Background of Monetary Policy Transmission Mechanism

The central banks, monetary authorities in the economies, are responsible for taking necessary monetary policy actions in order to affect the real economy (i.e. to stabilize inflation and to stimulate economic growth) by considering their primary objectives. The process from monetary policy actions to the real economy is defined as the transmission mechanism of monetary policy. This mechanism depicts how the adjustments in the short-term nominal interest rates or in the nominal money stock influence the variables of real economy such as aggregate output or employment (Ireland, 2005). In the monetary policy theory, there exist different views on the means of monetary policy transmission mechanism namely; *quantitative theory of money*, *interest rate channel, other asset prices channels* and *credit channel*. The details of these views are explained below:

2.1.1   The Quantitative Theory of Money

Humphrey (1974) comprehensively discusses the role of quantitative theory of money, its postulates and its evolution in his paper. The quantitative theory of money, supported by classical economists and further improved by neoclassical economists, is based on the fundamental logic that any adjustments in the quantity of money in circulation affect the general price level of goods and services. The quantity of money in circulation majorly determines the value of money. For instance, scarcity (abundance) of money causes rise (fall) in its value or its purchasing power, which leads to fall (rise) of the general price

level of commodities. The money stock, denoted by *M,* is the major determinant of the price level of goods and services, *P*. This theory offers some propositions and postulates so as to verify its claim. The first one is that the percentage change in P is the identical amount in the percentage change in M in the long-run equilibrium. The second proposition is that the causal relationship of this theory runs from M to P. M changes initially then the changes in M trigger the changes in P. Thirdly, the neutrality postulate states that the real economic variables, such as aggregate output and employment are determined by non-monetary factors such as tastes, technology etc. The changes in monetary conditions have no influence on the real economy except in transitional periods. This implies that, the effect of money on real economic variables is neutral in the long run. The fourth postulate, monetary theory of price level, claims that the change in quantity of money is the major determinant of the change in price level. Furthermore, the instability in price level is the result of monetary based disturbances, instead of non-monetary disruptions stemming from the real sector in the economy. The final assumption, exogeneity of the nominal stock of money, maintains that the nominal stock of money is an independent factor driving P, which makes M to be an exogenous variable in the determination of price level.

2.1.2 Interest Rate Channel

The central banks manage the short-term and long-term interest rates by steering the money supply in order to affect real economic variables including real aggregate output and inflation. For instance, the increase (decrease) in money supply brings about decline (rise) in the short-term interest rates. The change (either increase or decrease) in the short-term rates affects the expectations of market participants for future short-term interest rates, which influences the long-term interest rates by depending on the *expectations model of term structure*. Thus, the actions of the central banks inducing the short-term and long-term interest rates shape the decisions of consumption and investment (Taylor, 1995).

Mishkin (1996) depicts the monetary policy transmission mechanism through the view of Keynesian ISLM, which is as follows: The increase in money stock (M ↑) implying an expansionary monetary policy leads to a decrease in real interest rate (i_r ↓), resulting in the

6

lower cost of capital. Lower cost of capital increases the investments (I ↑), thus raising the aggregate demand and total output (Y ↑). In essence, rather than the short-term rates, real long-term interest rates have influence on the spending on business related fixed investments, inventory investments, housing investments and the expenditures on durable consumer goods. The increased spending in all these items also raises the total output. On the other hand, this mechanism also works when the nominal interest rates are at the zero lower bound. The increase in money stock (M ↑) causes rise in the general price level of goods and services (P_e ↑) and the expected inflation rate (π_e ↑). This leads to decrease in the real interest rate (i_r ↓) even if nominal interest rate is zero, thereby promoting investment (I ↑) and increasing total output (Y ↑).

2.1.3 Other Asset Prices Channels

The traditional interest rate channel of Keynesian view is criticized by the monetarist economists and they argue that besides the interest rate channel, the prices of other assets such as exchange rates, equity prices and real estate prices are also the means of transmitting monetary policy actions to the real economy (Mishkin, 1996).

a)   Exchange Rate Channel

The exchange rate channel works in the money transmission mechanism through two ways. The first one occurs through the net exports. When central banks conduct expansionary monetary policy actions (M ↑), they lower the domestic interest rates (i_r ↓). According to the interest rate parity relationship, the domestic currency is likely to depreciate up to the point in which the rates of returns at home and foreign country are equal to each other (Taylor, 1995). As the domestic currency depreciates (E↓), the domestic goods become cheaper than the foreign goods, thus increasing the net export (NX↑). This gives rise to an increase in total output (Y↑) (Mishkin, 1996). On the other hand, exchange rate can be a channel in money transmission mechanism through the balance-sheets (Mishkin, 2001). In most of the emerging economies, the firms may have debt denominated in foreign currencies. The increase in money supply (M ↑) gives rise to

depreciation of domestic currency (E↓), an increase in debt burden and a decrease in value of assets, hence a decline in net worth (NW↓). As a result, worsening balance sheets may lead to moral hazard and adverse selection problems, thus causing decline in lending (L↓). The decline in lending results in a decrease in investment (I↓), hence a decrease in total output (Y↓).

b)   Equity Price Channel

Mishkin (1996) ties the equity prices as a way of transmission mechanism to two routes namely; *Tobin's q* and *wealth effect*. The theory of Tobin's q (Tobin, 1969) defines the *q* value by dividing the market value of a firm to the replacement cost of capital. The higher the q value, the higher the market value relative to the replacement cost of capital. The firms with high q values could issue a small amount of new equity and make new investments such as plant and equipment capital, due to the relatively cheaper replacement cost of capital. On the contrary, the firms with low q values do not tend to make new investments, as the replacement cost of capital is higher in comparison to its market value. These firms acquire old equipment or an old firm when they are in the need of capital. In sum, higher q means more investment spending. When it comes to the link between this theory and the monetary policy, as the money supply increases (M ↑), the public is more likely to spend on the stock market, thereby increasing the demand for stocks and increasing the prices of stocks (P_e ↑). On the other hand, the expansion in money supply (M↑) lowers the interest rates (i_r ↓), which makes bonds lose their attractiveness when compared to stocks. This also increases demand for stocks and raises the stock prices (P_e ↑). Increased stock prices raise the market value of firms, thereby increasing q (q↑). The rise in q leads to more investment spending (I↑) as explained above. The increased investment also raises total output (Y↑).

In terms of household wealth effect, the life cycle framework of Modigliani (1971) states that the lifetime resources of consumers, human and real capital and financial wealth, have a major role in the spending of consumers (as cited in Mishkin, 1996). In essence, financial wealth, chiefly made up of common stocks, is affected by the monetary policy decisions.

8

For instance, when the expansionary monetary policy is applied (M↑), the financial wealth through stocks also increases, as the stock prices go up (P_e ↑). The increase in financial wealth stimulates consumer spending (C↑). Therefore, the increase in consumption causes rise in total output (Y↑) (Mishkin, 1996).

c)   Real Estate Price Channel

The real estate price channel of monetary policy transmission mechanism operates via housing expenditures and household wealth effect. The monetary policy decisions have direct effect on the housing expenditures. The increase in money stock (M↑) gives rise to decline in interest, thus decreasing the financing cost of housing and increasing the house prices (P_h ↑). On the construction side, low construction costs relative to higher house prices offer profitable opportunities for firms to increase construction of houses, thereby increasing expenditures for houses (H ↑). This leads to rise in aggregate demand (Y ↑). In terms of household wealth effect, one of the significant resources of household wealth is housing prices. The expansionary monetary policy (M ↑) increases the housing prices (P_h ↑) and thereby raising household wealth. The increase in wealth results in household consumption (C ↑), thus increasing in total output (Y↑) (Mishkin, 2001).

2.1.4   Credit Channels

As a response to the controversial views on the roles of asset prices in the transmission mechanism of monetary policy, the credit channel brings a new perspective to the monetary policy transmission mechanism. The credit channel transmits the monetary policy actions to the real economy through three routes; namely, *bank lending channel*, *firm balance sheet channel* and *household balance sheet channel* (Bernanke & Gertler, 1995; Mishkin, 1996; Mishkin, 2001).

9

a) Bank Lending Channel

Bernanke and Gertler (1995) claim that the credit supply provided by banks has significant impact on the economy. The banks are major sources of credit supply and many borrowers (such as small- and medium- size enterprises) are considerably dependent on these credits. When the supply of credit offered by banks is interrupted, the borrowers search for new lenders, which causes a rise in the external finance premiums. As a result, the real economic activities are adversely affected by the reduction of credit supply. Moreover, by regarding the importance of bank loans on the economy, Mishkin (1996) depicts the role of bank lending channel in the transmission mechanism as follows: The increase in money stock ($M \uparrow$) leads to a rise in bank reserves and bank deposits. This raises the amount of accessible bank loans, which indicates the increase in lending ($L \uparrow$). As the bank-borrowers take out more bank loans, they tend to invest more ($I \uparrow$). Hence, the rise in investment causes an increase in total output ($Y\uparrow$).

b) Firm Balance-Sheet Channel

The impact of balance-sheet of firms on the total output particularly depends on the lending which is affected by the moral hazard and adverse selection problems. As the net worth of firms decreases, the firms are likely to be involved in moral hazard problem by taking part in more risky investment projects. This means that the lenders may not be paid back since these firms have less collateral and are more likely to be exposed to losses stemming from adverse selection. Therefore, the borrowing opportunities are limited for the firms with lower net worth. In sum, when the expansionary monetary policy actions lead to a rise in the stock prices ($P_e \uparrow$), the net worth of firms also increases due to the higher stock prices ($NW \uparrow$). Since the firms with a higher net worth do not favor risky projects, it results in a decrease in moral hazard and adverse selection problems. As a result of this, the lending opportunities become more available for the firms to increase their investments ($I \uparrow$), which increases the investments and boosts the total output ($Y \uparrow$) (Mishkin, 2001).

c) Household Balance-Sheet Channel

The household balance-sheet, another important channel in transmission mechanism, especially depends on the liquidity effect on the household expenditures on durable goods and housing. The durable goods and houses are less liquid assets when compared to the financial assets, such as bonds and stocks. The households feel themselves more secure if they have more financial asset when they encounter financial distress. When households posseses more financial assets compared with their debt, they assume that their likelihood to be exposed to financial distress is lower. Feeling more secure against the financial distress encourages the households to purchase more durable goods and houses. Hence, the increase in money stock ($M \uparrow$) leads to a rise in the prices of financial assets ($P_s \uparrow$), thereby decreasing in the probability of being exposed to financial distress. As a result, lower financial distress gives rise to an increase in consumption ($C \uparrow$), thus increasing the total output ($Y \uparrow$) (Mishkin, 2001).

2.2 International Transmission Channels of Monetary Policy

In the recent decades, the economic globalization has strengthened due to the improvements in the integration of international markets. As the financial markets and economies are tied strongly at an international level, the domestic financial environments are likely to be more vulnerable to various external shocks (Kamin, 2010). As experienced in the recent years, the responses of major central banks to the global financial crisis give rise to considerable impacts on the emerging economies through highly volatile short-term cross-border capital flows (Kara, 2012). Therefore, the monetary policy stance in one country could affect the economies of other countries via various channels. The international spillover channels of monetary policy transmission mechanism are summarized as follows:

a) International Portfolio Balance Channel

This channel functions by depending on the substitutability between the domestic and foreign assets (Fratzscher et al., 2014). For instance, the accommodative policy in a major country leads to decreasing the term premium in domestic long-term interest rates. Therefore, the investors may search for more risky international debt instruments with similar maturities and higher yields. This upsurges the demand for foreign debt instruments, which also gives rise to an increase in the prices of these instruments and decrease in their yields. As seen, the monetary policy changes in advanced economies could influence the foreign long-term yields in other economies due to the portfolio balance approach of investors (Chen et al., 2012; Bauer & Neely, 2013; Lavinge et al. 2014; Takáts & Vela, 2014). This channel is also valid for the equity markets. The abundance of global liquidity and low interest rate levels due to the accommodative policies in advanced economies influence the sentiment of investors about risk-taking and drive investors to seek for the assets with higher yields in the emerging market economies. Therefore, this results in capital inflows to these markets and increase asset prices such as equity prices (Chen et al., 2012; Fratzscher et al., 2014).

b) Signaling Channel

In the signaling channel, the central banks declare information about their future monetary policy actions in order to influence the interest rates (such as lowering long-term yields) through market expectation. Due to various economic linkages between the economies, the central banks react to global financial and economic developments in similar ways. If the central bank in one of the major economies states information about its future monetary policy path, the other central banks may also take a similar monetary policy action (Bauer & Neely, 2013).

c) Exchange Rate Channel

The exchange rate balancing is another international spillover channel of monetary policy. The monetary policy stances in major economies such as accommodative monetary policy actions decrease the yields in the domestic country, which makes the investments based on domestic currency less attractive. Therefore, the investors may be interested in assets denominated in other currencies with higher yields. As seen, the accommodative policies in advanced economies lead to a depreciation of major currencies and appreciation of domestic currencies of developing and emerging market. The currency appreciations also lead to a decrease in export and hurt the trade competitiveness in these economies (Chen et al., 2012; Takáts & Vela, 2014).

d) International Bank Lending Channel

As the globalization increases in the banking system and the geographical boundaries lose their importance, the global banking has significant role in the transmission of shocks to the international financial markets. A liquidity shock initiated by the monetary policy not only influences the balance sheet of subsidiary of a global bank, but also affects the balance sheets of other branches or the parent across borders, as the shock leads to internal funding flows within the global bank (Ceterolli & Goldberg, 2012). On the other hand, Morais et al. (2015) claim that a credit supply to local firms by the foreign banks are affected significantly by the monetary policies of their home countries.

CHAPTER 3

REVIEW OF LITERATURE

In the existing literature, there are numerous studies interested in the monetary policy actions on the asset prices from both theoretical and empirical perspectives. Among them, some studies focus on the responses of asset prices of a country to its own monetary policy changes whereas some concentrate on the impacts of advanced countries' monetary policy actions on other countries' asset prices. In essence, most of these studies are interested in the impact of the monetary policy actions of central bank of U.S., the Federal Reserve (Fed), on the asset prices in the U.S. The study of Cook and Hahn (1989) is one of the earlier papers that investigate the impact of the changes in federal funds rate target on the market interest rates. They support the idea that the Fed can influence the movements of interest rates by depending on three notions. Firstly, the federal funds rate is employed as the Fed's monetary policy tool. Secondly, by making intermittent target changes in federal funds rate, the Fed reacts to the information about macroeconomic variables that could affect its decisions such as rates of money growth and inflation, unemployment, and foreign exchange rates. Thirdly, the Fed can induce long-term yields via the expected values of funds rate for the related time horizon. They apply event-study approach based on Ordinary Least Square (OLS) regression for the 75 dates of the federal funds rate target changes. The time span of the study is between September 1974 and September 1979. Their model is constructed as in Equation (3.1):

$$\Delta i_t = b_0 + b_1 \Delta r_t + u_t \tag{3.1}$$

where Δi_t denotes the changes in 3-, 6-, 9-month U.S. Treasury bill yields and 3-, 5-, 7-, 10-, 20-year U.S. Treasury bond yields and Δr_t denotes the changes in federal funds rate target. They find that the changes in the target rate lead to large, moderate and small movements in the short-term, intermediate-term and long-term interest rates respectively for that period. All empirical results are significant and in the same direction with the target rate changes. The findings also support that as the maturity of a bond increases, the impact of federal fund rate target changes on the bond yields tends to decline.

Roley and Sellon (1995) also conduct event-study analysis in order to examine how monetary policy changes affect the long-term interest rates through forward rates in the U.S. By depending on the expectation theory of term structure, they claim that the monetary policy actions shape long-term interest rates via current short-term interest rates and the expectations of market about the future short-term interest rates. The future expectations of investors about the yields are reflected by the forward rates. The empirical findings of the study indicate that the relationship between long-term rates and monetary policy decisions is more variable due to the impact of market anticipations on long-term yields. Moreover, Thorbecke (1997) investigates how the monetary policy actions of the Fed affect the stock market returns. By conducting event-study approach, it is found that the expansionary (contractionary) monetary policy actions lead to a rise (decline) in stock market returns in the U.S., through raising (decreasing) future cash flows or lowering (increasing) the discount rate factors employed in the stock valuation. Furthermore, Bomfim and Reinhart (2000) examine the impact of the federal funds rate changes on the various financial assets in the U.S., including debt securities, stock indices and exchange rate by using event-study approach and regarding the periods of pre-1994 and post-1994. The monetary policy proxy is the unexpected (surprise) component of the Fed funds rate target changes. Surprise part is the subtraction of expected part from the actual Fed funds rate. The expectations of market participants are measured from the survey of Money Market Services (MMS) and from the rates on short-term future contracts. The study confirms that the strongest and most significant impacts of monetary policy actions are detected on short-term yields.

Kuttner (2001) applies the event-study approach in the study of Cook and Hahn (1989) for the dates between 6 June 1989 and 2 February 2000 in order to examine how the federal fund rate target changes affect U.S. Treasury securities. However, the results in this study are smaller and have a lack of significance for the post-1989 period. These findings prove that the changes in target rate are expected in that period. Furthermore, the rates of bonds, are determined in the forward-looking markets, react in different ways to the expected and the unexpected components of the target rate changes. For instance, the bonds having longer-term maturities respond little to the expected component. Therefore, instead of considering only target rate changes, Kuttner (2001) separates the changes in the Fed funds rate target into two elements: expected and unexpected (surprise) parts. The actual changes in the Fed funds rate (Δr_t) is constructed as the sum of expected element (Δr_t^e) and unexpected element (Δr_t^u) in Equation (3.2):

$$r_t = r_t^e + r_t^u \tag{3.2}$$

The unexpected element is obtained from Equation (3.3).

$$r_t^u = \frac{T}{T-t} \left(f_{n,t} - f_{n,t-1} \right) \tag{3.3}$$

The Fed funds future contracts, traded at the Chicago Board of Trade, are considered as the market- based measure for the expectations about the decisions of the Fed's monetary policy. That is why it is preferred to capture the surprise part. The announcement of FOMC is set on day t in month n. T denotes the number of days in month n. $f_{n,t}$ is rate on the federal funds futures on day t of month n. Kuttner (2001) regresses each rate of 3-month, 6-month and 12-month bills and 2-year, 5-year and 10-year notes and 30-year bonds on the expected and unexpected elements of the Fed funds target changes. According to the empirical results, the anticipated part has a small and insignificant impact on the interest yields, whereas the surprise part has a large and significant effect on them. By distinguishing the target rate changes into two components, the model is saved from the errors-in-variables problem, which results from the contamination effect of changes in expected component on the unexpected rate changes.

Additionally, Cochrane and Piazzesi (2002) measure the monetary policy impact on the debt securities in the U.S by using daily data with regression analysis. The monetary policy proxy is determined as 1-month eurodollar rate, which reflects the unanticipated movements of the federal funds target change. The unexpected target changes lead to the yields of U.S. Treasury securities to move in the same direction with large magnitudes.

As different from these studies, Gürkaynak et al. (2005) consider the Federal Open Market Committee's (FOMC) statements (the power of words) as a factor influencing the financial assets in the U.S., as well as the standard monetary policy proxies when inspecting the time span from January 1990 to December 2004. In the first part of their study, the monetary policy measure is selected as the surprise component of changes in current federal funds rate target and this measure is employed in the event-study analysis for the intraday data as well as daily data. The analysis of intraday data is based on a tight window (thirty-minute) and a wide window (one-hour). The objective of handling high frequency data is to obtain more precise results since daily data may contain omitted variables problem (the information about other macroeconomic news, which may affect the financial assets). However, their results prove that daily data works as efficiently as intraday data and gives similar results to the results of intraday data except on the dates in which employment reports are released. According to the empirical test results, it is confirmed that there is a negative and significant relationship between the stock market and monetary policy shocks, while the relationship between monetary policy shocks and the interest yields is positive and significant. Furthermore, they run the regression analyses with two factors in the second part of their study. The first factor is *the current federal funds rate target*, a combination of both sets of federal funds futures and eurodollar futures rate expiring within one-year or less. This factor gives similar results when compared to the results of the monetary policy proxy selected in the first part, since the factor is also correlated with the surprise part of federal funds rate target. The second factor that brings different perspective to their study is the *future path of policy*. This factor includes the FOMC announcements influencing the futures rates for the forthcoming year while not changing the current federal funds rate. As a result, it is claimed that the statements of FOMC have an impact on the expectations of market participants by implying the policy actions that

17

would be taken in the future. Therefore, by the help of the expressions in the statements, the Fed influences the longer-term interest rates and the economy in general by shaping the future expectations of market participants.

Apart from empirical evidences based on the event-study approach, there also exist researches conducting vector autoregressive (VAR) method in order to show how monetary policies affect the stock and bond markets. Thorbecke (1997) applies VAR structure in order to observe the impacts of the monetary policy actions, gauged as federal funds rate and non-borrowed reserves on the stock returns from different sectors by also regarding the industrial production growth, the inflation rate, the index of commodity prices, and total reserves. For various industries, the relationship between stock market returns and the federal funds rate is negative and significant, whereas the impact of non-borrowed reserves on the returns is positive and significant. Both results imply that loose (tight) monetary policies give rise to an increase (decrease) on stock market returns. Moreover, Bernanke and Kuttner (2005) disentangle how the equity market reacts to the unexpected monetary policy changes of the Fed for the time span between June 1989 and December 2002. Their various event-study based empirical analyses demonstrate that there is a significant and negative relationship between broad stock market index and the surprise component of the federal funds rate changes. They also apply their analyses into different industries. However, the results tend to be variable depending upon type of the industry. Additionally, they carry their studies one step further so as to determine the factors through which monetary policy changes have an impact on the equity market. In order to research this question, they employ VAR structures as observed in the studies in the Campbell (1991) and Campbell and Ammer (1993). The changes in excess returns of equities are decomposed into the parts namely; the news about future dividends, news about future real interest rates and news about expected future excess returns and analyzed under VAR systems (Campbell & Ammer, 1993). By following these components, Bernanke and Kuttner (2005) try to capture the influence of unexpected federal funds rate changes on the expected future dividends, expected future real interest rates and expected future excess returns. They determine the components, which have a larger impact on the negative relationship between the equity market and unexpected monetary policy changes

18

of the Fed. According to their results, the expectations of future excess returns and expectations of future dividends have significant impact on this relationship whereas the influence of expectations of future real interests on this linkage is direct and slight. In the light of these results, they claim that tight (loose) monetary policy actions give rise to a decrease (increase) in the stock values by increasing (decreasing) the expected equity risk premium.

Different from the event-study methodology, Rigobon and Sack (2004) offer a technique which is called identification through heteroskedasticity. Since Cook and Hahn (1989), most of the empirical studies mainly utilize event-study method with a strong assumption that the monetary policy shocks have the largest impact on the financial assets in policy days when compared to the other shocks. Additionally, the event-study also ignores the endogenity problem which means the simultaneous relationship between monetary policy announcements and asset prices. The changes in asset prices may also lead to changes in monetary policy rates. Therefore, they propose identification through heteroskedasticity approaches namely; *standard instrumental variables* and *generalized method of moments (GMM)* so as to obtain reliable estimators under weaker assumptions. Both of these methods consider the non-policy days as well as the policy days. In their study, the impacts of the Fed's monetary policy announcements on the financial assets are investigated by these heteroskedasticity-based approaches and the event-study for the time spanning between 3 January 1994 and 26 November 2001. The monetary policy proxy of this study is based on the rate of eurodollar futures contract, which is the nearest to expire depending on the timing of FOMC announcements. The empirical test results show that the main stock market indices in the U.S. give significant and negative responses to the monetary policy changes under both the event-study approach and heteroskedasticity-based approaches. In terms of Treasury yields, short-term and intermediate-term Treasury yields respond to the monetary policy changes significantly and in the same direction whereas the yields on thirty-year Treasury bond do not respond to the monetary policy as strong as other maturities. The results indicate that the heteroskedastic-based approaches offer more reliable estimators since the estimators of event-study could contain some modest bias.

In addition to the studies focusing on the impact of U.S. monetary policy actions on asset prices in the U.S, there exist studies that are interested in the effects of U.S monetary policy decisions on the asset prices in other countries. One of the earlier studies, interested in the U.S. macroeconomic news on foreign interest rates, belongs to Becker et al. (1995). They try to reveal the effects of the significant news occurring in the U.S. on the other countries' interest rates through the international transmission mechanisms. Their study covers the periods between January 1986 - December 1990 and employs OLS regression. According to the empirical findings, the macroeconomic news including information on inflation, unemployment rates and trade balance etc. have significant impacts on the British, German and Japanese interest yields. In addition, Ehrmann et al. (2005) investigate influences of the international spillovers of U.S. monetary policies on foreign asset prices over the time line of 1989-2004. Their results indicate that U.S. markets are dominant and major drivers in the global markets and more than 25 % of the changes in the financial markets of the euro area result from these changes occuring in the U.S. markets.

By following Kuttner (2001) and Bernanke and Kuttner (2005), Berument and Ceylan (2008) analyze the impact of unexpected component of the federal funds rate on the short-term interest rates in Middle East and North Africa (MENA) countries namely; Algeria, Bahrain, Israel, Jordan, Kuwait, Tunisia and Turkey under VAR approach with impulse response functions. The data is collected monthly for the time span between March 1989 and December 2005. According to the results, most of the impulse response functions show that rises in U.S. monetary policy rates cause significant increases in the domestic interest rates in the MENA countries except Jordan for the first period after the U.S. moentary policy shock except Jordan. Due to the economic history and financial market conditions, Turkey is re-analyzed for the sub-period of 2002-2005 for various interest rates. As for the sub-period analysis of Turkey, it is found that positive U.S. monetary policy shocks have a positive impact on the rates of the 3-month and 12-month Treasury bills for the first period after the policy shock, while shocks have a negative impact on the Turkish interbank interest rate and treasury auction interest rate. Moreover, Wongswan (2006) also provides evidence about the international transmission of developed economies' major macroeconomic announcements to the emerging economies. In his

20

study, the impacts of macroeconomic related information released from the U.S. and Japan on the Korean and Thai equity markets are investigated for the years between 1995-2000 by using high-frequency data. In addition to inflation and employment reports, monetary policy meeting decisions in the U.S. and Japan are also taken into account. By considering the test results, it is found that Korean equity market is affected by the Japan's monetary policy decisions whereas Thai equity market is influenced by the monetary policy decisions of the U.S. Nevertheless, impact of the U.S. monetary policy decisions on the volatility of Thai equity returns is found to be weak because of the time variations in the U.S. monetary policy shocks. Furthermore, Wongswan (2009) also analyzes the effects of monetary policy actions in the U.S. on the 15 foreign equity prices in Asia, Europe and Latin America. The study includes all the FOMC announcements in the period between 29 September 1998 and 11 November 2004 except FOMC announcement on 17 September 2001. He inspects the effects of target surprise and path surprise components of the Fed's monetary policy changes on the stock prices by following Gürkaynak et al. (2005). The study provides evidence that foreign equity prices react significantly to the target surprise. For instance, a hypothetical 25 basis-point cut leads to an increase ranging between 0.5% and 2.5 % in foreign equity prices. On the other hand, it is found that the path surprise has significant impact on the equity prices in Argentina, Mexico, Hong Kong, Korea and Taiwan. In the study, it is also found that the magnitudes of the equity prices responses to the U.S. monetary policy shocks depend on the countries' financial integration degree with the U.S. As the financial integration level of a country with the U.S. increases, its vulnerability to the monetary policy shocks also increases. It also provides indirect evidence that the discount rate factor affecting foreign equity prices are influenced by the U.S. monetary policy actions.

Valente (2009) also makes valuable contributions to the literature by examining how U.S. monetary policy has a role in international markets. In his study, in addition to the responses of yields on various term structures in U.S., the reactions of yields of Hong Kong and Singapore to the FOMC announcements for the period spanning between 1994 and 2004 are investigated. The U.S. monetary policy proxy is selected as the change in daily closing prices of 3-month eurodollar futures since the futures are considered as

market-based measures of expectations. The impacts of FOMC announcements on daily 3-month bill yields and 1-year, 5-year and 10-year bonds yields for U.S., Singapore and Hong Kong are analyzed under event-study approach. According to the empirical results, the U.S monetary policy changes affect the yields in the U.S. and in Hong Kong in higher magnitudes and more significantly when compared to the impact of the policy changes on the yields in Singapore. Positive monetary policy shocks lead to positive reactions on the U.S. yields. However as the maturity of the bond increases, the magnitude of the monetary policy impact tends to decline. The responses of bond yields for Singapore and Hong Kong are also positively correlated with U.S. monetary policy shocks. As in the U.S. case, the amounts of the monetary policy impacts also decrease, as the maturities of Hong Kong and Singapore bonds rise. Furthermore, the impact of monetary policy announcements of Singapore on its domestic yields is also inspected. It is observed that domestic monetary policy announcements have more impact on the yields when compared to FOMC announcements. Hong Kong is not investigated since it does not have an independent monetary policy for the examined time period. Ultimately, the study shows that in addition to the domestic monetary policy announcements, the monetary policy shocks occurring in the leading economies influence the international markets noticeably, as the shocks in the major economies may shape the expectations of international participants by giving signals about the global macroeconomic indicators in the future.

Berument and Ceylan (2010) conduct a comprehensive study investigating the U.S. monetary policy changes on the domestic interest rates in both developed economies; namely Australia, Austria, France, Italy, Japan, the Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, Switzerland, and the United Kingdom (U.K.) and developing & emerging economies; namely Bulgaria, China, India, Malaysia, the Philippines, Romania, Russia, the Slovak Republic, Sri Lanka and Taiwan for the time line between 6 June 1989 - 5 August 2008. They follow the method of Kuttner (2001) in order to measure the U.S. monetary policy changes through the expected and unexpected components. They conclude that the unexpected part of the federal funds rate target has more impact on the domestic interest rates than the expected part. As the maturity of the debt security rises, the effects of both components are inclined to decline. Another important finding of the study

22

is that the impact of U.S. monetary policy changes is stronger in developed economies when compared to the developing and emerging market economies.

Rosa (2011) also contributes the literature by examining the effects of the Fed's monetary policy on foreign asset prices as well as the U.S. asset prices. He selects 51 countries including Turkey for the period between 1999-2007. He applies event-study and standard instrumental variables approach as in the study of Rigobon and Sack (2004). As for the main monetary policy proxy, the surprise part of change in the federal funds rate target is preferred. Alternative monetary policy measures are also employed in the study, such as the nearest three-month eurodollar future contracts. When interpreting the results, he focuses on the results as a whole and not individually (i.e. country level). The general responses of stock markets in foreign countries and the U.S. to the monetary policy changes are negative and for some countries the responses are statistically different from zero. For instance, the response of the stock market in Turkey is negative and substantial to the increase in unexpected federal funds rate target. This result is statistically significant. On the other hand, three-month interest rates in the U.S. and other countries give positive reaction to the increase in the federal funds rate target. For most of the countries, these responses are also statistically significant. In terms of the exchange rate, the results indicate that positive monetary policy surprise leads to an appreciation in the U.S. dollar. However, the significance of appreciation is only applicable to a few countries. In this study, by employing Hausman (1978) specification test, the validity of event-study assumptions is checked. The standard instrumental variables approach gives more accurate responses when compared to event-study approach. The event study estimators may include bias, however the bias is found fairly small.

A more comprehensive study, concentrating on the relationship between global asset prices and U.S. monetary policy announcements, is provided by Hausman and Wongswan (2011). They select 49 countries in the time span from February 1994 to March 2005 in order to disentangle the U.S. monetary policy impacts on the financial assets in the other countries. As asset prices data, they take each countries equity indices, exchange rates and 3-month money market yields for short term interest rates and 10-year government bond yields for

long term interest rates. However, due to the availability of the data, they could select only 20 countries for interest rates. The monetary policy has two components in this study namely; target surprise and path surprise components employed in the study of Gürkaynak et al. (2005). The target surprise is retrieved as in the study of Kuttner (2001). On the other hand, the path surprise is generated to obtain the expectations about the future path policy based on the statements of FOMC announcements. The path surprise has two components in this study. The first one is based on the change in 1-year-ahead-eurodollar futures yields in the tight window around the FOMC announcement and the second one is the part of the change in 1-year-ahead eurodollar futures yields having no correlation with the target surprise in the tight window around the announcement. By forming panel data, OLS regression is applied in order to capture the general impact of FOMC announcements on the global asset groups. In terms of equity indices for 49 countries, the foreign equity indices are mostly sensitive to the target surprise. In more detail, 25-basis-point cut in the target surprise results in 1 % increase in equity indices. As for exchange rates, the exchange rates mainly react to the path surprises. For instance 25-basis-point downward change in the first component of the path surprise leads to 0.5% decrease in the value of dollar with respect to foreign currencies. With regards to interest yields, short-term interest rates react to both target surprise and path surprise. Hypothetical 25-basis-point cuts in both target surprise and path surprise give rise to 5 basis-point decreases in the foreign short-term rates. Furthermore, 25-basis-point cuts in target surprise and path surprise bring about 3 basis-point decline and 8 basis-point decline, respectively, in the long-term foreign yields. In terms of long-term yields, these yields only respond significantly to the future path of monetary policy. When the study investigates the countries at individual level, it is observed that Turkey is one of the countries whose equity index responds negatively and significantly to an increased target surprise. The study associates this link to Turkey's experience of a serious financial crisis in the examined period. This may make the equity market in Turkey more sensitive to the monetary policy shocks occurring in the U.S. In terms of exchange rates, there is no significant result obtained for Turkey. In general, it is observed that the currencies of developed countries react more significantly to the U.S. monetary policy announcements than the currencies of emerging market economies do. Due to the unavailability of the interest rate data, the interest yields in Turkey are not

examined individually. This study also deem the country specific characteristics such as the exchange rate regimes and the degree of real economic and financial integration with the U.S. since different reactions of the asset prices to the U.S. monetary policy changes may result from these cross-country variations. The empirical test results provide evidence that the asset prices such as equity indices and interest yields react more to the FOMC announcements under less flexible exchange rate regimes, while these assets respond less to the U.S. monetary policy shocks under more flexible exchange rate regimes. Furthermore, the study shows that the equity markets in the countries that have a strong financial integration with the U.S. respond strongly to the U.S. monetary policy surprises, where the financial integration degree is measured by the stock market capitalization possessed by U.S. investors.

With the collapse of Lehman Brothers in the fall of 2008, the financial turmoil in 2007 resulting from the subprime mortgage loans revolved into global financial crisis and the severe effects of this crisis were felt in not only in U.S. financial markets but also in global financial markets (Mishkin, 2010). Therefore to protect the health and functionality of the financial markets and to ease the severe impacts of the crisis on the economy, the Fed had taken significant unprecedented monetary policy actions, such as keeping the policy rate at zero lower bound, launching large scale asset purchases (LSAPs) programs and implementing forward guidance following the aftermath of the Lehman Brothers bankruptcy (Glick & Leduc, 2013). The literature has also paid considerable attention to the impact of unconventional monetary policy actions of the Fed on the financial assets. Gagnon et al. (2011) deal with the effects of large LSAPs programs on the long-term interest yields. To mitigate the financial strain, the Fed maintained the federal funds rate at zero lower bound. Furthermore, it also launched LSAPs program in order to promote economy by decreasing longer-term interest rates. Buying longer-term agency debt securities and mortgage backed securities (MBS) give rise to a decline in the term premium of longer-term securities; hence decreasing in longer-term yields. So as to observe the FOMC announcements associating with the LSAPs, they inspect the yields of a set of long-term financial securities including 2-year and 10-year Treasury bonds around these announcements. As a baseline data set, they focus on the 8 announcements mainly related

25

to LSAPs. The announcements include not only the official FOMC announcement on the dates of 16 December 2008, 28 January 2009, 18 March 2009, 12 August 2009, 23 September 2009 and 4 November 2009 but also on the announcement of initial LSAPs on 25 November 2008 and the speech of the Fed's Chairman on 1 December 2008. In their study, they prefer one-day windows around the announcements, since the markets may need time to digest the news and modify expectations. According to observed results, all interest rates decline when the market gets information about the LSAPs. Especially, the decline in 10-year Treasury bond is more than the decline in 2-year Treasury bond, which implies that the announcements decrease the longer-term rates by reducing the term premium. This study shows that the Fed's unconventional monetary policy tools serve the aim of stimulating economy through the channel of lowering longer-term interest rates. Furthermore, Krishnamurty and Vissing-Jorgensen (2011) are also interested in the impacts of LSAPs on the interest rates. Even though the purchasing of long-term assets by the Fed is introduced as LSAPs, later these purchases are categorized as series of *quantitative easing* (QE). They show that the Fed's purchasing long-term securities in high amounts lead to significant declines in the yields of Treasury, agency and corporate bonds and MBS. However, the magnitudes of the impacts depend on the types and the maturities of securities, and the types of quantitative easing (QE1 or QE2). The study also tries to find through which channels QE1 and QE2 lower the yields. QE1, conducted in 2008-2009, mainly involves buying MBS in large amounts while QE2, conducted in 2010-2011, includes purchasing of longer-term Treasury bonds. Since QE1 mostly takes in MBS purchases, it lowers the yields of these securities via the MBS risk premium channel. Moreover, MBS purchases in QE1 help decline the default risk premium for corporate bonds. On the contrary, QE2 has considerable effects on the yields of Treasury and agency bonds, but minor impacts on the MBS and corporate bonds. In essence, there are common channels that affect the long-term yields for both QE1 and QE2. The signaling channel is effective in both QE1 and QE2. Signaling channel is the market's reaction about the future federal funds rate by regarding the QE announcements. Through this channel, the QE announcements lower the yields on all bonds. Furthermore, safety premium channel is also effective for the both types of QEs. By purchasing the medium- and long- term safe assets (i.e. having approximately zero default risk), the Fed reduces the supply of these assets.

26

Therefore the equilibrium safety premium rises. This leads to a decline in the yields of long-term safe assets. Finally, the inflation channel, proven by the inflation swap rates and Treasury-Inflation-Protected Securities (TIPS), is operative for both QE1 and QE2. The expected inflation rises because of QE1 and QE2, and this leads to large declines in real interest rates than in nominal rates. Moreover, Meaning and Zhu (2011) and Rosa (2012) also provide evidences on the significant impacts of LSAPs on the asset prices in their studies.

Another study examining the unconventional monetary policy period is offered by Wright (2011). He aims to examine the changes on the different longer-term interest rates, when the Fed adopts the zero lower bound approach by using both structural VAR and event-study methods. He examined the relevant unconventional monetary policy announcements and speeches for the period between November 2008 and December 2010. The impulse response results based on the VAR structure show that monetary policy shocks significantly decrease the yields on ten-year Treasury bond, while the monetary policy shock slightly reduces two-year Treasury bond yields. Furthermore, the monetary policy shock significantly lowers rates of the Moody's rated BAA and AAA corporate bonds, but these declines are slightly more than half as much as the decline in yields of the ten-year Treasuries. He also conducts an event-study by determining the monetary policy proxies are 2-, 5-, 10-and 30- year bond futures. The high frequency intraday data are employed. Due to the zero lower bound approach of the Fed since December 2008, there are no policy shocks on the federal funds rate target and FOMC announcements have less power on the anticipations over the next few periods. Therefore, the changes in longer-term yields can be preferred as monetary policy proxies for this unconventional monetary policy period. According to the event-study analysis, the monetary policy shocks lower the yields on 2-year, 10-year U.S. Treasuries and corporate bonds. The results also show that the monetary policy actions in the U.S. have a global impacts, since they lower the yields on 10-year Canadian, U.K. and German government bonds. On the other hand, monetary policy shocks significantly boost stock returns based on the S&P index. Furthermore, Campbell et al. (2012) study the impacts of FOMC announcements associated with forward guidance intentions on the macroeconomic indicators. Forward guidance is one of the

27

unconventional monetary policy tools that Fed has preferred mostly during the unconventional monetary policy period in order to keep the short-term rates at zero lower bound and to lower the long-term interest rates. They use the methodology used in Gürkaynak et al. (2005) by expanding on it. The empirical results show that the monetary policy shocks related with FOMC announcements have substantial impacts, not only on the yields of Treasury bonds and corporate borrowing rates but also on the inflation and unemployment forecasts.

Chodorow-Reich (2014) examines the unconventional monetary policy actions of the Fed on the financial institutions namely; life insurance and bank holding companies for the period between December 2008 and December 2013 by utilizing event-study approach. In this analysis, it is observed that the FOMC announcements have obvious impact on the yields of 5-year Treasury bonds. Therefore, the change in the yield of 5-year Treasury bond in the narrow intraday window around the FOMC announcements is selected as the monetary policy proxy. Since banks and life insurance companies are the major players in the financial system, the credit default swap (CDS) spreads, bond yields and stock prices of life insurance and bank holding companies are selected as the asset prices data. During the winter of 2008-09, after the FOMC announcements, expansionary policy surprises lead to a fall in the CDS spreads and bond yields, and a rise in the equity prices of life insurance companies. The impacts on the CDS spreads and equity prices are significant. However, for the period of post winter 2008-09, all the effects become insignificant. For the bank holding companies, only the significant result is observed for the equity prices in the period of winter 2008-09. The expansionary monetary policy action results in a rise in the stock prices for that period.

The unconventional monetary policy actions are not applied in the U.S. but also are adopted in other developed and emerging economies. Rogers et al. (2014) make a cross-country study including the U.S., the euro area, the U.K. and Japan so as to inspect the unconventional monetary policy effects of these countries on asset prices. The official monetary policy announcements and speeches related to unconventional monetary policy actions are taken into account for each country. However, these are the results of the

discussion of U.S. They state that the central banks may immediately affect their own sovereign bond yields during the zero lower bound period, and the impacts of unconventional policy actions on other assets could be detected through the changes in the yields of government bonds via a pass-through mechanism. Therefore, for the unconventional period, they select the first principal component of intraday changes in the yields on 2-year, 5-year, 10-year and 30-year U.S. Treasury futures as the monetary policy measures. According to the event-study results with narrow window data, the expansionary monetary policy actions of the Fed lead to a significant decrease in corporate bond yields in the U.S. Moreover, due to international spillovers of monetary transmission, the U.S. monetary policy surprises lower the ten-year yields in the U.K. and Germany. On the other hand, the expansionary shocks result in a rise in domestic stock prices in the U.S. and depreciation of the domestic currency. Rogers et al. (2014) also claim that since the narrow window is not sufficient for the markets to absorb the information, they use daily data in by applying identification through heteroskedasticity technique and selecting the monetary policy measure as 10-year U.S. Treasury bond yields. They prove that the policy days and non-policy days are different in terms of monetary policy shocks, which also method also gives confident results for the U.S. case.

In addition to the studies mentioned, a few more recent studies are conducted in order to compare the impacts of the conventional and unconventional monetary policy actions of the Fed on the asset prices in the U.S. For instance, Glick and Leduc (2013) conduct a study comparing the conventional and unconventional monetary policy effects on the U.S. dollar against euro, yen, pound and Canadian dollar. They determine the period between February 1994 and October 2008 as the conventional monetary policy period and measure the monetary policy surprises with intraday changes in the federal funds rate futures around the monetary policy announcements. On the other hand, for the unconventional monetary policy period lying between November 2008 and January 2013, they select the intraday changes in the long-term Treasury futures around the monetary policy announcements as the monetary policy measures since the federal funds rate reached at nearly zero level in this period. According to the empirical results, it is found that unconventional monetary policies lead to a depreciation in the U.S. dollar against the

currencies mentioned above. However, it is found that the monetary policy announcements have approximately the same amount of decline in the value of the dollar against other currencies for both periods. It shows that the monetary policy mechanism via the exchange rate channel in the unconventional monetary policy period works as efficiently as in the conventional monetary policy period. Moreover, Unalmis and Unalmis (2015) also investigate the impact of conventional and unconventional monetary policy actions of the Fed on the asset prices in the U.S. including stock and bond markets, exchange rates (the value of dollar against euro, Swiss franc and British pound etc.) and implied volatility indicators of stock and bond markets. They use the changes in the nearest eurodollar future contract to expire as a monetary policy surprises for the conventional period between January 1994 and November 2008, whereas they prefer the changes in ten-year Treasury futures rate measured as in Wright (2012) for the monetary policy surprises for the unconventional period between December 2008 and June 2014. By implementing GMM technique offered by Rigobon and Sack (2004), they find that the unconventional monetary policy actions have lower impact on the stock market returns and on the risk appetites in the stock and bond markets when compared to the conventional period. On the other hand, the impacts of unconventional policy actions on the most of the other assets are similar or higher when compared to the impacts of the conventional policy actions on these assets.

The number of studies investigating the U.S. unconventional monetary policy actions on other countries is not abundant in the literature. Neely (2015) inspects the international effects of U.S. unconventional monetary policies and observes that the yields on 10-year government bonds in Australia, Canada, Germany, Japan and the U.K. and the value of U.S. dollar with respect to the currencies in these countries decline after the LSAPs announcements. Furthermore, Fratzscher et al. (2013) explore the global spillover dimension of the U.S. unconventional monetary policy actions by employing panel data with 65 countries including U.S., the advanced and emerging market economies. The monetary policy proxies are determined as a set of various measures such as dummy variables associated with the QE1 and QE2 and the weekly changes in the amounts of the operations: the liquidity support for the financial sector, purchases of long-term Treasury bonds and long-term mortgage backed securities and agency debt. The empirical findings

indicate that the Fed's unconventional actions have considerable effect on the reduction of government bond yields and an increase in the stock prices in particular in the U.S. when compared to the other economies at the initial stage of the QE1. Furthermore, it is also found that the measures related with QE2 raise the stock prices worldwide whereas their impacts on sovereign yields are smoothed across countries. Another recent study, examining the transmission of unconventional monetary policy of the Fed to the emerging market economies, is conducted by Bowman et al. (2015). They take official FOMC announcements and the speeches on the unconventional monetary policy actions taken in the time span ranging between January 2006 and December 2013. They select 17 emerging market economies including Turkey. Firstly, this study employs VAR structure including the yields of 2-year, 10-year U.S. Treasury bonds and high-yield corporate bonds, sovereign bond yields, stock indices in the EMEs and domestic exchange rates against the U.S. dollar. The aim is to observe the impacts of monetary policy shocks around the unconventional monetary policy announcements on the assets by impulse-response analysis. The monetary policy shock through the interest rate channel is measured as the change in the 10-year sovereign bond yields. The results show that monetary policy shock in the U.S. has significant and negative impact on the most of the sovereign bond yields in the data set. In terms of exchange rates, the monetary policy shock leads to the appreciation of domestic currencies in most of emerging economies. As for stock prices, the shock, which results in decrease in the U.S. yields, boosts the stock prices of these countries. However, the impacts of the monetary policy shocks on exchange rates and stock prices are found to be statistically insignificant. They also verify these results by conducting event-study approach and selecting the monetary policy proxy as the changes in the 10-year U.S. Treasury bond yields. Similarly, there are considerable fluctuations on the EMEs yields around the announcements days, while large fluctuations on the stock prices and exchange rates are found to be less statistically significant for some countries. This study also performs monthly panel-data analysis so as to examine whether country-specific characteristics have a role in the vulnerability of these economies against the U.S. monetary policy shocks. The empirical results indicate that high interest rates, CDS spreads or current account deficit with less flexible exchange rate regimes, and a low pace of gross domestic growth, or more vulnerable banking systems increase the vulnerability of

the countries through asset prices against the fluctuations in the U.S. economy. As the macroeconomic and financial situations of the economies are not sound, the domestic asset prices are prone to be more vulnerable to the shocks occurring in the leading economies.

As seen from the studies given above, most of the studies are interested in the impacts of the Fed's monetary policy actions on both U.S. and foreign asset prices in both conventional and unconventional periods. Nevertheless, there exist studies documented in the literature concentrate on the impacts of the ECB decisions taken in Governing Council meetings on asset prices. For instance, Perez-Quiros and Sicilia (2002) investigate the impact of ECB monetary policy surprises on the yield curve in the euro area. The empirical findings show that as the maturity of a bond increases, the impact of the monetary policy shock on the yield tend to decrease. Alternatively, Brand et al. (2006) find that the ECB announcements during the press conferences have significant and substantial effects on the medium- and long-term market interest rates for the sample period from November 2000 and May 2006 by utilizing high frequency data. Angeloni and Ehrmann (2003) focus on the effect of monetary policy surprises of the ECB on the stock market in the euro area for the time period between January 1999 and November 2002. Most of the stock indices give negative and significant reactions to the monetary policy surprises of the ECB, which indicates the role of stock market channel of the monetary transmission mechanism. Furthermore, Bernoth and Hagen (2004) analyze the effectiveness of ECB's monetary policy decisions after the foundation of European Monetary Union (EMU) in 1999 for the period lying between March 1999 and September 2003. The European Interbank Offered Rate (EURIBOR) market indicating short-term market rates has been respected significantly since 1999, because the predictability of these rates shows whether ECB monetary policies are implemented effectively and transparently and whether these futures rates reflect the market expectations about future spot rates. By considering these, the study tests the efficiency of EURIBOR futures rates by using panel data method. The findings show that 3-month EURIBOR futures rates are efficient and unbiased predictors of the expectations of market participants about future spot rates. The findings also support that the volatility of EURIBOR futures rates on the policy days is found to be larger when it is compared with the volatility on the non-policy days. Therefore, the volatility of

EURIBOR futures rates on the meeting days can be employed as a policy measure that reflects the surprise parts of the ECB decisions. However, the volatility of EURIBOR futures rates stemming from the surprises of the ECB decisions is found to be low in general, as the participants of the new euro money markets could predict the monetary policy decisions of the ECB efficiently.

Kleimeier and Sander (2006) reveal the impact of monetary policy of the ECB on the retail banking interest rates in the euro area by considering the expected and unexpected parts of monetary policy shocks. They apply *standard pass-through model* employed by Cottarelli and Kourelis (1994). This approach disentangles the cointegrated relationships between the bank retail interest rates and the monetary policy measure for the time line between January 1999 and May 2003. In this study, the monetary policy measure for euro area is determined as EURIBOR for 1-month rate for euro time deposits. The expected and unexpected parts of the monetary policy measure are determined by following Kuttner (2001). The expected part is measured by 1-month futures contract, even though 3-month EURIBOR futures rates are found as an effective and unbiased estimators of future spot rates for the euro area in the study of Bernoth and Hagen (2004). The reason of selecting 1-month futures contract is that this contract is a better indicator reflecting the monetary policy rate determined by the ECB when compared to the longer-term interest rates. The national retail interest rates for euro area countries namely Austria, Belgium, Finland, France, Germany, Ireland, Italy, Netherlands, Portugal and Spain are also retrieved. The retail interest rates consist of different lending rates including mortgage and consumer loans to households, short-term loans to enterprises, medium- and long-term loans to enterprises and deposit rates such as current account deposits, time deposits and saving accounts. According to the cointegration test results between bank retail interest rates and monetary policy, 19 % and 57% of the series are symmetrically and asymmetrically cointegrated in the long-run respectively whereas 24% of the series are not cointegrated. Furthermore, the study proves that except time deposit rates, the expected monetary policy impulses have more effect on all rates when compared to the unexpected impulses, which shows the importance of good and efficient communication of the ECB in obtaining faster responses in the pass-through literature.

33

Bohl et al. (2008) also investigate how stock markets in the EMU respond to the monetary policy shocks of the ECB. They apply the standard instrumental variables method in Rigobon and Sack (2004), in order to cope with endogenity and omitted variable problems. The monetary policy proxy is selected as 1-month EURIBOR rate since the rate with maturity with less than one month can be more volatile, whereas the rate with maturity longer than one month may not reflect the changes in monetary policy sufficiently. The expected component of the monetary policy is retrieved mainly from the futures and swaps in the financial markets and surveys, as they reflect the expectations of the market participants. The unexpected part is retrieved by subtracting the expected part from monetary policy proxy for the euro area. The impacts of unexpected decisions of the ECB on the 4 main national stock indices namely; German DAX 30, French CAC 40, Spanish IBEX 35 and Italian MIB 30 and the aggregate stock index of euro area, EURO STOXX 50 are examined around the ECB announcements for the time period from 1 May 1999 to 28 February 2007. The test results indicate that there exist a significant and negative relationship between unexpected monetary policy changes and the stock market returns in the euro area. Furthermore, Rosa and Verga (2008) analyze the impact of ECB communication on asset prices. The study provides several evidences. The first one is that the financial markets are influenced by not only the policy rate decision of ECB but also by the statements about its monetary policy stance. Secondly, the unexpected monetary policy shocks derived as the difference between the market expectations about the ECB rate and the rate declared by the ECB have significant and considerable influences on futures prices. The study also investigates the market's perception about the credibility of ECB and finds that the financial markets require three years starting from 1999 in order to believe and infer from the announcements of ECB.

Kholodilin et al. (2009) contributes to the literature investigating the impacts of monetary policy of the ECB on the aggregate and subsector stock market indices; namely, oil and gas, building materials, industrial, consumption goods, health care, consumption services, telecommunications, utility, financial, technology in the euro area. They select the proxy for the monetary policy shocks as the daily changes in 1-month EURIBOR rate. As for methodology, they employ not only the instrumental variables and GMM techniques as in

the study of Rigobon and Sack (2004) but also event-study approach. They took 140 announcements of ECB Governing Council meetings occurring between the dates of January 1999 and January 2008. They do not distinguish the dates whether the monetary-policy shocks occur or not. All the methods show that the expansionary monetary policy actions of the ECB lead to an increase in the aggregate and subsector of the stock market indices in the euro area. They also compare the estimators of instrumental variables and GMM approaches to the estimators of the event-study by implementing Hausman specification test. The results imply that estimators of event-study give biased results when compared to estimators of the identification through heteroskedasticity approaches.

Leon and Sebestyan (2012) bring new surprise indicators reflecting the two significant aspects of monetary policy; namely, level factor and slope factor. The level factor is related to the decisions leading to shifts in the yield curve and is associated with market's anticipations about the long-term inflation. On the other hand, the slope factor is linked to decisions resulting in modifications in the slope of term structure and seems a good measure of predicting business cycle. The empirical findings suggest that these new measures outperform under the event-study approach and explain the daily variations in the interest rates on the monetary policy meeting days for the time period ranging between 18 February 1999 and 29 December 2006. Furthermore, the ECB avoids the actions giving rise to abrupt fluctuations in interest rates. Hence, this study also aims to inspect whether monetary policy decisions of the ECB result in large jumps in interest rates or not. The results show that when ECB starts to hold monthly monetary policy meetings, especially after November 2001, its predictability increases and this causes less jumps in interest rates.

In various stages of the global financial crisis, the ECB had also taken non-standard monetary policy measures in order to cope with the strains in the financial markets in the euro area. These non-standard measures have quite significant roles in making the financial systems and the economy more stable (Lenza et al. 2010). In the existing literature, there are some studies interested in the period, in which unconventional monetary policy tools employed by the ECB in addition to the conventional tools. Rogers et al. (2014)

concentrate on the period in which unconventional monetary policy tools were employed by the ECB and examine the impacts of the ECB monetary policy actions on the financial assets. During this period, the ECB maintained the short-term rates at zero lower bound, and implemented various non-standard monetary policy measures, such as Securities Market Program and Covered Bond Purchase Program. Therefore, the monetary policy surprises are measured from the intraday changes in the long-term sovereign bond yields during the announcements for this period. By considering this, the monetary policy measure for the euro area is selected as the change in the spread between 10-year Italian government bond yields and 10-year German government bond yields. High-frequency intraday data is employed for the event-study approach. The authors claim that the change in the 10-year German bond yields can be taken as monetary policy proxy, however, they aim to investigate the euro area in general not at the level of Germany by agreeing that the intra-euro spreads have critical roles in the transmission of monetary policy in the euro area especially under the extraordinary situations in the recent years. Therefore, the spreads between sovereign yields in the euro area preferred instead of taking one single sovereign bond yield. According to the event-study results, the expansionary monetary policies in the euro area result in a significant appreciation of euro and a significant increase in German bond yields as well as in the euro-area corporate bond rates. These findings are most probably associated with the positive impact of expansionary policies on supporting the financial stability of the euro area and the continued existence of European Monetary Union. Moreover, the study supports that bond purchases and the announcements of the Long-Term Refinancing Operations (LTRO) significantly raise the stock prices and decrease yields on Italian and Spanish government bonds. They also apply VAR structure under identification through heteroskedasticity approach by using daily data. The impulse responses show that the monetary policy is effective on the Italian-German government bond spreads as well as in the Spanish-German government bond spreads. Moreover, Eser and Schwaab (2015) inspect the impact of Securities Market Program (SMP) on several euro-area government bond markets for the years between 2010 and 2011. The results indicate that bond purchases under SMP give rise to a decline in the 5-year government bond yields in the euro area.

In addition to these studies, Haitsma et al. (2015) examine the impacts of conventional and unconventional monetary policy actions on the stock market returns in the euro area, such as EURO STOXX 50 index, various subsector stock market indices, the returns of large, medium and small companies, the returns of value stocks and growth stocks, and the firm ratios based on debt. The time line of their study lies between January 1999 and February 2015, which includes the global financial crisis. They pursue the study of Kuttner (2001) in order to measure the monetary policy surprises based on the changes in the rates of three-month EURIBOR futures for the non-crisis period in which conventional monetary policy actions were implemented. As for the crisis-period in which mostly unconventional policies were implemented, they follow the study of Rogers et al. (2014), and measure the monetary policy surprises based on the changes in the spread between Italian and German ten-year government bond rates. One of the significant empirical findings suggest that EURO STOXX 50 index is affected by the unexpected parts of both conventional and unconventional policy surprises, however, the effect of the unconventional policy surprise is more intense. Another significant finding is that growth stocks are less influenced by the unconventional monetary policy changes, when compared to the value stocks, whereas their responses to the conventional monetary policy surprises are quite similar.

Differently from the monetary policy impacts of the Fed and ECB on the asset prices, there are various studies which concentrate on the impacts of the central bank of the United Kingdom, Bank of England (BOE) and the Central Bank of the Republic of Turkey (CBRT) on the asset prices. The effects of monetary policy actions of the BOE on financial asset prices are examined comprehensively in the studies of Becker et al. (1995), Bredin et al. (2007), Brendin et al. (2009), Gregoriou et al. (2009), Meaning & Zhu (2011), and Rogers et al. (2014). Although some researchers have special interest on the U.K. monetary policy and its impact on asset prices, the monetary policy of the BOE is out of the scope of this study.

As for Turkey, there are also studies that focus on its monetary policies and the advanced economies on the financial assets in Turkey in the literature. Berument et al. (2007) analyze the effect of expected and unexpected components of the federal funds rate target on the financial indicators in Turkey for the time span between 6 June 1989 - 20 September

37

2005. They follow the method of Kuttner (2001) by separating the Fed's monetary policy measure into anticipated and unanticipated components. They select the financial indicators in Turkey namely; overnight interbank rate of CBRT, the value of U.S. dollar against Turkish Lira, the spread between daily interbank rate of return and daily depreciation rate of Turkish Lira, the benchmark bond rate, the BIST 100 equity index. The empirical findings show that for the full sample period, neither the anticipated nor unanticipated element of the federal funds rate target has significant impacts on the all financial variables. However, they continue their analyses by dividing the analyzed time period into sub-periods considering the financial crises that Turkey experiences. When the analyses are repeated for the sub-periods, it is found that for the sub-period covering between 1 January 2002 and 20 September 2005, the impacts of expected and unexpected components of the federal funds rate target on all the financial variables become statistically significant. These findings put forward a reasonable explanation that the involvement of foreign investors in Turkish financial markets tends to rise and the roles of these investors in domestic markets have become more significant since 2002. As a result, the domestic markets in Turkey respond more to changes in the U.S. monetary policy for the post 2002 period. Additionally, it is observed that the surprise component has more impact on the financial indicators in terms of magnitude when compared to the expected component. The results also show that increases in the federal funds rate target lead to increases in interbank rate, spread and benchmark bond rate, whereas the increases in the target rate result in decreases in exchange rate and stock market index.

Duran et al. (2012) make significant contribution the literature by examining the monetary policy effects of the CBRT on the financial assets in Turkey. Their study has a time period between January 2005 and December 2009 covering 60 monetary policy announcements of the CBRT. The financial assets are selected as various term-structures of market rates, domestic equity price indices and the value of Turkish lira against to U.S. Dollar and euro. The monetary policy proxy is based on the changes in the daily yields of 1-month Turkish government bond. The GMM technique offered by Rigobon and Sack (2004) is utilized in addition to the event-study method. The empirical results indicate that the yields of Turkish Treasury bonds, which have maturities between 6 and 36 months react to the monetary

policy changes in the same way and significantly. However, the impact on the yields tends to decrease as the maturity gets longer. Interestingly, Turkish Lira against dollar does not significantly respond significantly while it responds to the euro significantly but the magnitude of the response is fairly small. The expansionary monetary policy actions lead to a small appreciation of Turkish lira against euro. When it comes to the equity prices, all of the responses of aggregate index and the industry, service, financial and technology sector indices are significant and negative. An increase in the monetary policy rate gives rise to a decline in equity prices. The largest impact is detected in the financial sector, while the least effect is observed in the trade sector.

Furthermore, Küçükkocaoğlu et al. (2013) conduct more detailed study focusing on the monetary policy announcements of the CBRT on the bank stock returns in Turkey by considering the conventional (traditional) and new monetary policy periods. Aftermath of Lehman Brothers collapse in 2008, the stance of CBRT has also changed in order to adjust the Turkish economy to the new global business cycle. The accommodative monetary policies in advanced economies lead to volatile short-term capital flows to the emerging market economies and Turkey is one of these economies. These capital inflows result in domestic currency depreciation, triggering current account deficit and unhealthy credit growth. Hence, the CBRT requires revising its standard monetary policy and supporting its inflation oriented goals, by adopting a new monetary policy mix, including interest rate corridor and reserve requirements so as to maintain financial stability. In the light of these, the CBRT has started its new monetary policy episode since May 2010. The traditional period lies between January 2005 and April 2010 with 65 monetary policy decisions whereas new monetary policy period covers the months of May 2010 and January 2013 with 34 monetary policy announcements in the study. The monetary policy measure is determined as the Turkish sovereign bond yield with 1-month maturity while BIST_100, BIST_BANK and 16 individual bank stock indices are employed as the asset data. By using GMM method in Rigobon and Sack (2004), the empirical results prove that an increase in the monetary policy rate leads to a significant and negative impact on all stock indices for the traditional period whereas these impacts remain negative on the stock returns, but lose their significance for the new monetary policy episode. This result is tied

to the fact that in the new monetary policy period, the CBRT has more flexible approach and ability to intervene in the markets other than on the days when monetary policy meetings are conducted. Thus, results of the meeting days in the traditional period are more significant when compared to the new policy episode. They also examine the response of the banks' stock returns to the monetary policy decisions by considering the bank-specific characteristics. It is observed that the banks having significant proportion of interest payments in their balance sheets react more to the monetary policy decision. Furthermore, it is found that the participation banks and the banks whose ownership belong to the foreigners have tendency to respond less to the monetary policy shocks.

CHAPTER 4

METHODOLOGY

The methodologies in this study, *event-study approach* and *standard instrumental variables approach,* based on the identification through heteroskedasticity method and proposed by Rigobon and Sack (2004), are employed in order to investigate the impacts of monetary policy decisions of both the Fed and the ECB on the financial asset prices in Turkey.

By following the Rigobon and Sack (2004), the models examining the relationship between asset prices and monetary policy rates are established as in the Equation (4.1) and (4.2):

$$\Delta i_t = \beta \Delta s_t + \gamma z_t + \varepsilon_t \tag{4.1}$$

$$\Delta s_t = \alpha \Delta i_t + z_t + \eta_t \tag{4.2}$$

where Δi_t and Δs_t denote the change in the monetary policy rate and the change in the asset price, respectively. z_t represents the set of variables that could be observable or unobservable in the system. The monetary policy shock and asset price shock are represented by ε_t and η_t, respectively. It is assumed that there is no correlation between the monetary policy and asset price shocks, and these shocks are also uncorrelated with the common shock z_t. In Equation (4.1), the response of the monetary policy to the shocks resulting from asset price and z_t are captured, whereas Equation (4.2) expresses the response of the asset price to the monetary policy changes and other variables z_t. In this

study, the main focus is on the impact of the monetary policy change on the asset price which is measured by α.

The estimation of α in Equation (4.2) under OLS regression gives the estimator of event-study (α_{es}), which measures the impact of monetary policy change on the asset price change. However, the event-study estimator can be biased due to the existence of simultaneous equations and omitted variables problem. When the changes in monetary policy rates lead to changes in asset prices, the changes in asset prices also result in changes in the monetary policy rates. This is called the simultaneous equations problem. The simultaneity bias (if $\beta \neq 0$ and $\sigma_\eta > 0$) remains in the mean of OLS estimator as seen in Equation (4.3). On the other hand, the exclusion of the variables z_t also leads to omitted variable bias (if $\gamma \neq 0$ and $\sigma_z > 0$) as in Equation (4.3).

$$E(\hat{\alpha}) = \alpha + (1 - \alpha\beta) \frac{\beta\sigma_\eta + (\beta+\gamma)\sigma_z}{\sigma_\varepsilon + \beta^2\sigma_\eta + (\beta+\gamma)^2\sigma_z} \tag{4.3}$$

However, the bias in the α_{ES} under OLS regression goes to zero and the OLS estimation becomes consistent if the assumption that variance of the monetary policy shock (σ_ε) is infinitely large when compared to the variances of the other shocks (σ_η and σ_z) holds (i.e. $\sigma_\varepsilon/\sigma_\eta \to \infty$ and $\sigma_\varepsilon/\sigma_z \to \infty$).

If these assumptions hold, the event-study estimator is calculated as in Equation (4.4):

$$\widehat{\alpha_{ES}} = (\Delta i_P' \Delta i_P)^{-1} (\Delta i_P' \Delta s_P) \tag{4.4}$$

where P represents set of the policy days when the monetary policy announcements are made.

However, Rigobon and Sack (2004) propose a technique called identification through heteroskedasticity that estimates α parameter under weaker set of assumptions by

42

depending on the heteroskedasticity in the data set. In addition to the policy days, a set of non-policy days (*N*), consisting of days immediately preceding the policy days, is also considered in this technique. This technique depends on the changes in the covariance of interest rates and asset prices during the times when there is an increase in the variance of monetary policy shocks rather than requiring the variances of asset price shocks and other shocks to be infinitely large. The assumptions of this technique are based on the fact that the variance of monetary policy shocks in policy days is larger than the variance of monetary policy shocks in other days. Furthermore, it is assumed that the other shocks are the same in both policy days and non-policy days. These assumptions are expressed as follows in Equation (4.5), Equation (4.6) and Equation (4.7):

$$\sigma_\varepsilon^P > \sigma_\varepsilon^N \tag{4.5}$$

$$\sigma_\eta^P = \sigma_\eta^N \tag{4.6}$$

$$\sigma_z^P = \sigma_z^N \tag{4.7}$$

In order to estimate the α parameter, the reduced form of Equation (4.1) and Equation (4.2) are obtained as in Equation (4.8) and Equation (4.9) and the covariance matrices of these variables are obtained for both policy days and non-policy days as in Equation (4.10) and Equation (4.11):

$$\Delta i_t = \frac{1}{1-\alpha\beta} \left[(\beta + \gamma)z_t + \beta\eta_t + \varepsilon_t \right] \tag{4.8}$$

$$\Delta s_t = \frac{1}{1-\alpha\beta} \left[(1 + \alpha\gamma)z_t + \eta_t + \alpha\varepsilon_t \right] \tag{4.9}$$

$$\Omega_P = \frac{1}{(1-\alpha\beta)^2} \begin{bmatrix} \sigma_\varepsilon^P + \beta^2\sigma_\eta^P + (\beta+\gamma)^2\sigma_z^P & \alpha\sigma_\varepsilon^P + \beta\sigma_\eta^P + (\beta+\gamma)(1+\alpha\gamma)\sigma_z^P \\ . & \alpha^2\sigma_\varepsilon^P + \sigma_\eta^P + (1+\alpha\gamma)^2\sigma_z^P \end{bmatrix} \tag{4.10}$$

$$\Omega_N = \frac{1}{(1-\alpha\beta)^2} \begin{bmatrix} \sigma_\varepsilon^N + \beta^2\sigma_\eta^N + (\beta+\gamma)^2\sigma_z^N & \alpha\sigma_\varepsilon^N + \beta\sigma_\eta^N + (\beta+\gamma)(1+\alpha\gamma)\sigma_z^N \\ . & \alpha^2\sigma_\varepsilon^N + \sigma_\eta^N + (1+\alpha\gamma)^2\sigma_z^N \end{bmatrix} \tag{4.11}$$

By assuming that α, β and γ are stable for both of the subsamples, the α parameter can be retrieved as in Equation (4.13) by using the difference between two covariance matrices in Equation (4.12):

$$\Delta\Omega = \Omega_P - \Omega_N = \frac{(\sigma_\varepsilon^P - \sigma_\varepsilon^{N)}}{(1-\alpha\beta)^2} \begin{bmatrix} 1 & \alpha \\ \alpha & \alpha^2 \end{bmatrix} \qquad (4.12)$$

$$\hat{\alpha}_{het} = \frac{\Delta\hat{\Omega}_{12}}{\Delta\hat{\Omega}_{11}} \qquad (4.13)$$

here the $\hat{\Omega}_{ij}$ denotes the (i , j) element of the change in the $\hat{\Omega}$ matrix.

The estimation of α parameter in Equation (4.13) can also be obtained by *instrumental variables* approach based on the identification through heteroskedasticity. Rigobon and Sack (2004) combine the monetary policy changes and asset price changes on policy days and non-policy days and define the instrumental variable (w_i) including both policy and non-policy days as follows:

$$\Delta i \equiv [\Delta i_P' \Delta i_N']'$$

$$\Delta s \equiv [\Delta s_P' \Delta s_N']'$$

$$w_i \equiv [\Delta i_P' - \Delta i_N']'$$

However, when the sample size is small, in order to obtain an unbiased α estimator, the instrumental variable w_i is adjusted as follows (see Rigobon & Sack (2002); Bohl et al. (2008)):

$$w_i^* \equiv \{[\frac{\Delta i_P}{(T_P - 1)}]'[\frac{-\Delta i_N}{(T_N - 1)}]'\}'$$

where the numbers of policy days and non-policy days are denoted by T_P and T_N, respectively The estimator of instrumental variables approach (α_{IV}), which measures the impact of monetary policy change on the asset price change, is calculated as in Equation (4.14):

$$\widehat{\alpha_{IV}} = \left(w_i^{*\prime}\Delta i\right)^{-1}(w_i^{*\prime}\Delta s) \tag{4.14}$$

The instrumental variable (w_i^*) used in the estimation of α_{IV} is accepted as valid instrument under the assumptions of the heteroskedasticity approach such as stable parameters, heteroskedastic monetary policy shocks and homoskedastic asset price shocks. For instance, the instrumental variable (w_i^*) is correlated with Δi since the set of policy days (P) outweighs the set of non-policy days (N) because of the heteroskedasticity in monetary policy shock. On the other hand, w_i^* has no correlation with the error terms of asset price shocks (η_t) and other shocks (z_t) since these shocks are homoskedastic. Therefore two subsamples cancel each other out.

After estimating the parameters both in the event-study approach and the instrumental variable approach, it is possible to check the validity of strong assumptions of the event-study and compare the estimator of event-study approach (α_{ES}) versus the estimator of the instrumental variables approach (α_{IV}) by applying Hausman (1978) specification tests. The significant test statistic implies the rejection of null hypothesis that the monetary policy shocks are infinitely large when compared to asset price shocks and other shocks. If these assumptions are violated, then the estimators of event-study give biased results (Rigobon & Sack, 2004).

CHAPTER 5

THE FEDERAL RESERVE CASE

This chapter firstly offers the monetary policy functioning of the Federal Reserve (Fed) and its unprecedented (also called unconventional) monetary policy measures during the various stages of the global financial crisis. Then it describes the data and investigates effects of the monetary policy announcements of the Fed on the asset prices in Turkey for the pre- and post- crisis periods. Finally, it discusses the empirical test results.

5.1 The Monetary Policy of the Fed

The Fed has the responsibility and authority to set the monetary policy by basing it on the Federal Reserve Act of 1913 in order to manage the availability and the cost of money and credit, hence stimulating economic growth. The Fed has 3 main monetary policy tools namely; open market operations, discount rate and the reserve requirements. The responsibilities of discount rate and the reserve requirements belong to the Board of Governors of the Federal Reserve System, while the responsibility of open market operations are controlled by the Federal Open Market Committee (FOMC) (Federal Reserve System, 2015a).

The Federal Open Market Committee (FOMC) did not publicly disclose its monetary policy decisions related to the changes in the federal funds rate target immediately after the meetings until February 1994. However, the importance of being transparent has increased the efficiency of monetary policy implementations. Therefore, the FOMC started to disclose monetary policy decisions associated with the adjustments in the federal funds rate

target on the meeting day in February 1994 in order to lower uncertainty through deeds and words. In addition to the intended target rate, the announcements also included directives for the current policy to the Open Market Trading Desk. In December 1998, the Committee agreed that the evaluation about the possible future path of monetary policy would be disclosed immediately after the meeting. This implementation was first applied in May 1999. These disclosure proceedings, which were modified in 2000 in order to reduce bias in the markets, have been implemented since then (Ehrmann and Fratzscher, 2007).

The dates and the disclosures of monetary policy decisions of FOMC meetings are published in the official website of the Board of Governors of Federal Reserve System. The FOMC conducts 8 scheduled meetings in each year. In these meetings, the Committee evaluates the financial and economic environment and selects appropriate monetary policy actions. It also evaluates the risk that may affect the long run objectives such as price stability and steady economic growth (Federal Reserve System, 2015a). Until the global financial crisis, the Fed aimed to sustain its long run objectives by setting the federal funds rate target. In order to keep actual federal funds rate close to the target rate, the Fed sells and purchases U.S. Treasury securities consistently through open market operations (Labonte, 2014). However during each phase of the global financial crisis, the Fed had required to take necessary monetary policy measures most of which were unprecedented in order to mitigate the severe impacts of the crisis and strengthen the financial markets by conducting unscheduled meetings, conference calls, and publishing monetary policy press releases in addition to FOMC meetings.

5.2   The Monetary Policy Actions of the Fed during Global Financial Crisis

Until August 2007, the Fed could steer the monetary policy by using conventional monetary policy tools, such as open market operations, discount rate and reserve requirements as stated above. However, the financial turmoil, which started in August 2007, turned into a global financial crisis following the collapse of Lehman Brothers. Each phase of the global financial crisis forced the Fed to take unprecedented monetary policy

action besides its conventional policy actions (Cecchetti, 2009; Labonte, 2014). These monetary policy actions of the Fed as responses to the stages of the global financial crisis are given below:

5.2.1 Pre-Lehman Brothers Period

The outbreak of global financial crisis dates back to February 2007, in which several big subprime mortgage lenders disclosed their losses. After that, the difficulties in financial markets mounted, and the spread between risky and risk-free bonds widened in July 2007. However, the most important trigger of the financial crisis came with the stopping of the redemption of three investment funds of France's largest bank, BNP on August 2007. In this early stage of the crisis, so as to relieve the tension in financial markets, the Fed employed various monetary policies. Some of these were conventional ones whereas some actions were extraordinary and had never been implemented in the conventional monetary policy period (Cecchetti, 2009). The monetary policy actions starting from August 2007 until the collapse of Lehman Brothers in September 2008 are discussed below:

a) Decreasing the Federal Funds Rate and the Primary Lending Rate

Following the distressed condition of the large French bank BNP, on 10 August 2007, the FOMC released that the Fed would support the financial markets by providing reserves through open market operations if necessary and would put emphasis on the availability of a discount window. Then, the Fed took a further step on 17 August 2007, by reducing the primary lending rate (discount rate) by 50 basis points (bps). On that announcement, the Fed also altered the existing practices by allowing provisions to extend the period of discount lending from overnight to maximum 30 days. However, in the presence of the financial turmoil, the FOMC required to take further and stronger measures. Starting from the 18 September 2007, during their meetings the FOMC decreased the federal funds rate target of 5.25 % to 2 % in seven sequential moves until 30 April 2008. These seven steps are given in Table 5.1:

Table 5.1 The Cuts in the Target Federal Funds Rate and the Primary Lending Rate

18 September 2007	50 bps cut on a scheduled FOMC meeting
31 October 2007	25 bps cut on a scheduled FOMC meeting
11 December 2007	25 bps cut on a scheduled FOMC meeting
21 January 2008	75 bps cut on a unscheduled FOMC meeting
30 January 2008	50 bps cut on a scheduled FOMC meeting
18 March 2008	75 bps cut on a scheduled FOMC meeting
30 April 2008	25 bps cut on a scheduled FOMC meeting

Source: The study of Cecchetti (2009).

Despite the Fed's endeavors about easing the liquidity in the financial market through reducing the interest rates, the interbank lending market shrank in the crisis environment for several reasons. Firstly, lenders perceived the potential credit risk in the market, which implied the likelihood of borrowers' default. Secondly, the banks could use their funds so as to make their own prior commitments on the credit lines and had fears about the decrease in the value of assets that they held. Accordingly, the investors became unwilling to lend except in cases of shortest maturities. Moreover, the Fed tried to supply liquidity for financial institutions via discount rate window, however, most of the banks considered borrowing via discount window would be known and that would be a sign of financial weakness. Thereby, these banks became hesitant to borrow via discount window. As a solution, Fed tried another facility to overcome the financial tightness in the interbank funding market (Cecchetti, 2009; Thornton, 2012).

b) Term Auction Facility

Term Auction Facility (TAF) was launched in December 2007 so as to eliminate hesitations of banks about borrowing from the central bank. Under TAF program, the Fed could provide fully collateralized loans to all depository institutions that were in generally sound financial condition and were eligible to borrow. Therefore, the Fed made funds available to the markets under stress, by erasing the perception about the use of discount window. The institutions, willing to borrow, placed bids about the amount of funds that they required and interest rate that they would pay. This facility was announced on 12

49

December 2007 and was pursued untill 8 March 2010. The first TAF auction that would be held on 17 December 2007 was disclosed on 14 December 2007 by offering $20 billion. Furthermore, it was announced that the TAF program was expanded to $150 billion on 2 May 2008. When the Fed promoted lending facilities through these policy actions, it also sterilized the effect of increasing supply of credit by selling equivalent quantity of government securities. (Federal Reserve System, 2007a, 2007b; Cecchetti, 2009; Thornton, 2012).

c) Term Securities Lending Facility

On 11 March 2008, the Fed announced that the Term Securities Lending Facility (TSLF) was aimed at surmounting the scarce of U.S. Treasury securities in the financial markets. The Fed intended to lend up to $200 billion of Treasury Securities to primary dealers in exchange for federal agency debt, federal agency residential-mortgage-backed securities (MBS), and non-agency AAA/Aaa-rated private-label residential MBS for 28 days (instead of overnight). In this program, the collaterals were especially broadened to foster both liquidity and the functioning of financial markets. For instance, on 2 May 2008, the Fed announced that the collaterals pledged in TSLF could also be AAA/Aaa-rated asset backed securities containing student and auto loans, and credit card debts. (Federal Reserve System, 2010; Cecchetti, 2009).

d) Bear Stearns Case

The Bear Stearns case is another event in which the Fed took extraordinary actions. In the crisis environment, Bear Stearns was one of the financial institutions battling the severe consequences of the financial crisis. In essence, according to its public information on 29 February 2008, the institution was a vital part of interconnected financial network with $14.2 trillion of notional value of derivative contracts such as options, futures and swaps with large number of counterparties. When the institution gave signals of bankruptcy on 13 March 2008, the Fed needed to save the institution, as the collapse of such a financial institution would have had harsh impacts on the entire financial system. Additionally, Bear

Stearns had no opportunity to obtain liquidity from the Fed in exchange for collateral, because it was not a commercial bank. Hence, on the basis of Article 13(3) of the Federal Reserve Act, the Fed used its authority to loan directly to the Bear Stearns on 14 March 2008 (Cecchetti, 2009).

e) Primary Dealer Credit Facility (PDCF)

On 16 March 2008 the Fed announced that in addition to commercial banks, the primary dealers such as investment banks and brokers could also participate in daily open market operations. In a traditional way, these dealers did not have the authority to access the discount loans or the Term Auction Fund. From the announcement date to the 1 February 2010, the primary dealers were able to borrow from the Fed by pledging a broad set of collateral instruments, such as investment-grade corporate securities, municipal securities, mortgage backed securities and asset backed securities. This facility had two major purposes. Firstly, in such a financial tightness, the Fed officials noticed that besides commercial banks, investment banks should also have benefited from the lender of last resort functions of the Fed in order to protect the stability of the financial system. Secondly, the Fed aimed at decreasing the interest rate spread between the asset-backed securities and U.S. Treasury securities, by admitting the asset backed securities as collaterals for loans. Hence, the program promoted the purchase and sale of these assets in the financial markets (Federal Reserve System, 2014; Cecchetti, 2009).

f) Swap Lines with Other Central Banks

On 12 December 2007, the Fed announced the creation of swap lines with the European Central Bank and the Swiss National Bank in order to meet the short-term funding needs. Afterwards, the Fed raised the amount of swap lines with the European Central Bank and the Swiss National Bank both on 11 March 2008 and on 2 May 2008 (Cecchetti, 2009).

5.2.2   The Collapse of Lehman Brothers and Breakout of the Global Financial Crisis

The turmoil in financial markets resulted from subprime mortgage in 2007-2008 in United States reached the most intense stage with the bankruptcy of Lehman Brothers on 15 September 2008. As chaos in financial markets increased suddenly, large number of financial institutions faced to default risk. The decreasing confidence in financial markets spread to other countries and markets. Especially, the emerging markets were harmed by export collapses and a tight economic environment. Hence, with the bankruptcy of Lehman Brothers, the crisis moved to global dimension by giving rise to global loss of confidence and a near collapse of financial system (BIS, 2009).

5.2.3   Post-Lehman Brothers Period

Aftermath of the disclosure of Lehman Brothers bankcruptcy, one of the earliest unconventional monetary policy actions of the Fed was the declaration to start paying interest on required and excess reserve balances of banks, which was announced on 6 October 2008 (Federal Reserve System, 2008; Labonte 2014). As the severe impacts of financial crisis were felt in the markets, the Fed started to keep the target for the federal funds rate close to zero, in order to stimulate the recovery of economy. However, the zero lower bound policy applied since December 2008 was not sufficient alone for the recovery. This forced the Fed to seek different and supportive monetary policy tools. The unprecedented (unconventional) monetary policies applied by the Fed for post- Lehman Brothers period are grouped under three main categories: The first one is employing communication policies to affect the future public expectations, which is called *forward guidance*. The second one is *large scale asset purchasing* program which increases the balance sheet of the central bank through asset purchases. The last one is *operation twist* program also known as *maturity extension program*, which is the purchase of longer-term U.S. Treasury securities and the sale of equivalent amount of shorter-term U.S. Treasury securities (Labonte, 2014). The following headlines summarize the major monetary policy actions of the Fed after Lehman Brother bankrupcy:

a) Forward Guidance

Forward guidance is a monetary policy tool which is a declaration of the future steps of policy rate. The Fed employed forward guidance by keeping the federal funds rate target between 0 and 25 basis point for a specified period of time in the announcement of FOMC meeting on 16 December 2008. This was in order to reduce longer-term interest rates and ultimately stimulate an increase in aggregate output. Furthermore, the Committee implemented forward guidance by implying that the federal funds rate at an *exceptionally low level* would be set through to mid-2013 in the announcement of FOMC on 9 August 2011. Later, it carried on forward guidance by evaluating the inflation and unemployment rates as well as the economic outlook, stating that it would keep target rate at near zero level until the late-2014 in the FOMC announcement on 25 January 2012 (Federal Reserve System, 2011, 2012a; Negro et. al, 2013; Labonte 2014).

b) Quantitative Easing I (QE1)

Quantitative easing (QE) is a monetary policy action, which is employed by the Fed in order to handle a slowdown in the U.S. economy resulting from global financial crisis, includes purchasing of longer-term assets and maintaining a very large portfolio of government and private securities (Thornton, 2012). Quantitative easing program was firstly termed Large Scale Asset Purchase (LSAP). LSAP is buying longer-term securities issued by the U.S. government and longer-term securities issued or guaranteed by government sponsored agencies, such as Fannie Mae or Freddie Mac. By doing so, the Fed tried to reduce the supply of securities in the market which resulted in a price increase in securities and reduced the yields. As a result of this, the private investors reacted to lower yielded U.S. Treasury securities and agency-guaranteed mortgage-backed securities by leaning towards higher yielded asset types such as corporate bonds and other privately issued securities. Hence, the inclination to these assets made the prices of them increase and the yields on these assets to go down. In short, the LSAP program of the Fed put downward pressure on the yields of various assets in the market, which leads to economic recovery. (Federal Reserve System, 2015b).

On 25 November 2008, the Fed announced the first LSAP including buying up to $100 billion in agency debt securities and up to $500 billion in agency mortgage backed securities (MBS) to reinforce the mortgage market and forestall the slowdown of economy in the U.S. On 1 December 2008, the chairman of the Fed, Ben Bernanke, stated that even if the policy rate was set as a rate of zero, Fed could be in need of buying longer-term Treasury or agency securities in considerable amounts in order to stimulate the financial markets. After a while, the initiation of QE was supported in the proclamations of FOMC on 16 December 2008 and on 28 January 2009. The first quantitative easing (QE1) was announced on 18 March 2009. QE1 was aimed at enlarging existing LSAP program by purchasing up to an additional $750 billion MBS and $100 agency debt in total of up to $1.25 trillion agency MBS and $200 billion agency debt. It was also declared that the purchases up to $300 billion U.S. Treasury Securities were provided to improve private credit markets for the next six months (Federal Reserve System, 2009; Thornton, 2012; Labonte, 2014).

c) Quantitative Easing II (QE2)

The signal of the second step of quantitative easing (QE2) was given in the FOMC meeting held on 10 August 2010. On 3 November 2010 the QE program was expanded by purchasing additional of $600 billion of longer-term Treasury securities, by allocating about $75 billion per month. During QE2 program, the Fed increased its balance sheet by replacing maturing securities with Treasury securities with the maturity length between 2.5 and 10 years in order to promote economic expansion (Thornton, 2012; Labonte 2014).

d) Operation Twist

On 21 September 2011, the FOMC introduced the "Maturity Extension Program" (also referred as "Operation Twist") which covered that the Fed would purchase Treasury securities with a maturity period of between six and thirty years, and it would also simultaneously sell equal amount of securities ($667 billion) with a maturity period of three years or less. On 20 June 2012, the Fed announced that it extended this program by

an additional $267 billion worth of treasury securities. The program was planned to end in December 2012. When the Fed decreased the supply of longer-term Treasury securities in the market, the investors would tend to purchase other longer-term assets that were close substitutes of these securities. This would also put a downward pressure in the yields of other longer-term assets. When comparing the operation twist and QE2, operation twist retained the balance sheet of Fed neutral, whereas the quantitative easing expanded the balance sheet of the Fed. On the other side, both were intended to lower longer-term interest rates by reducing the supply of longer-term Treasury securities in the market in order to stimulate economic recovery (Ehlers, 2012; Federal Reserve System, 2013a; Labonte 2014).

e) Quantitative Easing III (QE3)

In the meeting of FOMC on 13 September 2012, the Fed Committee decided that an expansion of accommodative policy was still required to put downward pressure on the longer-term interest rates, to support financial markets and to promote economic recovery, thereby, the Committee announced that an additional $40 billion agency asset backed securities per month would be purchased. This is known as QE3 (Labonte, 2014).

Furthermore, on 12 December 2012, the Fed announced that it would continue to purchase $40 billion worth of MBS and $45 billion worth of Treasury securities per month as the maturity extension program ended. It would carry on with the asset purchase program until the labor market improved by also achieving the price stability (Federal Reserve System, 2012b). In addition to this, Ben Bernanke made significant announcements about the asset purchase program on 22 May 2013 and 10 July 2013 (Chodorow-Reich, 2014). In the testimony of Ben Bernanke on 22 May 2013, it was implied that the Fed might slow down the pace in the asset purchase program as the economic outlook seemed appropriate in terms of unemployment and inflation. Furthermore, in the speech of Ben Bernanke on 10 July 2013, he gave the signals about the possibility of winding down the asset purchases in the following periods (Market Watch, 2013a, 2013b). In the announcement made on 19 June 2013, it was disclosed that the Fed would carry on with the $85 billion worth of asset

purchase in total per month, but it might also moderate this pace of purchases by evaluating the economic and financial conditions (Federal Reserve System, 2013b). Despite the signals of tapering off asset purchases on 18 September 2013, the Fed announced that it would stick to its accommodative monetary policy by purchasing $40 billion MBS and $45 billion Treasury securities per month (Federal Reserve System, 2013c).

f) Tapering Off

On 18 December 2013, the Committee agreed to taper off (i.e. reduce) purchases of both agency mortgage-backed securities and longer-term Treasury securities. In the announcement, it was planned to purchase $35 billion MBS and $40 billion Treasury securities per month in the early days of January, however, the purchase was reduced down to $30 billion MBS and $35 billion Treasury securities on 29 January 2014, as the Fed considered the economy to be recovering (Labonte, 2014).

5.3 The Dates of Monetary Policy Announcements of the Fed

The time span of the study lies between January 2004 and December 2013. By considering the motivation of this study, the time line is separated into two main phases as *pre-global financial crisis period* and *post- global financial crisis period*. Since the financial turmoil, started in August 2007, turned into a global financial crisis with the bankruptcy of the Lehman Brothers in September 2008, the time span between January 2004 and September 2008 is pointed out as the pre-global financial crisis period. On the other hand, most of the unconventional monetary policies were employed by the major central banks in the period following the failure of Lehman Brothers. Hence, the time line between October 2008 and December 2013 is set as post-global financial crisis period. The studies of Glick and Leduc (2013), Rogers et al. (2014) and Chodorow-Reich (2014) also examine the period following the collapse of Lehman Brothers, in which most of the intensive unconventional monetary policy actions were taken by the Fed in their studies.

The dates of the monetary policy announcements of the Fed are determined as the dates of the announcements of the official FOMC meetings (some of which are conference calls) for the years between 2004 and 2013. The dates of the official FOMC meetings are obtained from the Fed's official website. Besides the official FOMC meetings, some additional significant monetary policy announcements and the speeches of President Ben Bernanke, associated with the unprecedented monetary policy actions during the different stages of the crisis, are also considered in this study. The dates of these additional monetary policy announcements and of the speeches are retrieved from the monetary policy releases in the official website of the Fed, in the studies of Cecchetti (2009), Labonte (2014) and Chodorow-Reich (2014). The times of the announcements are obtained through the channels of the official website of the Fed, Bloomberg, and the studies of Rosa (2012) and Chodorow-Reich (2014). The dates of the monetary policy announcements of the Fed and their details are given in Table A.1 in Appendix A.

5.4   The Data of the Fed Case

In this chapter, the impacts of the monetary policy announcements of the Fed on the financial asset prices in Turkey, stock market returns, exchange rates and domestic interest rate are separately examined for the pre- and post- global financial crisis periods. The monetary policy proxies of the Fed for the pre- crisis period (January 2004 - September 2008) and post-crisis period (November 2008 - December 2013) are based on different monetary policy measures in the existing literature. In the aftermath of the collapse of Lehman Brothers, the Fed has kept monetary policy rate at zero lower bound, which results in no surprises in the federal funds rate target changes and made FOMC announcements to have small impact on the anticipations for the following few quarters (Wright, 2011). Furthermore, Rogers at al. (2014) claim that during this period the central banks can immediately affect their own sovereign bond yields and the changes in these yields influence the other asset prices via a pass through mechanism when the policy rates are at zero lower bound. Therefore, the most of the studies which are conducted for the post-Lehman Brothers period (i.e. mostly referred as unconventional monetary policy period) determine the monetary policy measures of the U.S. as the changes in the yields on longer-

term interest rates rather than short-term rates. For instance the study of Glick and Leduc (2013) use the changes in short-term interest rates through federal funds rate for the pre-crisis period whereas it considers the changes of the long-term U.S. Treasury rate futures as monetary policy proxy for the post-crisis period. Additionally, Unalmis and Unalmis (2015) measure the monetary policy shock in the U.S. by considering the eurodollar futures rates for the conventional period whereas they select the changes in ten-year U.S. Treasury futures rates for the unconventional policy period by using daily data.

In this study for the Fed case, two separate monetary policy proxies are utilized for the pre- and post- global financial crisis periods. The monetary policy proxy for the pre-crisis period, denoted by *US_short_term_i*, is based on the changes in the rates on the nearest eurodollar future contract to expire as in the study of Rigobon and Sack (2004). The rates of these contracts, traded on Chicago Mercantile Exchange, are three-month eurodollar deposit rate for $1,000,000 principle value. According to Rigobon and Sack (2004), the rates retrieved from the eurodollar future contracts reflect the surprise component of changes in the policy rates of the Fed since most of the studies point out the importance of the surprise component of the policy rate changes as in the study of the Kuttner (2001). Nevertheless, the surprise component of the change in current month federal funds future rate is intensely exposed to the surprises in the timing of the policy changes. In order to eliminate these timing shocks, the three-month eurodollar rate is selected to reflect the surprises for the anticipated interest rate for the upcoming three months. The eurodollar future contracts are recorded at 2 p.m. according to Chicago time, while the most of the FOMC announcements are released at around 2.15 p.m. New York time (Valente, 2009). However, some FOMC announcements are released at around 12.30. p.m. New York time in the years of 2011 and 2012. Additionally except January 2013, all the FOMC statements of 2013 are disclosed at 2 p.m. New York time. On the other hand, the additional monetary policy press releases and the speeches of the Chairman of the Fed in the data set are recorded at various times according to New York time. Therefore, the monetary policy measure based on the eurodollar future contract is determined by considering the time of each monetary policy announcement of the Fed and the recorded time of the contract.. The

descriptive statistics of daily percentage changes of eurodollar future rates (US_short_term_i) for pre-crisis period are given in Table 5.2.

When it comes to the period of the post-global financial crisis, in the existing literature the studies focus on the yields on the longer-term government bonds as the monetary policy measure. Rogers et al. (2014) claim that the central banks are able to make expressive and immediate changes in the government bond yields by influencing the term premia. Thus, the changes in the government bond yields reflecting the monetary policy stances of the central banks affect other financial asset prices via a pass-through mechanism during monetary policy period of zero lower bound. In their study, the monetary policy surprise is measured by the intraday changes in government bond yields around the monetary policy announcements. Hence, they use the first principle part of the changes in the two-, five-, ten and thirty- year U.S. Treasury bond futures as monetary policy proxies, when investigating the impacts of the unconventional monetary policy actions of the Fed on asset prices by employing OLS approach. However, they claim that daily changes are also preferable because the monetary policy actions during this period are very complex to be digested by the market participants in a narrow window length. On the other hand, the wider window length may lead to contamination resulting from other shocks different from monetary policy shocks. They also employ an alternative approach identification through heteroskedasticity in VAR structure with weaker assumptions. They re-analyze the data by using the daily changes on ten-year U.S. Treasury yield as monetary policy proxy, as the monetary policy shocks have higher variances on the policy days. Additionally, the Chodorow-Reich (2014) uses intraday changes on the five-year U.S. Treasury yields around the announcements as the monetary policy proxy for the U.S. during the unconventional period. Furthermore, Bowman et al. (2015) also use the changes in ten-year U.S. sovereign yields in order to gauge the unexpected part of monetary policy rate changes in the U.S. through interest rate channel when implementing the method of identification through heteroskedasticity in Rigobon and Sack (2003). By considering these studies, the monetary policy proxy of post-global financial crisis period, represented by *US_long_term_i*, is measured by the changes in ten-year U.S. government bond yields in

this study. The summary statistics about daily percentage changes of the ten-year U.S. government bond yields (US_long_term_i) are reported in Table 5.3.

The financial assets in Turkey that are employed in this study are stock market returns, exchange rates and domestic interest rate. The stock market returns are obtained from BIST_100 National Index, and the indices of major subsectors, namely finance (BIST_Financial), industry (BIST_Industry), services (BIST_Services), trade (BIST_Trade) and technology (BIST_IT) in the stock exchange market in Turkey. The stock indices are calculated as the daily percentage changes. As for exchange rates, the values of U.S. dollar and euro against Turkish lira (i.e. direct quotations) are used. The exchange rates, represented as USD/TRL and EUR/TRL, are measured in daily percentage changes. In terms of domestic interest rate, the percentage changes in the yields on two-year Turkish government bond (Two_year_bond) are selected because only data of the yields on the two-year Turkish government bond has been available since June 2006. The changes in the stock indices, exchange rates and the yields on two-year Turkish government bond are calculated by assuring that timing of monetary policy announcements of the Fed are covered in the stock and the bond markets in Turkey, and in the exchange rate markets. The descriptive statistics related to asset price changes in Turkey for both periods are reported in Table 5.2 and Table 5.3. The data for all variables in this chapter are obtained from Bloomberg.

Table 5.2 The Descriptive Statistics of Fed Case for the Pre-Crisis Period

Variable	Mean	Std. Dev.	Min	Max
Monetary Policy Rate				
US_short_term_i[a]	-0.000016	0.001019	-0.005080	0.002400
US_short_term_i[b]	0.000099	0.000656	-0.001280	0.002400
US_short_term_i[c]	-0.000077	0.001348	-0.005080	0.002400
Stock Indices				
BIST_100	0.001299	0.026054	-0.074590	0.066992
BIST_Financial	0.001057	0.029369	-0.078230	0.079193
BIST_Industry	0.000577	0.022100	-0.068580	0.041389
BIST_Services	0.003297	0.021955	-0.058460	0.060528
BIST_Trade	0.005651	0.023128	-0.046680	0.067145
BIST_IT	-0.000230	0.022426	-0.073300	0.043007
Exchange Rates				
USD/TRL	-0.002800	0.008111	-0.021490	0.024705
EUR/TRL	-0.001770	0.008982	-0.019910	0.031852
Yield On Government Bond				
Two_year_bond	0.000024	0.002835	-0.005800	0.006000

Notes: The descriptive statistics are the daily percentage changes of asset prices and U.S. monetary policy rates in decimal points for the pre-global financial crisis period.

The descriptive statistics of the monetary policy rates used for stock market, exchange rate and interest rate data sets are denoted by a, b and c respectively, since the data sets can be different due to the availabilityof the data.

Table 5.3 The Descriptive Statistics of Fed Case for the Post-Crisis Period

Variable	Mean	Std. Dev.	Min	Max
Monetary Policy Rate				
US_long_term_i[a]	-0.000054	0.001192	-0.004740	0.001977
US_long_term_i[b]	-0.000051	0.001168	-0.004740	0.001977
US_long_term_i[c]	-0.000078	0.001213	-0.004740	0.001977
Stock Indices				
BIST_100	0.004122	0.028187	-0.068150	0.073843
BIST_Financial	0.005469	0.033488	-0.073040	0.096282
BIST_Industry	0.002223	0.022370	-0.060560	0.066680
BIST_Services	0.001990	0.020462	-0.048750	0.048960
BIST_Trade	0.003838	0.031108	-0.064360	0.113524
BIST_IT	0.000184	0.024379	-0.052630	0.066350
Exchange Rates				
USD/TRL	-0.001810	0.009659	-0.026080	0.022393
EUR/TRL	0.001667	0.008729	-0.018850	0.028004
Yield On Government Bond				
Two_year_bond	-0.000790	0.002953	-0.008300	0.008000

Notes: The descriptive statistics are the daily percentage changes of asset prices and U.S. monetary policy rates in decimal points for the post-global financial crisis period.
The descriptive statistics of the monetary policy rates used for stock market, exchange rate and interest rate data sets are denoted by a, b and c respectively since the data sets can be different due to the availability of the data.

5.5 The Empirical Test Results for the Fed Case

The event-study and standard instrumental variables approaches are implemented under Equation (4.2) in order to separately see the impacts of the U.S. monetary policy announcements on the asset prices in Turkey for the pre- and post-global financial crisis periods. The estimators of event-study and standard instrumental variables approaches are obtained as in Equation (4.4) and Equation (4.14), respectively. For the pre-crisis period, the U.S. monetary policy rate is based on short-term rate (eurodollar future rate) and the estimators of the event-study and instrumental variables approaches are reported in Table 5.4 (columns a and b). As for the post-crisis period, the monetary policy measure is based

on long-term rate (ten-year U.S. government bond yield) and the estimators of both approaches are given in Table 5.5 (columns a and b).

Table 5.4 The Empirical Test Results of Fed Case for the Pre-Crisis Period (Full Sample Data Set)

Monetary Policy Proxy: US_short_term_i	$\hat{\alpha}_{ES}$ (a)	$\hat{\alpha}_{IV}$ (b)	ES vs IV[a] (c)	Number of Observations
Stock Indices				
BIST_100	0.257 (3.945)	-0.484 (4.574)	[0.7490]	44
BIST_Financial	-1.646 (4.440)	-2.923 (5.079)	[0.6046]	44
BIST_Industry	3.360 (3.306)	3.718 (3.942)	[0.8674]	44
BIST_Services	2.235 (3.307)	1.790 (4.021)	[0.8456]	44
BIST_Trade	4.647 (3.428)	5.487 (3.726)	[0.5648]	44
BIST_IT	1.624 (3.387)	1.232 (4.337)	[0.8851]	44
Exchange Rates				
USD/TRL	-1.230 (1.900)	3.047 (4.354)	[0.2749]	44
EUR/TRL	-3.819* (2.030)	1.499 (4.413)	[0.1746]	44
Yield On Government Bond				
Two_year_bond	0.150 (0.437)	0.0502 (0.457)	[0.4573]	25

Notes: The monetary policy proxy is based on short-term rate.
For ES and IV estimators, the standard errors are given in parentheses.
***, **, * denote the 1% (p<0.01), 5% (p<0.05) and 10% (p<0.1) significance levels respectively.
[a]The p-values of Hausman specification test are given in square brackets.

Table 5.5 The Empirical Test Results of Fed Case for the Post-Crisis Period (Full Sample Data Set)

Monetary Policy Proxy: US_long_term_i	$\widehat{\alpha}_{ES}$ (a)	$\widehat{\alpha}_{IV}$ (b)	ES vs IV[a] (c)	Number of Observations
Stock Indices				
BIST_100	-4.634 (3.497)	-12.27* (6.334)	[0.1483]	46
BIST_Financial	-5.542 (4.153)	-15.96** (7.828)	[0.1164]	46
BIST_Industry	-3.322 (2.785)	-10.63** (5.325)	[0.1072]	46
BIST_Services	-2.690 (2.557)	-9.073* (4.837)	[0.1200]	46
BIST_Trade	-4.448 (3.878)	-18.36** (8.253)	[0.0562]	46
BIST_IT	-0.615 (3.083)	-6.338 (5.550)	[0.2150]	46
Exchange Rates				
USD/TRL	0.998 (1.211)	6.100** (3.099)	[0.0738]	48
EUR/TRL	-3.618*** (0.965)	-3.835* (2.151)	[0.9104]	48
Yield On Government Bond				
Two_year_bond	1.076*** (0.337)	2.075*** (0.670)	[0.0844]	44

Notes: The monetary policy proxy is based on long-term rate.
For ES and IV estimators, the standard errors are given in parentheses.
*** p<0.01, ** p<0.05, * p<0.1 denote the 1%, 5% and 10% significance level respectively.
[a] The p-values of Hausman specification test are given in square brackets.

When the impacts of U.S. monetary policy announcements on the stock market in Turkey are examined for the pre-global financial crisis period, it is observed that BIST_100 index is reacted differently by depending on the methodology employed. For the pre-crisis

period, a cut in the U.S. monetary policy rate based on the short-term rate leads to a drop in the return of BIST_100 index under event-study approach whereas a cut in the U.S. monetary policy rate gives rise to an increase in the return of BIST_100 index under instrumental variables approach. However, both results are statistically insignificant. As for post-crisis period, both methodologies support that a reduction in the U.S. monetary policy rate increases the return of the BIST_100 index. This impact is statistically significant according to the instrumental variables approach. For subsectors stock market indices, except BIST_Financial index, a decrease in the U.S. monetary policy rate results in an insignificant decrease in the returns of subsector indices for the pre-crisis period. A reduction in the U.S. monetary policy rate leads to an insignificant rise in BIST_Financial index in the pre-crisis period. On the other hand, the expansionary monetary policies in the U.S. cause increases in the returns of all subsector indices for the post-crisis period. All the results are statistically significant according to the instrumental variables approach except BIST_ IT index.

In terms of exchange rates, the event-study approach and standard instrumental variables approach give different results about the impacts of the U.S. monetary policy announcements on the USD/TRL and EUR/TRL for the pre-crisis period. Nevertheless, the estimators of the USD/TRL are found to be statistically insignificant according to both approaches. On the other hand, a decrease in the U.S. monetary policy rate results in a significant depreciation of Turkish lira against euro under event-study approach. As for post-crisis period, the instrumental variables approach implies that a cut in the U.S. monetary policy rate cause a significant appreciation of Turkish lira against U.S. dollar. On the other hand, the expansionary monetary policy actions in the U.S. result in significant a depreciation of Turkish lira against euro for the post-crisis period.

As for the yields on Turkish government bond, the yields of the two-year Turkish government bond response to the U.S. monetary policy changes in the same direction for both periods. However, the response is found to be statistically insignificant for the pre-crisis period whereas it is found to be statistically significant for the post-crisis period.

According to Hausman (1978) specification test results in Table 5.4 (column c) and Table 5.5 (column c), the null hypotheses that the event-study assumptions are valid are rejected for only BIST_Trade, USD/TRL and Two_year_bond cases for the post-crisis period. In these cases, the event-study approach tends to give more biased estimators when compared to instrumental variables approach. Anyway, the instrumental variable approach estimators of these variables are considered for the post-crisis period. The assumptions of the event-study approach are valid for rest of the variables.

On some dates of the Fed monetary policy announcements, the ECB or the CBRT also made monetary policy announcements that might affect the asset prices in Turkey (see Appendix Table A.2 and Table A.3 for dates of the monetary policy announcements of the ECB and CBRT, respectively). Therefore, the dates in the data set of the Fed case coincide with other central banks' announcements are excluded in order to avoid the noise resulting from the monetary policy shocks of other central banks. For instance, Gürkaynak et al. (2005) also omit the dates on which the employment reports are released from their sample set since the effects of these reports on the assets can conflict with the effects of the monetary policy announcements. The empirical test results of the reduced sample data set of the Fed for the pre-crisis and post-crisis periods are given in Table 5.6 (columns a and b) and in Table 5.7 (columns a and b), respectively.

Table 5.6 The Empirical Test Results of Fed Case for the Pre-Crisis Period (Reduced Sample Data Set)

Monetary Policy Proxy: US_short_term_i	$\widehat{\alpha}_{ES}$ (a)	$\widehat{\alpha}_{IV}$ (b)	ES vs IV[a] (c)	Number of Observations
Stock Indices				
BIST_100	0.901 (4.315)	-0.364 (4.926)	[0.5945]	36
BIST_Financial	-0.877 (4.837)	-2.643 (5.444)	[0.4794]	36
BIST_Industry	3.713 (3.666)	3.725 (4.283)	[0.9955]	36
BIST_Services	2.906 (3.517)	2.058 (4.271)	[0.7263]	36
BIST_Trade	5.298 (3.714)	5.692 (3.948)	[0.7686]	36
BIST_IT	2.139 (3.686)	1.281 (4.646)	[0.7615]	36
Exchange Rates				
USD/TRL	-2.082 (1.872)	3.129 (4.539)	[0.2076]	42
EUR/TRL	-4.725** (2.006)	1.127 (4.617)	[0.1593]	42
Yield On Government Bond				
Two_year_bond	0.119 (0.472)	0.0642 (0.477)	[0.4476]	22

Notes: The monetary policy proxy is based on short-term rate.
For ES and IV estimators, the standard errors are given in parentheses.
 *** $p<0.01$, ** $p<0.05$, * $p<0.1$ denote the 1%, 5% and 10% significance level respectively.
[a] The p-values of Hausman specification test are given in square brackets.

Table 5.7 The Empirical Test Results of Fed Case for the Post-Crisis Period (Reduced Sample Data Set)

Monetary Policy Proxy: US_short_term_i	$\hat{\alpha}_{ES}$ (a)	$\hat{\alpha}_{IV}$ (b)	ES vs IV[a] (c)	Number of Observations
Stock Indices				
	-4.017	-11.27*	[0.1783]	37
BIST_100	(3.884)	(6.643)		
	-5.004	-15.10*	[0.1404]	37
BIST_Financial	(4.620)	(8.260)		
	-2.170	-9.213*	[0.1265]	37
BIST_Industry	(3.021)	(5.511)		
	-2.345	-7.975	[0.1669]	37
BIST_Services	(2.815)	(4.951)		
	-3.953	-17.48**	[0.0739]	37
BIST_Trade	(4.398)	(8.754)		
	0.474	-4.784	[0.2354]	37
BIST_IT	(3.261)	(5.502)		
Exchange Rates				
	0.278	5.857*	[0.0872]	43
USD/TRL	(1.098)	(3.442)		
	-4.635***	-5.188**	[0.7950]	43
EUR/TRL	(0.863)	(2.296)		
Yield On Government Bond				
	1.026**	2.039***	[0.0951]	36
Two_year_bond	(0.377)	(0.715)		

Notes: The monetary policy proxy is based on long-term rate.
For ES and IV estimators, the standard errors are given in parentheses.
*** p<0.01, ** p<0.05, * p<0.1 denote the 1%, 5% and 10% significance level respectively.
[a] The p-values of Hausman specification test are given in square brackets.

The interpretations of the results obtained from the reduced sample data set do not differ from the interpretations of the results of the full sample data set in general, except the BIST_Services index for the post-crisis period. The expansionary monetary policy in the

U.S. also lead to boost BIST_Services index, however this impact is found to be statistically insignificant for the post-crisis period for the reduced sample data set, whereas it is found to be statistically significant in the post-crisis period for the full sample data set.

In sum, it is more reliable to regard the empirical test results of the reduced sample data set as the reduced sample data set for the Fed case excludes the monetary policy shocks resulting from other central banks When considering the empirical test results of the reduced sample data set, most of the stock market indices, exchange rates and the domestic interest rates significantly respond to the changes in the monetary policy of the U.S. in the post-crisis period, whereas their responses to the U.S. monetary policy changes are statistically insignificant in general during the pre-crisis period.

CHAPTER 6

THE EUROPEAN CENTRAL BANK CASE

This chapter provides the monetary policy mechanism of the European Central Bank (ECB) and its non-standard monetary policy measures during various stages of the global financial crisis. It also offers data and examines the effects of monetary policy announcements of the ECB on the asset prices in Turkey for the pre- and post- crisis periods. Lastly, it discusses the empirical test results.

6.1   The Monetary Policy of the ECB

The Treaties and the Statute of the European System of Central Banks (ESCB) found the European Central Bank (ECB). The ECB, which is a legal and independent institution of the European Union (EU) based on the Article 13 of Treaty on European Union, is in charge of decision-making for the euro-area's monetary policy since 1 January 1999. The euro area comprises of EU Member States which use euro as domestic currency. The Treaties and Statute of ESCB also establish the Eurosystem and the ESCB. The Eurosystem is composed of the ECB and the national central banks (NCBs) of the EU Member States which use the euro as domestic currency. When it comes to the ESCB, it is made up of the ECB and the national central banks of all EU Member States (European Central Bank, 2011a).

The primary objective of the ECB is to sustain price stability for the euro area. In essence, the inflation rate is determined as below but nearly 2 % over the medium term to increase the transparency of the ECB monetary policy. In order to pursue this primary objective, the

ECB manages short-term interest rates in the money market and affects the price level through monetary policy transmission mechanism channels. The Eurosystem employs various monetary policy instruments and procedures to attain the objective of price stability for the euro area. This set of instruments and procedures is the operational framework. By implementing operational framework, the Eurosystem tries to manage interest rates and liquidity in the money market and give signals about monetary policy plans. The operational framework is composed of open market operations, standing facilities and minimum reserve requirements (European Central Bank, 2011a; Delivorias, 2015): They are discussed in detail as follows:

a) Open Market Operations

Open market operations are the most significant components of operational framework. They are implemented to control the liquidity in the money market and give signals about the monetary policy stance of the ECB. The open market operations are made up of the operations as given below (Delivorias, 2015):

i. Main refinancing operations (MROs):
MROs, which are the most crucial open market operations, are conducted regularly with aim of providing sufficient liquidity for the counterparties against acceptable collaterals. The MROs are carried out via weekly standard tenders. In these tenders, the banks could bid for the liquidity that they need for one week maturity.

ii. Longer-term refinancing operations (LTROs):
LTROs are conducted via monthly standard tenders for the banks providing long-term liquidity. The maturity of the provided liquidity is three months.

iii. Fine-tuning operations (FTOs):
FTOs, which are implemented with the purpose of raising or diminishing the liquidity in the money market and managing the interest rates so as to reduce the impacts of

fluctuations resulted from unanticipated liquidity in the market, are conducted on an ad hoc basis.

iv.   Structural operations:

These operations can be implemented through outright purchases/sales, reserve transactions or issuance of ECB debt certificates when the ECB needs to modify structural position of the Eurosystem over against financial markets. These operations can be carried out either in regular or non-regular way with non-standard maturity.

b) Standing Facilities

The standing facilities can be conducted through either marginal lending facility or the deposit facility in order to raise or diminish the overnight liquidity respectively and give signals about the monetary policy stance in general. Although the open market operations are started by the ECB, the standing facility operations are initiated by the counterparts of the ECB. In the absence of alternatives, the credit institutions could demand overnight funds from their national central banks, against eligible collaterals, in return for higher borrowing rates than the rates in the money market. This is called marginal lending facility. In contrast, the institutions can also deposit their funds to their national central banks in return for lower deposit rates when compared to deposit rates in the money market if there is no preferable alternative. This is called deposit facility. Actually, the ECB determines the rates on the standing facilities, in order to create ceiling and floor rates for the interest rate corridor of overnight money market rate (European Central Bank, 2011a; Delivorias, 2015).

c) Minimum Reserve Requirements

The ECB makes the banks in the euro area to hold compulsory and minimum amount of deposits on their current accounts in their own NCBs. The amount of minimum required reserve is determined by considering the certain elements of the banks' balance sheets, for instance their deposits. The central banks can manage the liquidity fluctuations in the

money market through implementing minimum reserve requirements. The central banks could bring about structural liquidity scarcity in the banking system by using this monetary policy tool. As a result of this, the ECB could provide the liquidity for the banks which are in the need of funds in return for the rates that are consistent with its monetary policy stance (Delivorias, 2015).

The monetary policy decision-making is conducted by the Governing Council in the ECB. The Committee makes decisions about the key interest rates and the supply of the reserves in the Eurosystem and its monetary objectives. In general, the Committee carries out monthly monetary policy decision meetings for the years between 2004 and 2014. However, it is possible to encounter more than one meeting in a month if it is required. Nevertheless, the Governing Council monetary policy meetings have been held every six weeks since 2015 (European Central Bank, 2015).

6.2 The Monetary Policy Actions of the ECB during the Global Financial Crisis

The ECB implemented the monetary policy instruments discussed above during the conventional monetary policy period. However, during various stages of the global financial crisis, the ECB had also required employing non-standard measures in order to mitigate the severe impacts of the crisis and stabilize the economic and financial environment in the euro area. The phases of the global financial crisis and the responses of the ECB to each phase of the crisis are discussed as follows:

6.2.1 Pre-Lehman Brothers Period / Financial Turmoil Phase: From August 2007 to September 2008:

With the breaking out of severe tension in interbank market including the euro area in August 2007, the ECB encountered raising risk premiums on interbank loans at different maturities and exceptional high level of spreads between secured and unsecured interbank money market rates. Hence, market activities especially at longer maturities seized up and the uncertainty about the short-term funding resulted in lack of confidence in the market.

In order to efface the stress in the financial market, the ECB increased the frequency of fine tuning operations which primarily aimed at keeping the short-term interest rates close to the key policy rate (i.e. main refinancing rate). These operations were conducted to meet the liquidity demand in the markets during those times. Furthermore, the ECB launched supplementary refinancing operations having maturity of three and six months. It expanded the weights of longer-term refinancing operations, while it simultaneously decreased the amount allocated to the shorter-term refinancing operations. The aim behind promoting longer-term refinancing operations was to encourage credit institutions to carry on supplying funds in order to stimulate the economy. Furthermore, in this period, the ECB divided maintenance period into two parts. In the first part, it permitted the banks *front loading* of reserves and let them hold less reserve in the second part. During full maintenance period, the ECB supplied same amount of liquidity, however, it provided the liquidity at earlier times of the maintenance period by considering the front loading. Thus, it raised the average maturity of liquidity supply. By implementing these policy actions, the ECB changed the composition of its balance sheet not the overall size of its balance sheet. Other than these operations, the ECB made temporary swap lines with the U.S. Federal Reserve in order to overcome the tightness in the U.S. dollar liquidity (Cassola et al., 2010; European Central Bank, 2010; Lenza et. al, 2010).

6.2.2 The Collapse of Lehman Brothers / Breakout of Global Financial Crisis: From September 2008 to April 2010

The financial turmoil emerged in August 2007 turned into a global financial crisis with the collapse of Lehman Brothers on 15 September 2008. Intensifying uncertainty about the financial strength of major banks worldwide resulted in collapse of activities in many financial markets. The short-term interest rate spreads also reached unusual high levels in the euro area. The uncertainty in the financial markets led the banks to raise liquidity buffers, shed risk off their balance sheets and constrain credit supply. By considering the importance of banks both in supplying funds for the euro area and in efficient monetary policy implementation of the ECB, this situation gave warnings of high risk of credit crunch and failure of ECB to manage monetary policy. Furthermore, the crisis emerged in

74

the financial system spread out to real sector, which caused worsening in total output in major economies and in global trade. As seen, the global financial crisis firstly hit the banking sector. In order to improve the weak and instable banking sector during the crisis environment, the ECB not only decreased key interest rates but also supported the financial conditions of banks in the euro area by taking some non-standard monetary policy measures for the period between September 2008 and April 2010 (European Central Bank, 2010; Cour-Thimann & Winkler, 2013; Rodriguez & Carrasco, 2014). The monetary policy actions during this phase are as follows:

a) Decreasing Key Interest Rates

The ECB firstly responded to the crisis by decreasing its key monetary policy interest rates. For instance, the main refinancing rate was cut by 50 basis points on 8 October 2008. Subsequently, the ECB brought main refinancing rate down from 4.25 % to 1%, which had not been observed in decades for the euro area until May 2009. Furthermore, it narrowed the width of interest rate corridor from 200 basis points to 100 basis points between October 2008 and January 2009, and then it raised this width to 200 basis points again until April 2009. Finally, since May 2009 the ECB had kept width of the interest rate corridor at 150 basis points (Cour-Thimann & Winkler, 2013; Rodriguez & Carrasco, 2014).

b) Fixed Rate Full Allotment

In the fixed rate full allotment tender procedure, the eligible financial institutions in the euro area could access the unlimited central bank liquidity at main refinancing rate for all refinancing operations against sufficient collateral, while in normal times the ECB conducts variable rate tender procedures for pre-determined amount of central bank liquidity. This procedure aimed at providing sufficient funds for the short-term needs of the banking sector, hence satisfying the credit need of households and companies (European Central Bank, 2010; Cour-Thimann & Winkler, 2013).

c) Extension of the Maturity of Liquidity Provision

The maturities of LTROs were extended. Additional LTROs having six-month maturity were conducted. Furthermore, it was disclosed that the LTROs having maturity of twelve-month would be carried out. The major purpose behind this action was to keep the money market interest rates at a low level. Therefore, the maturity extension facilitated a decrease in liquidity costs and eased the uncertainty in the euro-area banking sector, which supported the banks for supplying credit for the economy (European Central Bank, 2010; Cour-Thimann & Winkler, 2013).

d) Expansion of Collateral Eligibility

The variety of eligible collaterals accepted in the Eurosystem for refinancing operations was increased in order to make the banks with less liquid assets to ease their access to the funds provided by central banks. As the list of collaterals expanded, the liquidity shortages resulted from sudden stop in interbank lending was effaced in considerable amount. Additionally, the list of counterparties qualified to benefit from the fine tuning operations was expanded (European Central Bank, 2010; Cour-Thimann & Winkler, 2013).

e) Currency swap agreements

In return for pledging as euro-dominated collaterals, the ECB supplied liquidity in foreign currencies at different maturities for the short-term. Hence, it cooperated with major central banks, such as the Fed, the Bank of England, the Swiss National Bank, the Bank of Japan in terms of currency swap agreements (Cour-Thimann & Winkler, 2013; Rodriguez & Carrasco, 2014).

f) Covered Bond Purchase Program 1 (CBPP1)

The ECB disclosed that it would launch CBPP1 with 60 billion euro worth of covered bonds denominated in euro and issued in the euro area for the time line between June 2009

and June 2010. The major aim behind this program was to stimulate the covered bond market, as this market was one of most vital funding supply for credit institutions in the euro area. By the help of this program, the funding costs would be decreased and the banks could access more funds with less difficulty. Thus, they could provide more credits to their clients, which would give rise to increasing the market liquidity in the significant part of private debt securities market (Cour-Thimann & Winkler, 2013; Rodriguez & Carrasco, 2014).

All the monetary policy actions providing liquidity to overcome the financial contraction in the banking system expanded the balance sheet of the ECB at unprecedented level when compared to the usual times. From late 2009 to May 2010, the financial conditions in the euro area recovered gradually; therefore, the ECB slowly started to *phase out* non-standard monetary policy actions and a small amount of decline was noticed in the balance sheet of the ECB. For instance, the ECB announced that the LTRO with a twelve-month maturity in December 2009 would be the final one and just one more LTRO with six-month maturity would be carried out in March 2010. In addition, the ECB decided to terminate the additional LTROs having three-month maturity and it also made a decision about going back to the LTROs with a variable tender procedure. Lastly, it finalized the cooperation with other central banks in terms of providing foreign currency liquidity (European Central Bank, 2010; Cassola et al., 2010; Rodriguez & Carrasco, 2014).

6.2.3 The Start of Sovereign Debt Crisis in the Euro area: From May 2010 to August 2011

In the early of 2010 the questions about the sustainability of public finance of Greece in the market led to a sharp increase in the spreads between Greek government bonds and German government bonds, which implied sovereign debt crisis that could spread out to other sovereign bond markets in the euro area, such as Ireland, Portugal and Spain. As a result of these developments, the secondary euro debt markets did not work in terms of providing liquidity and the spreads attained extremely high levels in May. By considering the negative conditions, the governments in the euro area launched the package program of

European Financial Stability Facility and the ECB introduced Securities Market Program (SMP) on 10 May 2010. The SMP was conducted by interfering the markets of public and debt securities in order to make dysfunctional markets operate properly and to give rise to more efficiently functioning monetary policy transmission mechanism in the euro area. Nevertheless, the impact of the liquidity injection through SMP was fully sterilized by conducting liquidity-absorbing operations. In addition, the ECB resumed implementing a non-standard monetary policy measure in order to prevent the contagion of sovereign debt crisis to other markets. For instance, it restarted the LTROs with full allotment and three-month maturity under a fixed rate tender procedure by starting from the end of May. It also started to carry out a new refinancing operation with full allotment having six-month maturity in May 2010. The temporary swap agreements with the Fed were also reestablished. When the economic conditions in the euro area seemed stable between April 2011 and August 2011, the ECB brought the key policy interest rate to 1.25 % and to 1.5 % in April 2011 and July 2011, respectively (European Central Bank, 2010; Cassola et al., 2010; Rodriguez & Carrasco, 2014).

6.2.4 The Re-Intensification of Sovereign Debt Crisis in the Euro Area and Intensified Strains in Banking Sector: From August 2011 to May 2013

In the summer of 2011, the Italian and Spanish government bond markets became dysfunctional due to a risk of contagion of sovereign debt crisis. As a response to this, on 7 August 2011, the ECB made a decision about efficient reimplementation of the SMP which had been inactive for several months. Furthermore, in the autumn of that year the banking system in the euro area fell into a financial strain, as the depressed government bonds deteriorated the bank balance sheets. The sovereigns with financial distress were perceived as they could not build sound images. The sovereign bond prices of other countries different from the stressed ones such as France, Belgium and Austria also fell, the bank equity prices decreased in considerable amounts. Furthermore, the interbank market in the euro area turned out to be dysfunctional. Re-intensification of both financial and sovereign crises forced the ECB to take additional non-standard measures in order to maintain the financial stability in the euro area. On 6 October 2011, the ECB declared that it would

carry out the second Covered Bond Purchase Program (CBPP2) by purchasing euro-denominated covered bonds with an intention of 40 billion euros in both primary and secondary markets. On 8 December 2011, during a Governing Council meeting, the ECB declared that it would conduct two LTROSs with three-year maturity in December 2011 and February 2012 with an option of early repayment after one year. It also announced the cutback of reserve ratio from 2 % to 1 %. In the same meeting, the ECB raised the availability of collateral by permitting the national central banks to accept the credit claims such as bank loans in frames of their own responsibilities and also increased the list of eligible asset backed securities (ABS) as collaterals in order to raise accessibility of collaterals. Furthermore, it promoted the development of different credit evaluation bases employed in the election of eligible collateral. Furthermore, on 6 September 2012 the ECB introduced another sovereign bond purchasing program called Outright Monetary Transactions (OMT) while it officially finalized the SMP. Just like the SMP, it also aimed at providing the monetary policy transmission mechanism to operate efficiently and the credit markets to function homogenously throughout the euro area. By taking these measures, the ECB showed that it could take necessary actions to eliminate the worries about the reversibility of the euro. The OMT focused on the operation having maturity between one- and three- year, while the SMP dealt with longer-term maturities. In OMT, the ECB declared that it would buy the sovereign bonds of governments that were involved in the European Financial Stability Facility (EFSF) or the European Stability Mechanism (ESM) programs. In OMT, the ECB also relinquished its senior standing with respect to private creditors, and concentrated on the transparency of the transactions. During this phase, in the period between January 2013 and May 2013 the stress in the financial markets such as bond and money markets decreased. Furthermore, the banks began paying back the loans, which gave rise to a decreasing tendency in the size of the ECB balance sheet (European Central Bank 2011b; Cour-Thimann & Winkler, 2013; Szczerbowicz, 2013; Rodriguez & Carrasco, 2014).

From June 2013 to mid-2014, the financial conditions improved in the euro area and economic outlook turned into a more positive perspective. The banks started to make early repayments of very long-term refinancing operations and were not in the need of liquidity

provided by ECB anymore. In addition, they did not prefer to utilize the excess reserves to supply credit. In sum, the credit institutions chose deleveraging. All these led to a distinct amount of decrease in the balance sheet of the ECB and made the EONIA (i.e. overnight interest rate in the interbank) approach the MRO rate. When considering the increase in volatility in the money market and evaluating the inflationary outlook during this phase, the ECB reduced the MRO down to 0.25 % and set the marginal lending rate and deposit rate to 0.75 % and 0.00%, respectively in the Governing Council meeting in November 2013. One of the most significant monetary policy actions of the ECB for this stage is to start to adopt *forward guidance*. In the meeting of Governing Council conducted on 4 July 2013, the ECB gave explicit signals of maintaining forward guidance about the future path of policy interest rates. Henceforth, the ECB has implemented forward guidance since July 2013 in order to communicate how the ECB makes evaluations on the risks regarding price stability in the euro area over the medium-term and its monetary policy stance depending on these evaluations. During the global financial crisis like other major central banks, the ECB has also considered the importance of the clear communication about the expectations of future monetary policy path in order to attain its objectives. In 2014, the ECB carried on steering the policy interest rates and conducting refinancing operations which are not in range of this study's time span (European Central Bank; 2014; Rodriguez & Carrasco, 2014).

6.3   The Dates of the Monetary Policy Announcement of the ECB

As in the Fed case, the *pre-global financial crisis period* is determined as January 2004 - September 2008, while the *post-global financial crisis* is set as October 2008 - December 2013. Although, the ECB had taken several measures since the onset of the financial crisis in August 2007, the financial turmoil turned into the global financial crisis after the collapse of Lehman Brothers in September 2008 and most of the intense non-standard measures were taken by the ECB by following the bankruptcy of Lehman Brothers (European Central Bank, 2010, 2011a; Cour-Thimann & Winkler, 2013). Therefore, the period following the Lehman Brothers collapse is regarded as the post-crisis period. The studies of Lenza et al. (2010) and Febrero et al. (2015) also consider the period following

the collapse of Lehman Brothers when examining the non-standard measures of the ECB in their studies.

The dates of monetary policy announcements of the ECB are determined as the dates of the Governing Council meetings of the ECB for the years between 2004 and 2013. Furthermore, the dates of the additional press releases about non-standard monetary policy measures taken by the ECB and dates of the speeches of the President Mario Draghi, during various phases of the crisis. The dates of Governing Council meetings are obtained from the official website of the ECB. Furthermore, the dates of some additional significant monetary policy announcements about non-standard measures and of the speeches are obtained from the study of Rogers et al. (2014). The times of announcements are obtained via the channels of the official website of the ECB and the study of Rogers et al. (2014). The dates of monetary policy announcements of the ECB and their details are given in Table A.2 in Appendix A.

6.4   The Data of the ECB Case

This chapter investigates the impacts of the monetary policy announcements of the ECB on the financial asset prices in Turkey stock market returns, exchange rates and domestic interest rate for the pre- and post-global financial crisis period. For the ECB case, it is also vital to use different monetary policy measures for these different periods since the ECB also had kept target rate at unprecedented low levels and had employed non-standard monetary policy measures in the aftermath the collapse of Lehman Brothers as in the Fed case. For instance, Haitsma et al. (2015) use monetary policy surprises depending on the changes in the three-month EURIBOR futures rates for the non-crisis years, whereas they prefer the changes in the spread between Italian and German ten-year government bond yields for the crisis years. Therefore, the monetary policy measure is based on the longer-term yields rather than short-term rates for the post-crisis period. The daily changes in the one-month EURIBOR rate is selected as the monetary policy measure in the euro area for the pre-global financial crisis period as in the study of Kholodilin et al. (2009). One-month EURIBOR is preferable as in the studies of Kleimeier and Sander (2006) and Bohl et al.

(2008), as the interest rates with maturities less than one month may be exposed to high volatility whereas the interest rates with maturities higher than one month may not reflect the changes in the monetary policy alterations. Additionally, Kholodilin et al. (2009) note that the EURIBOR closing prices are recorded at 11 a.m. based on the Central Europe Time (C.E.T) and the Governing Council meetings are published at 1.45 p.m. C.E.T. The other press releases and speeches in the event days are disclosed after 11 a.m. C.E.T. and the press conferences of the Governing Council meetings are held on 2.30 p.m. C.E.T (Rogers et al., 2014). Therefore, the closing prices in the following days are considered when calculating this monetary policy measure for the policy days. The monetary policy measure of the euro area for the the pre-crisis period is denoted by EURO_short_term_i and its descriptive statistics are reported in Table 6.1.

As for the post-crisis period, the changes in the yields on the longer-term sovereign bonds in the euro area are considered as the monetary policy measure, as the central banks could affect their own government bond yields immediately when the policy rates are kept at zero lower bound (Rogers et al., 2014). Therefore, Rogers et al. (2014) measure the monetary policy surprises as the changes in spread between the yields on Italian ten-year sovereign bond and German ten-year sovereign bond by using intraday data. The reason of using this measure is that the intra-euro area spreads have a significant role in the monetary policy transmission mechanism in the euro area under an extraordinary economic environment, particularly in the recent years. In these special conditions, the monetary policy stance of the ECB has aimed at declining default risk premia in the euro area which is reflected by the intra-euro area spreads. Hence, the expansionary monetary policies are perceived as being associated with the lower spread, thus lower default risk. By deeming the study of Rogers et al. (2014), the monetary policy proxy is selected as the daily percentage changes in the spread between Italian ten-year sovereign bonds and ten-year German sovereign in this study. This monetary policy proxy of the euro area in the post-crisis period is denoted by EURO_long_term_i and its summary statistics are given in Table 6.2.

When it comes to the financial assets in Turkey, the assets used in the Fed case are also employed here. The stock market indices are daily percentage changes in BIST_100, BIST_Financial, BIST_Industry, BIST_Services, BIST_Trade, and BIST_IT. In terms of the exchange rate, the values of U.S. dollar and euro against Turkish lira (i.e. direct quotations) are used. The exchange rates, represented as USD/ TRL and EUR/TRL, are measured in daily percentage changes. The domestic interest rate in Turkey, denoted by Two_year_bond, is taken as the percentage changes in the yields on two-year Turkish government bond. The changes in the stock indices, exchange rates and the yields on two-year Turkish government bond are calculated by assuring that timing of monetary policy announcements of the ECB are covered in the stock and bond markets in Turkey and in the exchange rate markets. The descriptive statistics of the stock indices, exchange rates and interest rate data are given in Table 6.1 and Table 6.2 for pre-crisis period and post-crisis period respectively. The data source for all the variables in this chapter is Bloomberg.

Table 6.1 The Descriptive Statistics of ECB Case for the Pre-Crisis Period

Variable	Mean	Std. Dev.	Min	Max
Monetary Policy Proxy				
EURO_short_term_i[a]	0.000024	0.000134	-0.000350	0.000510
EURO_short_term_i[b]	0.000020	0.000132	-0.000350	0.000510
EURO_short_term_i[c]	0.000055	0.000163	-0.000350	0.000510
Stock Indices				
BIST_100	-0.000190	0.018569	-0.040250	0.043813
BIST_Financial	-0.001720	0.023107	-0.046030	0.052283
BIST_Industry	0.001693	0.015475	-0.030070	0.052329
BIST_Services	0.000103	0.017163	-0.039760	0.037348
BIST_Trade	0.002387	0.016356	-0.032910	0.053558
BIST_IT	0.001845	0.018459	-0.034740	0.047170
Exchange Rates				
USD/TRL	0.001379	0.009886	-0.021140	0.025686
EUR/TRL	0.001516	0.009050	-0.019270	0.024887
Yield On Government Bond				
Two_year_bond	-0.00029	0.002671	-0.008000	0.005900

Notes: The descriptive statistics are the daily percentage changes of asset prices and the euro area monetary policy proxies in decimal points for the pre-global financial crisis.
The descriptive statistics of the monetary policy rates used for stock market, exchange rate and interest rate data sets are denoted by a, b and c respectively since the data sets can be different due to the availability of the data.

Table 6.2 The Descriptive Statistics of ECB Case for the Post-Crisis Period

Variable	Mean	Std. Dev.	Min	Max
Monetary Policy Proxy				
EURO_long_term_i[a]	0.000030	0.001626	-0.004480	0.005550
EURO_long_term_i[b]	0.000028	0.001614	-0.004480	0.005550
EURO_long_term_i[c]	0.000030	0.001626	-0.004480	0.005550
Stock Indices				
BIST_100	-0.00063	0.018485	-0.046980	0.037142
BIST_Financial	-0.00029	0.021709	-0.044710	0.052001
BIST_Industry	-0.00185	0.015562	-0.045600	0.024769
BIST_Services	-0.00025	0.015674	-0.053120	0.035258
BIST_Trade	-0.00036	0.016036	-0.060510	0.034466
BIST_IT	-0.00361	0.018755	-0.061810	0.039350
Exchange Rates				
USD/TRL	0.000953	0.011699	-0.017940	0.039712
EUR/TRL	0.000709	0.008678	-0.017910	0.033537
Yield On Government Bond				
Two_year_bond	-0.000430	0.002367	-0.013500	0.004600

Notes: The descriptive statistics are the daily percentage changes of asset prices and the euro area monetary policy proxies in decimal points for the post-global financial crisis.
The descriptive statistics of the monetary policy rates used for stock market, exchange rate and interest rate data sets are denoted by a, b and c respectively since the data sets can be different due to the availability of the data.

6.5   The Empirical Test Results for the ECB Case

In order to observe the impacts of euro area monetary policy announcements on the asset prices in Turkey for the pre- and post- financial global crisis periods, event-study and standard instrumental variables approaches are employed under Equation (4.2). The estimators of event-study and standard instrumental variables methodologies are calculated as in Equation (4.4) and Equation (4.14), respectively. As for the pre-crisis period, the monetary policy proxy for the euro area is based on the short-term rate (one-month EURIBOR rate) and the empirical test results for this period are reported in Table 6.3 (columns a and b). On the other hand, the monetary policy measure is regarded through

long-term yields (spread between ten year- Italian and German government bond yields) for the post-crisis period and the results for post-crisis period are given in Table 6.4 (columns a and b).

Table 6.3 The Empirical Test Results of ECB Case for the Pre-Crisis Period (Full Sample Data Set)

Monetary Policy Proxy: EURO_short_term_i	$\hat{\alpha}_{ES}$ (a)	$\hat{\alpha}_{IV}$ (b)	ES vs IV[a] (c)	Number of Observations
Stock Indices				
BIST_100	-17.44 (18.51)	659.6 (1,923)	[0.7248]	57
BIST_Financial	-15.08 (23.13)	718.4 (2,115)	[0.7287]	57
BIST_Industry	-27.41* (15.10)	630.3 (1,853)	[0.7226]	57
BIST_Services	-5.812 (17.23)	436.6 (1,280)	[0.7296]	57
BIST_Trade	-18.09 (16.25)	795.8 (2,288)	[0.7221]	57
BIST_IT	-30.22 (18.10)	482.8 (1,467)	[0.7265]	57
Exchange Rates				
TRL/USD	2.509 (9.833)	-486.8 (1,539)	[0.7505]	60
TRL/EUR	6.207 (8.970)	-517.4 (1,643)	[0.7499]	60
Yield On Government Bond				
Two_year_bond	5.747* (2.902)	-229.4 (1,715)	[0.8910]	30

Notes: The monetary policy proxy is based on short-term rate.
For ES and IV estimators, the standard errors are given in parentheses.
 *** p<0.01, ** p<0.05, * p<0.1 denote the 1%, 5% and 10% significance level respectively.
[a] The p-values of Hausman specification test are given in square brackets.

Table 6.4 The Empirical Test Results of ECB Case for the Post-Crisis Period (Full Sample Data Set)

Monetary Policy Proxy: EURO_long_term_i	$\widehat{\alpha}_{ES}$ (a)	$\widehat{\alpha}_{IV}$ (b)	ES vs IV[a] (c)	Number of Observations
Stock Indices				
BIST_100	-4.556*** (1.302)	-4.616* (2.391)	[0.9764]	66
BIST_Financial	-5.224*** (1.535)	-5.391* (2.909)	[0.9462]	66
BIST_Industry	-3.552*** (1.111)	-3.147 (2.023)	[0.8106]	66
BIST_Services	-3.294*** (1.132)	-3.404* (1.970)	[0.9457]	66
BIST_Trade	-3.978*** (1.128)	-5.580** (2.336)	[0.4334]	66
BIST_IT	-2.853** (1.397)	-4.286 (2.655)	[0.5257]	66
Exchange Rates				
USD/TRL	2.086** (0.861)	1.984 (1.446)	[0.9302]	67
EUR/TRL	-0.290 (0.666)	-0.570 (1.200)	[0.7790]	67
Yield On Government Bond				
Two_year_bond	0.186 (0.180)	0.227 (0.308)	[0.8701]	66

Notes: The monetary policy proxy is based on long-term rate.
For ES and IV estimators, the standard errors are given in parentheses.
*** p<0.01, ** p<0.05, * p<0.1 denote the 1%, 5% and 10% significance level respectively.
[a] The p-values of Hausman specification test are given in square brackets.

When the empirical test results are examined, it is seen that the event-study and standard instrumental variables approaches give estimators in different signs for all stock market indices for the pre-crisis period. The event-study approach implies that a decrease in the

monetary policy rate in the euro area results in an increase in the returns of stock market in Turkey whereas the standard instrumental variables approach indicates contrary results with the event-study approach. However, all the results of both approaches are statistically insignificant except BIST_Industry index. According to event-study approach, a decrease in euro area monetary policy rate leads to a rise in BIST_Industry. For the post crisis period, the monetary policy proxy for the euro area is measured by the spread between ten-year Italian and German government bond yields. In the post-crisis period, the expansionary monetary policy aims at lowering default risk in the euro area which is reflected by intra-euro sovereign spreads. Hence, expansionary monetary policy actions indicate lower intra-euro sovereign spreads. As seen from the test results, the expansionary monetary policy boosts all stock returns in Turkey, and these results are statistically significant according to either event-study approach or instrumental variables approach.

As in the stock market results, the impacts of monetary policy decisions in the euro area on the exchange rates seem variable depending on the methodology employed for the pre-crisis period. A decrease in monetary policy rate in the euro area may lead to either an appreciation or depreciation of Turkish lira against U.S. dollar and euro. Nevertheless, the results are statistically insignificant. On the other hand, according to event-study approach, the expansionary monetary policy actions result in a significant appreciation of Turkish lira against U.S. dollar for the post-crisis period, while the expansionary monetary policy actions lead to depreciation of Turkish lira against euro, but this result is statistically insignificant.

Lastly, the yields on the two-year Turkish government bond respond significantly to the monetary policy changes in the euro area and in the same direction according to event-study approach. When the post-crisis period is considered, both event-study and instrumental variables approached imply that the expansionary monetary policy actions give rise to a decrease in yields on Turkish government bond, however, this decrease seems statistically insignificant.

The assumptions of event-study validity are tested under Hausman (1978) specification tests. The test results given in Table 6.3 (column c) and in Table 6.4 (column c) cannot be rejected at any significance level, which implies that event-study estimators are not found to be statistically biased when compared to the estimators of instrumental variables approach.

As in the Fed case, there are some dates of the monetary policy announcements of the ECB coinciding with dates of the monetary policy announcements of the Fed and the CBRT (as given in Table A.1 and Table A.3 in Appendix A). Therefore, these dates are excluded from the full sample data set of the ECB case since the monetary policy shocks resulting from the monetary policy announcements of the Fed and the CBRT may generate noise in the results of the monetary policy shocks of the ECB.[1] As in the full sample data set, the results of pre-crisis period for the reduced sample data set are reported in Table 6.5 (columns a and b). For the post-crisis period, the results of post-crisis period are offered in Table 6.6 (columns a and b).

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[1] See also Gürkaynak et al.(2005). They also exclude the dates of employment reports coinciding with the monetary policy dates since these reports may also affect the asset prices.

Table 6.5 The Empirical Test Results of ECB Case for the Pre-Crisis Period (Reduced Sample Data Set)

Monetary Policy Proxy: EURO_short_term_i	$\hat{\alpha}_{ES}$ (a)	$\hat{\alpha}_{IV}$ (b)	ES vs IV[a] (c)	Number of Observations
Stock Indices				
BIST_100	-9.283 (21.65)	-82.02 (90.77)	[0.4093]	48
BIST_Financial	-11.93 (25.51)	-109.5 (111.5)	[0.3688]	48
BIST_Industry	-5.584 (15.21)	-41.55 (60.70)	[0.5405]	48
BIST_Services	-2.736 (19.78)	-47.13 (78.01)	[0.5563]	48
BIST_Trade	13.68 (17.00)	7.604 (62.95)	[0.9201]	48
BIST_IT	-19.92 (21.24)	-79.42 (84.16)	[0.4650]	48
Exchange Rates				
USD/TRL	-0.0463 (10.69)	23.74 (39.86)	[0.5356]	53
EUR/TRL	7.435 (10.44)	43.89 (42.65)	[0.3780]	53
Yield On Government Bond				
Two_year_bond	4.960 (3.398)	14.92 (13.03)	[0.4285]	27

Notes: The monetary policy proxy is based on short-term rates.
For ES and IV estimators, the standard errors are given in parentheses.
*** p<0.01, ** p<0.05, * p<0.1 denote the 1%, 5% and 10% significance level respectively.
[a] The p-values of Hausman specification test are given in square brackets.

Table 6.6 The Empirical Test Results of ECB Case for the Post-Crisis Period (Reduced Sample Data Set)

Monetary Policy Proxy: EURO_short_term_i	$\widehat{\alpha}_{ES}$ (a)	$\widehat{\alpha}_{IV}$ (b)	ES vs IV[a] (c)	Number of Observations
Stock Indices				
BIST_100	-4.847*** (1.419)	-4.776 (3.083)	[0.9792]	57
BIST_Financial	-5.586*** (1.690)	-5.629 (3.794)	[0.9899]	57
BIST_Industry	-3.608*** (1.178)	-2.907 (2.524)	[0.7534]	57
BIST_Services	-3.617*** (1.265)	-3.750 (2.495)	[0.9504]	57
BIST_Trade	-4.493*** (1.280)	-7.430** (3.161)	[0.3096]	57
BIST_IT	-2.890* (1.530)	-3.438 (3.313)	[0.8521]	57
Exchange Rates				
USD/TRL	2.376** (0.968)	2.306 (1.823)	[0.9636]	57
EUR/TRL	-0.295 (0.756)	-0.512 (1.520)	[0.8697]	57
Yield On Government Bond				
Two_year_bond	0.196 (0.213)	0.249 (0.415)	[0.8823]	57

Notes:The monetary policy proxy is based on long-term rates.
 For ES and IV estimators, the standard errors are given in parentheses.
 *** p<0.01, ** p<0.05, * p<0.1 denote the 1%, 5% and 10% significance level respectively.
 [a] The p-values of Hausman specification test are given in square brackets.

According to the test results of the reduced sample data set, the event-study and instrumental variables approaches give consistent results in terms of the signs of estimators for the stock market indices for the pre-crisis period. In the full sample data set, although most of the impacts are statistically insignificant, the event-study approach and

instrumental variables approach give the estimators with different signs. However, when the sample size is reduced by extracting the coinciding dates, the results seem more consistent in terms of the signs of the estimators. Except BIST_Trade variable, the expansionary monetary policy in the euro area increases the stock market returns in Turkey for the pre-crisis period. Nevertheless, all results are statistically insignificant. As for the post crisis period, the empirical results show that the expansionary monetary policy actions boost the stock market returns in Turkey for all stock market indices and the results are still statistically significant according to event-study approach.

The results for the value of Turkish lira against U.S. dollar in the reduced sample data set are also inconsistent in terms of the signs of the estimators, but the results are statistically insignificant as in the full sample data set for the pre-crisis period. When it comes to the post-crisis period, the expansionary monetary policy in the euro area gives rise to an appreciation of Turkish lira against U.S. dollar and this appreciation seems statistically significant. As for the euro variable, the expansionary monetary policy increases the statistically insignificant appreciation of Turkish lira against euro for the pre-crisis period for the reduced sample data set. For the post-crisis period, the expansionary monetary policy leads to a depreciation of the Turkish lira against euro, however this result is statistically insignificant. Finally, the expansionary monetary policy actions result in a decrease in the yields on the two-year Turkish government bond for both pre-crisis and post-crisis periods. Nevertheless, the results for both periods are detected as statistically insignificant.

The Hausman specification test results in Table 6.5 (column c) and in Table 6.6 (column c) indicate that the estimators of the event-study are not statistically biased when compared to the estimators of the instrumental variables approach for all variables.

Since the impacts of the monetary policy shocks of the ECB could conflict with the monetary policy shocks of the Fed or the CBRT on some dates, it is more reliable to consider the empirical test results acquired from the reduced sample data set. In sum, the empirical test results imply that most of the financial assets (all the stock market indices

and the value of Turkish lira against U.S. dollar) in Turkey give significant reactions to the monetary policy changes in the euro area during the post-crisis period whereas the reactions of all assets are statistically insignificant to the policy changes in the euro area in the pre-crisis period.

CHAPTER 7

CONCLUSION

The recent global financial crisis, intensified in September 2008 with the bankruptcy of Lehman Brothers, has severe impacts not only on developed economies but also on the economies of developing and emerging markets. The central banks in advanced economies such as the Fed and the ECB had taken intensive unprecedented monetary policy measures since the period following the collapse of Lehman Brothers in order to cope with the harsh impacts of the global financial crisis (Cassola et al., 2010; Cour-Thimann & Winkler, 2013; Labonte, 2014). The accommodative policies in the advanced economies with continuing fragilities in the global financial system and the high volatility in the global risk appetite have led to considerable volatile short-term capital flows towards emerging markets such as Turkey, which influences macroeconomic and financial stability of Turkey (Kara, 2012). By regarding all of these, the main objective of this study is to examine how the asset prices (stock market returns, exchange rates and domestic interest rate) in Turkey respond to the monetary policy announcements of the Fed and the ECB for pre- and post-global financial crisis periods. In essence, the study aims to reveal whether the asset prices in Turkey become more responsive to the fluctuations in the monetary policies in the U.S. and the euro area during the post-crisis period when compared to the pre-crisis period, since the asset prices reacting more sensitively to the fluctuations in the advanced economies may indicate a more fragile financial system.

In this study the time period lying between the years 2004 and 2013 is separated into two parts as the pre-global financial crisis period (January 2004 - September 2008) and the post-global financial crisis period (October 2008 - December 2013) by regarding the

collapse of Lehman Brother in September 2008. It is better to remind that since both the Fed and the ECB had maintained monetary policy rates at zero lower bound and took non-standard monetary policy measures in order to decrease longer-term yields, hence stimulating economy in the aftermath of global financial crisis, different monetary policy measures are employed for the pre- and post-crisis periods.The monetary policy measures of the U.S. and the euro area are based on the short-term rates; namely, eurodollar futures and one-month EURIBOR, respectively for the pre-crisis period. On the other hand, the monetary policy measures of the U.S. and the euro area for the post-crisis period are derived from long-term yields; namely U.S. ten-year government bond yields, and the spread between Italian and German ten-year government bond yields, respectively. The event-study approach and standard instrumental variables approach proposed by Rigobon and Sack (2004) are implemented.

When the impacts of monetary policy changes in the U.S. on the asset prices in Turkey are investigated for both the pre- and post-global financial crisis periods, the empirical findings suggest that most of the asset prices in Turkey are affected significantly by the monetary policy changes in the U.S. in the post-crisis period when compared to the pre-crisis period. Except euro variable, the monetary policy announcements in the U.S. have insignificant impact on other assets in Turkey for the pre-crisis period. Nevertheless, when the post-crisis period responses are considered, it is found that the expansionary monetary policies implemented in the U.S. significantly boost stock returns of BIST National 100 index, and of the subsectors of finance, industry and trade. This finding can be associated with the international spillover of monetary policy through international portfolio balance channel. The abundance in global liquidity and low yields in advanced economies may convey investors to search for higher yields through more risky equities in foreign markets. Therefore, the boost in stock prices in Turkey may be result of capital inflows of foreign investors. Furthermore, the Turkish lira against U.S. dollar is more responsive to the changes in the U.S. monetary policy for the post-crisis period when compared to the pre-crisis period. The expansionary monetary policy actions in the U.S. lead to a significant appreciation of Turkish lira against U.S. dollar in the post-crisis period. This can be the result of exchange rate channel of international spillover of the monetary policy. The

capital inflows in foreign currency lead to abundance of foreign currency in the domestic market, hence appreciation of domestic currency. On the other hand, during the post-crisis period it is observed that the expansionary policies in the U.S. cause a depreciation of Turkish lira against euro. Finally, the yields of the two-year Turkish government bond give significant response to the U.S. monetary policy changes in the same direction during the post-crisis period. This finding can alaso work through the portfolio balance channel of international spillover of monetary policy. The lower yields on the domestic debt instruments in the advanced economies due to the expansionary monetary policies make the investors seek for foreign debt instruments with same maturities, and higher risk and yields. Therefore, the demand for foreign debt instruments increases the prices of these instruments whereas it lowers the yields of them. In Turkey, the decrease in the yields on Turkish government bond depending on the expansionary monetary policy in the U.S. may be the result of this situation.

As for the impacts of the monetary policy changes of the ECB on the asset prices in Turkey, it is found that the responses of all asset prices in Turkey to the monetary policy changes in the euro area are found to be statistically insignificant for the pre-crisis period. However, when the post-crisis period is considered, most of the assets give significant responses to the monetary policy decisions in the euro area. The expansionary monetary policy actions aiming at decreasing the default risk in the euro area during the post-crisis period increase the returns on BIST National 100 index and all subsector indices at significant levels. The lower yields in the euro area may direct the capital flows to the stock market in Turkey to attain higher returns through international portfolio balance channel. On the other hand, through the exchange rate channel, the expansionary monetary policy actions in the euro area lead to appreciation of the Turkish lira against U.S. dollar in the post-crisis period. Lastly, the responses of Turkish lira against euro and two-year Turkish government bond yield are found to be statistically insignificant to the changes in the monetary policy in the euro area during the post-crisis period.

Actually, the interpretations of the test results are based on the expansionary monetary policy cases, however, when the developments that worsen economies in advanced

countries occur or tight monetary policies are implemented there could be a sudden reversal of capital flows. In such a case, the asset prices still give significant responses but they respond in an opposite direction. Both cases threaten the macroeconomic and financial stability of Turkey. In addition, the study also suggest that the monetary policy changes in the U.S. have significant impacts on the more various asset types during the post-crisis period, when compared to the impacts of the monetary policy changes in the euro area.

This study offers some empirical findings that the most of the asset prices in Turkey respond significantly to the monetary policy changes in the U.S. and the euro area in the post-crisis period, while the asset prices react insignificantly to these policy changes in general during the pre-crisis period. As stated in Aysan et al. (2014), the volatile global liquidity abundance and low yields in the advanced economies resulting from the accommodative monetary policy actions in the post-crisis period have generated excessively volatile and short-term capital flows to Turkey, which in turn has made Turkey more exposed to the monetary policy changes in major economies and distorts its financial stability. In essence, the excessive and volatile short-term capital flows towards Turkey threaten the financial stability of Turkey through two factors, volatile movements in the exchange rate and excessive domestic credit growth. In order to maintain the financial stability and cope with the adverse effects of excessive fluctuations in the short-term capital flows, the monetary authority in Turkey (CBRT) has required adopting flexible and innovative monetary policy tools. In essence in the aftermath of the global financial crisis, the CBRT has developed its monetary policy approach by adopting new monetary policy tools including interest rate corridor and reserve option mechanism in order to deal with the financial stability challenges stemming from volatile short-term capital flows. As seen, the empirical findings are consistent with Aysan et al. (2014) and this study suggests that the CBRT should persist in employing these new monetary policy tools and increase the variety of monetary policy tools in order to maintain the financial stability by reacting to external shocks resulting from monetary policy changes in advanced economies effectively and on time.

97

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THE DATES OF MONETARY POLICY ANNOUNCEMENTS OF THE FEDERAL RESERVE, THE EUROPEAN CENTRAL BANK AND THE CENTRAL BANK OF THE REPUBLIC OF TURKEY

Table A.1 The Dates of Monetary Policy Announcement of the Federal Reserve

Pre-Global Crisis Period	
2004	
28/01	FOMC Meeting
16/03	FOMC Meeting
04/05	FOMC Meeting
30/06	FOMC Meeting
10/08	FOMC Meeting
21/09	FOMC Meeting
10/11	FOMC Meeting
14/12	FOMC Meeting
2005	
02/02	FOMC Meeting
22/03	FOMC Meeting
03/05	FOMC Meeting
30/06	FOMC Meeting
09/08	FOMC Meeting
20/09	FOMC Meeting
01/11	FOMC Meeting
13/12	FOMC Meeting
2006	
31/01	FOMC Meeting

28/03	FOMC Meeting
10/05	FOMC Meeting
29/06	FOMC Meeting
08/08	FOMC Meeting
20/09	FOMC Meeting
25/10	FOMC Meeting
12/12	FOMC Meeting
2007	
31/01	FOMC Meeting
21/03	FOMC Meeting
09/05	FOMC Meeting
28/06	FOMC Meeting
07/08	FOMC Meeting
10/08	Conference Call
17/08	Conference Call
18/09	FOMC Meeting
31/10	FOMC Meeting
11/12	FOMC Meeting
12/12	Press Release
14/12	Press Release
2008	
22/01	Conference Call
30/01	FOMC Meeting
11/03	Conference Call
14/03	Press Release
16/03	Press Release
18/03	FOMC Meeting
30/04	FOMC Meeting
02/05	Press Release
25/06	FOMC Meeting
05/08	FOMC Meeting
16/09	FOMC Meeting
Post-Global Financial Crisis Period	

2008	
06/10	Press Release
08/10	Conference Call
29/10	FOMC Meeting
25/11	Press Release
01/12	Speech of Fed's President
16/12	FOMC Meeting
2009	
28/01	FOMC Meeting
18/03	FOMC Meeting
29/04	FOMC Meeting
24/06	FOMC Meeting
12/08	FOMC Meeting
23/09	FOMC Meeting
04/11	FOMC Meeting
16/12	FOMC Meeting
2010	
27/01	FOMC Meeting
16/03	FOMC Meeting
28/04	FOMC Meeting
09/05	FOMC Meeting
23/06	FOMC Meeting
10/08	FOMC Meeting
21/09	FOMC Meeting
03/11	FOMC Meeting
14/12	FOMC Meeting
2011	
26/01	FOMC Meeting
15/03	FOMC Meeting
27/04	FOMC Meeting
22/06	FOMC Meeting
09/08	FOMC Meeting
21/09	FOMC Meeting

02/11	FOMC Meeting
13/12	FOMC Meeting
2012	
25/01	FOMC Meeting
13/03	FOMC Meeting
25/04	FOMC Meeting
20/06	FOMC Meeting
01/08	FOMC Meeting
13/09	FOMC Meeting
24/10	FOMC Meeting
12/12	FOMC Meeting
2013	
30/01	FOMC Meeting
20/03	FOMC Meeting
01/05	FOMC Meeting
22/05	Testimony of Fed's President
19/06	FOMC Meeting
10/07	Speech of Fed's President
31/07	FOMC Meeting
18/09	FOMC Meeting
30/10	FOMC Meeting
18/12	FOMC Meeting

Notes:Although 6 December 2007, 9 January 2008, 24 July 2008, 29 September 2008, 16 January 2009, 7 February 2009 and 3 June 2009 are the dates of official conference calls in the FOMC meeting calendar and, they are not included since there is no statement released after them.

The unscheduled official meetings with no press release on the dates of 15 October 2010, 1 August 2011, 28 November 2011 and 16 October 2013 are also excluded from the data set.

The dates of 12 December 2007, 16 March 2008, 6 October 2008 are excluded for all assets due to overlapping of the data. These dates precede or follow other announcements.

The dates of 25 October 2006, 23 September 2009, 24 October 2012 are excluded from the event days for bond and stock markets since these markets were closed in Turkey on those dates because of official holidays.

The data of yields on two-year Turkish Treasury bond has been available since June 2006. The data of yields on two-year Turkish Treasury bond is not available for non-policy days on the dates of 4 November 2009 and 30 October 2013.

The exchange rate data and corresponding policy rates are available and applicable for all the event days except 22 January 2008 since data for eurodollar future is unavailable on 22 January 2008. The foreign exchange rates are traded electronically on all business days.

Table A.2 The Dates of Monetary Policy Announcements of the European Central Bank

Pre-Global Financial Crisis Period	
2004	
08/01	Governing Council Meeting
05/02	Governing Council Meeting
04/03	Governing Council Meeting
01/04	Governing Council Meeting
06/05	Governing Council Meeting
03/06	Governing Council Meeting
01/07	Governing Council Meeting
05/08	Governing Council Meeting
02/09	Governing Council Meeting
07/10	Governing Council Meeting
04/11	Governing Council Meeting
02/12	Governing Council Meeting
2005	
13/01	Governing Council Meeting
03/02	Governing Council Meeting
03/03	Governing Council Meeting
07/04	Governing Council Meeting
04/05	Governing Council Meeting
02/06	Governing Council Meeting
07/07	Governing Council Meeting
04/08	Governing Council Meeting
01/09	Governing Council Meeting
06/10	Governing Council Meeting
03/11	Governing Council Meeting
01/12	Governing Council Meeting
2006	
12/01	Governing Council Meeting
02/02	Governing Council Meeting
02/03	Governing Council Meeting
06/04	Governing Council Meeting

04/05	Governing Council Meeting
08/06	Governing Council Meeting
06/07	Governing Council Meeting
03/08	Governing Council Meeting
31/08	Governing Council Meeting
05/10	Governing Council Meeting
02/11	Governing Council Meeting
07/12	Governing Council Meeting
2007	
11/01	Governing Council Meeting
08/02	Governing Council Meeting
08/03	Governing Council Meeting
12/04	Governing Council Meeting
10/05	Governing Council Meeting
06/06	Governing Council Meeting
05/07	Governing Council Meeting
02/08	Governing Council Meeting
09/08	Press Release
22/08	Press Release
06/09	Governing Council Meeting
04/10	Governing Council Meeting
08/11	Governing Council Meeting
06/12	Governing Council Meeting
2008	
10/01	Governing Council Meeting
07/02	Governing Council Meeting
06/03	Governing Council Meeting
28/03	Press Release
10/04	Governing Council Meeting
08/05	Governing Council Meeting
05/06	Governing Council Meeting
03/07	Governing Council Meeting
07/08	Governing Council Meeting

04/09	Governing Council Meeting
Post-Global Financial Crisis Period	
2008	
02/10	Governing Council Meeting
08/10	Governing Council Meeting
06/11	Governing Council Meeting
04/12	Governing Council Meeting
2009	
15/01	Governing Council Meeting
05/02	Governing Council Meeting
05/03	Governing Council Meeting
02/04	Governing Council Meeting
07/05	Governing Council Meeting
04/06	Governing Council Meeting
02/07	Governing Council Meeting
06/08	Governing Council Meeting
03/09	Governing Council Meeting
08/10	Governing Council Meeting
05/11	Governing Council Meeting
03/12	Governing Council Meeting
2010	
14/01	Governing Council Meeting
04/02	Governing Council Meeting
04/03	Governing Council Meeting
08/04	Governing Council Meeting
06/05	Governing Council Meeting
09/05	Press Release
10/06	Governing Council Meeting
08/07	Governing Council Meeting
28/07	Press Release
05/08	Governing Council Meeting
02/09	Governing Council Meeting
07/10	Governing Council Meeting

04/11	Governing Council Meeting
02/12	Governing Council Meeting
2011	
13/01	Governing Council Meeting
03/02	Governing Council Meeting
03/03	Governing Council Meeting
07/04	Governing Council Meeting
05/05	Governing Council Meeting
09/06	Governing Council Meeting
07/07	Governing Council Meeting
04/08	Governing Council Meeting
07/08	Press Release
08/09	Governing Council Meeting
06/10	Governing Council Meeting
03/11	Governing Council Meeting
08/12	Governing Council Meeting
2012	
12/01	Governing Council Meeting
09/02	Governing Council Meeting
08/03	Governing Council Meeting
04/04	Governing Council Meeting
03/05	Governing Council Meeting
06/06	Governing Council Meeting
05/07	Governing Council Meeting
26/07	London Speech of ECB's President
02/08	Governing Council Meeting
06/09	Governing Council Meeting
04/10	Governing Council Meeting
08/11	Governing Council Meeting
06/12	Governing Council Meeting
2013	
10/01	Governing Council Meeting

07/02	Governing Council Meeting
07/03	Governing Council Meeting
22/03	Press Release
04/04	Governing Council Meeting
02/05	Governing Council Meeting
06/06	Governing Council Meeting
04/07	Governing Council Meeting
01/08	Governing Council Meeting
05/09	Governing Council Meeting
02/10	Governing Council Meeting
07/11	Governing Council Meeting
05/12	Governing Council Meeting

Notes: 9 May 2010 and 7 August 2011 are excluded for all assets since these announcements were made on Sunday and the non-policy days of these dates coincide with the policy days of Governing Council meetings on 6 May 2010 and 4 August 2011. By eliminating these dates prevents the overlapping of the data.

The data of two-year Turkish Treasury bond has been available since June 2006.

The dates of 5 February 2004, 3 November 2005, 12 January 2006, 2 October 2008 are excluded from the event days for bond and stock markets since these markets were closed in Turkey on that dates due to official holidays.

The foreign exchange rates are traded electronically on all business days.

Table A.3 The Dates of the Monetary Policy Announcements of the Central Bank of the Republic of the Turkey

2004	
05/02	Monetary Policy Committee
17/03	Monetary Policy Committee
08/09	Monetary Policy Committee
20/12	Monetary Policy Committee
2005	
11/01	Monetary Policy Committee
11/02	Monetary Policy Committee
09/03	Monetary Policy Committee
11/04	Monetary Policy Committee
10/05	Monetary Policy Committee
09/06	Monetary Policy Committee
11/07	Monetary Policy Committee
09/08	Monetary Policy Committee
09/09	Monetary Policy Committee
11/10	Monetary Policy Committee
09/11	Monetary Policy Committee
09/12	Monetary Policy Committee
2006	
23/01	Monetary Policy Committee
23/02	Monetary Policy Committee
23/03	Monetary Policy Committee
27/04	Monetary Policy Committee
25/05	Monetary Policy Committee
07/06	Monetary Policy Committee
25/06	Monetary Policy Committee
20/07	Monetary Policy Committee
24/08	Monetary Policy Committee
26/09	Monetary Policy Committee
19/10	Monetary Policy Committee
23/11	Monetary Policy Committee

21/12	Monetary Policy Committee
2007	
16/01	Monetary Policy Committee
15/02	Monetary Policy Committee
15/03	Monetary Policy Committee
18/04	Monetary Policy Committee
14/05	Monetary Policy Committee
14/06	Monetary Policy Committee
12/07	Monetary Policy Committee
14/08	Monetary Policy Committee
13/09	Monetary Policy Committee
16/10	Monetary Policy Committee
14/11	Monetary Policy Committee
13/12	Monetary Policy Committee
2008	
17/01	Monetary Policy Committee
14/02	Monetary Policy Committee
19/03	Monetary Policy Committee
17/04	Monetary Policy Committee
15/05	Monetary Policy Committee
16/06	Monetary Policy Committee
17/07	Monetary Policy Committee
14/08	Monetary Policy Committee
18/09	Monetary Policy Committee
22/10	Monetary Policy Committee
19/11	Monetary Policy Committee
18/12	Monetary Policy Committee
2009	
15/01	Monetary Policy Committee
19/02	Monetary Policy Committee
19/03	Monetary Policy Committee
16/04	Monetary Policy Committee
14/05	Monetary Policy Committee

16/06	Monetary Policy Committee
16/07	Monetary Policy Committee
18/08	Monetary Policy Committee
17/09	Monetary Policy Committee
15/10	Monetary Policy Committee
19/11	Monetary Policy Committee
17/12	Monetary Policy Committee
2010	
14/01	Monetary Policy Committee
16/02	Monetary Policy Committee
18/03	Monetary Policy Committee
13/04	Monetary Policy Committee
18/05	Monetary Policy Committee
17/06	Monetary Policy Committee
15/07	Monetary Policy Committee
19/08	Monetary Policy Committee
16/09	Monetary Policy Committee
14/10	Monetary Policy Committee
11/11	Monetary Policy Committee
16/12	Monetary Policy Committee
2011	
20/01	Monetary Policy Committee
15/02	Monetary Policy Committee
23/03	Monetary Policy Committee
21/04	Monetary Policy Committee
25/05	Monetary Policy Committee
23/06	Monetary Policy Committee
21/07	Monetary Policy Committee
04/08	Monetary Policy Committee
23/08	Monetary Policy Committee
20/09	Monetary Policy Committee
20/10	Monetary Policy Committee
23/11	Monetary Policy Committee

22/12	Monetary Policy Committee
2012	
24/01	Monetary Policy Committee
21/02	Monetary Policy Committee
27/03	Monetary Policy Committee
18/04	Monetary Policy Committee
29/05	Monetary Policy Committee
21/06	Monetary Policy Committee
19/07	Monetary Policy Committee
16/08	Monetary Policy Committee
18/09	Monetary Policy Committee
18/10	Monetary Policy Committee
20/11	Monetary Policy Committee
18/12	Monetary Policy Committee
2013	
22/01	Monetary Policy Committee
19/02	Monetary Policy Committee
26/03	Monetary Policy Committee
16/04	Monetary Policy Committee
16/05	Monetary Policy Committee
18/06	Monetary Policy Committee
23/07	Monetary Policy Committee
20/08	Monetary Policy Committee
17/09	Monetary Policy Committee
23/10	Monetary Policy Committee
19/11	Monetary Policy Committee
17/12	Monetary Policy Committee

Notes: The announcement time of each MPC was 10 a.m. and 09 a.m. according to Turkey local time on the meeting days in 2004 and in 2005, respectively.
In 2006 and 2007, the MPC announcements were declared between 5 p.m and 7 p.m. on the meeting days.
In 2008, 2009 and 2010, the announcements were released at 7 p.m. on the meeting days. The MPC announcements in 2011, 2012 and 2013 were released at 2 p.m. on the meeting days (İnal, 2006; Erelvanlı, 2009; CBRT, 2009, 2010, 2011, 2012).
The dates of MPC since 2006 were obtained official website of the Central Bank of the Republic of Turkey and the dates of MPC in 2004 and 2005 are retrieved in the study of Erelvanlı (2009).

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APPENDIX C

TURKISH SUMMARY

Finansal varlık fiyatlarının merkez bankası para politikalarına olan tepkileri literatürde önemli ölçüde incelenmiştir. Çünkü merkez bankaları ekonomik büyüme, enflasyon ve işsizlik gibi makroekonomik değişkenleri etkileyebilmek adına para politikası faizlerini yönetirler. Bu faiz yönetiminin nihai makroekonomik değişkenlere yansıması ise faiz, döviz kuru ve hisse senedi fiyatları vb. kanallar üzerinden gerçekleşmektedir (Ireland, 2005). Bu nedenle merkez bankalarının yaptığı para politikası değişikliklerinin varlık fiyatları üzerindeki etkisi oldukça önemlidir. Literatüre baktığımızda genel olarak Amerika Merkez Bankası'nın para politikalarındaki değişimlerin farklı zaman dilimlerinde çeşitli Amerikan varlık fiyatları üzerindeki etkisinin yoğun bir şekilde araştırıldığını görmekteyiz. Bu literatüre katkı sağlayan birçok araştırmacı aslında Cook ve Hahn (1989)'un çalışmasını takip etmiştir. Para politikası ve varlık fiyatları arasındaki ilişkiyi inceleyerek literatürün en öncü çalışmalarından birini gerçekleştiren Cook ve Hahn (1989), Amerika Merkez Bankası'nın para politikası aracı olarak kullandığı federal fon oranındaki değişikliklerin bonoların ve tahvillerin getirileri üzerindeki etkilerini basit doğrusal regresyon kullanarak 1974 ve 1979 yılları arasında incelemişlerdir. Bu basit doğrusal regresyon aslında ileride literatüre olay çalışması olarak geçmiştir. Çalışmanın sonucunda para politikasındaki değişim kısa vadeli faizler üzerinde en çok etkiyi gösterirken, orta vadeli faizler üzerinde orta derecede etki, uzun vadeli faizlerde ise daha küçük etki yaratmıştır. Cook ve Hahn (1989) çalışmasını daha sonra Roley ve Sellon (1995) ve Thorbecke (1997) takip ederek Amerika'daki para politikası değişikliklerinin uzun vadeli faizler ve hisse senedi getirileri üzerindeki etkilerini incelemişlerdir. Daha sonrasında para politikasındaki değişiklerin kendisi yerine, bu değişimin sürpriz ve sürpriz olmayan

yönlerini ele alan Kuttner (2001) literatüre farklı bir bakış açısı kazandırmıştır. Para politikası değişimindeki sürpriz olmayan kısma göre sürpriz olan kısmın varlıklar üzerinde daha büyük etkileri olduğu gözlemlenmiştir. Sonrasında Gürkaynak vd. (2005) önemli çalışmalarıyla literatüre katkıda bulunmuştur. Buraya kadar bahsedilen tüm çalışmalar olay çalışması kullanarak analizlerini gerçekleştirmişlerdir. Bunun dışında Thorbecke (1997), Bernanke ve Kuttner (2005) para politikası değişimlerinin varlıklar üzerindeki etkisini incelerken vektör otoregresif yaklaşımını kullanmışlardır. Olay çalışması bu denli yaygın kullanılmasına rağmen, Rigobon ve Sack (2004) bu yöntemde görülen eşanlı denklem ve dâhil edilmemiş değişken problemleri doğrusal regresyon sonuçlarında yanlı tahmin edicilerin hesaplanmasına neden olduğunu ileri sürmüştür. Bu nedenle Rigobon ve Sack (2004) araç değişkenler yöntemi ve genelleştirilmiş momentler yöntemi sayesinde para politikası değişimleri ile varlık fiyatları değişimleri arasındaki ilişkinin daha sağlam tahmin ediciler ile hesaplanabildiğini öne sürmüşlerdir. Sonrasında birçok çalışma olay çalışmasının yanı sıra araç değişken ve genelleştirilmiş momentler yöntemi ile gerçekleştirilmiştir. Literatüre baktığımızda Amerika Merkez Bankası'nın diğer ülkelerdeki varlık fiyatları üzerindeki etkisini inceleyen birçok çalışmayı görebiliriz. Valente (2009), Berument ve Ceylan (2010), Rosa (2011) ve Hausman ve Wongswan (2011) bu çalışmalardan bazılarıdır. Bunun yanı sıra, literatürde Avrupa Merkez Bankası'nın para politikası değişimlerinin çeşitli varlık fiyatları üzerindeki etkisi de incelenmiştir (Perez-Quiros & Sicilia, 2002; Brand vd., 2006; Angeloni & Ehrmann, 2003; Bernoth & Hagen, 2004; Kleimeier & Sander, 2006; Kholodilin vd., 2009). Bu kısma kadar bahsedilen çalışmaların hepsi 2008 küresel kriz öncesi geleneksel para politikası araçlarının kullanıldığı dönemi incelemiştir. Burada kullanılan para politikası ölçümleri genellikle kısa vadeli faizler üzerinden elde edilmiştir.

Ancak 2007 yılında, düşük gelir grubuna yüksek faiz ile verilen mortgage kredisinden doğan finansal sıkıntılar 2008 yılının Eylül ayında Lehman Brothers şirketinin iflasıyla küresel bir krize dönüşmüştür (Mishkin, 2010). 2008 yılının Eylül ayında derinleşen küresel krizin bankacılık sisteminde ve finansal piyasalardaki olumsuz etkilerini giderebilmek ve ekonomileri teşvik edebilmek amacıyla başta gelişmiş ülkelerin merkez bankaları olmak üzere geleneksel para politikası araçlarının yanı sıra alışılagelmişin

126

dışında, standart olmayan para politikası araçları kullanılmaya başlanmıştır. Amerika Merkez Bankası, 2008 Eylül ayından sonra öncelikle politika faizini düşürerek ekonomiyi teşvik etmeyi amaçlamıştır. Hatta sonrasında sözle yönlendirmeyi de etkin kullanarak para politikasını sıfır alt sınırda tutmaya çalışmıştır. Ancak, sıfıra yakın para politikası tek başına yeterli olmayınca, Amerika Merkez Bankası büyük miktarlarda Amerikan devlet tahvili ve varlığa dayalı menkul kıymetleri satın alarak uzun vadeli faizleri düşürmeyi amaçlamıştır. Böylece varlık alımları sayesinde ekonominin iyi yönde gitmesi için adımlar atmıştır (Labonte, 2014). Sadece Amerika Merkez Bankası değil, Avrupa Merkez Bankası da standart olarak kullanılmayan para politikası araçlarına başvurmuştur. Düşük para politikası izlemenin yanı sıra, piyasaya fon sağlama koşullarının esnetilmesi (örneğin piyasaya fon sağlarken standardın üzerindeki vadenin kullanılması), ipotekli tahvillerin satın alındığı programların başlatılması ve menkul kıymet programı altında varlık alımları önemli geleneksel olmayan para politikası yöntemleridir (Cour-Thimann & Winkler, 2013). 2008 küresel kriz sonrası izlenen bu geleneksel olmayan para politikalarının varlıklar üzerindeki etkisi literatürde son zamanlarda ilgiyle araştırılan bir alan yaratmıştır. Küresel finansal kriz sonrası dönemi inceleyen çalışmalar geleneksel para politikasının uygulandığı dönemdeki para politikası ölçümlerini artık kullanamaz hale gelmiştir. Wright (2011) Amerika Merkez Bankası'nın politika faizini sıfıra yakın tutmasını ve Federal Açık Piyasa Komitesinde alınan para politikası kararlarının gelecek dönemdeki beklentiler üzerindeki etkisinin çok az olmasını göz önünde tutarak, daha uzun vadeli faizlerin para politikası değişimlerini ölçmede kullanılmasının daha uygun olacağını iddia etmiştir. Ayrıca Rogers vd. (2014) merkez bankalarının sıfır alt sınır para politikasını uyguladıkları ve geleneksel olmayan politika araçlarını kullandıkları bu dönemde, merkez bankalarının kendi uzun dönemli devlet tahvilleri üzerinde etkili ve anında değişimler yapabildiklerini iddia etmiştir. Böylece kriz sonrası dönem için yapılan para politikası değişikliklerini devlet tahvillerinin getirileri üzerinde gözlemlemek mümkündür. Bu nedenle geleneksel olmayan para politikalarının uygulandığı dönemi inceleyen çalışmalarda, para politikası ölçümü uzun vadeli faiz oranları üzerinden elde edilmiştir (Chodorow- Reich, 2014; Rogers vd., 2014; Glick & Leduc, 2013; Bowman vd., 2015).

2008 yılında derinleşen küresel krizin etkileri sadece gelişmiş ülke ekonomilerinde değil, Türkiye gibi yükselen piyasa ekonomileri üzerinde de önemli ölçüde etkiler yaratmıştır. Özellikle kriz sonrasında gelişmiş ülke ekonomilerindeki genişletici para politikaları ve Amerika ve euro bölgesindeki kırılgan ekonomik iyileşmeler, oynaklığı yüksek küresel likidite bolluğu yaratmıştır. Bu gelişmelerde Türkiye gibi yükselen piyasa ekonomilerine oynaklığı yüksek aşırı miktarda kısa vadeli sermaye akımlarının yönelmesine neden olmuştur. Ancak bu oynaklığı yüksek ve kısa vadeli sermaye akımları Türkiye ekonomisini ve finansal istikrarını tehdit etmiştir. (Aysan vd., 2014). Bu nedenle bu çalışmanın amacı, Türkiye'deki varlık fiyatlarının (borsa endeks getirilerinin, döviz kurlarının ve yurtiçi faizin) Amerika Merkez Bankası'nın ve Avrupa Merkez Bankası'nın para politikası değişikliklerine nasıl tepki verdiğini kriz öncesi ve kriz sonrası dönemlerini göz önüne alarak incelemektir. 2008 yılının Eylül ayında Lehman Brothers'ın iflasını göz önüne alarak 2004 ile 2013 yıllarını kapsayan çalışmanın zaman dilimi ikiye ayrılmıştır. Kriz öncesi dönem Ocak 2004 ile Eylül 2008 dönemini kapsarken, kriz sonrası dönem ise Ekim 2008 ile Aralık 2013 dönemini kapsamaktadır. Buradaki temel motivasyon, Türkiye'deki varlık fiyatlarının kriz sonrası dönemde kriz öncesi döneme kıyasla gelişmiş ülke merkez bankası para politikası değişimlerine daha duyarlı olup olmadığını gözlemlemektir. Çünkü varlık fiyatları ne kadar dışsal şoklara duyarlı olursa bu durum finansal istikrar bakımından o ülkenin daha kırılgan bir yapısı olduğunun göstergesi olabilir. Her iki dönemdeki varlık fiyatlarının Amerika Merkez Bankası'nın ve Avrupa Merkez Bankası'nın para politikası değişimlerine tepkileri araştırılırken olay çalışması yöntemi ile Rigobon ve Sack (2004) tarafından öne sürülen araç değişkenleri yöntemi kullanılmıştır. Ayrıca, kriz öncesi dönem için para politikası ölçümleri kısa vadeli faizler üzerinden elde edilirken, kriz sonrası dönem içinse uzun vadeli faizler üzerinden para politikası ölçümleri elde edilmiştir.

Çalışmada kullanılan iki yöntemden birisi olay çalışması iken, diğer yöntem ise araç değişkenleri yöntemdir. Rigobon ve Sack (2004) varlık fiyatları ile para politikası arasındaki ilişkiyi aşağıdaki Denklem (1) ve Denklem (2) gibi tanımlamıştır:

$$\Delta i_t = \beta \Delta s_t + \gamma z_t + \varepsilon_t \tag{1}$$

$$\Delta s_t = \alpha \Delta i_t + z_t + \eta_t \tag{2}$$

Burada Δi_t para politikasındaki değişimi gösterirken, Δs_t değişkeni ise varlık fiyatındaki değişimi göstermektedir. z_t değişkeni ise sistemde gözlemlenen veya gözlemlenemeyen değişkenleri ifade etmektedir. Çalışmanın temel odak noktası ise değişen para politikası faizinin varlık fiyatı üzerindeki değişimini nasıl etkilediğini gözlemlemek üzerinedir ve Denklem (2) ışığında bahsedilen iki yöntemin tahmin edicileri hesaplanmaya çalışılmaktadır.

Olay çalışmasında elde edilecek α tahmin edicisi aşağıdaki Denklem (3)'de verildiği gibi elde edilmektedir. Burada α tahmin edilirken para politikası duyurularının yapıldığı günlerdeki (bu günler P ile gösterilmiştir) varlık fiyatlarındaki değişimleri ve para politikasındaki değişimleri göz önüne alarak hesaplanmaktadır.

$$\widehat{\alpha_{ES}} = (\Delta i'_P \Delta i_P)^{-1} (\Delta i'_P \Delta s_P) \tag{3}$$

Ancak olay çalışmasından elde edilecek olan α tahmin edicisi eşanlı denklem ve dâhil edilmemiş değişkenler problemi yüzünden yanlı tahmin ediciler verebilmektedirler. Basit doğrusal regresyonun tutarlı olabilmesi ve tahmin edicideki yanlılık miktarının sıfıra yakınsaması için gerekli varsayım, para politikası şokunun varyansının diğer ortak şokların varyansından ve varlık fiyatlarındaki şokların varyansından kıyaslanamayacak kadar büyük olmasıdır. Ancak bu durumda α tahmin edicisindeki yanlılık sıfıra yakınsayabilmektedir ($\sigma_\varepsilon / \sigma_\eta \to \infty$ and $\sigma_\varepsilon / \sigma_z \to \infty$).

Ancak, olay çalışmasına alternatif olarak Rigobon ve Sack (2002) veri setindeki politika günlerindeki ve politika olmayan günlerdeki heteroskedastisitiye dayanarak geliştirilen araç değişkenler yöntemini sunmuştur. Öncelikle para politikası açıklamasının olmadığı ve para politikası günlerinden hemen önce gelen günler, politika olmayan günler olarak belirlenmiş ve bu günler N ile gösterilmiştir. Daha sonra politika günlerine ve politika olmayan günlere ait veri seti birleştirilerek, bir de araç değişken tanımlanmıştır. Bu tanımlamalar aşağıdaki gibi belirtilmiştir:

$$\Delta i \equiv [\Delta i_P' \Delta i_N']'$$

$$\Delta s \equiv [\Delta s_P' \Delta s_N']'$$

$$w_i \equiv [\Delta i_P' - \Delta i_N']'$$

Ancak w_i olarak belirlenen araç değişkeni Rigobon ve Sack (2004)'un ve Bohl vd. (2008)'in çalışmalarında olduğu gibi daha yansız tahmin edici elde edebilmek adına, örnek sayısı küçük olduğunda aşağıdaki gibi tekrar düzenlenmiştir:

$$w_i^* \equiv \{[\frac{\Delta i_P}{(T_P - 1)}]'[\frac{-\Delta i_N}{(T_N - 1)}]'\}'$$

Burada T_P ve T_N, politika günlerindeki ve bu günlerin hemen öncesi günlerdeki elde edilen gözlem sayılarını sırasıyla vermektedir. Bu yöntemle birlikte eşanlı denklem ve dâhil edilmeyen değişkenler problemleri giderilebilmektedir. Bunun için gerekli varsayımlar ise Denklem (1) ve Denklem (2)'deki tahmin edici parametrelerinin stabil olması, para politikası şoklarının varyanslarının para politikası günlerinde, para politikası olmayan günlere kıyasla büyük olması, ortak şokların varyanslarının ve varlık fiyatlarındaki şokların varyanslarının politika günlerinde ve politika olmayan günlerde eşit olmasıdır.

Bu varsayımlar altında araç değişkenler yöntemi ile elde edilecek tahmin edici Denklem (4)'deki gibi hesaplanmaktadır:

$$\widehat{\alpha_{IV}} = (w_i^{*'}\Delta i)^{-1}(w_i^{*'}\Delta s) \tag{4}$$

Ayrıca olay çalışması ve araç değişkenler yönteminden elde edilen tahmin edicilerin kıyaslamasını yapmak Hausman (1978) testi ile mümkündür. Bu test olay çalışmasının güçlü varsayımı olan para politikasının şoklarının diğer şoklara kıyasla son derece büyük olması durumunu test etmektedir. Bu yokluk hipotezinin reddilmesi demek olay

çalışmasına ait olan tahmin edicinin istatistiksel olarak yanlı sonuçlar vermesidir (Rigobon & Sack, 2004).

Bu çalışmada Amerika Merkez Bankası'na ve Avrupa Merkez Bankası'na ait para politikaları değişimlerinin Türkiye'deki hisse senedi endeks getirileri, döviz kurları ve yurtiçi faiz üzerindeki etkileri küresel finansal kriz öncesi dönem ve küresel finansal kriz sonrası dönem için ayrı ayrı incelenmiştir.

Öncelikli olarak Amerika Merkez Bankası'nın yapmış olduğu para politikası duyurularının Türkiye için bahsedilen varlık fiyatları üzerindeki etkilerini incelemek adına Amerika Merkez Bankası'nın para politikası ile ilgili açıklamalar yaptığı günler belirlenmiştir. Amerika Merkez Bankası'nın para politikası açıklamaları düzenli olarak yaptıkları Federal Açık Piyasa Komitesi toplantılarında yapılmaktadır. Bu bağlamda, yapılan tüm resmi toplantı ve konferans görüşmeleri Amerika Merkez Bankası'nın resmi internet sitesinden 2004 ve 2013 yılları için alınmıştır. Ayrıca krizin çeşitli evrelerinde özellikle geleneksel olmayan para politikası adımlarına ait duyurular ve bu adımlarla ilişkili olan Amerika Merkez Bankası Başkanı Ben Bernanke'nin bazı konuşmaları da çalışmanın veri setine dahil edilmiştir (Cecchetti 2009; Chodorow-Reich, 2014; Labonte 2014).

Amerika Merkez Bankasının etkilerini araştırırken para politikası ölçümü küresel finansal kriz öncesi dönemi (Ocak 2004 – Eylül 2008) için kısa vadeli faizler üzerinden elde edilmiştir. Rigobon ve Sack (2004)'ün kullandığı gibi para politikasındaki değişim, politika duyurusu tarihine en yakın tarihte süresine dolduran eurodollar future kontratın faizindeki değişim üzerinden günlük olarak ölçülmüştür ve ABD_kısa_vade_i gösterimi ile verilmiştir. Ancak kriz sonra dönemde, politika faizlerinin sıfır alt sınırda tutulması ve geleneksel olmayan para politikası araçları ile uzun dönemleri faizlerin düşürülmeye çalışılması para politikası ölçümlerini iki, beş ve on yıllık devlet tahvillerinin getirileri üzerinden elde etmeye yönelmiştir (Bowman vd., 2015; Chodorow- Reich, 2014; Rogers vd., 2015). Bu çalışmada da küresel kriz sonrası dönemi (Ekim 2008 – Aralık 2013) için para politikası ölçümü 10 yıllık Amerika devlet tahvili getirisindeki günlük değişim üzerinden elde edilmiştir. Türkiye'deki varlık fiyatlarına gelince, öncelikli olarak hisse

senedi piyasasındaki BIST_100 endeksindeki getirilerin yanı sıra, hisse senedi piyasasındaki alt sektörlerin endekslerinin getirileri alınmıştır. Bu alt sektör hisse senedi endeksler BIST_Mali, BIST_Sınai, BIST_Hizmet, BIST_Ticaret ve BIST_Teknoloji endeksleridir. Elde edilen endeks getirileri günlük yüzde değişimler üzerinden hesaplanmıştır. Döviz kuruna gelince, Amerikan dolarının ve euronun Türk lirası karşısındaki değerleri alınmıştır. Bu değişkenler sırası ile USD/TRL ve EUR/TRL ile gösterilmiştir ve günlük yüzde değişimler üzerinden hesaplanmıştır. Yurtiçi faiz için iki yıllık devlet tahvilinin getirisi üzerinden günlük yüzde değişim hesaplanarak ölçüm yapılmıştır ve yurtiçi faiz değişkeni İki_yıllık_tahvil değişkeni ile gösterilmiştir. Olay çalışması yöntemi ve araç değişkenler yöntemi kullanılarak elde edilen tahmin ediciler kriz öncesi dönem için aşağıdaki Tablo 1'de sırasıyla a ve b sütunlarında verilirken, kriz sonrası elde edilen tahmin ediciler Tablo 2'deki a ve b sütunlarında sunulmuştur.

Tablo 1 Küresel Finansal Kriz Öncesi Amerika Merkez Bankası Durumu İçin Test Sonuçları (Tüm Veri Seti)

Para Politikası Ölçümü ABD_kısa_vade_i	$\hat{\alpha}_{ES}$ (a)	$\hat{\alpha}_{IV}$ (b)	ES vs IV[a] (c)	Gözlem Sayısı
Hisse Senedi Endeksleri				
BIST_100	0.257 (3.945)	-0.484 (4.574)	[0.7490]	44
BIST_Mali	-1.646 (4.440)	-2.923 (5.079)	[0.6046]	44
BIST_Sınai	3.360 (3.306)	3.718 (3.942)	[0.8674]	44
BIST_Hizmet	2.235 (3.307)	1.790 (4.021)	[0.8456]	44
BIST_Ticaret	4.647 (3.428)	5.487 (3.726)	[0.5648]	44
BIST_Teknoloji	1.624 (3.387)	1.232 (4.337)	[0.8851]	44
Döviz Kurları				
USD/TRL	-1.230 (1.900)	3.047 (4.354)	[0.2749]	44
EUR/TRL	-3.819* (2.030)	1.499 (4.413)	[0.1746]	44
Devlet Tahvili Getirisi				
İki_yıllık_tahvil	0.150 (0.437)	0.0502 (0.457)	[0.4573]	25

Notlar: Para politikası ölçümü kısa vadeli faizler üzerinden hesaplanmıştır.
Olay çalışması yöntemine ve araç değişkenler yöntemine ait tahmin edicilerin standart hataları parantez içinde verilmiştir.
***, **, * 1% (p<0.01), 5% (p<0.05) ve10% (p<0.1) anlam düzeylerini sırasıyla temsil etmektedir.
[a]Hausman test sonuçlarının p- değerleri köşeli parantez içerisinde verilmiştir.

Tablo 2 Küresel Finansal Kriz Sonrası Amerika Merkez Bankası Durumu İçin Test
Sonuçları (Tüm Veri Seti)

Para Politikası Ölçümü ABD_uzun_vade_i	$\widehat{\alpha}_{ES}$ (a)	$\widehat{\alpha}_{IV}$ (b)	ES vs IV[a] (c)	Gözlem Sayısı
Hisse Senedi Endeksleri				
BIST_100	-4.634 (3.497)	-12.27* (6.334)	[0.1483]	46
BIST_Mali	-5.542 (4.153)	-15.96** (7.828)	[0.1164]	46
BIST_Sınai	-3.322 (2.785)	-10.63** (5.325)	[0.1072]	46
BIST_Hizmet	-2.690 (2.557)	-9.073* (4.837)	[0.1200]	46
BIST_Ticaret	-4.448 (3.878)	-18.36** (8.253)	[0.0562]	46
BIST_Teknoloji	-0.615 (3.083)	-6.338 (5.550)	[0.2150]	46
Döviz Kurları				
USD/TRL	0.998 (1.211)	6.100** (3.099)	[0.0738]	48
EUR/TRL	-3.618*** (0.965)	-3.835* (2.151)	[0.9104]	48
Devlet Tahvili Getirisi				
İki_yıllık_tahvil	1.076*** (0.337)	2.075*** (0.670)	[0.0844]	44

Notlar: Para politikası ölçümü uzun vadeli faizler üzerinden hesaplanmıştır.
Olay çalışması yöntemine ve araç değişkenler yöntemine ait tahmin edicilerin standart hataları parantez içinde verilmiştir.
***, **, * 1% (p<0.01), 5% (p<0.05) ve10% (p<0.1) anlam düzeylerini sırasıyla temsil etmektedir.
[a]Hausman test sonuçlarının p- değerleri köşeli parantez içerisinde verilmiştir.

Kriz öncesi dönemde Amerika'daki para politikasındaki azalış BIST_100 endeksi getirisi üzerinde olay çalışmasına yöntemine göre azalışa, araç değişkenler yöntemine göre artışa neden olmaktadır. Ancak her iki sonuç istatistiksel olarak anlamlı değildir. Ancak kriz

sonrası döneme baktığımızda BIST_100 endeksinin getirisi üzerinde Amerika'daki genişletici para politikası araç değişkenler yöntemine göre istatistiksel olarak anlamlı bir artışa neden olmaktadır. Bunun yanı sıra hisse senedi piyasasındaki alt sektör endekslerini incelediğimizde BIST_Mali endeks getirisi hariç, kriz öncesi dönemde genişletici para politikasının tüm alt sektör endeks getirilerinde azalışa neden olduğu görülmektedir. BIST_Mali endeksine bakıldığında ise, genişletici para politikasının bu endeks getirisi üzerinde artışa neden olduğu görülmektedir. Ancak tüm sonuçlar istatistikî açıdan anlamsız bulunmuştur. Ancak kriz sonrası döneme bakıldığında, teknoloji sektörüne ait endeks dışında, tüm alt sektör endeksleri üzerinde Amerika'daki genişletici para politikasının istatistiksel olarak anlamlı ve pozitif etkisinin olduğunu araç değişkenler yöntemi ile görmek mümkündür. BIST_Teknoloji değişkeni üzerindeki etki de pozitiftir ancak bu etki istatistiksel olarak anlamlı değildir.

Döviz kuruna gelince Amerika'daki genişletici para politikasının Türk lirasının Amerika doları karşısındaki değeri üzerindeki etkisi yöntemler bazında farklılık göstermektedir. Ancak her iki yönteme göre bu sonuçlar istatistiksel olarak anlamsızdır. Kriz sonrası döneme bakıldığında ise Amerika'daki genişletici para politikaları Türk lirasının dolar karşısında değer kazanmasına neden olmaktadır. Araç değişkenler yönteminin sonuçları istatistiksel olarak anlamlıdır. Türk lirasının euro karşısındaki değeri göz önüne alınınca, olay çalışması sonuçlarına göre genişletici para politikasının Türk lirasının euro karşısında değer kaybetmesine neden olduğu ve bu sonucun istatistiksel olarak anlamlı olduğu görülmektedir. Bu etki kriz sonrası dönem için de geçerli olup her iki yönteme göre istatistiksel olarak anlamlıdır.

Yurtiçi faiz ise kriz öncesi dönemde ve kriz sonrası dönemde Amerika'daki para politikası değişimleriyle aynı yönde tepki vermektedir. Kriz öncesi dönem sonucu istatistiksel olarak anlamsızken, kriz sonrası döneme göre bu sonuç anlamlıdır.

Tablo 1'de c sütununda verilen Hausman test sonuçlarına göre ise kriz öncesi dönemde olay çalışmasının varsayımlarının ihlaline ilişkin bir sonuç elde edilmezken, Tablo 2'deki c sütununda verilen Hausman p-değerleri BIST_Ticaret, USD/TRL, İki_yıllık_tahvil

değişkenleri açısından anlamlı bulunmuştur. Bu değişkenlere ait sonuçlar olay çalışması varsayımlarının ihlalini işaret ederken, tahmin edicilerin istatistiksel olarak yanlı olabileceğine işaret etmektedir. Ancak kriz sonrası için elde edilen istatistikî olarak anlamlı sonuçlar zaten araç değişkenler yöntemine göre yorumlanmıştır.

Amerika Merkez Bankası'nın para politikası duyurularının yapıldığı bazı tarihlerde Avrupa Merkez Bankası ve Türkiye Cumhuriyet Merkez Bankası da para politikalarına ilişkin duyurularda bulunmuşlardır. Amerika Merkez Bankası'nın yarattığı para politikası şokları diğer merkez bankalarının yarattığı para politikası şoklarından etkilenmesin diye aynı tarihlere denk gelen para politikası duyuruları Amerika Merkez Bankası'nın veri setinden çıkarılarak analizler tekrar edilmiştir. Gürkaynak vd. (2005) benzer bir yaklaşım izleyerek, çalışmalarında para politikası duyuruları ile aynı güne denk gelen istihdam raporlarının açıklandığı tarihleri veri setinden çıkararak analizlerinde daha güvenilir sonuçlar elde etmeyi amaçlamışlardır. Azaltılmış veri setine ait ampirik test sonuçları aşağıdaki Tablo 3'deki ve Tablo 4'deki a ve b sütunlarında sırasıyla kriz öncesi dönem ve kriz sonrası dönem için verilmiştir.

Tablo 3 Küresel Finansal Kriz Öncesi Amerika Merkez Bankası Durumu İçin Test Sonuçları (Azaltılmış Veri Seti)

Para Politikası Ölçümü ABD_kısa_vade_i	$\widehat{\alpha}_{ES}$ (a)	$\widehat{\alpha}_{IV}$ (b)	ES vs IV[a] (c)	Gözlem Sayısı
Hisse Senedi Endeksleri				
	0.901	-0.364	[0.5945]	36
BIST_100	(4.315)	(4.926)		
	-0.877	-2.643	[0.4794]	36
BIST_Mali	(4.837)	(5.444)		
	3.713	3.725	[0.9955]	36
BIST_Sınai	(3.666)	(4.283)		
	2.906	2.058	[0.7263]	36
BIST_Hizmet	(3.517)	(4.271)		
	5.298	5.692	[0.7686]	36
BIST_Ticaret	(3.714)	(3.948)		
	2.139	1.281	[0.7615]	36
BIST_Teknoloji	(3.686)	(4.646)		
Döviz Kurları				
	-2.082	3.129	[0.2076]	42
USD/TRL	(1.872)	(4.539)		
	-4.725**	1.127	[0.1593]	42
EUR/TRL	(2.006)	(4.617)		
Devlet Tahvili Getirisi				
	0.119	0.0642	[0.4476]	22
İki_yıllık_tahvil	(0.472)	(0.477)		

Notlar: Para politikası ölçümü kısa vadeli faizler üzerinden hesaplanmıştır.
Olay çalışması yöntemine ve araç değişkenler yöntemine ait tahmin edicilerin standart hataları parantez içinde verilmiştir.
***, **, * 1% (p<0.01), 5% (p<0.05) ve10% (p<0.1) anlam düzeylerini sırasıyla temsil etmektedir.
[a]Hausman test sonuçlarının p- değerleri köşeli parantez içerisinde verilmiştir.

137

Tablo 4 Küresel Finansal Kriz Sonrası Amerika Merkez Bankası Durumu İçin Test Sonuçları (Azaltılmış Veri Seti)

Para Politikası Ölçümü ABD_uzun_vade_i	$\hat{\alpha}_{ES}$ (a)	$\hat{\alpha}_{IV}$ (b)	ES vs IV[a] (c)	Gözlem Sayısı
Hisse Senedi Endeksleri				
	-4.017	-11.27*	[0.1783]	37
BIST_100	(3.884)	(6.643)		
	-5.004	-15.10*	[0.1404]	37
BIST_Mali	(4.620)	(8.260)		
	-2.170	-9.213*	[0.1265]	37
BIST_Sınai	(3.021)	(5.511)		
	-2.345	-7.975	[0.1669]	37
BIST_Hizmet	(2.815)	(4.951)		
	-3.953	-17.48**	[0.0739]	37
BIST_Ticaret	(4.398)	(8.754)		
	0.474	-4.784	[0.2354]	37
BIST_Teknoloji	(3.261)	(5.502)		
Döviz Kurları				
	0.278	5.857*	[0.0872]	43
USD/TRL	(1.098)	(3.442)		
	-4.635***	-5.188**	[0.7950]	43
EUR/TRL	(0.863)	(2.296)		
Devlet Tahvili Getirisi				
	1.026**	2.039***	[0.0951]	36
İki_yıllık_tahvil	(0.377)	(0.715)		

Notlar: Para politikası ölçümü uzun vadeli faizler üzerinden hesaplanmıştır.
Olay çalışması yöntemine ve araç değişkenler yöntemine ait tahmin edicilerin standart hataları parantez içinde verilmiştir.
***, **, * 1% (p<0.01), 5% (p<0.05) ve10% (p<0.1) anlam düzeylerini sırasıyla temsil etmektedir.
[a]Hausman test sonuçlarının p- değerleri köşeli parantez içerisinde verilmiştir.

Tüm veri setinden elde edilen ampirik bulguların yorumlamaları ile azaltılmış veri setinden elde edilen sonuçlara dair yorumlamalar arasında genel olarak benzerlik görülmektedir. Sadece BIST_Hizmet değişkeni kriz sonrası dönemde tüm veri setinin kullanıldığı ampirik

bulgularda istatistiksel olarak anlamlı bulunurken, azaltılmış veri setinin bulgularında istatistiksel olarak anlamsız bulunmuştur. Genel olarak sonuçlar değerlendirilecek olursa, azaltılmış veri setinin bulgularının göz önünde bulundurulması daha güvenilir olacaktır.

Avrupa Merkez Bankası'nın yapmış olduğu para politikası duyurularının Türkiye'deki finansal varlık fiyatları üzerindeki etkisine bakılacak olursa, euro bölgesi için seçilen para politikası ölçümü küresel finansal kriz öncesi ve küresel finansal kriz sonrası dönem için farklılık göstermektedir. Ocak 2004 ile Eylül 2008 arasındaki dönemi inceleyen süreçte euro bölgesindeki para politikası ölçümü Kholodilin vd. (2009)'un çalışmasında yer aldığı gibi 1 aylık EURIBOR oranının günlük değişimi üzerinden hesaplanmıştır. Çünkü Kleimeier ve Sander (2006) ve Bohl vd. (2008) 1 aydan daha uzun süreli faiz oranlarının kullanılmasının para politikasındaki değişimleri yansıtmayacağını, diğer tarafta ise 1 aydan kısa süreli faiz oranlarının ise oynaklığa maruz kalacağını iddia etmektedirler. Bu nedenle 1 aylık EURIBOR oranındaki değişim para politikası ölçümü olarak dikkate alınmıştır. Küresel kriz sonrası uygulanan geleneksel olmayan para politikası uygulamaları ve politika faizlerinin alışılmışın dışında çok düşük seviyelerde seyretmesi, kriz sonrası dönem için para politikası ölçümü yaparken araştırmacıları daha uzun vadeli devlet tahvilleri getirilerini kullanmaya yöneltmiştir (Rogers vd., 2014; Haitsma vd., 2015). Rogers vd. (2014) son yıllardaki özellikle kriz sonrasında Avrupa Merkez Bankası'nın euro bölgesi için hedeflerini göz önüne alarak İtalya ve Almanya 10 yıllık devlet tahvillerinin getirileri arasındaki farktaki değişimi kullanarak euro bölgesi için para politikası ölçümü elde etmişlerdir. Çünkü kriz sonrası dönemde, Avrupa Merkez Bankası euro bölgesindeki temerrüt riskini düşürmek için ve euro finansal birliğini sağlamak adına adımlar atmıştır. Euro bölgesindeki temerrüt riskinin düşük olduğu gösteren durumlardan birisi de euro bölgesindeki devlet tahvillerinin getirileri arasındaki farkın düşük olmasıdır. Bu nedenle euro bölgesinde genişletici para politikaları uygulandıkça, bölgede oluşabilecek temerrüt riski azalacak, bu durum ise euro bölgesi devlet tahvillerinin getirileri arasındaki farkın daha düşük olmasından gözlemlenebilecektir. Bahsedilen durum göz önüne alınarak bu çalışmada 10 yıllık İtalya ve Almanya devlet tahvillerinin getirileri arasındaki farkın günlük değişimi kriz sonrası dönem için para politikası ölçümünde kullanılmıştır.

139

Türkiye'deki varlık fiyatlarında ise Amerika Merkez Bankası durumunda incelendiği gibi aynı varlıklar kullanılmıştır. Hisse senedi getirileri BIST_100, BIST_Mali, BIST_Sinai, BIST_ Hizmet, BIST_Ticaret ve BIST_Teknoloji endekslerinin günlük getirileri üzerinden elde edilmiştir. Döviz kuru içinse yine Amerikan dolarının ve euronun Türk lirası karşılığındaki değerlerinin günlük değişimleri kullanılmıştır. Bu değişkenler USD /TRL ve EUR/TRL ile gösterilmiştir. Yurtiçi faiz için ise iki yıllık devlet tahvilinin getirilerindeki günlük değişim ele alınmıştır.

Olay çalışması yöntemi ve araç değişkenler yöntemi kullanarak elde edilen tüm veri setine ilişkin bulgular Tablo 5'deki a ve b sütunlarında kriz öncesi dönem için, kriz sonrası dönem için ise Tablo 6'daki a ve b sütunlarında verilmiştir.

Tablo 5 Küresel Finansal Kriz Öncesi Avrupa Merkez Bankası Durumu İçin Test Sonuçları (Tüm Veri Seti)

Para Politikası Ölçümü EURO_kısa_vade_i	$\widehat{\alpha}_{ES}$ (a)	$\widehat{\alpha}_{IV}$ (b)	ES vs IV[a] (c)	Gözlem Sayısı
Hisse Senedi Endeksleri				
BIST_100	-17.44 (18.51)	659.6 (1,923)	[0.7248]	57
BIST_Mali	-15.08 (23.13)	718.4 (2,115)	[0.7287]	57
BIST_Sınai	-27.41* (15.10)	630.3 (1,853)	[0.7226]	57
BIST_Hizmet	-5.812 (17.23)	436.6 (1,280)	[0.7296]	57
BIST_Ticaret	-18.09 (16.25)	795.8 (2,288)	[0.7221]	57
BIST_Teknoloji	-30.22 (18.10)	482.8 (1,467)	[0.7265]	57
Döviz Kurları				
USD/TRL	2.509 (9.833)	-486.8 (1,539)	[0.7505]	60
EUR/TRL	6.207 (8.970)	-517.4 (1,643)	[0.7499]	60
Devlet Tahvili Getirisi				
İki_yıllık_tahvil	5.747* (2.902)	-229.4 (1,715)	[0.8910]	30

Notlar: Para politikası ölçümü kısa vadeli faizler üzerinden hesaplanmıştır.
Olay çalışması yöntemine ve araç değişkenler yöntemine ait tahmin edicilerin standart hataları parantez içinde verilmiştir.
***, **, * 1% (p<0.01), 5% (p<0.05) ve10% (p<0.1) anlam düzeylerini sırasıyla temsil etmektedir.
[a]Hausman test sonuçlarının p- değerleri köşeli parantez içerisinde verilmiştir.

Tablo 6 Küresel Finansal Kriz Sonrası Avrupa Merkez Bankası Durumu İçin Test Sonuçları (Tüm Veri Seti)

Para Politikası Ölçümü EURO_uzun_vade_i	$\widehat{\alpha}_{ES}$ (a)	$\widehat{\alpha}_{IV}$ (b)	ES vs IV[a] (c)	Gözlem Sayısı
Hisse Senedi Endeksleri				
BIST_100	-4.556*** (1.302)	-4.616* (2.391)	[0.9764]	66
BIST_Mali	-5.224*** (1.535)	-5.391* (2.909)	[0.9462]	66
BIST_Sınai	-3.552*** (1.111)	-3.147 (2.023)	[0.8106]	66
BIST_Hizmet	-3.294*** (1.132)	-3.404* (1.970)	[0.9457]	66
BIST_Ticaret	-3.978*** (1.128)	-5.580** (2.336)	[0.4334]	66
BIST_Teknoloji	-2.853** (1.397)	-4.286 (2.655)	[0.5257]	66
Döviz Kurları				
USD/TRL	2.086** (0.861)	1.984 (1.446)	[0.9302]	67
EUR/TRL	-0.290 (0.666)	-0.570 (1.200)	[0.7790]	67
Devlet Tahvili Getirisi				
İki_yıllık_tahvil	0.186 (0.180)	0.227 (0.308)	[0.8701]	66

Notlar: Para politikası ölçümü uzun vadeli faizler üzerinden hesaplanmıştır.
Olay çalışması yöntemine ve araç değişkenler yöntemine ait tahmin edicilerin standart hataları parantez içinde verilmiştir.
***, **, * 1% (p<0.01), 5% (p<0.05) ve10% (p<0.1) anlam düzeylerini sırasıyla temsil etmektedir.
[a]Hausman test sonuçlarının p- değerleri köşeli parantez içerisinde verilmiştir.

Kriz öncesi dönemin sonuçları incelendiği zaman olay çalışması ve araç değişkenler yöntemine göre elde edilen tahmin edicilerin işaretleri açısından birbiriyle tutarlı sonuçlar vermediği görülmektedir. Ancak elde edilen sonuçlara göre, BIST_Sinai ve

İki_yıllık_tahvil değişkenleri için olay çalışmasından elde edilen sonuçlar dışında, diğer varlıklar üzerinde gözlemlenen etkilerin istatistikî olarak anlamlı olmadığı bulunmuştur. Diğer taraftan kriz sonrası dönem için, euro bölgesindeki genişletici para politikalarının tüm hisse senedi endeks getirilerini arttırdığı görülmektedir. Kriz sonrası diğer bir istatistikî anlamlı sonuç ise Türk lirasının dolar karşısındaki değeri için bulunmuştur. Euro bölgesindeki genişletici para politikalarının Türk lirasının dolar karşısında değer kazanmasına neden olduğunu göstermektedir. EUR/TRL ve İki_yıllık_tahvil değişkenlerinin üzerindeki etki ise kriz sonrası dönem için anlamsız bulunmuştur. Hausman test sonuçlarına göre her iki dönem için olay çalışması varsayımlarının ihlal edilmediği gözlemlenmiştir.

Avrupa Merkez Bankası'nın para politikası duyurularının yapıldığı bazı tarihlerde Amerika Merkez Bankası ve Türkiye Cumhuriyet Merkez Bankası Türkiye'deki varlık fiyatlarını etkileyecebilecek para politikası duyurularını yapmışlardır. Bu nedenle diğer merkez bankası para politikası duyuruları Avrupa Merkez Bankası'nın yapmış olduğu duyuruların etkisini bozmasın diye veri setinden aynı güne denk gelen açıklamalar çıkartılarak analizler tekrar edilmiştir. Benzer bir yaklaşım Gürkaynak vd. (2005)'in çalışmasında da gözlemlenmiştir. Gürkaynak vd. (2005) de istihdam raporlarının açıklandığı güne denk para politikası günlerini veri setinden çıkartarak daha güvenilir sonuçlar elde etmeye çalışmıştır. Azaltılmış veri setine ait bulgular Tablo 7'deki a ve b sütunlarında kriz öncesi dönem için verilirken, Tablo 8' deki a ve b sütunları kriz sonrası dönem bulguları verilmiştir.

Tablo 7 Küresel Finansal Kriz Öncesi Avrupa Merkez Bankası Durumu İçin Test Sonuçları (Azaltılmış Veri Seti)

Para Politikası Ölçümü EURO_kısa_vade_i	$\hat{\alpha}_{ES}$ (a)	$\hat{\alpha}_{IV}$ (b)	ES vs IV[a] (c)	Gözlem Sayısı
Hisse Senedi Endeksleri				
	-9.283	-82.02	[0.4093]	48
BIST_100	(21.65)	(90.77)		
	-11.93	-109.5	[0.3688]	48
BIST_Mali	(25.51)	(111.5)		
	-5.584	-41.55	[0.5405]	48
BIST_Sınai	(15.21)	(60.70)		
	-2.736	-47.13	[0.5563]	48
BIST_Hizmet	(19.78)	(78.01)		
	13.68	7.604	[0.9201]	48
BIST_Ticaret	(17.00)	(62.95)		
	-19.92	-79.42	[0.4650]	48
BIST_Teknoloji	(21.24)	(84.16)		
Döviz Kurları				
	-0.0463	23.74	[0.5356]	53
USD/TRL	(10.69)	(39.86)		
	7.435	43.89	[0.3780]	53
EUR/TRL	(10.44)	(42.65)		
Devlet Tahvili Getirisi				
	4.960	14.92	[0.4285]	27
İki_yıllık_tahvil	(3.398)	(13.03)		

Notlar: Para politikası ölçümü kısa vadeli faizler üzerinden hesaplanmıştır.
Olay çalışması yöntemine ve araç değişkenler yöntemine ait tahmin edicilerin standart hataları parantez içinde verilmiştir.
***, **, * 1% (p<0.01), 5% (p<0.05) ve10% (p<0.1) anlam düzeylerini sırasıyla temsil etmektedir.
[a]Hausman test sonuçlarının p- değerleri köşeli parantez içerisinde verilmiştir.

Tablo 8 Küresel Finansal Kriz Sonrası Avrupa Merkez Bankası Durumu İçin Test Sonuçları (Azaltılmış Veri Seti)

Para Politikası Ölçümü EURO_uzun_vade_i	$\hat{\alpha}_{ES}$ (a)	$\hat{\alpha}_{IV}$ (b)	ES vs IV[a] (c)	Gözlem Sayısı
Hisse Senedi Endeksleri				
BIST_100	-4.847*** (1.419)	-4.776 (3.083)	[0.9792]	57
BIST_Mali	-5.586*** (1.690)	-5.629 (3.794)	[0.9899]	57
BIST_Sınai	-3.608*** (1.178)	-2.907 (2.524)	[0.7534]	57
BIST_Hizmet	-3.617*** (1.265)	-3.750 (2.495)	[0.9504]	57
BIST_Ticaret	-4.493*** (1.280)	-7.430** (3.161)	[0.3096]	57
BIST_Teknoloji	-2.890* (1.530)	-3.438 (3.313)	[0.8521]	57
Döviz Kurları				
USD/TRL	2.376** (0.968)	2.306 (1.823)	[0.9636]	57
EUR/TRL	-0.295 (0.756)	-0.512 (1.520)	[0.8697]	57
Devlet Tahvili Getirisi				
İki_yıllık_tahvil	0.196 (0.213)	0.249 (0.415)	[0.8823]	57

Notlar: Para politikası ölçümü uzun vadeli faizler üzerinden hesaplanmıştır.
Olay çalışması yöntemine ve araç değişkenler yöntemine ait tahmin edicilerin standart hataları parantez içinde verilmiştir.
***, **, * 1% (p<0.01), 5% (p<0.05) ve10% (p<0.1) anlam düzeylerini sırasıyla temsil etmektedir.
[a]Hausman test sonuçlarının p- değerleri köşeli parantez içerisinde verilmiştir.

Diğer merkez bankalarının para politikası duyuruları ile çakışan günler çıkarıldığında, özellikle kriz öncesi dönem için elde edilen tahmin edicilerinin işaretlerinin daha tutarlı olduğunu gözlemlenmektedir. Dahası, azaltılmış veri setinin sonuçlarını yorumlamak daha

güvenilir olacaktır. Hisse senedi getirileri kriz öncesi dönem için değerlendirilecek olursa, BIST_Ticaret değişkeni dışında, euro bölgesindeki genişletici para politikaları diğer tüm hisse senedi endekslerinin getirileri üzerinde artışa neden olmaktadır. Ticaret sektöründeki endekste ise genişletici para politikaları bu endeksin getirilerinde azalışa neden olmaktadır. Ancak elde edilen tüm sonuçlar istatistikî olarak anlamsızdır. Kriz sonrası dönem için elde edilen tüm sonuçlar olay çalışması yöntemine göre istatistikî olarak anlamlı olup, euro bölgesindeki genişletici para politikalarının hisse senedi endeksleri üzerinde pozitif yönde bir etkisinin olduğu gözlemlenmiştir. Döviz kuru için, Türk lirasının Amerikan doları karşısındaki değerine olan genişletici para politikası etkisi kriz öncesi dönem için uygulanan yönteme göre değişkenlik göstermekle birlikte elde edilen sonuçlar istatistiksel olarak anlamlı bulunmamaktadır. Kriz sonrası dönemde ise euro bölgesinde uygulanan genişletici para politikasının, Türk lirasının Amerikan doları karşısında değerini arttırdığı gözlemlenmektedir. Bu sonuç olay çalışması yöntemine göre istatistikî olarak anlamlı bulunmuştur. Diğer taraftan kriz öncesi dönemde genişletici para politikasının Türk lirasının euro karşısındaki değer kazanmasına neden olduğu gözlenmiş olup bu sonuç istatistikî olarak anlamsız bulunmuştur. Kriz sonrası dönemde ise euro bölgesindeki genişletici para politikası uygulanması Türk lirasının euro karşısında değer kaybetmesine neden olmaktadır. Ancak bu sonuç anlamlı değildir. Son olarak iki yıllık devlet tahvili üzerindeki etkiye bakıldığında, kriz öncesi dönemde ve kriz sonrası dönemde euro bölgesinde uygulanan genişletici para politikası iki yıllık tahvilin getirisinde azalışa olmaktadır. Her iki dönem için elde edilen sonuçlar istatistikî olarak anlamsız bulunmuştur. Ayrıca her iki dönemin Hausman test sonuçlarına göre elde edilen olay çalışması tahmin edicilerinin istatistikî olarak yanlı olmadığı gözlemlenmektedir.

Özetle bu çalışma, 2008 küresel finansal kriz öncesinde ve sonrasında Türkiye'deki finansal varlık fiyatlarının Amerika Merkez Bankası'na ve Avrupa Merkez Bankası'na ait para politikası değişikliklerine nasıl tepki verdiğini incelemektedir. Çünkü Lehman Brothers'ın iflası sonrasında küresel krizin etkilerini gidermek amacıyla bahsedilen gelişmiş ülkelerin merkez bankaları geleneksel olmayan para politikası araçlarını kullanmışlardır. Atılan bu genişletici para politikaları adımları ve finansal piyasalardaki kırılgan yapı küresel risk iştahında artışa neden olarak yükselen piyasa ekonomilerine

yönelik aşırı miktarda ve oynaklığı yüksek kısa vadeli sermaye akımlara neden olmuştur. Bu durum da Türkiye gibi ülkelerin makroekonomik ve finansal istikrarını tehdit etmiştir (Kara, 2012). Bu nedenle varlık fiyatlarının Amerika ve Avrupa Merkez Bankaları'nın para politikası değişikliklerine kriz sonrası dönemde, kriz öncesi döneme kıyasla daha mı duyarlı olduğu açığa çıkarılmak istenmiştir. Çünkü dışsal şoklara daha duyarlı olan varlık fiyatları daha kırılgan bir finansal sistemin göstergesi olabilmektedir.

Kriz öncesi ve kriz sonrası dönem incelenirken dikkat edilen hususlardan biri, geleneksel para politikalarının uygulandığı dönemde para politikası ölçümleri kısa vadeli faizler üzerinden ölçülürken, kriz sonra dönem içinse para politikası ölçümleri daha uzun vadeli faizler üzerinden elde edilmiştir. Çünkü kriz sonrası dönemde gelişmiş ekonomilerdeki merkez bankaları politika faizlerini sıfır alt sınırda tutup, geleneksel olmayan çeşitli para politikası araçlarına başvurmuşlardır.

Amerika Merkez Bankası'nın Türkiye'deki varlık fiyatları üzerindeki etkisi incelendiğinde, kriz öncesi dönem için Türk lirasının euro karşısındaki değeri dışında, Amerika'daki para politikası değişikliklerinin herhangi bir varlık üzerinde istatistikî olarak anlamlı bir etkisi bulunmamaktadır. Elde edilen sonuca göre genişletici para politikası adımları Türk lirasının euro karşısında değer kaybetmesine neden olmaktadır. Kriz sonrası döneme bakıldığında Amerika'daki genişletici para politikası adımları BIST_100, BIST_Mali, BIST_Sinai ve BIST_Ticaret hisse senedi endeks getirilerinin artmasına neden olmuştur. Bu durum uluslararası portföy dengeleme kanalının üzerinden bir sonucu olabilmektedir (Fratzscher vd., 2014; Chen vd., 2014). Uluslararası portföy dengeleme kanalına göre yatırımcılar düşük getirilerin olduğu piyasalara yatırım yapmaktansa, daha fazla riski göze alarak daha fazla getiri elde edebilecekleri piyasalara yönelebilirler. İşte yatırımcıların aradığı bu yatırım araçları, Türkiye gibi yükselen piyasa ekonomilerindeki hisse senetleri olabilir. Ayrıca, yine kriz sonrası dönem için Türk lirasının Amerikan doları karşısında değeri artarken, Türk lirasının euro karşısındaki değerinin düştüğü gözlemlenmektedir. Türk lirasının Amerikan doları karşısındaki değerinin artması döviz kuru kanalı ile açıklanabilmektedir (Chen vd., 2012; Takáts & Vela, 2014). Yabancı para cinsinden Türkiye'ye gelen sermaye akımları yurtiçinde yabancı para bolluğuna neden

olarak, Türk lirasının değerinin artmasına neden olabilmektedir. Yurtiçi faizinin ise Amerika Merkez Bankası'nın yapmış olduğu para politikası değişimi ile aynı yönde hareket etmesi ise yine uluslararası portföy dengeleme kanalı ile açıklanabilir. Gelişmiş ülkelerdeki genişletici para politikalarından ötürü, bu ülkelerdeki borç araçları yerine yatırımcılar yükselen piyasa ekonomilerindeki aynı vadeli ancak daha riskli ve daha yüksek getirili borç araçları yönelebilirler. Böylece bu borç araçlarına olan talebin artması, borç araçlarının fiyatlarını yükseltirken, getirilerini düşürebilir (Chen vd., 2012; Bauer & Neely, 2013).

Avrupa Merkez Bankasının para politikası sonuçlarına gelindiğinde ise, kriz öncesi dönem için euro bölgesindeki para politikası değişimlerinin Türkiye'deki varlık fiyatları üzerinde istatistiksel olarak anlamlı etkileri gözlenmemektedir. Ancak kriz sonrası döneme bakıldığında ise, genişletici para politikası uygulamaları tüm hisse senedi endeks getirilerinin üzerinde anlamlı bir artışa neden olduğu gözlemlenmektedir. Bu durum yine uluslararası portföy dengeleme kanalı ile ilişkilendirilebilinir. Diğer taraftan euro bölgesindeki genişletici para politikası Türk lirasının Amerikan doları karşısında değer kazanmasına neden olduğunu göstermektedir. Bu durum istatistiksel olarak anlamlı olup, döviz kuru kanalı etkisi burada görülmüş olabilir. Türk lirasının euro karşısındaki değeri ile yurtiçi faiz değişkenlerinin tepkileri ise istatistiksel olarak anlamlı bulunmamıştır.

Ampirik bulgular yorumlanırken para politikası değişimleri genişletici para politikası üzerine temellendirilmiştir. Ancak gelişmiş ülke ekonomilerini kötüleştirebilecek gelişmelerin olması durumunda yada bu ekonomilerde sıkılaştırıcı para politikası uygulamaları olduğunda, sermaye akımları aniden ters yönde hareket edebilmektedir. Bu durumda varlık fiyatları verdiği tepkilerin anlamlılık düzeyinde bir farklılık olmayacaktır ancak verilen tepkilerin yönü genişletici para politikası uygulamalarında olan tepkinin tam tersi yönünde olacaktır. Ancak iki durum da Türkiye'nin makroekonomik ve finansal istikrarını tehdit etmektedir. Bunun dışında, her iki merkez bankası sonuçları göz önüne alındığında kriz sonrası dönemde Amerika Merkez Bankası'nın, Avrupa Merkez Bankası'na kıyasla anlamlı etkiler yarattığı varlıkların çeşitliliğinin daha fazla olduğu gözlemlenmiştir.

Bu çalışma, Türkiye'deki varlık fiyatlarının çoğunun kriz sonrası dönemde Amerika'da ve Avrupa'da uygulanan para politikası değişikliklerine kriz öncesi döneme göre daha anlamlı tepkiler verdiğine dair bulgular sunmuştur. Aysan vd., (2014)'ün belirttiği gibi küresel likidite bolluğundaki oynaklık ve gelişmiş ekonomilerdeki düşük getiri oranları kriz sonrası dönemde Türkiye'ye yönelik aşırı oynak kısa vadeli sermaye akımlarına neden olmuştur. Bu durum Türkiye'nin gelişmiş ülkelerdeki para politikası değişimlerine daha fazla maruz kalmasına neden olarak Türkiye'deki finansal istikrarının bozulmasına neden olmuştur. Aslında Türkiye'deki finansal istikranın bozulması iki ana unsur üzerinden gözlemlenmiştir. Bunlardan birisi döviz kurundaki oynaklık iken diğeri ise aşırı kredi büyümesidir. Finansal istikrarı sağlamak, aşırı oynak kısa vadeli sermaye hareketlerinin negatif etkileri ile baş edebilmek adına Türkiye'deki para otoritesinin daha esnek ve daha yenilikçi para politikası araçlarına ihtiyaç duymuştur. Aslında küresel finansal kriz sonrası Türkiye Cumhuriyet Merkez Bankası faiz koridoru ve rezerv opsiyon mekanizması gibi araçları benimseyerek mevcut para politikası çerçevesini geliştirmiştir. Çünkü bu araçlar sayesinde finansal istikrarsızlığın yaratabileceği sıkıntılara müdahale edilmesi amaçlanmıştır. Görüldüğü gibi bu çalışmanın bulguları Aysan vd. (2014)'ün belirttikleri ile örtüşmektedir. Bu nedenle, bu çalışma gelişmiş ülkelerde uygulanan para politikası değişimlerinin yaratabileceği dışsal şoklara zamanında ve etkin bir şekilde müdahale edebilmek adına Türkiye Cumhuriyet Merkez Bankası'nın yeni para politikası araçlarını etkin bir şekilde kullanmaya devam etmesini ve kullanmış olduğu para politikası araçlarının çeşitliliğini arttırması önermektedir.