

**CHARLES UNIVERSITY IN PRAGUE**

FACULTY OF SOCIAL SCIENCES

Institute of Economic Studies



BACHELOR THESIS

**Fed's and ECB's monetary policy during  
the crisis - differences and their reasons**

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Year of defence: **2014**

## **Declaration of Authorship**

I hereby proclaim that I wrote my bachelor thesis on my own under the leadership of my supervisor and that the references include all resources and literature I have used.

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Prague, May 13, 2014

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Signature

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## **Bibliography Reference**

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## **Extent of the Thesis**

81,105 characters (with spaces)

# Abstract

This bachelor thesis analyzes the approaches of the Federal Reserve System and the European Central Bank to monetary policy during the crisis. The main part of this thesis is devoted to unconventional monetary policy measures conducted during the crisis. We firstly introduce the respective measures, subsequently compare them and state reasons which caused different behaviour of the Federal Reserve System and the European Central Bank. This thesis states six main differences and their respective reasons. First, the fundamental difference is the perspective on unconventional monetary policy measures in terms of whether they were considered a substitute or complement to the existing policy instruments. The second significant difference can be found in the behaviour before the collapse of Lehman Brothers. Third, the timing of implementation of measures was also distinct. Fourth, the purchases of government bonds were common for the Federal Reserve System even before the crisis, while for the European Central Bank it was a novelty. The fifth difference is in the use of outright purchases versus collateralized lending. The last difference resides in the attitude toward main interest rates steering, in which the Federal Reserve System was more aggressive than the European Central Bank. Reasons which contributed to these distinct approaches are various – mandates of the central banks, method of liquidity distribution, structure of financial systems and other.

**JEL Classification** E50, E52, E58

**Keywords** Monetary policy, unconventional tools, central bank's balance sheet

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# Abstrakt

Tato bakalářská práce zanalyzuje přístupy Federálního rezervního systému a Evropské centrální banky k monetární politice během krize. Hlavní část této práce se zabývá nekonvenčními opatřeními měnové politiky, která byla během krize provedena. Nejprve příslušná opatření představujeme, poté jednotlivé přístupy srovnáváme a uvádíme důvody, které zapříčinily odlišné chování Federálního rezervního systému a Evropské centrální banky. Tato práce udává šest hlavních rozdílů a jejich příslušné příčiny. Prvním a základním rozdílem je pohled na nekonvenční monetární politiku, a to ve smyslu komplementu nebo substitutu ke stávající politice. Druhý signifikantní rozdíl můžeme najít v chování v období před pádem Lehman Brothers. Za třetí, načasování implementace nekonvenčních opatření se také liší. Za čtvrté, zatímco pro Federální rezervní systém bylo nakupování vládních dluhopisů běžnou záležitostí již před krizí, pro Evropskou centrální banku to byla novinka. Pátým rozdílem je použití přímých nákupů versus půjček jištěných pomocí kolaterálu. Poslední rozdíl tkví v přístupu k řízení hlavních úrokových sazeb, ve kterém byl Federální rezervní systém agresivnější. Důvody, které přispěly k těmto odlišným přístupům, jsou různorodé – mandáty centrálních bank, způsob distribuce likvidity, struktura finančních systémů a jiné.

<b>JEL klasifikace</b>	E50, E52, E58
<b>Klíčová slova</b>	Měnová politika, nekonvenční nástroje, bilance centrální banky
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# Bachelor Thesis Proposal

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<b>Proposed topic</b>	Fed's and ECB's monetary policy during the crisis - differences and their reasons

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**Topic characteristics** In 2007, the whole world plunged into a crisis and central banks became crucial players in saving the economies from disaster. Central banks used not only commonly known policies, but also unconventional ones to achieve stability.

This thesis will focus on two major central banks, (i.e.) the European Central Bank (ECB) and the Federal Reserve System (FED), and their monetary policy during the crisis. The aim of this work is to show the differences between these two central banks in handling various situations and the reasons that forced the central banks to take respective measures. In the first part of this thesis, I will introduce ECB and FED and also give a theoretical background of monetary policy. Afterwards I intend to devote a piece of this work to the economic performance of the Eurozone and the United States of America and detection of major macroeconomic indicators. The remaining part will deal with ECB's and Fed's monetary policy during the crisis. In the final chapter, differences in the approaches of these two institutions will be discussed and a general conclusion made.

## Outline

1. Introduction
2. Theoretical Background
3. Economic performance of the Eurozone and the U.S. before and during the crisis
4. Monetary policies of ECB and FED during the crisis
5. Conclusion

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# Acronyms

ABCP	– Asset-backed commercial paper
AMFL	– ABCP money market mutual fund liquidity facility
CBPP	– Covered bond purchase programme
CPFF	– Commercial paper funding facility
ECB	– European Central Bank
EFSM	– European financial stabilization mechanism
EMU	– Economic and Monetary Union
ESCB	– European System of Central Banks
ESM	– European stability mechanism
ERM II	– European Exchange Rate Mechanism II
EUR	– Euro
Fed	– Federal Reserve System
FOMC	– Federal open market committee
FRFA	– Fixed rate tenders and full allotment
GDP	– Gross domestic product
HICP	– Harmonised index of consumer prices
LTV	– Loan-to-value ratio
MBS	– Mortgage backed security
MMMFs	– Money market mutual funds
MRO	– Main refinancing operations
OECD	– Organization for economic cooperation and development
OMT	– Outright monetary purchases
PDCF	– Primary dealers credit facility
RCA	– Reciprocal currency agreement

SMP – Securities markets programme

TAF – Term auction facility

TALF – Term asset-backed securities loan facility

TDWP – Term discount window program

TSLF – Term securities lending facility

U.S., USA – The United States of America

USD – United States dollar

QE – Quantitative easing

QuaE – Qualitative easing

ZLB – Zero lower bound

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# Chapter 1

## Introduction

The crisis erupted in the U.S. markets in 2007. U.S. financial sector faced high level of risk and insufficient amount of liquidity. Many banks were not able to respond to these problems, suffered huge losses and in some cases they even went to bankrupt. They were also not sufficiently able to provide households and firms with loans. This depressed subsequently spending and investment. Consequences of these struggles got also reflected in the macroeconomic performance. This was registered by a significant drop in GDP and the unemployment rose. The crisis widened after a few months to other parts of the world, including the euro area. The USA and the euro area faced severe problems and central banks of these two areas – the Fed and the ECB – became crucial players in rescuing the economies. The central banks fought the crisis using already existing monetary policy tools; however, the impact of these instruments was not sufficient. The most profound monetary policy instrument – main interest rates – approached very quickly values near zero lower bound after the onset of the crisis and the Fed and the ECB were not able to operate with this instrument anymore. Because of this, they had to resort to other instruments which had not been used before in order to express their monetary policy stance clearly and primarily help financial systems and economies to get from troubles. It was sufficient to use slightly modified ordinary measures at the beginning of the crisis but with the crisis gaining more strength, the central banks had to establish new programmes and facilities (e.g., the Fed introduced three rounds of quantitative easing, the ECB announced the outright monetary transactions). The crisis also evolved over time.

It changed its face in the euro area and translated to the sovereign debt crisis. This modification meant for the ECB another innovation in its monetary policy approach. Moreover, since the characteristics of the two economies, their financial systems, central banks and other factors are different, also distinct monetary policy approaches were chosen.

The goal of this thesis is to find differences between monetary policy approaches of the Fed and the ECB during the crisis and explain reasons which stand behind their respective monetary policy actions. So far, there can be found many papers related to monetary policy conducted by the central banks during the crisis. However, separate papers contain different information; therefore, evidence on behaviour of the Fed and the ECB during the crisis is fragmented. In this thesis, we summarize information from available evidence and give additional explanation of differences in monetary policy.

The thesis is structured as follows. Chapter 2 acquaints reader with the basic facts concerning monetary policy of the Fed and the ECB in ordinary times. We do this in order to offer comparison between monetary policy in non-exceptional times and during the crisis. We can also find brief subchapter containing information about the crisis and impact of the crisis on economic performance of the USA and the euro area in this chapter. We deal with monetary policy conducted by the Fed and the ECB during the crisis in chapter 3. We divide monetary policy into two phases – before and after the collapse of Lehman Brothers – since these two periods are characterized by completely different approaches. Moreover, we also mention macroeconomic impacts of nonstandard monetary policy measures. In chapter 4, we finally approach differences in monetary policy conducted by the Fed and the ECB during the crisis. We introduce each difference separately and discuss the reasons standing behind them. General conclusion is made in the last chapter.

# Chapter 2

## Remarks on the ECB and the Fed

We describe the European Central Bank and the Federal Reserve System in this chapter. We also mention macroeconomic impacts of the crisis on the euro area and the USA. For the purpose of a description of the ECB and the Fed and their monetary policy instruments we use Bofinger (2006), Scheller (2006) and the Fed (2013).

### 2.1 The European Central Bank

The European Central Bank is the central bank of the euro area. It was founded in 1998 as an institution needed for EMU establishment. Today, the European Central Bank performs its tasks in these three fields:

- (i) monetary policy,
- (ii) supervision and regulation of financial institutions, and
- (iii) financial stability.

The European Central Bank is a member of the European System of Central Banks. There are three decision-making bodies of the ECB: the Governing Council, the Executive Board and the General Council. These bodies have two main tasks: the governance of the euro area and the governance of the European Central Bank itself.

The most important body is the Governing Council to whose competencies belong the most significant decisions. It is responsible for the monetary policy and defines its strategy and operational framework. Other tasks are, e.g., adoption of the regulations or establishment of the rules.

The Executive Board is an operational body that has other important functions. The decisions on a day-to-day basis are conducted by this authority. Conditions in the money markets and capital markets are developing very quickly and sometimes it is necessary to make immediate intervention in order to hold variables close to their target values.

The last of the three mentioned bodies is the General Council. This institution bridges the Eurosystem and the non-euro area Member States. It serves principally as an advisor for those countries that try to join the Eurosystem. Other objective is monitoring ERM II system.

Similarly to the Federal Reserve System, advisory committees are present. Committees focus on agenda stemming from their specialization, provide their opinions and give advices and then implement final decisions. Currently, 16 committees are in operation, e.g., the Monetary Policy Committee, the Market Operations Committee or the Accounting and Monetary Income Committee.

### **2.1.1 The ECB's monetary policy objective**

The main objective of the ECB's monetary policy is price stability over the medium term. This final target is precisely defined in Article 105(1) of the Treaty on European Union<sup>1</sup> as follows:

*“The primary objective of the ESCB shall be to maintain price stability. Without prejudice to the objective of price stability, the ESCB shall support the general economic policies in the Community with a view to contributing to the achievement of the objectives of the Community as laid down in Article 2.”*

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<sup>1</sup>Article 105 of the Treaty on European Union is in the newest version of the Treaty classified as article 107

It is important to mention that the Article 105 unambiguously stipulates by its wording that price stability is the main and superior objective to the following one. On the other hand, the Fed is legally bound to give both goals the same priority.<sup>2</sup>

Monetary policy strategy of the European Central Bank is based on several elements. The most important one is a quantitative definition of price stability (which was defined by ECB's Governing Council as "*a year-on-year increase in the Harmonised Index of Consumer Prices (HICP) for the euro area of below 2% over the medium term*" (ECB 2003, p. 79); this definition was clarified in May 2003 by stating that HICP will be maintained "*below, but close to, 2%*" because the preceding one proved to be insufficient). This approach was chosen based on these three points: more transparent monetary policy, guide for expectations about prices, and European Central Bank's accountability.

For the purpose of price stability evaluation, a system of two analytical viewpoints was implemented. This system is based on economic analysis and monetary analysis. The first one focuses on the short-term and medium-term factors influencing prices, and monetary analysis focuses on medium-term and long-term factors. Such designed system is supposed to reduce the probability of policy error.

The European Central Bank affects the developments of the short-term money market rates by influencing liquidity or by adjustment of conditions under which it is disposed towards transactions. It is also responsible for appropriate functioning of the market. This is achieved by providing sufficient liquidity to other banks in a way of regular refinancing. Emphasis is placed on the safety and minimum risk of financial operations. Therefore, all lending to credit institutions is secured by collateral.

The Governing Council of the European Central Bank meets every two weeks and determines the rates for standing facilities and main refinancing operations. There are no other official operating targets and the European Central Bank focuses on short-term money rates. The evidence confirms the role of short-term money market rate (overnight, one-month and three-month) as the operating target. From this implies that the ECB pursues the interest rate targeting policy.

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<sup>2</sup>For more detail see section 2.2.1

### 2.1.2 Monetary policy instruments of the ECB in non-exceptional times

The most important monetary policy instrument for the ECB, as well as in the United States of America, is the *open market operations*. We can meet with three types: main refinancing operations, fine-tuning operations, and structural operations. As name suggests, main refinancing operations are the most important from these three types. They are conducted on a weekly basis with one-week maturity. The participants have to fulfil certain conditions and all credit institutions in the euro area can take part in this action in reality. In addition to this instrument, fine-tuning operations can be conducted. These serve for unexpected situations and unlike the first one, only certain participants can take part. The last one – structural operations – serve for adaptation of structural liquidity position.

The overnight money market rate is maintained in a band. As an instrument for defining the upper limit for overnight money rate serves the rate for *marginal lending facility*. This special lending is without quantitative restrictions. The rate for marginal lending facility also states the upper limit for the rate of overnight money because no bank would borrow for higher rate than the rate set by the central bank. And because of this fact, the marginal lending facility is used as a last resort. Of course, collateral is needed.

The rate for *deposit facility* serves for maintaining the lower limit for overnight money rate band. This instrument is specific because it is not used by other major central banks. Its main advantage to open-market transactions is that it is unlimited; thus, it has high sterilization potential. Credit institutions can deposit their balances at the European Central Bank at predetermined interest rate. The interest rate is, however, lower than the market rate and this means that deposit facility is used only if the banks have no other choice how to operate with their surpluses.

Another important instrument is the *minimum reserve*. Because it is known how much money the banking system will need for reserve holdings, the central bank is able to supply appropriate amount and can avoid high fluctuations in the money market rate.

*Securities repos* and *interest rate smoothing* are other instruments available to the ECB. We cannot forget to mention the *foreign exchange operations*. The most crucial is an intervention on foreign exchange markets. This can be done only through foreign reserves deposited at the European Central Bank.

## 2.2 The Federal Reserve System

The Federal Reserve System (the System) is the central bank of the United States of America. It was founded in 1913 with a goal of ensuring more stable monetary and financial system. Tasks of this institution have changed since its foundation. Today, the System carries out its operations in four main fields. These are:

- (i) monetary policy,
- (ii) supervision and regulation of financial institutions,
- (iii) stability of the financial system, and
- (iv) financial services.

The Federal Reserve System consists of a main institution, the Board of Governors, located in Washington, D.C. and twelve Federal Reserve Banks. These banks are responsible for carrying out their operations without exception. This ensures that the System can effectively operate all over the country. An important part of the structure is the Federal Open Market Committee which serves as a supervisor of open market operations. This committee also plays a role in operations performed in foreign exchange markets.

Let us mention advisory committees that play a significant role. Committees serve as an inseparable body to the Board of Governors and help its members in conducting their decisions through their recommendations. These are for example Federal Advisory Council which is responsible for the recommendations in the area of Board's jurisdiction, Consumer Advisory Council which was established under the questions connected with consumer financial services and Thrift Institutions Advisory Council which engages in the field of thrift institutions.

The Board of Governors consists of seven members. Its tasks cover, among others, supervision and regulation of the Federal Reserve Banks and a whole banking system, changes in reserve requirements and approval of changes in the discount rate proposed by a Federal Reserve Bank. From this implies that The Board of Governors can issue regulations aimed at banks which are the members of the Federal Reserve System as well as on non-members. Beside its own tasks, it also cooperates with other parts of the System and it is responsible for their common activities.

The structure of the twelve Federal Reserve Banks allows carrying out various functions defined for the whole or particular area of the country. This includes for example supervision and regulation of various banking institutions, distribution of the nation's currency or providing the information for the Federal Reserve System. One of the most important functions is setting the value of interest rates which has to be approved by the Board of Governors eventually.

Let us turn attention to the commercial banks in the USA. These can be classified based on membership of the Federal Reserve System and the charter. If the bank belongs to the System (i.e., it is a national bank or chartered by the state), it must contribute to stock in the Federal Reserve Bank in the share of six percentage points of its capital. Advantage of being a member of the System rests on the fact that a member has a vote in elections of the Reserve Bank's directors and receives a six percent dividend on its stock.

### **2.2.1 The Fed's monetary policy objective**

The objectives of monetary policy conducted by the Federal Reserve System are specified in the section 2A of the Federal Reserve Act as follows:

*“The Board of Governors of the Federal Reserve System and the Federal Open Market Committee shall maintain long run growth of the monetary and credit aggregates commensurate with the economy's long run potential to increase production, so as to promote effectively the goals of maximum employment, stable prices, and moderate long-term interest rates.”*

As we can see, unlike the ECB the Fed cannot prefer any of the policy's goals because it has to give all goals the same priority.<sup>3</sup>

Stable prices in the long-run can be effectively used to ensure maximum output growth and employment. In the situation of stable prices, uncertainty is low enough to encourage effective allocation of resources. Another point is that this circumstance minimizes risks and leads to increase in investment spending and also allows higher households' savings. On the other hand, in the short run there can be a trade off between stable prices on the one hand and output growth and employment on the other hand. It is possible that upward pressure on prices is accompanied with a simultaneous decrease in employment and growth. In such situation, a "remedy" for inflation would lead to a further decrease in employment or growth and thus a policy maker must decide which potential result is more suitable. Another way that the Federal Reserve System can contribute to good economic performance is through financial stability. It can decrease the financial system's vulnerability to various shocks by using regulations.

U.S. monetary policy is executed by the Federal Reserve System through market for balances that are held by depository institutions at the respective Federal Reserve Bank. It is done by influencing conditions in this market. The central bank *"implements monetary policy through its control over the federal funds rate — the rate at which depository institutions trade balances at the Federal Reserve"* (Fed: Its Purposes and Functions 2013, p. 3). Control of supply of and demand for balances and the federal funds rate is done through open market operations, reserve requirements, contractual clearing balances and discount window facility. The federal funds rate is set by the Federal Funds Rate Committee and serves as the policy rate and the official operating target simultaneously.

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<sup>3</sup>For more detail see section 2.1.1

### 2.2.2 Monetary policy instruments of the Fed in non-exceptional times

We can find clear distinctions in the monetary policy instruments of the European Central Bank and the Federal Reserve System. The first one is the lack of standing facilities at the Fed. There cannot be found a facility that serves for setting the upper and lower limit on the federal funds rate. Therefore, we can see in the System's armoury only repurchase agreements and outright open-market operations. The Federal Reserve System has to conduct its operations on a daily basis in order to be able to control the federal funds rate.

*Open market operations* with primary dealers (U.S. security dealers and foreign official institutions) are performed through auction. A decision whether open market operations should be conducted and also which type of them has to be made every day. This depends on the analysis of supply of Federal Reserve balances. The system of variable rate tenders is specific for the United States of America. The Federal Reserve System can make outright purchases and sales, repurchase agreements or reverse repurchase agreements. Let us start with the first possibility. Purchases are made much more frequently than sales because the System has to fill the gap in balances resulting from higher demand for Federal Reserve notes. If it comes to purchase, the spectrum of securities is chosen to protect market prices. On the other hand, the Federal Reserve System can sell securities or redeem maturing ones. Repurchase agreements are the second possibility of how to influence Federal Reserve balances. Repurchase agreements are types of operations where the System gains a security and agrees to return the security to its primary dealer on a fixed day (typically overnight). The reverse repurchase agreements are the last possibility. These work in the same manner as repurchase agreements only with opposite roles of a seller and a buyer.

*Discount window lending* serves for two purposes. Firstly, in situation where the supply of balances is lower than desired and it is not suitable to use open market operations further, discount window lending provides increase of supply of balances and helps the federal funds rate in achieving its target value. Secondly,

it serves as a source of additional liquidity. If we look on the volume of discount window borrowing, we can see that it does not reach high amounts. However, it plays a crucial role in case of upward pressures on the federal funds rate. If an unexpected event occurs and a depository institution does not possess enough balances, it can use discount window lending and increase in the supply of Federal Reserve balances ensures that upward pressures on the federal funds rate are limited. All loans provided through this process have to be secured by collateral.

*Reserve requirements* are another useful tool of how to influence the federal funds rate. These requirements precisely state what ratio of liabilities has to depository institutions hold as a reserve. The Federal Reserve System can change minimum reserve requirements or type of liabilities used in this process in order to make open market operations more undoubted (adjustments influence demand side for Federal Reserve balances). Required reserves can be held in vault cash or in the form of non-interest-bearing balances at the Federal Reserve System.

The similar function fulfils *contractual clearing balances*, i.e., creation of a predictable demand for Federal Reserve balances. They serve as a cushion against sudden overdrafts. We should not forget to mention *foreign exchange operations* again.

## **2.3 The crisis and the economic situation in the USA and the euro area**

The crisis began in the United States of America in December 2007 and spread to the whole world roughly one year later in September 2008.

The crisis originated on the U.S. mortgage market. In year 2006, mortgages were granted to risk clients with LTV even higher than 100%. A moral hazard was raised by securitization of these mortgages, which stayed no longer in banks' balance sheets and thus banks did not pay attention to selection of clients of mortgages. Risk of securitized mortgages was underestimated and moreover spread to the whole world. Other aspects (such as failure of regulators) also contributed to the subsequent problems. These collateralised products appeared to be attractive

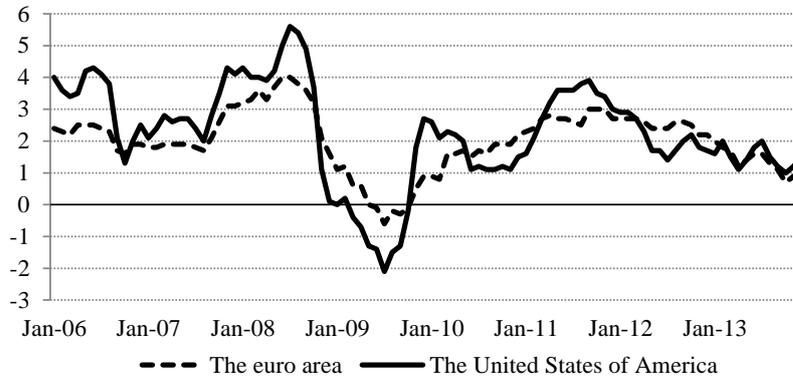
because they carried seemingly a low risk and a high return. But as we know, traded securities carried unspecified risks (much higher than was assessed) and after some time it turned out that these collateralised products are worth much less than previously thought. Banks were not able to sell these problematical assets or use them somehow. Unexpected losses with a fall of one of the most significant American bank, Lehman Brothers, caused a panic on markets. With decreasing housing prices and share prices, many investment and commercial banks in the whole world faced huge losses and in some cases they nearly went to bankrupt. Banks were not able to provide their clients (i.e., corporations and consumers) with enough credit and the global recession emerged.

This crisis also stroke countries and their governments and caused various problems in their policies. Sharp decreases in economic indicators, such as employment, inflation and GDP, became common aspects of that time. The central banks have become the crucial players in helping the financial institutions to handle this difficult time.

Let us look on the most eminent economic indicators. Because this thesis focuses on two major central banks, our target areas are the United States of America and the euro area. To indicate the changes in price stability, we use harmonised index of consumer prices. As we can see in Figure 2.1, the development of inflation has been in the United States volatile but we can see sharp decrease in year 2007. In the euro area, inflation was maintained around 2% level for several years and we can clearly see a huge drop caused by the crisis in 2008.

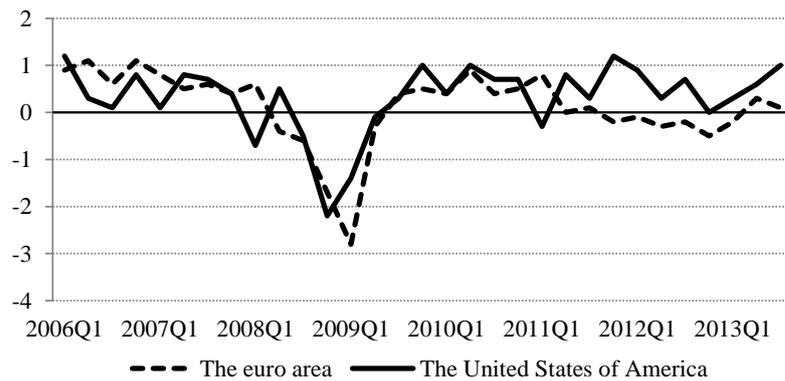
The standard of living is measured by real gross domestic product. A sudden disruption in flow of credit has emerged and producers lowered their production in year 2007 (see Figure 2.2). Many corporations began the fight against their bankruptcy. One of the tools used in their protection were dismissals. This claim is demonstrated in Figure 2.3. In year 2008, many employees were laid off and unemployment rate rose suddenly. As we can see, the crisis presented itself differently in both continents and Figure 2.2 also shows that the United States of America handled the situation better. Both areas after approximately two years in recession swung upward and got to black numbers. However, unlike the USA, the euro area dropped after mild

Figure 2.1: Inflation, percent



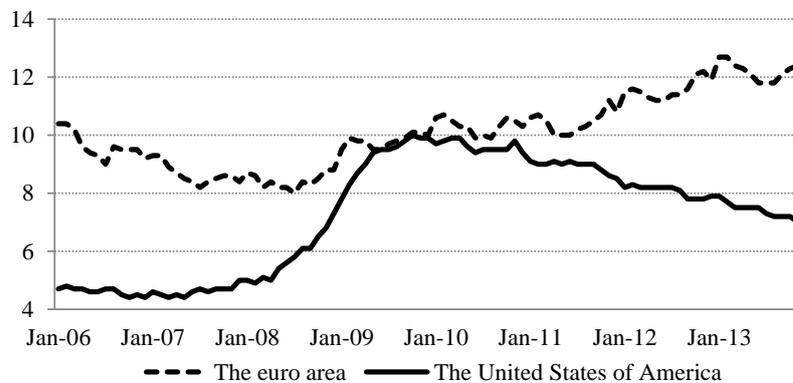
Source: Bureau of Labor Statistics, Eurostat

Figure 2.2: Real GDP growth rate, percent



Source: Eurostat

Figure 2.3: Unemployment, percent



Source: Bureau of Labor Statistics, Eurostat

recovery in red numbers again. The situation on the labour market fits to this situation. The U.S. labour market has stabilised after the sudden increase in year 2008 and the trend seems to be descending. On the other hand, the euro area labour market totters in troubles and the development does not seem positive.

From this can be easily seen that the crisis has presented itself to all inhabitants and worsen their living. The whole world faced many problems reflected in each aspect of their economies. All three figures also illustrate the evolution of the world crisis beginning in the United States of America and then widening to other countries.

## Chapter 3

# Monetary policy and the crisis

Typical procedure of central banks in case of economic problems is to lower the main interest rates. The main interest rates (e.g., the federal funds rate) are the most profound conventional monetary policy instruments. This measure is a tried method of how to achieve an increase in aggregate demand. However, slashing main interest rates is not possible to conduct endlessly. Until the collapse of Lehman Brothers, central banks fought the crisis using conventional monetary policy tools combined with some unconventional ones in order to protect economies from possible troubles. With the collapse of Lehman Brothers, central banks got into difficulties that most of them had never faced. Typical lowering of main interest rates was not sufficient. Gradual lowering of main interest rates caused them to approach zero bound and their value is denoted as technical zero. Therefore, central banks had to resort to unorthodox solution of given situation. They had to use other available monetary policy tools which are not commonly used and help economies to get from the troubles.

In this chapter, we firstly describe unconventional monetary policy tools in general. Then we briefly mention impact of these monetary policy tools on economy. The main part of this chapter is devoted to unconventional monetary policy tools used by the ECB and the Fed. We discuss these two central banks' approaches in two subchapters where we distinguish monetary policy tools before and after the collapse of Lehman Brothers.

### 3.1 Unconventional monetary policy tools

As Bernanke, Reinhart and Sack (2004) suggest, there are two groups containing alternative monetary policy tools. The first group are *communication policies* and the second are *balance sheet policies*. Because we understand unconventionality as every action that was not undertaken by central banks before the crisis but also as altering common monetary policy tools, we can add one another group. This group contains operations such as modified common facilities. We denote this group as *altered ordinary measures*. We briefly discuss all of these three groups in the following paragraphs.

Let us start with *communication policies*. Cecioni, Ferrero and Secchi (2011) mention, that using signalling channel is nothing to be seen as unconventional since this channel is used commonly. The unconventionality resides in the fact that central banks inform public about a practice which is not commonly used by central banks (e.g., commitment to hold interest rates near ZLB for specified time period). Communication policies play a key role in shaping expectations about interest rates development. Since conditions on financial markets heavily depend not only on the current value but also on expectations of future (i.e., expected) value of main interest rates, monetary policy authorities must be careful about their potential actions because each action has a big influence on expectations' development. In case that countries face economic problems and main interest rates are near ZLB, communication policies gain more importance. We could notice that central banks increasingly inclined to a tool called forward guidance during the crisis. The function of this special tool is to make a promise about future development of some important indicator. To be more specific, the central banks pledged to a future path of main interest rates. Commitments can be done in two ways – conditionally or unconditionally. The former option is seen much more often than the latter. Conditional commitment means that some policy action will be undertaken as long as chosen economic event will be met (e.g., unemployment will reach 5% level). On the other hand, unconditional commitment means that some policy action is fixed to certain date. Of course, we may encounter some problems. In a theory, it may be possible

to state appropriate plan for some designed model but in reality we have to face unknown events. Thus, monetary policy authorities should communicate with public on a regularly basis in order to pass as many information as possible.

The second group – *balance sheet policies* – contains two possible types of policies, increasing the size of the central banks' balance sheet known as quantitative easing (QE) and changing composition of the central banks' balance sheet known as qualitative easing (QuaE). These policies are transmitted via portfolio-balance channel.

QE is an operation which consists of expansion of the central bank's balance sheet. This entails on the asset side no changes to the composition but increase of conventional assets<sup>1</sup> and on the liability side increase of the monetary base reflected by increase of reserves (for illustration see Figure 3.1). Goal of this operation is to encourage higher spending and investment in order to keep inflation near to its target value. Bank of England (2013) and Lenza, Pill and Reichlin (2010) describe how QE works. Central banks purchase assets from various institutions (e.g., insurance companies, pension funds) – most of these assets are government bonds. Because of a large size of market, quite enormous amount of assets can be obtained quickly. As assets purchased by central bank become rare in the market, their price increases and yield is thus reduced. These assets are no longer attractive for investors; thus, they substitute these assets for another (such as company bonds). New assets are bought by investors, their price increases and yield decreases in general again. Lower yield means lower cost of borrowing and it leads to higher consumer spending and higher investment. Another way of influencing economy via QE is through accumulation of funds on commercial banks' accounts. Sale of assets leads to higher deposits on commercial banks' accounts and it means that these banks have suddenly more funds available (i.e., they can finance new loans and thus support spending and investment).

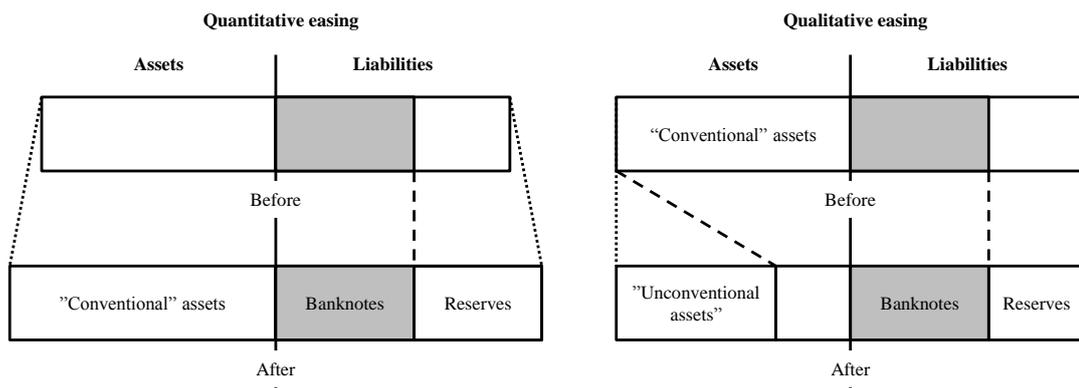
The asset side of the central bank's balance sheet consists of various securities (we mean also distinction in characteristics, such as maturity). QuaE is a special

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<sup>1</sup>By conventional assets we mean those assets that are held by the central bank in ordinary times

operation via which the central bank can influence the supply of these securities. Farmer (2012) describes this operation as follows. Such operation consists of two parts: the first part is purchasing the securities carrying more risk, less liquidity or with longer maturity, and the second part is selling identical amount of less riskier securities, more liquid or securities with shorter maturity. The result of such transaction is a transfer of the risk or liquidity, but the size of the balance sheet remains the same (for illustration see Figure 3.1). In the incomplete financial markets with existing transaction costs, the central bank can influence the characteristics (e.g., risk or liquidity premium) of the securities it purchased via this operation. Thus, such influence can cause a change in overall yields. This unconventional policy tool can contribute to the stabilization of economy and the markets.

Figure 3.1: Quantitative and qualitative easing



Source: Lenza, Pill and Reichlin (2010, p. 300)

We denoted the last group containing unconventional policies as *altered ordinary measures*. This group includes such policies which could be seen in pre-crisis period but in time of the crisis with modified parameters. Such modifications comprise widening of collateral necessary for borrowing, extending maturities or widening the scope of eligible counterparties which can be potentially involved in various facilities. Lenza, Pill and Reichlin (2010) conclude that these modifications can serve for two purposes. First, ordinary measures were altered in order to increase their effectiveness. Such policies can be seen as complements to ordinary monetary policy. Second, ordinary measures were altered because they were no longer able to serve their purpose. Such policies can be seen as substitutes for conventional ones.

## 3.2 Macroeconomic effects of unconventional monetary policy

We briefly discuss macroeconomic impacts of unconventional monetary policy in this subchapter. So far, there is limited quantity of sources available, economists do not have sufficient number of observations at disposal; thus, making conclusions about long-term effects is not appropriate. In spite of this, we can collect available evidence and try to find common features investigated by various authors in order to draft possible impacts.

Curdia, Ferrero and Chen (2012) investigate effect of the Large-scale asset purchase program in the USA. Impact of this special programme on US economy is modest. Effect on GDP is not higher than a half percentage point. Impact on inflation is even lower. We can find interesting ascertainment in this paper. Commitment to carry out Large-scale asset purchase program combined with keeping main interest rate near to ZLB for extended time period leads to increase in unconventional policy effectiveness – these procedures can then lead to increase in GDP growth by 1 percentage point and to a higher increase in inflation.

Peersman (2011) focuses on the euro area. He finds out that unconventional monetary policy tools have effect on consumer prices and such effect is permanent. On the other hand, positive effect on output was recognized only at the beginning of respective unconventional action, i.e., the effect on output is only temporary. However, in comparison to ordinary monetary policy tools, the impact is slower.

Gambacorta, Hoffman and Peersman (2012) examine both the USA and the euro area, and try to compare ordinary and unorthodox tools. Result of this work suggests approximately the same effect of the unconventional and ordinary tools on the output. But significant difference can be seen in effects on prices. The unconventional policies lead to lower increase in prices. Another point of this paper is that the impacts of unconventional policies are approximately the same in the USA and the euro area despite the fact that both central banks used different approaches. This paper found out that the use of unconventional policies was effective, but also stresses that it does not mean the effectiveness in ordinary times (the set-up of the

model is defined specially for time of the crisis).

Labonte (2013) mentions impact of unconventional monetary policy on exchange rates and trade deficit. According to the economic theory, QE should lead to decrease in the real exchange rate value of currency. QE also should decrease long-term interest rates. US or euro area assets are no longer attractive for foreign investors and thus demand for respective currency declines. Because of this lower demand, value of currency drops. This should subsequently lead to improvement in trade deficit. Domestic goods are cheaper for foreigners and foreign goods become more expensive in the two respective areas. Both of these effects should lead to higher exports and lower imports.

Different perspective on unconventional monetary policy gives us Chen et al. (2012). They try to investigate impact of the Fed's monetary policy during the crisis on other countries. According to these authors, the effect differs across emerging and advanced economies. First, the effect of lower US Treasury yields led to increase of equity prices in developed economies. Second, impact of lower yields did not lead to credit growth in developed economies. Third, overall impact of US unconventional policy was larger in emerging economies (e.g., in Hong Kong or Brazil, U.S. QE led to sharp credit increase, significant growth of capital inflow and higher inflation).

To conclude, authors of these papers are rather cautious about possible impacts on economy and thus we should evaluate macroeconomic impact of unconventional monetary policies as modest.

### **3.3 Unconventional monetary policy before the fall of Lehman Brothers**

We first focus on the period preceding the collapse of Lehman Brothers, i.e., the period of time embodying the onset of the crisis. To be more precise, we describe monetary policy undertaken by the Fed and the ECB between August 2007 and September 2008. According to Lenza, Pill and Reichlin (2010), changes in monetary policy up to the collapse of Lehman Brothers pursued two fundamental objectives. First, to ensure sufficient amount of liquidity to banks, which struggled with a

problem of illiquid assets on their balance sheets. Second, to improve conditions in the money market. Monetary policy up to the collapse of Lehman Brothers is characterized by the group of policies denoted as altered ordinary measures. In the following subchapters we gather information from Cecioni, Ferrero and Secchi (2011) and Collignon, Cui and Esposito (2012) and provide new information from valid sources: ECB's and Fed's official websites.

### 3.3.1 Monetary policy of the Fed before the fall of Lehman Brothers

In the USA, reserves from the Fed's balance sheet are conveyed to depository institutions through intermediaries, so called primary dealers.<sup>2</sup> Task of the Fed was to provide primary dealers and also depository institutions with additional liquidity.

The first unconventional measure was establishment of the *Term discount window program* (TDWP). This programme substantially increased the maturity of discount window loans provided to depository institutions up to 90 days and also cut discount rate imposed on the discount window.

Nevertheless, providing liquidity via the discount window was not sufficient. Moreover, many banks became hesitant to borrow through the discount window because they perceived such borrowing as showing their financial weakness. For this purpose, the *Term auction facility* (TAF) was introduced. This facility not only satisfied a desire of many banks but also ensured flow of liquidity to a higher number of counterparties (but still financially sound) against a higher variety of collateral needed for borrowing than via the discount window.

Because USD is a global currency and plays a significant role in various markets, the Fed had to monitor situation in global markets in order to prevent worsening of financial situation in the United States of America via these markets. Because tensions in global market intensified and demand for USD was rising, the Fed had to resort to creation of central bank liquidity swap lines called the *Reciprocal currency*

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<sup>2</sup>In the USA, primary dealers are some banks or securities broker-dealers which have permission to trade directly with the Fed. These are for example BNP Paribas, Barclays or RBS Securities

*agreement* (RCA). These swap lines helped to moderate tensions in foreign banking systems via respective central banks.

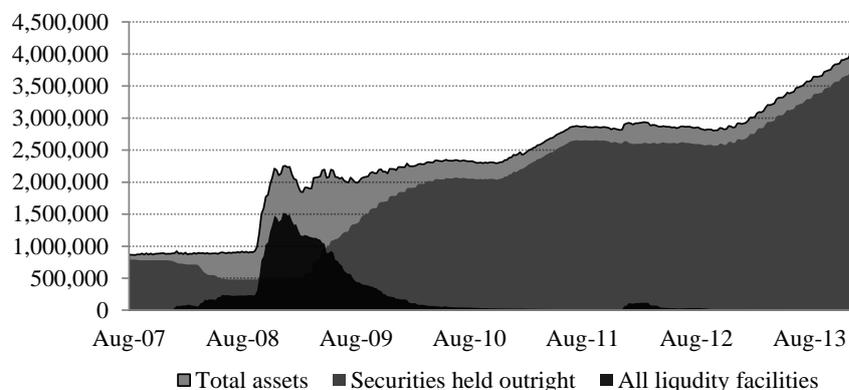
The Fed adopted *Term securities lending facility* (TSLF) in order to improve functioning of financial markets. Through this facility the primary dealers were supplied with Treasury securities against less liquid assets.

With a rising strain in funding markets, the Fed was forced to implement another special programme – the *Single-tranche open market operations program*. Under this programme, primary dealers were allowed to hand in any type of collateral which is accepted in ordinary open market operations.

Since primary dealers had troubles with insufficient amount of liquidity, the Fed established the *Primary dealers credit facility* (PDCF) through which the primary dealers were directly provided with liquidity.

Sudden increase of all liquidity facilities can be recognized in the Fed's balance sheet (see Figure 3.2).

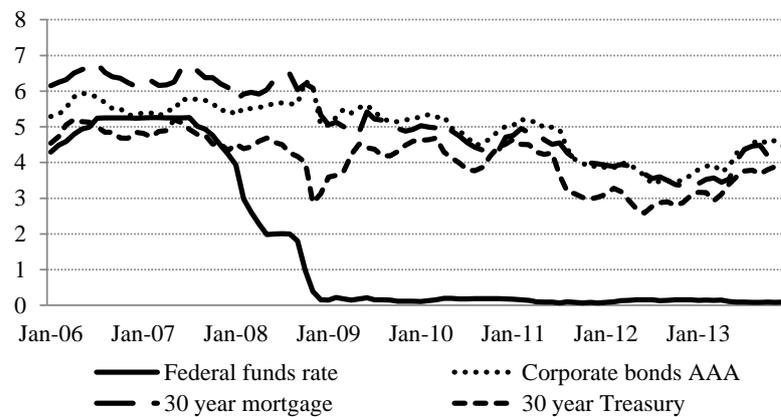
Figure 3.2: Assets of the Fed's balance sheet, USD millions



Source: Federal Reserve

Amid these unconventional activities, the Fed kept on decreasing the Federal funds rate. This in turn led to changes in other interest rates since the federal funds rate serves as a benchmark for other rates (Labonte 2013) (for illustration see Figure 3.3).

Figure 3.3: Selected U.S. interest rates, percent



Source: Federal Reserve

### 3.3.2 Monetary policy of the ECB before the fall of Lehman Brothers

Unlike the USA, the euro area was not forced to implement such a huge number of new programmes and facilities (for more discussion see chapters 4.1 and 4.2). Up to the collapse of Lehman Brothers, sufficient protection against deepening of problems was provided by slightly modified conventional measures.

With the onset of the crisis, it was firstly sufficient to satisfy higher demand for liquidity by modification of *long-term refinancing operations*. With this modification, the long-term refinancing operations were undertaken more frequently and rendered a higher amount of liquidity. With the crisis gaining more strength, the ECB faced higher volatility in demand for additional liquidity. *Fine-tuning operations* were executed in order to decrease a risk of other problems. Using established RCA by the Fed, the ECB provided European institutions with sufficient amount of USD. With the sudden collapse of Bern Stearns, the ECB was forced to launch *supplementary long-term operations*.

Beside these activities, the ECB intensified its communication policy and also continued in decreasing interest rates.

## 3.4 Unconventional monetary policy after the fall of Lehman Brothers

After the collapse of one of the most important banks in the USA, Lehman Brothers, the crisis gained more strength and became more severe. It was obvious that measures taken before Lehman Brothers collapse are no longer sufficient. Therefore, the central banks were forced to improve nonstandard measures and implement new ones. Unconventional monetary policy after the collapse of Lehman Brothers is characterised by a blend of QuaE and QE policies. To describe respective operations we use Cecioni, Ferrero and Secchi (2011) and Collignon, Cui and Esposito (2012) and ECB's and Fed's official websites.

### 3.4.1 Monetary policy of the Fed after the fall of Lehman Brothers

The first new facility launched after the collapse of Lehman Brothers was the *ABCP<sup>3</sup> money market mutual fund liquidity facility* (AMFL). Through this operation were depository institutions supplied with loans aimed to purchase ABCP from money market mutual funds<sup>4</sup> (MMMFs) in order to avoid drops in the ABCP prices which would lead in turn to huge losses for MMMFs.

With an aim to improve conditions of households and businesses, the *Commercial paper funding facility* (CPFF) was established. The CPFF contributed to higher liquidity in the short-term funding markets and thus improved position of households and businesses to acquire credit. The similar objective was pursued by the *Term asset-backed securities loan facility* (TALF). This facility fostered the issuance of AAA ABS, which were backed by various consumer loans (such as student loans) and small business loans, by providing investors with loans.

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<sup>3</sup>ABCP – asset-backed commercial paper is a special type of commercial paper that is collateralized by other financial assets (such as leases, loans)

<sup>4</sup>MMMFs are mutual funds that maintain a huge amount of USD (we speak about trillions of USD) on behalf of businesses, individuals, pension funds, etc. Since MMMFs were severely hit by the crisis, they desperately needed liquidity

At the end of year 2008, the Fed announced that it will support markets for housing by introducing a *programme of asset purchases in the sum of USD 600 billion in agency debt and agency MBS*. By this decision, the Fed launched this programme for the purpose of decreasing cost of credit for house purchases and availability of this credit in general. Moreover, the Fed expected that this action would help to recover the financial markets.

Despite this effort, the U.S. economy did not flourish. Outlooks about bad development in mortgage market and housing market induced the Fed to extend initial programme of asset purchases by purchase of additional agency debt in amount of USD 200 billion and agency MBS in amount of USD 1.25 trillion – commonly referred to as *QE I*. This can be seen in increase of the Fed's balance sheet (please see Figure 3.2). With unemployment still in the highest levels and low output, the Fed intended in the last quarter of 2010 to massively support a restart of the US economy – namely higher spending and investment. This should be ensured by additional purchases of Treasury securities in amount of USD 600 billion, denoted as *QE II* (for illustration see Figure 3.2)

Better conditions in the financial markets and lower long-term interest rates should have been ensured by the *Maturity extension program* (so called “operation twist”). Under this programme, the Fed purchased long-term Treasury securities in amount of USD 667 billion and sold identical amount of short-term Treasury securities. In September 2012, the Fed announced another large scale asset purchases in amount of USD 40 billion per month (*QE III*) for unspecified period with intention to improve economic recovery and keep inflation near its target value. Target assets of this action were again agency MBS and Treasury securities. Decision made in September 2012 was understood as the toughest intervention since the onset of the crisis. In January 2013, the Federal open market committee (FOMC) changed its previous decision about pace of purchases and altered amount of agency MBS and Treasury securities purchases to USD 45 billion per month. During the year 2013, the FOMC changed its decision for several times and the amount of purchased assets climbed to USD 85 billion per month. At the end of year 2013, the Fed announced that its support to the US economy would be declining. This claim was confirmed by

the FOMC decision made in December 2013 to cut asset purchases by USD 10 billion to USD 75 billion per month. The newest report originated in January 2014 affirms intention of declining aid. In February 2014, asset purchases should be diminished by additional USD 10 billion to USD 65 billion due to labour market improvements and faster GDP growth.

Beside these activities, the Fed pursued active communication policy. In addition to announcements about new facilities and large asset purchases, the Fed issued several times an opinion concerning the federal funds rate development. As with the *QEIII*, the Fed changed its decision throughout years. The latest statement of the FOMC originated in January 2014 confirms the previous intentions of the Fed to keep the Federal funds rate at exceptionally low level within a band 0-0.25% as long as the unemployment rate will be above 6.5% level. This intention remains unchanged since the first use of this forward guidance type in December 2012.

To summarize, all the actions mentioned above starting in September 2008 led to an increase in the Fed's balance sheet from USD 1 trillion to more than USD 4 trillion. Thus, its size increased more than four times.

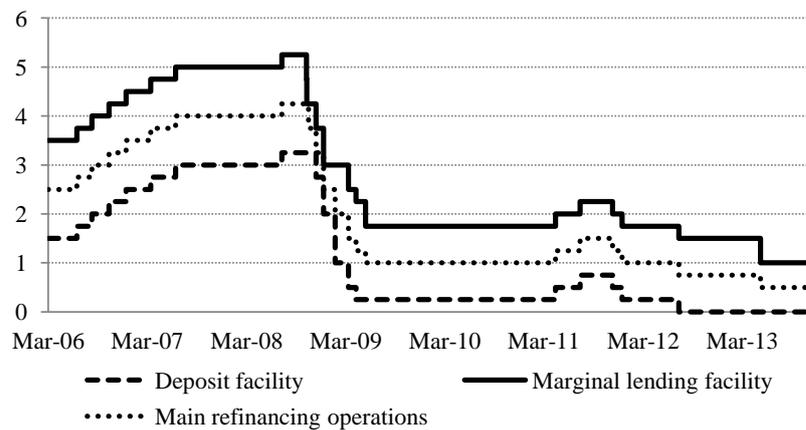
### **3.4.2 Monetary policy of the ECB after the fall of Lehman Brothers**

With more severe crisis, previous policies designed by the ECB were no longer sufficient. Like the Fed, the ECB had to resort to creation of new facilities. Beside this, the ECB continued to lower official rates (see Figure 3.4).

In the last quarter of 2008, the ECB made a decision to conduct all refinancing operations in a special regime – with *fixed rate tenders and full allotment* (FRFA). This modification of its refinancing operations ensured more liquidity to banks making its supply unlimited (the collateral was the only barrier to take part in). More liquidity to banks meant higher amount of loans available for households and businesses and thus more potential credit. In order to make this procedure available for more counterparties, the ECB extended range of collateral eligible for these operations. This operation led to significant increase in the ECB's balance sheet (see

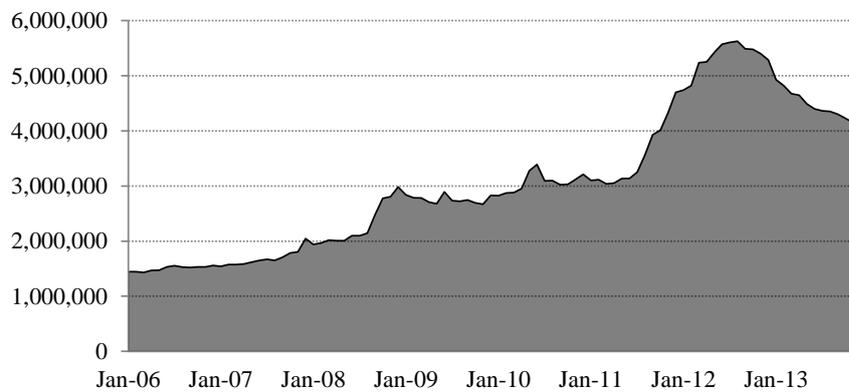
Figure 3.5). Moreover, the ECB used option of the central bank liquidity swap lines with the US Fed and supplied liquidity in USD. After the collapse of Lehman Brothers, the use of these swap lines even intensified.

Figure 3.4: Selected euro area interest rates, percent



Source: ECB

Figure 3.5: Total euro area assets, EUR millions



Source: ECB

Another step of the ECB to fight the crisis was an extension of existing refinancing operations for additional three rounds in duration of 12 months – we can denote this measure as *12 months FRFA refinancing operations*. Expected outcome of these operations was to give banks more confidence and thus increase amount of credit available for households and businesses.

Markets for private and public debt securities were before the crisis one of the most important markets for banks providing them with a lot of funds. The crisis hit these markets severely and thus it was crucial to restore these market segments.

Because of this, the *Covered bonds purchase programme* (CBPP) was implemented. This operation consisted of outright purchases of EUR 60 billion. With the same aim (i.e., to improve conditions in bond market segment), the CBPP2 was established in October 2011. The CBPPs also served as stabilizers of monetary policy transmission.

As was mentioned in chapter 2, the crisis had also a huge impact on countries and therefore on public deficits. In the first quarter of 2010, troubles emerged also in financial markets and even in some government bond markets. The *Securities markets programme* (SMP) was implemented to fight these problems and to prevent other segments of financial markets from potential widening of this contagion. The ECB launched purchases of private and public securities via this programme. At the beginning of this programme (May 2010), the purchases were frequent. As conditions in these market segments were restoring, activity of purchases declined. Unfortunately, the ECB was forced to implement again purchases of larger amounts of private and public securities due to unclear development in government debt markets in August 2011.

In order to improve overall conditions in euro money market, enhance bank lending to private sector and restore liquidity in the euro area banking system, the ECB conducted *main refinancing operations* for two times, *long-term operations* in length of 12 months, long-term refinancing operations in length of 3 months and 36 months (for two times), and *fine-tuning operations*. Through two 36 months long-term refinancing operations the ECB provided EUR 489 billion in the first round and EUR 530 billion in the second (these two rounds began in December 2011 and March 2012 and can be seen in increase of balance sheet in figure 3.5).

In August 2012, the ECB announced that a new programme would be launched. Unlike previous SMP programme, for a new action called *Outright monetary transactions* (OMT) there is not specified date of termination and no quantitative limit. These transactions are conducted via secondary sovereign bond market and should protect respective transmission of monetary policy. These operations were also fully sterilized. This programme includes one interesting feature – countries could use these special transactions only in case that they have entered EFSF/ESM.

# Chapter 4

## Differences and their reasons

From the previous chapter, it is obvious that the Fed and the ECB used during the crisis different measures in order to handle this tough time. Crucial question is: why we can find between these two central banks such apparent differences? To answer this question, we devote this chapter to comparison of both distinct approaches and explanation of reasons which drove them.

### 4.1 Different perspectives on nonstandard measures

The first and the most fundamental difference between monetary policy conducted by the ECB and the Fed during the crisis is the perspective on unconventional monetary policy measures. We could acquaint two distinct comprehensions.

According to Cour-Thimann and Winkler (2012), the ECB (in contrast with the Fed) understands unconventional monetary policy measures as a complement to its standard operations. On the other hand, the Fed sees its nonstandard measures as a substitute to its existing monetary policy measures. This means that unconventional monetary policy tools compensated dysfunctional interest rate policy during the crisis.

The ECB uses three main interest rates to express its monetary policy stance in non-exceptional times. The main indicator representing the ECB's stance is

the rate on MRO, the two remaining rates – rate on deposit facility and rate on marginal lending facility – have a supporting role. However, signalling its stance via the MRO rate was not sufficient during the crisis and thus two remaining rates began to play a crucial role. Moreover, since the result of the ECB's actions was excess of liquidity in the financial system, rate on deposit facility gained more importance because overnight deposit facility is only available solution for liquidity deposit. This means that for the ECB it was sufficient to employ additional already existing tools to express clearly its monetary policy stance. Nonstandard measures were mainly conducted in order to ensure transmission of monetary policy and thus formed “only” complement to its standard interest rate targeting policy.

However, unconventional measures played a different role on the other side of the Atlantic Ocean. The Fed expresses its monetary policy stance in non-exceptional times via the main interest rate – the federal funds rate. During the crisis, a value of the federal funds rate was gradually diminished to a level denoted as technical zero and thus this central bank was unable to adjust it further. Thus, a function of this main interest rate with respect to expressing monetary policy stance faded out. The federal funds rate was no longer viewed as sufficient for this purpose and the Fed had to resort to a new solution. It chose for this purpose non-standard monetary policy measures which began to behave as substitutes to standard interest rate targeting policy at the zero lower bound.

There is another field in which the perspectives of the two central banks are distinct. As we have seen in previous chapter, a number of new facilities established and a number of new operations conducted by the ECB and the Fed differed diametrically. Reason for this is a diverse view on aims of unconventional monetary policy measures. For the ECB it was sufficient to establish not so numerous number of new operations in order to stabilize financial system. Increase in liquidity provided by the ECB was caused by a higher demand of banks which wanted to protect themselves or get out from problems. On the other hand, goals of unconventional monetary policy measures of the Fed were not only to stabilize the financial system but also to boost the economy. This can be also proved by numerous extensions of various programmes and operations which did not bring desired outcome in their

first round of application. Hence, the Fed ensured liquidity not only because of higher demand of financial institutions but also because of its willingness.

## 4.2 Approaches before the collapse of Lehman Brothers

As we could notice in chapter 3, the approaches of the ECB and the Fed were different before the collapse of Lehman Brothers as well as after it. In this subchapter, we deal with analysis of banks' responses in period before the collapse of Lehman Brothers.

Quantity of new programmes and facilities which were established by the ECB and the Fed in the first period of the crisis is notably apparent. On side of the Fed we could recognize various new programmes and facilities, such as TDWP, TAF, RCA or TLSF. On the other hand, for the ECB, it was sufficient to implement modified versions of its standard measures.

Reasons of these distinct responses are several. The first of them is severity of the crisis. The crisis originated in the USA in the last quarter of year 2007 and several months later widened to the European continent. However, the euro area was hit less severely in that period. The crisis was gaining strength as more of banks were getting into troubles which proved in later times. For this reason, it was not necessary in the euro area to implement so many facilities and programmes and thus it was sufficient for the ECB to use ordinary measures. The situation was different on the other side of the Atlantic Ocean. The Fed faced more severe problems and had to intervene in more market segments and thus implemented more programmes than the ECB did.

Other reason is connected to liquidity transmission to financial system which had large impact on central banks' behaviour. Cour-Thimann and Winkler (2012) describe liquidity transmission in the euro area and the USA. The main role in the euro area is played by banks. Liquidity is distributed to whole financial system through banks. Approximately 1,500 banks have access to direct participation in the ECB's operations. Through this vast amount of banks, the ECB is able to supply

the whole financial system with sufficient amount of liquidity very quickly without severe modifications of parameters of ordinary measures. On the other hand, the Fed distributes liquidity to financial system using partnership with primary dealers.<sup>1</sup> The Fed pumps liquidity to whole financial system through these counterparties. With respect to the limited number of these institutions, it is harder to supply financial system with sufficient volume of liquidity in a short period. Since the USA faced large problems and the demand for liquidity was enormous, the Fed had to resort to solution which would allow higher and more effective liquidity supply. Due to this reason, the Fed implemented new programmes which widened terms of borrowing for counterparties and thus allowed faster liquidity transmission.

### 4.3 Timing of nonstandard measures

Another difference that we can find between the Fed's and the ECB's attitude toward nonstandard measures taken during exceptional time is timing of their actions.

To explain why central banks conducted their special operations in different time periods, we should return to the second chapter of this thesis describing fundamental features of both central banks. In this chapter, we could read about mandates. Let us remind important passages from the respective treaty and law. The main target of the ECB is precisely defined in Article 105(1) of the Treaty on European Union<sup>2</sup> as follows:

*“The primary objective of the ESCB shall be to maintain price stability. Without prejudice to the objective of price stability, the ESCB shall support the general economic policies in the Community with a view to contributing to the achievement of the objectives of the Community as laid down in Article 2.”*

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<sup>1</sup>Primary dealers are chosen institutions which are allowed to trade with the Fed directly. Relationship between the Fed and primary dealers is specified in the Primary Dealers Act. Number of these primary dealers is quite small – 21

<sup>2</sup>Article 105 of the Treaty on European Union is in the newest version of the Treaty classified as article 107

On the other hand, main goal of the Fed is specified in the section 2A of the Federal Reserve Act as follows:

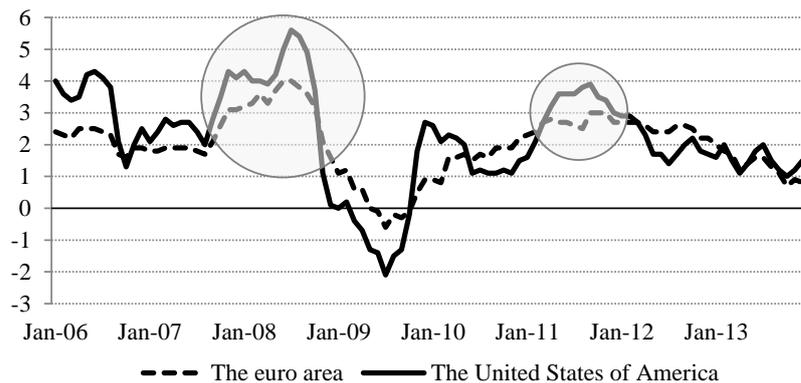
*“The Board of Governors of the Federal Reserve System and the Federal Open Market Committee shall maintain long run growth of the monetary and credit aggregates commensurate with the economy’s long run potential to increase production, so as to promote effectively the goals of maximum employment, stable prices, and moderate long-term interest rates.”*

As we can see, there are clear distinctions. The ECB has only one main goal and it is price stability. This goal is given the most priority and other goals, such as support of economic performance, are secondary. Contrary to this, the Fed has the so called dual mandate. It has to simultaneously pursue goals regarding price stability and employment.

Let us analyze why these two central banks have absolutely different mandates. Roots of this difference can be found in the history. Both areas (the USA and the most important member of the euro area – Germany) faced huge economic problems in the last century. To be more specific, in the case of the USA we mean Great depression which erupted in 1929 and hyperinflation in the Weimar Republic between years 1921 and 1924 in the case of Germany. Both of these events are historical extremes. Hyperinflation in the Weimar Republic devaluated German mark very severely (one U.S. dollar was worth approximately 4,000,000,000,000 German marks) (Ludwig von Mises Institute 2006). On the other hand, the USA faced in 1930s different problems – high unemployment (even 25%), GDP deeply below 0% level (Temin 1994). Since these two extremes had large impact on economies, experiences from these events were used in formulation of the ECB’s and the Fed’s mandates (since Germany was very strong economy, its priorities were mirrored in common treaty when setting up the European Union). German angst of high inflation was reflected in main goal of the ECB – price stability. On the other hand, since the Great depression caused problems regarding a wider range, the Fed set its two goals – price stability and also economic performance of the USA.

We are familiar with these concepts now and we can turn our attention to Figure 4.1. We can see two interesting periods in this graph. The first one is related to year 2008 and the second to year 2011. The banks of our focus conducted different types of operations in these two time periods. The Fed conducted during the first period following operations: TDWP, TAF, RCA, TSLF, Single tranche OMO programme, PDCF and AMFL, and during the second period: QEI and Operation twist. On the other hand, the ECB conducted in the first period only modified conventional operations such as 6-month operations and special term refinancing operations, and in the second period MRO, CBPP and 3-month refinancing operations. During these two periods, the ECB issued under its operations much less liquidity to financial system than the Fed did.

Figure 4.1: Inflation, percent



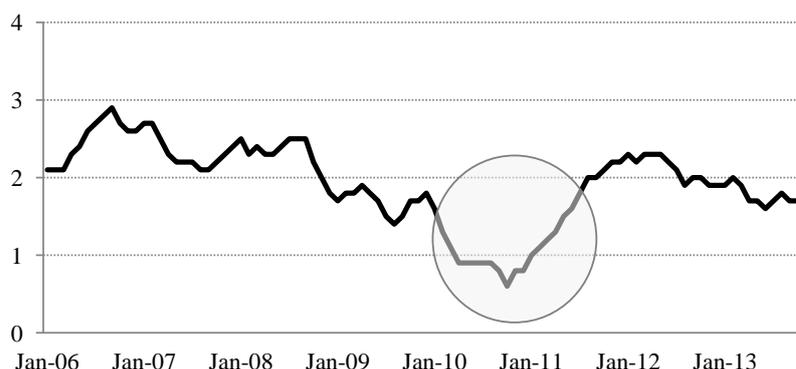
Source: Bureau of Labor Statistics, Eurostat

Possible explanation of these two different attitudes can be seen in different mandates of these central banks. As we can see in Figure 4.1, inflation in our two specific periods was rising and moving away from its target value. Since priority of the ECB is to maintain price stability, the ECB was more concerned about possible inflation development and thus did not conduct so many actions. On the other hand, the Fed implemented higher number of operations because the Fed had to focus also on unemployment development and respective measures were partially designed to support employment.

Moreover, there can be found another difference between the Fed and the ECB. As we have discussed earlier, both central banks pursue inflation targeting. However,

the Fed focuses also on a distinct measure of inflation. The Fed traditionally places strong emphasis on core inflation<sup>3</sup>. Since this indicator began to deviate from its 2% target level in 2010 (see Figure 4.2), the Fed was not reluctant to implement its operations and tried to push core inflation value near to its target.

Figure 4.2: U.S. core inflation, percent



Source: OECD

#### 4.4 Government bonds – habitualness vs. novelty

Rehbock (2013) mentions a difference regarding government bonds purchases, however, he does not explain what stands behind this difference. A common feature of monetary policy conducted by the Fed is purchases of government bonds. This technique had been used before the crisis and it did not change during the crisis. The only difference with respect to pre-crisis period was increase in the amount of government bonds purchased. On the other hand, the ECB did not use this procedure before the crisis. Reasons are two articles of the Treaty on European Union of 1992 – 101<sup>4</sup> and 103<sup>5</sup>. Article 101 of the Treaty on European Union says:

<sup>3</sup>Core inflation is a special type of inflation indicator which does not include items susceptible to volatile prices (such as food or energy)

<sup>4</sup>Article 101 of the Treaty on European Union is in the newest version of the Treaty classified as article 123

<sup>5</sup>Article 103 of the Treaty on European Union is in the newest version of the Treaty classified as article 125

*“Overdraft facilities or any other type of credit facility with the European Central Bank or with the central banks of the Member States (hereinafter referred to as “national central banks”) in favour of Union institutions, bodies, offices or agencies, central governments, regional, local or other public authorities, other bodies governed by public law, or public undertakings of Member States shall be prohibited, as shall the purchase directly from them by the European Central Bank or national central banks of debt instruments.”*

Article 103 of the Treaty on European Union says:

*“The Union shall not be liable for or assume the commitments of central governments, regional, local or other public authorities, other bodies governed by public law, or public undertakings of any Member State, without prejudice to mutual financial guarantees for the joint execution of a specific project. A Member State shall not be liable for or assume the commitments of central governments, regional, local or other public authorities, other bodies governed by public law, or public undertakings of another Member State, without prejudice to mutual financial guarantees for the joint execution of a specific project.”*

The ECB followed these rules strictly until the onset of the sovereign debt crisis. During this crisis, a few countries got into difficulties and they were not able to help themselves. Some government bonds markets faced severe problems – supply of these bonds far exceeded demand leading to enormous yields. High yields meant for governments difficulties since they could not afford such expensive financing. Because of this reason, the ECB made a decision to implement programmes such as SMP or OMT in order to help them and rectify failure of the transmission mechanism.

From the two paragraphs of the Treaty on European Union mentioned above result that legality of SMP and OMT is questionable. Looking on official communication of the ECB, we found out, that the aim of these programmes is to ensure proper transmission of monetary policy. Since the crisis impaired proper functioning

of monetary policy transmission in government bond markets, its intervention was indispensable move to repair this defect. The ECB argued that its role is not only ensuring price stability but also proper transmission of monetary policy and these operations are designed precisely in accordance with this.<sup>6</sup> However, purchases of government bonds have among others impact on their prices (and therefore interest rates) and financing of government debts. These purchases of government bonds decrease their yields and create better conditions for debt financing. This can be understood as fiscal policy rather than monetary policy and fiscal policy is beyond the scope of the ECB. Moreover, such outright purchases by the ECB finance directly government debts and this is contradictory to the wording of the Treaty on European Union. These are the arguments the critics of OMT operate with. The main critics are German economists led by a chief of Bundesbank who was the only one member of the ECB Governing Council who voted against OMT implementation. The criticism of OMT was so loud that the ECB was sued for breaching its powers and violation of the Treaty on European Union.

Let us mention few reasons describing why the ECB had to resort to implementation of these programmes. The crisis during the past several years presented itself in various forms. We can say that the crisis in the USA had in all years similar characteristics. On the other hand, in the euro area the crisis showed its various faces.

The crisis has evolved since year 2007. Initially, the crisis emerged on the US mortgage market, then transforming to banking crisis and other types. However, not both areas of our interest had faced all of them. We can say that the crisis in the USA since 2007 had the same characteristics – high risk in the financial sector, insufficient amount of liquidity, collapses of banks etc., and the Fed dealt with the same problems. On the other hand, the euro area experienced different issues. At the beginning, the euro area faced the same problems as the Fed did. However, the crisis translated into other form – the sovereign debt crisis – during 2010. Because

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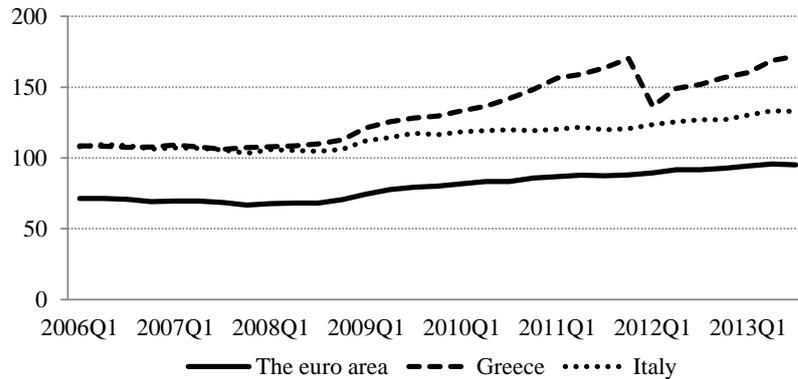
<sup>6</sup>For more information see Introductory statement to the press conference (with Q&A), 6 September 2012, the European Central Bank, <http://www.ecb.europa.eu/press/pressconf/2012/html/is120906.en.html>

of this, the ECB implemented special programmes (such as SMP or OMT) in order to help governments handle these tough times.

The crisis which resulted in the Europe in the sovereign debt crisis has a lot of factors which contributed to such evolution. E.g., one possible factor has according to us its roots in the formation of the euro area. To be more specific, we mean Maastricht convergence criteria which served as a requirement for the euro area entry. Faults which were made stem from both sides – the side of the EU and also the side of national governments. As we know, in some cases the fulfilment of the convergence criteria was only based on temporary conditions that did not prove sustainable in longer term, or even based on manipulation of figures. This means that countries which used such procedure were not able to bear duties stemming from the euro area membership and were not prepared to become a member. It came very quickly to the breach of the Stability and growth pact. Countries maintained high debt levels (see Figure 4.3), which created unhealthy environment and became more predisposed to various shocks and disruptions. On the other hand, the EU contributed to this by its inconsistency in controlling economic conditions of respective countries. The result of such behaviour was creation of environment which entails huge risk of predisposition to various problems and with inability to defend itself against external shocks. With the onset of the crisis, very little was sufficient to get these countries into troubles. Since several European countries faced problems with high indebtedness already before the crisis, during the crisis they got into even more severe troubles. They were not able to refinance their debt anymore due to low rating and high borrowing costs. Because of this, the ECB had to intervene and help them.

To summarize, whilst for the Fed it is common to purchase government bonds, for the ECB it was novelty and first experience, also given the strict prohibition of monetary financing in the Treaty. Therefore, only the sovereign debt crisis has forced the ECB to go in the direction of purchasing government bonds. However, despite the ECB's effort, amount of government bonds purchased compared to the Fed's purchases of these bonds is much smaller.

Figure 4.3: Government debt of selected countries, percent of GDP



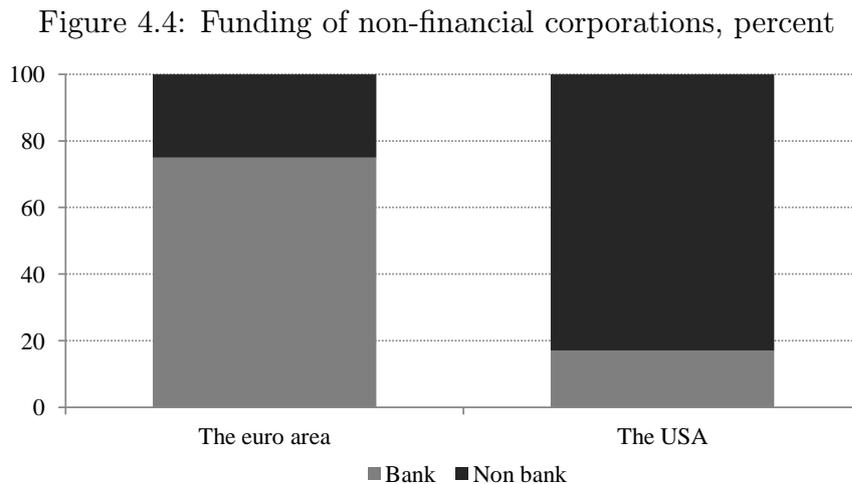
Source: Eurostat

## 4.5 Outright purchases vs. lending

The ECB and the FED resorted to use of various unconventional measures during the crisis. However, there is a clear difference in operations conducted by these two central banks. The Fed launched programmes such as *QEI*, *QEII* and *QEIII*. These programmes have the same feature – massive outright purchases. On the other hand, the ECB conducted all its operations as collateralized lending.

The reason why these two distinct approaches were used resides in a difference of financial systems (for illustration see Figure 4.4). Cour-Thimann and Winkler (2012) describe differences in these two systems. The financial system in the USA is market-based oriented. Assets play in the USA key role for households and every change in asset prices has significant impact on wealth. The same role is played by equity prices which have large impact on firms' investment. Fawley and Neely (2013) recount the chain of reactions resulting from outright purchases. Outright purchases conducted by the Fed made some types of assets scarce and pushed their price up. This means that households and firms try to find other alternatives and thus rebalance their portfolios. This has in turn large impact on overall economic situation. Thus, such measures are appropriate for financial system which is market-based oriented. On the other hand, the financial system in the euro area is bank-based oriented and collateralized lending is more appropriate.

Another possible explanation of this distinct behaviour can be found in the past experience and cultural roots. Central bank of Germany – the Bundesbank – had



Note: Shares in consolidated debt outstanding in 2012Q1

Source: Cour-Thimann and Winkler (2012), p. 5

large influence on the development of the ECB. Many features characteristic for the Bundesbank were transferred to the ECB. One of these features is securities purchases. But this instrument never reached importance like it did in the USA. There are concerns (especially in Germany) that security purchases can lead to government financing by the central bank (security purchases would practically mean government bond purchases, because government bond market is the most suitable for this – it is the most liquid and the deepest one). Moreover, outright purchases are subsequently in public connected with high inflation. As we have discussed in subchapter 4.3, German experience with hyperinflation in 1920s left deep imprint on their minds and thus German nation is aware of any significant movement of inflation from its target value. Since price stability is main goal of the ECB, angst of this undesired effect exceeds use of outright purchases.

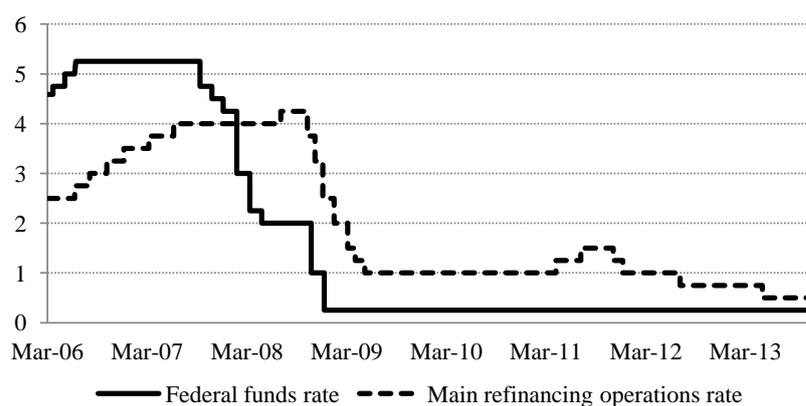
## 4.6 Main interest rates steering

So far, we dealt in this chapter with comparing different approaches regarding unconventional monetary policy. Nevertheless, we can also find differences regarding standard monetary policy tool. As we know, since values of main interest rates approached ZLB, the central banks had to resort to nonstandard measures. These measures played a crucial role in our analysis so far. However, we should also pay

attention to the main interest rates development. Let us focus on the federal funds rate in case of the Fed and the rate on MRO in case of the ECB.

As we can see in Figure 4.5, the main interest rates developments were distinct. The first clearly visible difference is that the Fed resorted to interest rate cuts sooner than the ECB did and with more aggressive stance. The federal funds rate value was before the crisis higher than the rate on MRO. With the onset of the crisis, the Fed resorted to truculent steering of the federal funds rate and decreased its value starting somewhere around 5% to value near ZLB very quickly. On the other hand, attitude of the ECB was different. It may seem that approach of the ECB was more aggressive but it decreased the rate on MRO “only” by approximately 3% to value around 1% level. The second difference is in maintaining the main interest rates from the beginning of year 2008. As we can see in Figure 4.5, from the beginning of year 2009 onwards, the Fed maintained value of the federal funds rate near ZLB with only slight deviations in terms of hundredths. On the other hand, the ECB maintained value of the rate on MRO around 1% but we can notice mild upswing and then fall to ZLB in 2011. However, with a shift to a system with excess liquidity, market rates decreased under ECB’s main interest rate. Thus, this difference is partly apparent.

Figure 4.5: Federal funds rate and MRO rate, percent



Source: ECB, Federal Reserve

The first possible explanation regarding timing of actions may be an evolution of the crisis. As we know, the crisis began in the USA and after several months moved to the euro area. We can say that whole U.S. financial system was in unsteady

situation. Thus, the Fed was forced to act sooner than the ECB. Since conditions in the euro area were not depressing at that time and only few banks were under pressure, the ECB postponed its intervention.

Let us analyze why the Fed resorted to more aggressive attitude to monetary policy than the ECB. A good reason for this behaviour could be an economic projection about future values of main indicators (such as GDP or unemployment) as Wyplosz (2010) suggests. Estimated data for years 2008 and 2009 by the ECB stemming from years 2007 and 2008 respectively support this hypothesis (for illustration see Table 4.1). Estimated values of GDP and unemployment substantially deviated from real numbers. E.g., the ECB expected GDP for year 2009 to be positive. GDP was deeply below zero in reality (approximately around -4%). This indicates that the ECB provided with these positive values made a decision not to conduct such intensive decreasing in the main interest rate and thus the ECB did not resort to such sharp cuts in the MRO rate. On the other hand, the Fed was about its forecasts more cautious. Thus, the Fed showed more aggressive stance to the federal funds rate cuts.

Table 4.1: ECB's and Fed's macroeconomic projections, mean point estimates

<b>Real GDP growth rate, percent</b>						
	07Q1→08	07Q4→08	Real 2008	08Q1→09	08Q4→09	Real 2009
<b>ECB</b>	2.1	2.1	0.4	2.0	0.3	-4.4
<b>Fed</b>	3.0	2.5	-0.3	2.8	-0.2	-2.8
<b>Unemployment rate, percent</b>						
	07Q1→08	07Q4→08	Real 2008	08Q1→09	08Q4→09	Real 2009
<b>ECB</b>	7.3	7.0	7.6	6.7	8.0	9.6
<b>Fed</b>	4.8	4.9	5.8	5.1	7.4	9.3

Source: ECB, Federal Reserve

Another reason why the ECB and the Fed held the main rates on different levels and explanation of the aggressiveness of interest rates cuts could be already mentioned issue in one of the previous subchapters. The reason is different mandates of

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both central banks. As we know, the ECB gives priority to one goal and that is price stability. On the other hand, the Fed had to focus on more goals simultaneously. Since the situation on labour market did not look well and future development indicated high values of unemployment, the Fed cut the federal funds rate near ZLB very quickly in order to prevent economy from even higher values of unemployment than in reality were. The only concern of the ECB was price stability. It was sufficient to decrease the MRO rate only to value around 1% in order to achieve its goal. Unfortunately, with the crisis gaining more strength, the ECB was forced in 2011 to decrease the MRO rate to value near ZLB.

# Chapter 5

## Conclusion

With the onset of the crisis, the Fed and the ECB were forced to resort to implementation of nonstandard monetary policy measures since the most profound monetary policy tool – main interest rates – reached values near zero lower bound and additional decreasing of these main interest rates was not possible. The crisis also evolved over time and on both continents – North America and Europe – presented itself in different forms. Thus, the central banks had to face different problems over time. Moreover, since characteristics of respective financial systems, economies and central banks are different, the Fed and the ECB approached solving problems in a different manner.

Evidence on monetary policy conducted by the Fed and the ECB during the crisis is fragmented. We can find various papers concerning behaviour of the Fed and the ECB during the crisis; however, separate papers contain different information. Main contribution of this thesis resides in an overview of nonstandard measures conducted by the Fed and the ECB during the crisis and primarily in comparison of two different approaches and stating reasons of respective behaviour.

In this thesis, we identify six main differences between monetary policy conducted by the Fed and the ECB during the crisis. (1) The most fundamental difference is the perspective on nonstandard monetary policy measures. The ECB understands nonstandard measures as a complement to its already existing monetary policy tools. On the other hand, the Fed sees nonstandard measures as a substitute and this means that these measures compensate dysfunctional interest rate policy (a value of the

federal funds rate was diminished to ZLB and thus the Fed was not able to adjust it further, a function of this main interest rate with respect to expressing monetary policy stance thus faded out). We also detect another aspect influencing perception of nonstandard measures. The ECB sees nonstandard measures as a mean to achieve stability in financial system. On the other hand, nonstandard measures are for the Fed a mean to achieve stability in financial system and to boost performance of the U.S. economy as well. (2) The second strong difference can be recognized in a period before the collapse of Lehman Brothers. The Fed implemented more programmes and facilities than the ECB did. This was caused by distinct severity of the crisis and different approach to liquidity distribution. (3) Timing of the measures conducted during the crisis also differs. The Fed acted even in case that inflation was moving appreciably away (i.e., above) from its target value, in comparison the ECB was more restrained. Reason standing behind this is different mandates of the central banks and in case of the Fed emphasizing core inflation as opposed to headline inflation. (4) With the onset of the sovereign debt crisis in the euro area, the ECB resorted to purchases of government bonds. This was a novelty for the ECB. On the other hand, the Fed is used to purchasing of government bonds even from the pre-crisis period. (5) The fifth difference resides in a manner in which the central banks provide liquidity – the Fed used outright purchases of securities, while the ECB collateralized lending. These approaches were selected because of the structure of financial systems – U.S. financial system is market-oriented, financial system of the euro area is bank-oriented. Another important aspect is related to the “angst” of higher inflation which is connected to outright purchases. (6) The last difference that we can find is in main interest rates steering. The Fed was more aggressive than the ECB. The first possible explanation can be severity of the crisis. Other aspects that contributed to this difference are distinct mandates of the Fed and the ECB and the exaggerated optimism about economic projections about future values of main macroeconomic indicators in a case of the ECB.

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