

University of Economics in Prague
Faculty of Finance and Accounting
Responsible institute: Banking and Insurance
Study Field: Finance



Thesis Title
**Analysis of European Central Bank policies in times
of European debt crisis**

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Year of thesis defense: 2014

Declaration on word of honor

I declare on word of honor that I independently elaborated the diploma thesis “Analysis of European Central Bank policies in times of European debt crisis” and listed all used literature and the background material in the enclosed list of literature.

In Prague 5th June 2014

Special Thanks

I would like to thank my thesis supervisor Ing. David Havlíček for his invaluable help, great support and insightful advices throughout the thesis creation process. I would also like to thank my sister Jana, my brother Jozef and mum for their tremendous support throughout the years of my study and their faith in me. Lastly, I would like to thank my best friend Dominika for always being there for me and being an amazing friend.

Anotace:

Americká finanční krize způsobila finanční krachy na rozličných světových finančních trzích. Nestabilní pozice evropských bank, úvěrová krize a zmrazení trhů měly silný dopad na evropský trh a následně vedly k evropské dluhové krizi v roce 2009. Některé evropské země přestaly být schopné splácet své státní dluhy, čímž donutily Evropskou Centrální Banku vstoupit na trh jako hlavní článek pro vyřešení krize Eurozóny. Mezi její hlavní politiky patřily neomezené nákupy dluhopisů, levné půjčky bankám, snížení požadavků na povinné bankovní rezervy a snížení úrokových sazeb. Práce objasní redefinování role Evropské Centrální Banky na Evropském trhu po roku 2012 s důrazem na zesílení robustnosti Evropských trhů a posilování konkurenceschopnosti Evropy na mezinárodních trzích. Cílem práce je analyzovat efektivnost monetární politiky ECB na základě zjištění celkových nákladů záchranných balíčků a celkového dopadu na hrubý domácí produkt, inflaci a míru nezaměstnanosti v Eurozóně. Práce se bude taktéž snažit vysvětlit, proč americké náklady na záchranu měli více pozitivní dopad na americkou ekonomiku ve srovnání se situací v Eurozóně. Práce na konci shrne efektivnost programů ECB z dlouhodobého hlediska a poukáže na výhody a nevýhody jak evropského, tak amerického přístupu k vyřešení globální finanční krize.

Klíčová slova: Záchranné programy, Evropská Centrální Banka, monetární politika

JEL klasifikace: E52, E58, E61, E62

Annotation:

The U.S. financial crisis has compelled financial meltdowns on diverse global financial markets. Unsettled position of European banks, credit crunch and market freeze severely affected European market and consequently led to European sovereign-debt crisis in 2009. Some European countries became incapable of paying off their government debts which forced European Central Bank to step in as a major party to resolve Eurozone crisis. Main policies consisted of unlimited bond purchases, cheap loans to banks, cutting banks' reserve requirements and lowering of interest rates. The thesis will explain the redefinition of European Central Bank role on post-2012 European Market to maintain strengthening of the European robustness and augmenting the Eurozone competitiveness on international markets. The thesis aim is to analyze the effectiveness of European Central Bank policies by determining their total costs and overall impact on the Euro area gross domestic product, inflation and unemployment rate. The thesis will strive to explain why American bailout costs had more positive impact on U.S. economy compared to the situation in Euro area. In the end, the thesis will summarize the efficaciousness of ECB programs in the long run and conclude the advantages and disadvantages of both the European and the American approach in resolving the global financial crisis.

Keywords: Bailouts, European Central Bank, monetary policies

JEL Classification: E52, E58, E61, E62

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Introduction

Since the breakout of global financial crisis in 2008, the Euro area markets have changed vigorously. Severely hostile market conditions, dysfunctional segments, distrust into banking sector, lending freeze, and triggering fiscal debts as well as other factors have deeply shaken the overall Euro area economic and financial stability. In order to face the liquidity obstacles, the sovereign debt crisis and possible economic downturn, European Central Bank has decided to step in and intervene on the markets.

In the first part, the thesis introduces the status and role of European Central Bank and its redefinition based on the new economic climate. On macroeconomic level, many countries were not able to fight the increasing sovereign debts seeking help from European Central Bank. In addition, unfavorable financial situation has damaged the European Central Bank effectiveness of the monetary policy transmission mechanism. Thus, the European Central Bank has introduced a new post-crisis role adapting to the current financial situation.

Second part illustrates the various simultaneous solutions to the European Debt Crisis. Firstly, European Central Bank's new open market operations and other policies are presented as a new way of providing additional liquidity to financial markets, boosting the banking sector lending and strengthening the monetary policy transmission mechanism. In addition, the thesis continues with the deeper description of the liquidity situation development in the Euro area and studies its influence on the bank lending conditions and credit availability. Secondly, new regulation mechanisms are introduced to diminish future risks of moral hazards and public bailouts. Lastly, guarantee and bailout programmes of other institutions such as International Monetary Fund and European Union are described as a financial help to individual countries and their banking sectors.

Third parts consists of empirical research quantifying the total amount of bailout costs as well as their impact on macroeconomic indicators such as gross domestic product, inflation rate and unemployment rate. In order to measure the actual economy performance, the Forecast-Actuals Analysis and least squares regression analysis model were used. Then the same approach was applied to the economy of the United States of America in order to find a relation between their total amount of bailout costs spent and the macroeconomic indicators.

Lastly, the thesis summarizes the efficiency of spent bailout costs and the effectiveness of European Central Bank monetary policies. After that, the European and American approaches are compared. The conclusion sums up which approach was more effective in which way and how.

1. The European Central Bank

The Maastricht Treaty of 1992 has mandated the establishment of the European System of Central Banks which later developed into the system of the European Central Bank and 27 participating national central banks. The European Central bank has a role as central bank over the eighteen member states of Eurozone. In order to pursue Maastricht's goal of forming a European Economic and Monetary Union, the ECB commenced its monetary policy over the Euro area in January 1999, two years prior to the usage of the euro currency.

The main objective of the ECB is to maintain price stability through the single monetary policy in countries using the euro currency. Its main instruments consist of managing key interest rates and controlling the monetary supply in order to control inflation rates below or close to two percent over the medium term. The ECB is the sole issuer of Eurozone bank notes and bank reserves and assists national central banks in issuing bank notes. The ECB is in charge of Eurozone's foreign currency reserves to maintain stable exchange rates.

The ECB consists of three decision-making bodies. The General Council is made up of the president and vice president of the ECB and all the European Union national central bank governors. Its main role focuses on the transitional issues of euro adoption and the General Council will be dissolved after all EU member states accept the euro currency. The Executive Board of the ECB is accountable for the decision making, the day-to-day running of the bank and the proper implementation of monetary policies. European Council appoints of the ECB president, vice president, and four other members of the Executive Board. The Governing Council consists of the six Executive Board members and eighteen national central bank governors or the euro area. The Governing Council meetings focus on decision making on monetary policy for the euro area.

1.1 The new definition of central banks' policies

Based on the recent financial crisis, nowadays role of Central banks (CB) has evolved into two main parallel, yet independent tasks which are being a stability guardian and a crisis manager. The new role of central banks strives for both monetary policy and financial stability.

Central banks have a critical role in stabilizing crisis by newly introduced monetary policies that connect real economies and financial markets in Euro area. Based on the direct connection to financial markets, the central bank has a strong instrument to influence financial crises. The CB's advantages are an independent decision making and operational framework policies. On the other hand, the CB's goals are restricted in terms of effect and competence. The primary role of central banks should stay pursuing the price stability and in times of crises, the CB should not be overburdened with too many different goals. The CBs can react by maintaining short-term stability on markets, but structural economic problems should be addressed to institutions others than CB. (Alessi, 2012)

1.2 The evolution of central banks' roles over the time

The redefinition of central banks' role has been developing over time, and by the 1980s, main factors in forming central banks' purviews were stagflations and two oil price crises. Academics reached a conclusion that central banks can no longer pursue both stable inflation and low levels of unemployment rate. First conclusion was to maintain price stability. The European Central Bank decided that their primary goal was maintaining steady inflation goal over the medium term. Secondly, central banks are supposed to be legally and operationally independent institutions. This idea has been translated into the law over the time.

During the 1990s and early 2000s, Jackson Hole consensus limited the role of central banks to participate on financial markets only to fix financial imbalances and maintain the inflation forecasts. The banks were supposed to act only „ex-post“ to avert deflationary and

instability risks (such as the dot-com bubble), since „ex-ante“ policies seemed to be too-complicated-to-pursue.

In 2005, the European Central Bank already observed underpricing of risk as well as strong credit growth. While central banks proved to be efficient in guarding the price stability successfully, they weren't effective enough to stabilize total economic situation in Euro area. In 2007, the financial crisis commenced by Lehman Brothers bankruptcy and later on transformed into the global crisis underlined by global economies' recession. The lack of interbank market liquidity and high market volatility later on reflected in higher banks' risk premia. The main concern of central banks and governments was questioning the auto-correcting mechanism of markets which led to questions about the new role of central banks. (Berend, 2013)

2. New ECB policies in times of European sovereign crisis

In 2010, the European debt crisis progressed into another level by weakening bank's balance sheets, decreasing banks' lending capabilities and causing economic downturn. The fiscal support also led to unfavorably high government deficits. In times of unstable private and public finances, the European Central Bank has decided to pursue new options in optimizing the markets.

One of the main reasons was weakened and less effective transmission of common monetary policies (such as lowering the policy rates in order to lower the market rates) based on failing bank lending system and negative businesses' and households' credit situation. Another reason to step in was the significance of bank loan financing in European area. Two-thirds of economic activity is financed by external financing via banking sector. (Asmussen, 2012) Dysfunctional banking sector could deepen the overall economic situation. As a result, the European Central Bank alongside other institutions has introduced new policies in times of the financial crisis.

Table 1: Bailout and Guarantee programmes for Euro area

Entity	Policy	Programme
ECB	Open Market Operations	Special Long-term Refinancing Operations Covered Bond Purchase Programme 1&2 Securities Market Programme Outright Monetary Transactions
ECB	Additional Policies	Collateral Extensions Reserve Cuts Main Refinancing Interest Rates TARGET2 System
ECB	New Regulation mechanisms	Single Supervisory Mechanism Single Resolution Mechanism Deposit Insurance Harmonization
EU	Guarantee Programmes	European Financial Stability Facility European Stability Mechanism
EU/IMF	Bailout Programmes	Greek Bailout 1&2

Source: created by author

2.1 Liquidity-providing Open Market Operations

European Central Banks's main market operations focus on providing liquidity to the market and during the crisis they consisted of

- **Main refinancing operations (MROs)** with one-week maturity – manage to control short-term interest rates, supervise the liquidity levels and monitor the monetary policies' influence in Eurozone.
- **Longer-term refinancing operations (LTROs)** with three-month maturity – supply additional longer-term liquidity to the financial markets.
- **Two Special-term refinancing operations (STROs)** with maturity of 36 months.
- **US dollar liquidity-providing operations** with one-week or three-month maturity
- **First covered bond purchase programme (CBPP)** – from July 2009 to June 2010
- **Second covered bond purchase programme (CBPP2)** – from November 2011 to October 2012
- **Securities Market Programme (SMP)** – intervened in debt markets from May 2010 to February 2012 and was terminated in September 2012. Provided liquidity is being gradually absorbed by weekly fixed-term deposits collections.
- **Outright Monetary Transactions (OMT)** – outright open market operations which operate in secondary sovereign bond markets to ensure proper monetary policy transmission and singleness since September 2012. (European Central Bank, 2014a)

2.1.1. Long-term refinancing operations policies

The two special **long-term refinancing operations policies** (LTROs/STROs) were established to add needed liquidity to bank institutions with an extended 36-month maturity.

In December 2011, The Governing Council of the European Central Bank has introduced standard fixed rate tender procedure with full allotment lending €489 billion to 523 bidding banks. Tender's payment term is 1'134 days, however, counterparties are allowed to repay any size of allotted amount at any time under the condition of giving one week's notice to their responsible national central bank. The tender also gave an option to transfer allotted

finances from the previous Longer-term refinancing operation from December 2011 with duration of one year. (European Central Bank, 2011a) This offer was accepted by 123 bidders moving €45.7 billion to the new STRO. (European Central Bank, 2011b)

Picture 2: Standard Tender Longer-Term Refinancing Operation 1 Allotment

Reference Number: 20110149	Tot Amount Allotted: 489190.75 mn
Transaction Type: REVERSE_TRANSACTION	Tot Bid Amount: 489190.75 mn
Operation Type: LIQUIDITY_PROVIDING	Tot Number of Bidders: 523
Procedure: STANDARD_TENDER	
Tender Date: 21/12/2011 11:15:00	
Start Date: 22/12/2011	
Maturity Date: 29/01/2015	
Duration (days): 1134	
Auction Type: FIXED_RATE	

Source: http://www.ecb.europa.eu/mopo/implement/omo/html/20110149_all.en.html

In February 2012, second tender has been introduced with 1092-day duration and it has provided additional €529.5 billion of liquidity to 800 bidders. (European Central Bank, 2011c)

Picture 3: Standard Tender Longer-Term Refinancing Operation 2 Allotment

Reference Number: 20120034	Tot Amount Allotted: 529530.81 mn
Transaction Type: REVERSE_TRANSACTION	Tot Bid Amount: 529530.81 mn
Operation Type: LIQUIDITY_PROVIDING	Tot Number of Bidders: 800
Procedure: STANDARD_TENDER	
Tender Date: 29/02/2012 11:15:00	
Start Date: 01/03/2012	
Maturity Date: 26/02/2015	
Duration (days): 1092	
Auction Type: FIXED_RATE	

Source: http://www.ecb.europa.eu/mopo/implement/omo/html/20120034_all.en.html

About €1 trillion in lending has helped to provide liquidity to European banks in trouble, particularly the banks that were unable to borrow money on interbank market. The

three year maturity has helped to provide needed security for banks to ameliorate the monetary policy transmission and essentially to avert possible major credit crunch. (Asmussen, 2012)

2.1.2 Covered Bond Purchase Programme

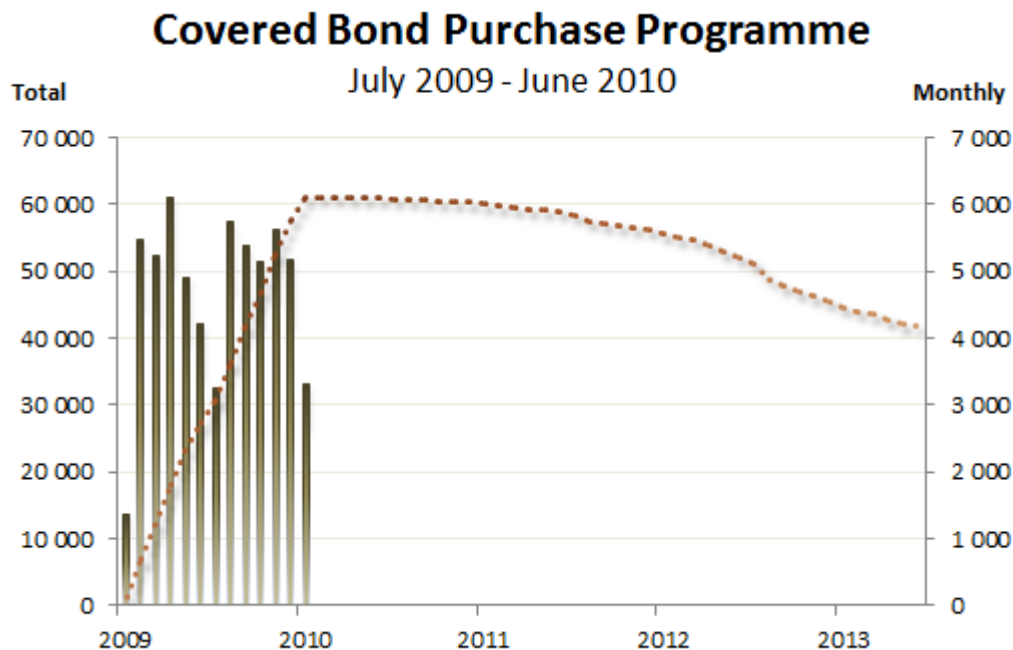
In July 2009, the president of ECB Jean-Claude Trichet commenced Covered Bond Purchase Programme where the National Central Banks alongside with European Central Bank were purchasing outright eligible covered bonds. The purchases were taking place gradually based on the current market conditions and the monetary policy needs. The main goals of purchase programme were

- ensuring continuous decreasing of money market term rates,
- improving funding terms for credit institutions and enterprises,
- supporting credit institutions in expanding their lending to client market and
- adding liquidity to the troubled private debt securities market.

The programme was purchasing covered bonds denominated in Euro in the primary and secondary market based on the eligibility of counterparties. (European Central Bank, 2009a) Covered bonds should be denominated in Euro, minimum rating of 'AA', with minimum issue size of €500 million (€100 million in exceptional cases) and consisting of assets containing exposure to private/public entities. (European Central Bank, 2009b) The nominal target size of purchases was €60 billion. The Purchase Programme has been terminated in June 2010 due to reaching its nominal target amount. The assets are being held by the Eurosystem until reaching maturity. (European Central Bank, 2014b)

The programme succeeded to recover issuing of covered bonds in the primary market and additional liquidity helped Euro area credit institution with their funding situation. Covered bond purchases had an overall positive effect on bond yields by decreasing the spreads 12 basis points while the highest declines were monitored in Germany and Spain. In certain markets, the positive effects were cancelled out by the strong upward pressures on bond yields. (European Central Bank, 2011d)

Graph 4: Covered Bond Purchase Programme



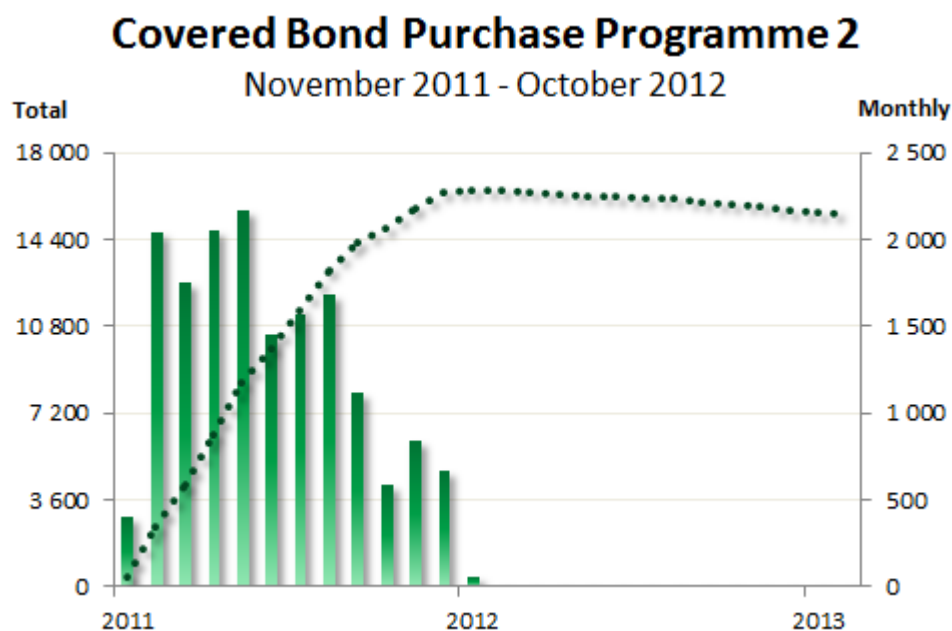
Source: created by author Data: <http://www.ecb.europa.eu/stats/monetary/res/html/index.en.html>

2.1.3 Covered Bond Purchase Programme 2

The second Covered Bond Purchase Programme was initiated in November 2011 by the successor president of ECB Mario Draghi. Purchase objectives continued in the goals of precedent programme mainly focusing on improving funding conditions of credit institutions and accelerating their lending to the client sector. Eligibility requirements have been downgraded to covered bond's minimum issue size of €300 million, minimum rating of 'BBB-', having a maximum remaining maturity of 10.5 years at the time of security purchase and containing assets exposed to private/public entities. (European Central Bank, 2011d)

Covered bonds had to be denominated in Euro and purchases took place in the primary and the secondary markets again. Nominal target amount of collected bonds was originally estimated at €40 billion until October 2012. (European Central Bank, 2011e) However, at the programme's termination only €16.4 billion has been demanded by the credit institutions. (European Central Bank, 2014c)

Graph 5: Covered Bond Purchase Programme 2



Source: created by author Data: <http://www.ecb.europa.eu/stats/monetary/res/html/index.en.html>

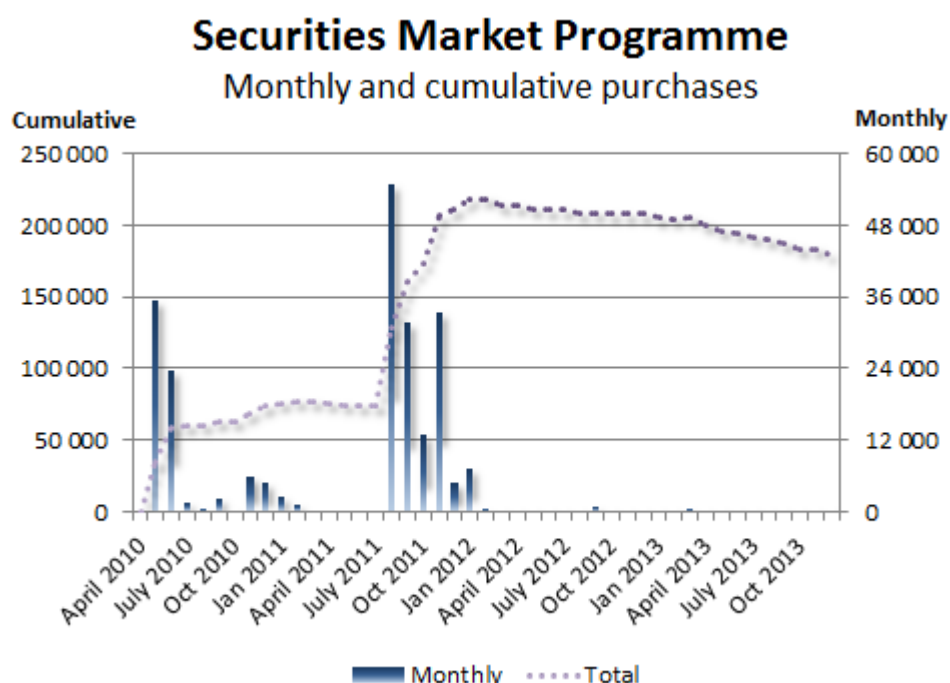
2.1.4 The Securities Markets Programme

In May 2010 under the direction of former ECB president Jean-Claude Trichet, the temporary **Securities Markets Programme** (SMP) was announced due to severe tension in particular markets weakening the monetary policy transmission mechanism (medium-term price stability). The National Central Banks alongside with European Central Bank were implementing interventions in both the primary and secondary debt securities market where the public/private debt instruments had to be denominated in Euro. (European Central Bank, 2010a)

The public and private debt securities purchase program was addressing the improvement of ECB's monetary policy transmission mechanism as well as ensuring depth and liquidity at momentarily dysfunctional securities market segments. (European Central Bank, 2010b) In order to omit influence on overall Eurosystem liquidity levels, weekly liquidity-absorbing operations are carried out to sterilize cumulated volume of SMP transactions processed the previous week. (European Central Bank, 2014b) Therefore, the

additional liquidity is stored back in reserves rather than in market loans avoiding multiplication process and averting inflationary pressures. (European Central Bank, 2012a)

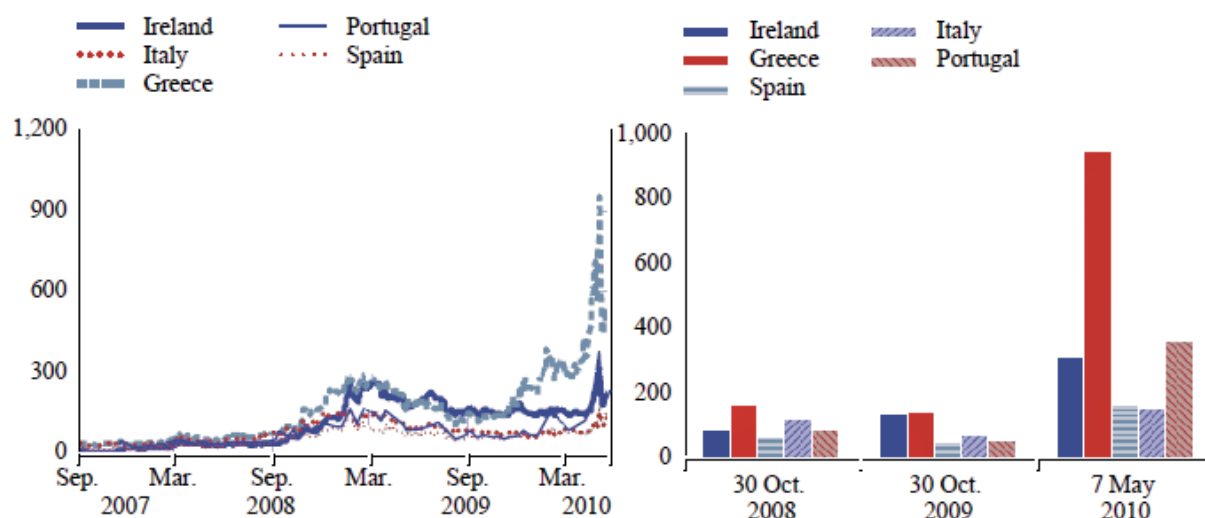
Graph 6: Securities Market Programme purchases



Source: created by author Data: <http://www.ecb.europa.eu/press/pr/wfs/2014/html/index.en.html>

Securities Market Purchases took place in two main periods – from May 2010 to July 2010 and August 2011 to January 2012. The programme was a response to the significant widening of Greek ten-year sovereign bond spreads as well as the increase of five-year credit default swap premia raising concerns regarding the long-term solvency of Greece. In April 2010, Standard & Poor's has downgraded Greek rating causing massive selling of Greek bonds. In May 2010, ten-year government bond yield spreads have peaked at record levels of 730 basis points creating concerns about possible spillovers to other European sovereign issuers; especially Ireland, Portugal, Spain and Italy. (European Central Bank, 2010c) The Securities Market Programme responded in two stages in order to stabilize higher yield volatility.

Graphs 7 & 8: Ten-year sovereign bond spreads (vis-à-vis Germany)

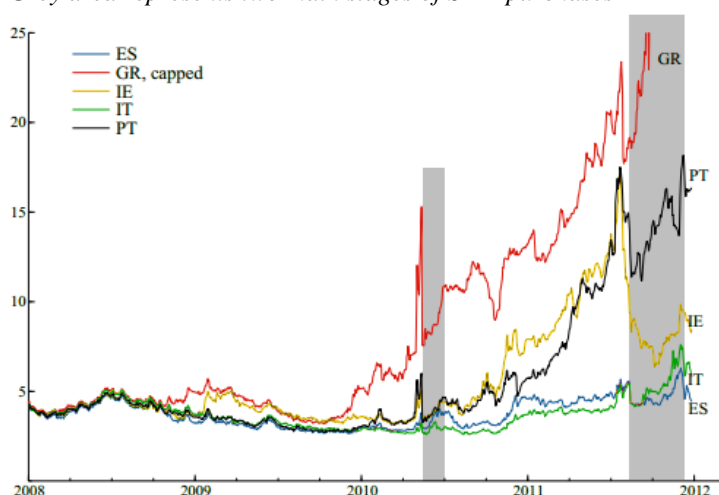


Source: <http://www.ecb.europa.eu/pub/pdf/mobu/mb201006en.pdf>

According to the Eser and Schwaab's analysis of Euro area five-year sovereign bond market, €1 billion of purchases had a successful effect of -1 to -2 basis points for Italian and -17 to -21 basis points for Greek bond yields at five-year maturity. (Eser, Schwaab, 2013)

Graph 9: Five-year sovereign bond levels in Euro area

Grey area represents two main stages of SMP purchases



Source: <https://www.ecb.europa.eu/pub/pdf/scpwps/ecbwp1587.pdf>

On the other hand, the programme failed to appeal to the governments to initiate necessary structural reforms and recovery of public finances. Even though the purchases were a noticeable part of ECB's balance sheet, they did not address stabilizing of markets in a satisfactory way. Moreover, the negative side effect caused the ECB to unintentionally

become the preferred creditor in relation to other market creditors. Consequently, the SMP was terminated by the Governing Council in 2012.

2.1.5 The Outright Monetary Transactions Programme

Despite the SMP purchases, the particular market segments failed to return to their pre-crisis functioning and the troubled market situation still prevailed. The main negative market trends in year 2012 could have been identified as

- continuously very high aversion of non-residing investors to demand sovereign bonds of certain European countries,
- severe yield volatility and illiquidity problems in bond markets and
- possible scenario of redenomination risks.

These factors were translated into higher risk premia and their wider volatility which negatively constrained the effectiveness of monetary policies transmission mechanism. Moreover, monetary policies were differently affecting different parts of Euro area.

As a result, the new ECB policy has been introduced called **Outright Monetary Transactions** (OMT). The new programme of unlimited bond purchases was established by the Governing Council in September 2012 to ensure the monetary policy transmission mechanism evenly throughout the Euro area. The main target was to regain trust and increase consistency of the euro area in the long-term by purchasing the bonds of highly indebted countries to decrease their borrowing costs.

The strife for directly supporting European governments into new structural reforms and fiscal consolidations has been omitted from the policy target. In order for country to be eligible for bond buys, it must first ask for bailout help to the Eurozone rescue fund, the European Stability Mechanism and it has to agree on strict budgetary and structural conditions. Therefore, the programme targets governments' structural and fiscal reforms indirectly. (Asmussen, 2012) Bond buys are oriented to push bond prices up and interest yield rates down in the secondary market segments. Afterwards, the governments can take

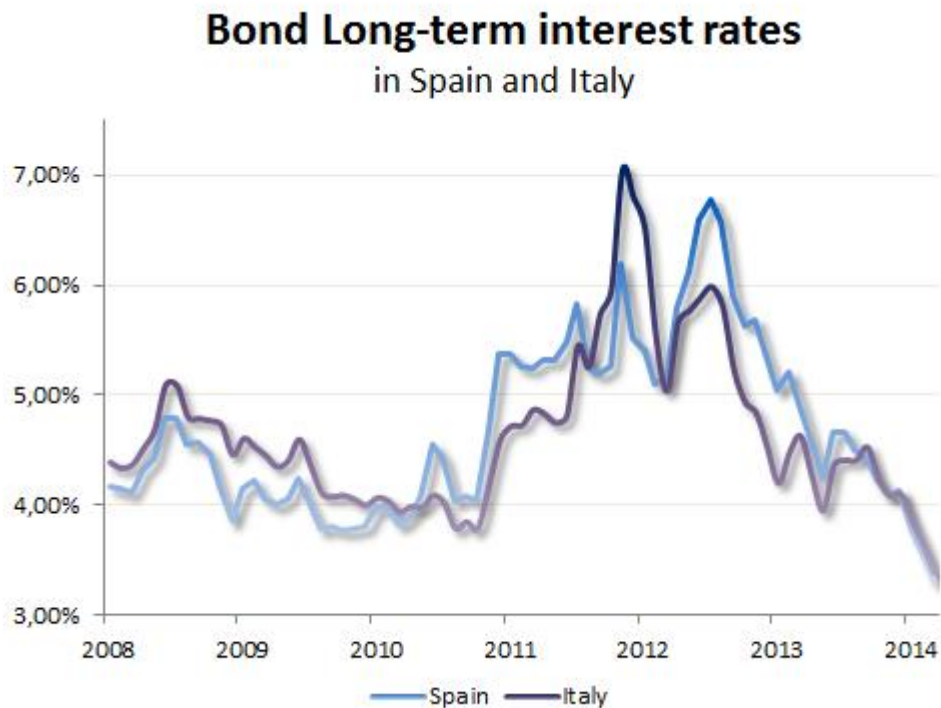
advantage of the lower yield rate by selling current bonds to pay off the old ones. (Associated Press, 2012)

The ECB pursuit aimed at long-term fiscal, structural and macroeconomic stability and prevention of moral hazard in the markets. Main elements of the Outright Monetary Transactions programme are:

- The programme is fully compatible with European law, mainly the prohibition of monetary financing. The programme is designed particularly for the secondary bond markets and does not conflict with the ECB's primary target to maintain medium-term price stability. The reports of aggregate holding purchases with their market values are published weekly, while individual country reports are released each month to increase the information transparency.
- Main requirement for the unlimited bond purchases is country's strict adherence to European Financial Stability Facility/European Stability Mechanism and prior preference of EFSF/ESM primary market purchases.
- In order to avert former complications of ECB becoming a preferred creditor, the programme supports the same treatment as purchases by private creditors, depending on the bond terms. The programme is striving for protecting countries and their sovereign to maintain easy access to financial investors' capital.
- The special focus is on the shorter end of the yield curve, especially on sovereign bonds with the one-to-three-year maturity. The monetary policy of managing short-term market rates aims to remove market disorders and reduce increased market volatility.
- The Governing Council monitors policies' efficiency via large set of indicators based on which it reconsiders the further continuation of interventions.

Based on the improved programme's terms and omitted previous flaws of Securities Market Programme, the unlimited bond purchases mechanism is an upgrade of the ECB's role as a crisis manager and a stability guardian with its main pursuit of stabilizing euro in the entire Euro area and decreasing risks of redenomination. (Asmussen, 2012)

Graph 10: ten-year bond yields for Spain & Italy



Source: created by author Data: <http://www.ecb.europa.eu/stats/money/long/html/index.en.html>

The policy has successfully delivered decreased spreads on bond yields without spending single Euro. The yield levels have declined in entire Euro area and for Italy and Spain, the indicators have returned to their levels of summer 2011. Lending conditions to banks and firms have been eased and corporate bond spreads lowered significantly opening funding capital to creditworthy companies in both the financials and non-financial sector. The diversity of funding costs in Euro area has diminished and the amount of bank deposits by Euro area residents have increased by €210 billion between 2012 and 2013. (Cœuré, 2013a)

2.2 Additional Policies of European Central Bank

2.2.1. Extension of collateral requirements and reserve cuts

The **milder collateral requirements** were operating in two main channels. First channel pursued lowering of the rating threshold for particular Asset-backed securities (ABS). Secondly, National central banks were temporarily permitted to acquire additional performing credit claims as collateral when meeting eligibility requirements. (European Central Bank, 2011f) Easier conditions of collateral extensions were as followed:

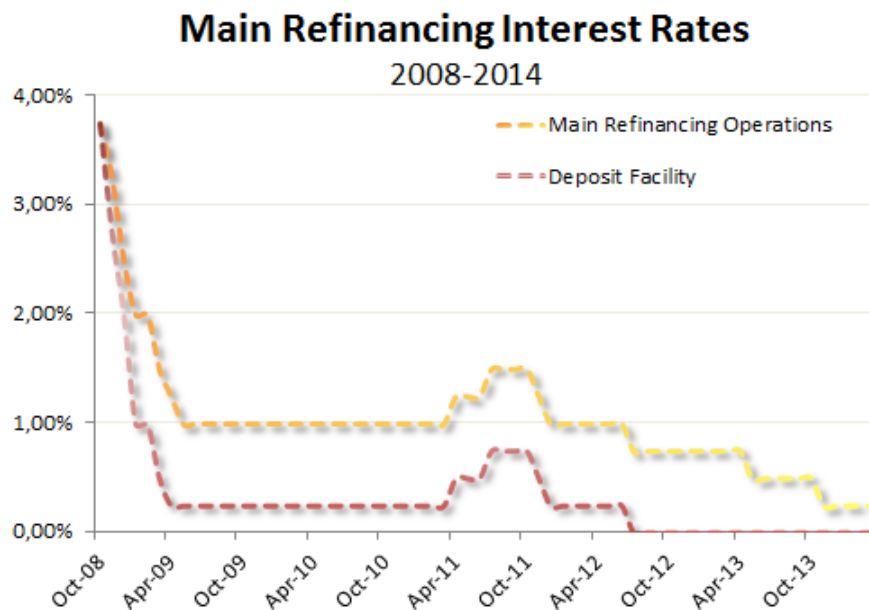
- Collateral can be denominated in other currencies if issued and held in the Euro area
- Acceptable minimum rating threshold of ABS securities and other marketable and non-marketable assets was downgraded to 'BBB'. Rating threshold was ignored in case of certain sovereign-backed assets. Assets of ABS securities had to be backed at residential mortgages or loans to small and medium enterprises.
- National Banks can temporarily accept additional credit claims if specific requirements are met. (European Central Bank, 2013a)

Moreover, the ECB has lowered **the reserve ratio from 2% to 1%** as the system of reserves was not as beneficial as during the pre-crisis period. On January 18th, the reserves limit dropped from €207 billion to €103.3 billion causing additional capital of €103.7 billion to become available for the banks to invest elsewhere. (European Central Bank, 2014c)

2.2.2 European Central Bank Interest Rates

Former president of the ECB Jean-Claude Trichet's main policy was **reversing low interest rates** adjusted during the crisis period. In second quarter of 2011, Trichet has raised the main refinancing operations interest rate two times from 1 percent to 1.5 percent. Various economists such as Paul Krugman and Nouriel Roubini have criticized such move and warned about a possibility of deepening the Eurozone crisis. Trichet's defense was based on the primary mandate of the European Central Bank which was maintaining price stability.

Graph 11: European Central Bank Main Refinancing Interest Rates



Source: created by author Data: <http://www.ecb.europa.eu/stats/monetary/rates/html/index.en.html>

In November 2011, Italian Mario Draghi was appointed as a new president of the ECB. Conservative economists expressed doubts about Draghi's persistence in following Trichet's regime. Draghi opined his commitment to Trichet's policies. However, two days after being in the office he continuously started **lowering the interest rates** from 1.5 percent to 0.75 percent in July 2012. Nonetheless, the undesirable side effect was worsening of the economic situation in various countries including Germany. (Alessi, 2012) In May 2013, the main refinancing rate for fixed rate tenders has decreased to 0.5 percent and in November 2013, it has reached a record low of 0.25 percent. (European Central Bank, 2014d) The refinancing rate is the main instrument of the ECB for borrowing credit to European banks and highly affects the interest rates of lending on inter-bank market as well as bank lending to businesses and customers.

In July 2012, the overnight interest rate for the deposit facility has been decreased to zero. The main purpose was to support inter-bank lending rather than leaving banks' capital at an unprofitable rate at the deposit facility. (Associated Press, 2012)

Consequently, a discussion has emerged about the effect of low interest rates on financial system's exposure to risk and about the sensitivity of the balance sheets to duration risk. Benoît Cœuré, Member of the Executive Board of the ECB, explains 'the risk-taking

channel’ of monetary policy and warns about the connection between low interest rates environment and the search for yield that could lead to riskier behavior by financial institutions and overall financial instability.

Cœuré defines four arguments of the high-risk channel:

- The **asset substitution** derived from standard portfolio theory suggests that lower yield on safe assets will decrease their weight in banking portfolios. Banks will look for the new equilibrium of risk-adjusted returns on risky and safe investments, leaving a lower share of safe assets in bank portfolio.
- Secondly, **financial organizations with long-term commitments** to their clientele (for instance insurance companies or pension funds) need to generate the promised yield on their liabilities. High rates allow such institutions to invest in safe assets. On the other hand, lower rates can push the ‘search for yield’ into riskier assets in order to meet the required yield on their liabilities.
- Thirdly, if the institutions follow **constant or pro-cyclical leverage ratios**, boosting of asset prices through monetary easing will consequently increase banks equity. ‘The leverage channel’ forces banks to increase their demand for assets based on the fall in leverage leading to a more fragile bank system.
- Lastly, repeated **liquidity provision to financial institution in trouble** can set the expectation of relevant policy responses to negative shocks in the future, which has been defined as so-called ‘Greenspan put’. Even though providing the liquidity can be necessary in crisis, it can cause price signals distortion when financial participants willing to take on ex ante extra risks relying on central banks to step in in times of financial problems.

Therefore the continuous liquidity support can create another market downturn. Since banks are borrowing short and lending long, are operating under asymmetric information and are partially restricted to hedge against interest rate risk, banking institutions might carry more risk than is socially optimal due to their inability to internalize the loss. The ECB goal is to focus on reversing the interest rates in the future as well as to improve more transparent and consistent framework for bank resolution such as new ‘bail-in’ regulations with limited exemptions and a clear pecking order.

Over the course of last decades, extremely easy monetary conditions have triggered various financial crises, particularly the bond market bubble in 1994, the LTCM collapse in 1998, the New Economy bubble in 2001, and the 2009 global financial crisis. Even though increasing short-term interest rates might have ambivalent effects, the recent data suggests a possible change in policy. Since 2010, the markets activity have been declining and volumes of trading in overnight interbank loans are historically at a very low level, 60 percent below pre-crisis levels at certain markets. Moreover, very low interest rates may force the money market funds and other financial intermediaries out of the market and may elevate bank's funding costs based on reduced supply of available funds. (Cœuré, 2013b)

2.2.3 TARGET2 System

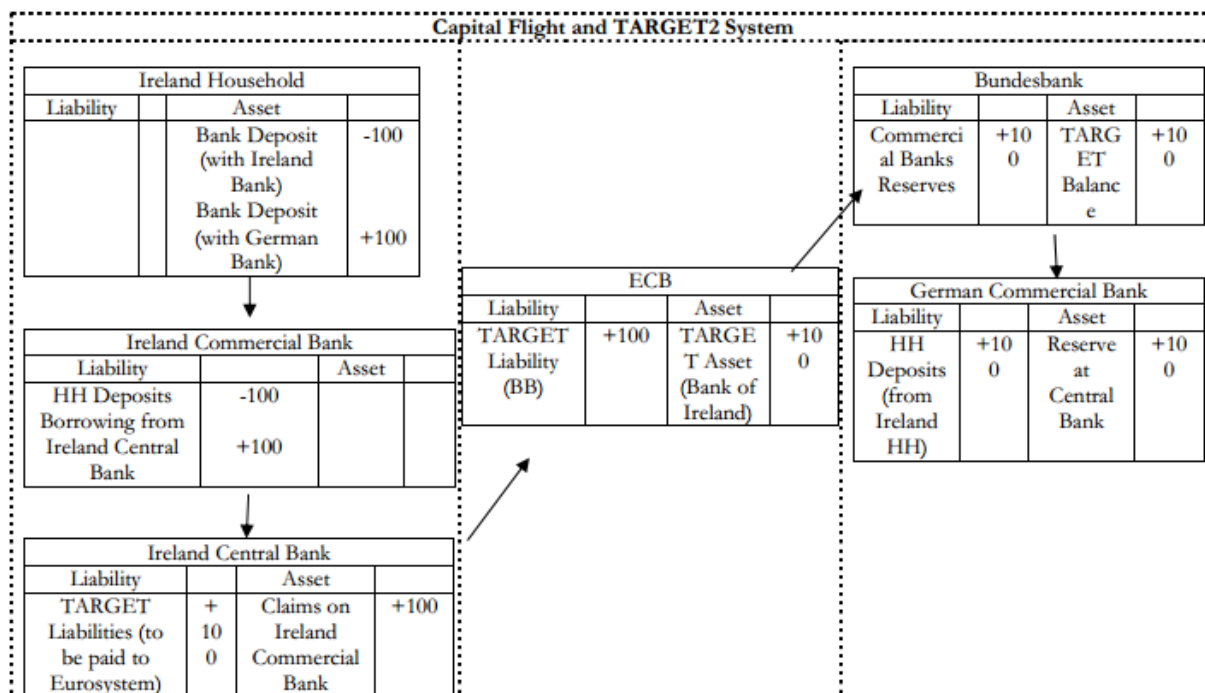
The **Trans-European Automated Real-time Gross settlement Express Transfer** system (TARGET2) is the real-time gross settlement system established and functioned by the Eurosystem. System has a single technical platform processing payments between TARGET2 customers and central banks in relation to monetary policy, interbank and customer trading and other large-amount operations. Payment transactions are settled on a continuous basis without pre-defined upper or lower limit. (European Central Bank, 2014e)

Main advantage of TARGET2 programme lies on ensuring smooth functionality of payment system and consequently providing trust-worthiness of the currency and stable currency circulation on the market. Having strong payment, clearing and settlement system assures safe and effective transactions flow in the economy and ultimately develops strong public confidence in the currency and the system itself. Therefore, efficient payment platform provides multiple improvements at once:

- The system increases the stability of financial institutions and strengthens the trust in both the interbank and customer markets.
- It decreases the overall systemic risk on the financial market.
- It enhances monetary policy transmission and functioning of the euro currency.
- It ensures the smooth processing of cross-border payments in Euro area. (European Central Bank, 2014f)

The transaction system works in several steps. As an illustration, the scenario is presented when an Irish household wants to withdraw amount of €100 from Irish commercial bank and then wants to deposit it into the German commercial bank:

Picture 12: The payment process of TARGET2 system transactions



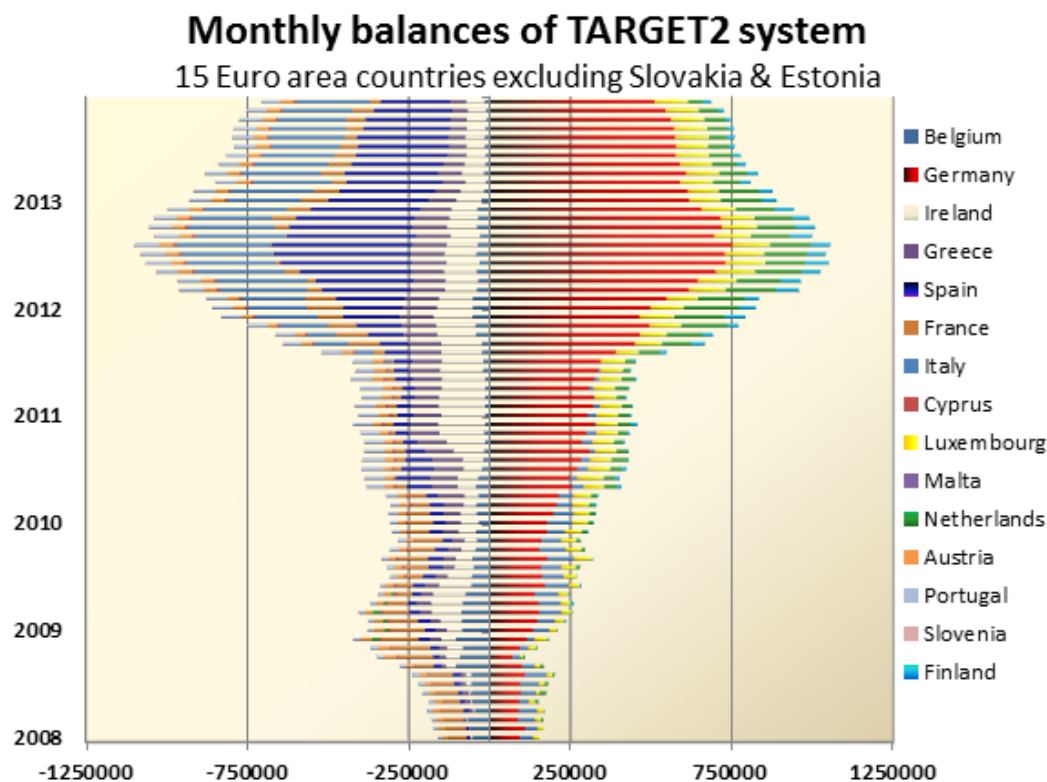
Source: <http://www.stcipc.com/UserFiles/File/ECBs%20TARGET2%20System-%20A%20Stealth%20Bailout.pdf>

- Firstly, the Irish commercial bank will notify the Irish central bank and withdraw the same amount from it.
- Secondly, Ireland Central Banks transfers the payment to Germany using the TARGET2 system. A TARGET liability is created against Eurosystem in the amount of €100.
- Parallel to it, German Central Bank creates a TARGET asset against Eurosystem and raises the bank reserve of German Commercial Bank.
- In consequence, German Commercial Bank raises its deposit base by €100 and Irish deposit is transferred from Irish to German Commercial Bank.

As a result, the balance sheet of both Irish and German Central Banks is increased by €100. On the contrary, the transaction will not increase net balance sheet of European Central

Bank as the transaction's impact is nil. Moreover, aggregated balances of the two National Central Banks and European Central Bank cancel each other out equaling zero.

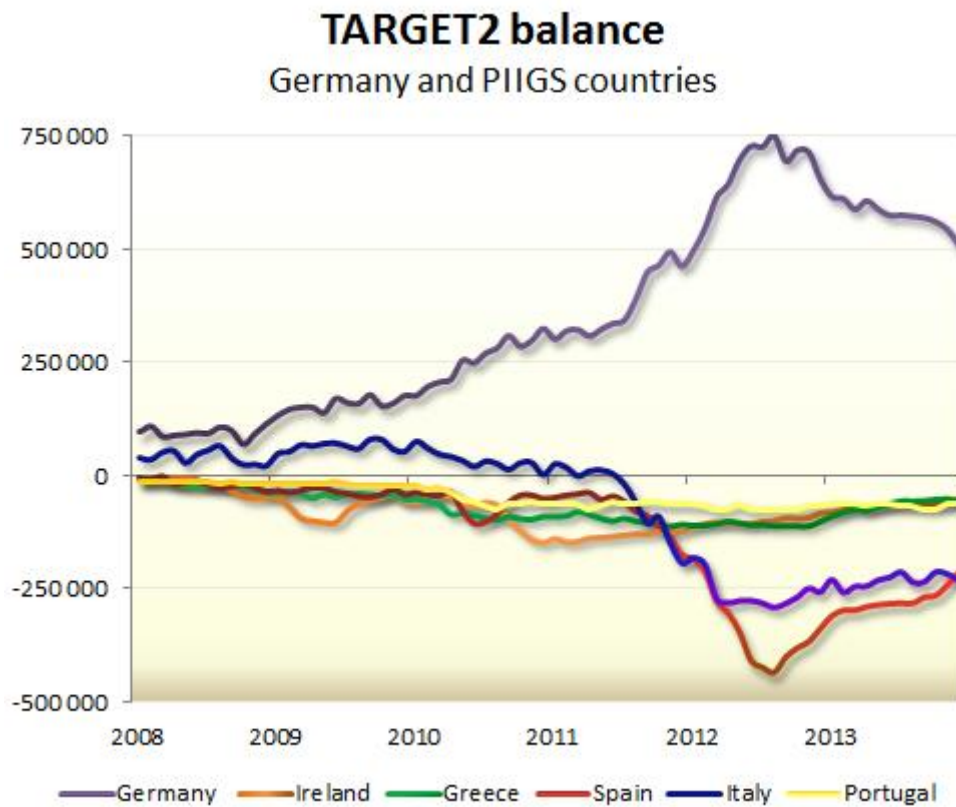
Graph 13: TARGET2 balances of Euro area countries



If one takes a closer look at a national level, withdrawal of €100 from Irish Commercial Bank demanded a raise of €100 on the Ireland National Bank balance sheet in order to avoid system liquidity deficit. On the other hand, German Central Bank balance sheet is also increased by €100 even though the Germany does not require additional liquidity. Thus, German Central Bank needs to sell its securities in order to absorb excessive liquidity on the market. (Agrawal, 2012)

Even though TARGET2 system is not a direct form of bailout, ensuring proper liquidity flow between deficient and abundant countries ensures the overall financial stability on the market; therefore, it is included in the total costs of European Central Bank bailouts. (Whittaker, 2011) TARGET2 system helped to provide additional liquidity to the deficit countries avoiding the liquidity deficiency or potential country default.

Graph 14: TARGET2 balances of Germany and deficient countries



Source: created by author Data: <http://www.eurocrisismonitor.com/>

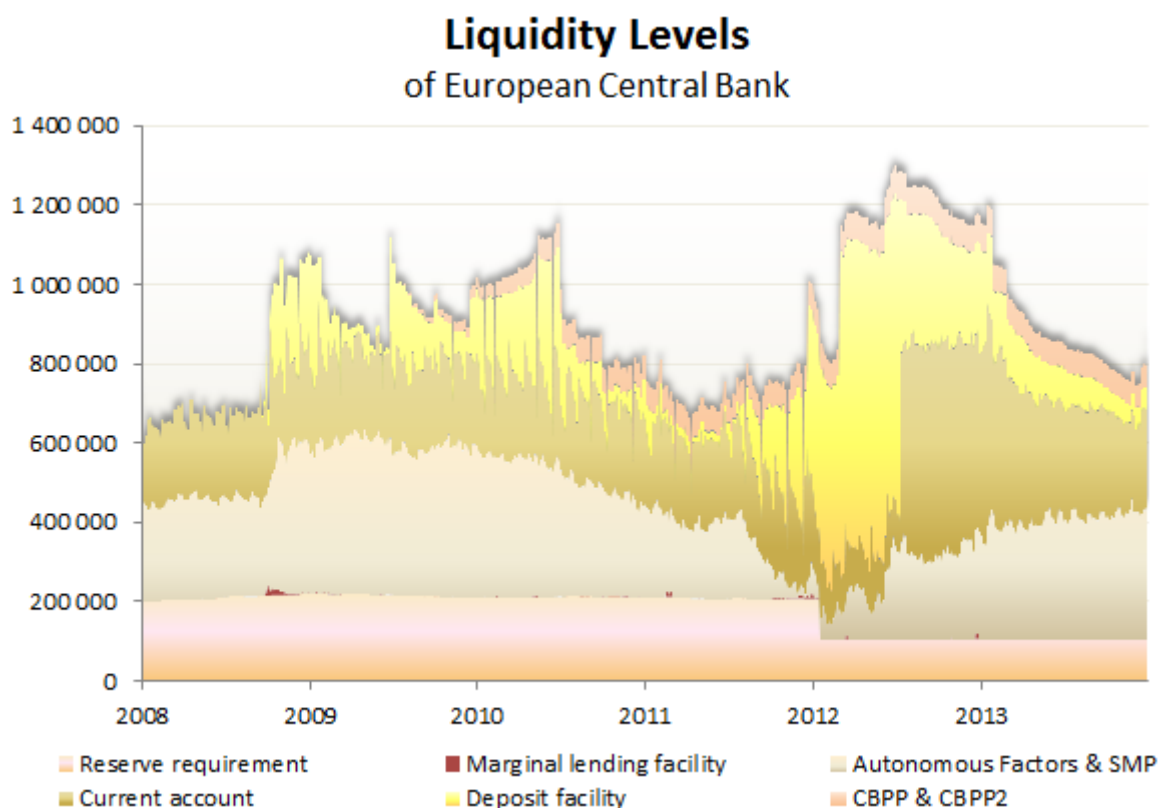
The top country providing the liquidity is Germany with reaching the highest point in June 2012 of €728'567 million. Four troubled countries – Ireland, Greece, Spain and Portugal – have already been in deficient position withdrawing the additional liquidity in 2008. Italy became deficient in July 2011 and all five countries did not recover their balances up to this date.

2.3 Impact of monetary policies on the financial stability

2.3.1 Liquidity levels

Based on severe illiquidity problems on European markets since the beginning of the crisis, European Central Bank has decided to increase its liquidity levels in order to avoid insolvency on the markets through various channels. Firstly, the longer-term refinancing tender operations were introduced in October 2008 (yellow area). Securities Market Programme increased the total amount of Autonomous factors (grey area). The following year, Covered Bond Purchase Programmes were introduced (pink area). On the other hand, the reserves were cut in half in the beginning of 2012 decreasing the overall liquidity levels (bottom area).

Graph 15: Excessive Liquidity of European Central Bank



Source: created by author Data: <http://www.ecb.europa.eu/stats/monetary/res/html/index.en.html>

Huge amount of operations has led to the increase of overall liquidity levels from €600 billion in January 2008 up to €1.3 trillion in March 2012. Since then, the excess liquidity began to decline to its original levels reaching value of €800 billion in December 2003. The liquidity levels are forecasted to continue in declining trend, however, overall liquidity is assumed to stay at higher than pre-crisis level due to more strict regulatory requirements.

During the crisis, the higher demand for liquidity from the banking sector could be mainly explained by banks' voluntary interest of cumulating more liquidity than necessary. Additional liquidity served as a financial insurance compared to the more difficult access to the money market funds at a reasonable cost. Consequently, huge downward shift in liquidity levels after 2012 was caused by improvement of market conditions, repayment of ECB monetary policies and lower risk aversion as the banks started to lower their precautionary liquidity buffers. As the market impairments started to diminish, market funding slowly became a more attractive option compared to Eurosystem's refinancing operations.

As a result of downward liquidity trends, higher volatility of money market rates was experienced in the second half of 2013. If the excessive liquidity carries on declining, the money market rates would start shifting more towards main refinancing operations rates rather than ECB deposit facility rates. However, as the future liquidity balance remains questionable, uncertainty about future liquidity levels could reflect into the higher price of overnight index swaps and more unpredictable development of monetary policy rates. (European Central Bank, 2014g)

2.3.2 Liquidity absorbing/providing operations

Excessive liquidity provided from the side of European Central Bank was caused by the liquidity imbalances on the markets. Central bank liquidity providing factors (liquidity supply) consist of 1. Net assets 2. Main refinancing operations 3. Longer-term refinancing operations 4. Marginal lending facility and 5. Other liquidity providing operations. European Central Bank monetary policies can however directly impact only last four factors. On the other hand, liquidity absorbing factors (liquidity demand) consist of 6. Deposit facility 7. Banknotes in circulation 8. Broad autonomous factors 9. Central government deposits 10. Other factors (such as fixed-term deposits) and 11. Credit Institutions current accounts.

European Central Bank can directly influence only liquidity-absorbing factors no. 6-8 through the monetary policies. (European Central Bank, 2014g)

Since the crisis outbreak, central government deposits and banks current accounts remained on the stable levels until 2012. On the contrary, a significant rise in liquidity demand can be monitored especially through the increase of banknotes in circulation and in the deposit facility figures. Main reason for preference of depositing into the refinancing facility was the decrease of refinancing interest rates which offered banks low-cost parking of their additional liquidity levels.

Table 16: Liquidity supply & demand (in millions of EUR)

Period (in million of EUR)	Liquidity-providing factors					Liquidity-absorbing factors					Credit institutions current accounts	Base money
	Net Assets in Gold and Foreign Currency	Main refinancing operations	Longer-term refinancing operations	Marginal lending facility	Other liquidity providing operations	Deposit facility	Other liquidity-absorbing factors	Banknotes in circulation	Central government liabilities	Other Factors		
January-08	346 882	203 598	268 602	178	107	609	-117 357	657 682	52 588	23 000	202 845	861 136
April-08	362 970	176 209	287 176	173	857	380	-116 206	667 046	67 488	588	208 088	875 514
July-08	375 843	171 725	291 561	91	0	443	-120 829	682 732	62 448	613	213 813	896 988
October-08	515 592	271 019	414 641	7 635	3 375	144 846	36 679	712 525	82 658	17 556	217 998	1 075 369
January-09	547 110	222 799	545 814	2 176	0	169 789	73 743	744 941	104 232	4 478	220 717	1 135 446
April-09	502 766	236 327	423 511	849	0	40 929	3 718	754 874	140 899	2 955	220 078	1 015 881
July-09	439 412	130 101	614 785	640	3 756	147 172	-93 135	767 667	132 500	16 825	217 664	1 132 503
October-09	413 988	62 395	612 131	425	19 644	87 239	-120 736	771 577	145 923	11 601	212 978	1 071 795
January-10	421 820	66 908	650 549	507	33 301	167 219	-122 934	788 339	118 509	10 618	211 334	1 166 892
April-10	453 033	88 120	674 546	552	59 965	235 904	-104 944	798 565	116 259	17 951	212 481	1 246 950
July-10	529 175	168 691	480 152	343	127 817	136 941	-27 758	816 101	102 859	62 913	215 123	1 168 164
October-10	517 942	175 633	356 307	1 121	127 736	51 799	-63 622	814 525	94 298	68 122	213 617	1 079 941
January-11	542 406	172 283	318 617	2 723	138 660	44 222	-77 182	825 564	90 767	78 368	212 950	1 082 736
April-11	532 282	107 059	324 581	401	136 586	21 375	-104 868	831 633	65 650	77 485	209 634	1 062 642
July-11	538 412	150 943	340 991	202	148 708	69 353	-106 231	851 210	65 691	88 625	210 606	1 131 170
October-11	601 761	208 999	383 253	2 897	236 569	208 964	-85 046	861 893	57 242	180 484	209 941	1 280 798
January-12	690 136	126 335	723 661	3 516	283 053	503 084	-8 842	874 190	98 923	216 267	143 078	1 520 353
April-12	661 219	53 824	1 084 381	1 879	280 974	771 164	-22 009	874 875	133 755	214 183	110 308	1 756 347
July-12	674 124	145 777	1 077 218	1 162	280 481	480 755	78 367	895 915	125 511	210 958	387 256	1 763 926
October-12	699 329	92 010	1 053 585	1 235	278 620	264 416	128 927	890 684	106 103	208 933	525 715	1 680 815
January-13	665 400	112 039	946 778	1 635	273 362	189 341	171 421	889 181	89 874	206 625	452 772	1 531 294
April-13	656 723	113 808	753 756	634	264 889	112 925	169 097	896 800	85 082	203 050	322 857	1 332 582
July-13	560 006	103 608	699 630	668	254 169	84 645	59 349	915 759	87 384	194 067	276 877	1 277 280
October-13	546 619	92 884	650 773	120	244 766	53 097	54 174	921 529	77 052	184 797	244 512	1 219 138
January-14	517 781	108 841	579 657	291	232 944	43 896	-1 938	937 292	75 443	163 079	221 741	1 202 929
April-14	527 643	116 714	527 112	440	225 089	29 462	-13 556	943 154	80 749	163 962	193 227	1 165 842

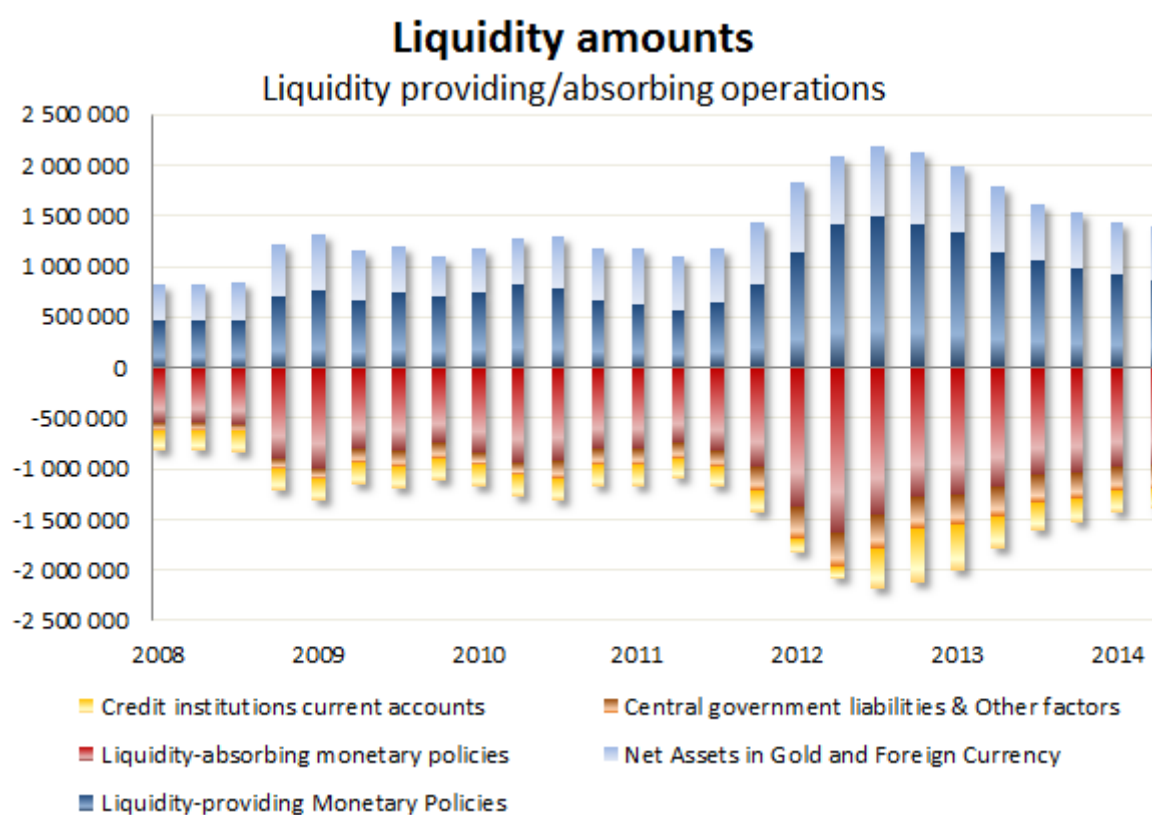
Source: created by author Data: <http://sdw.ecb.europa.eu/>

In resilient times, liquidity shocks are commonly absorbed smoothly without negative market price effects. In case of crisis, the liquidity shocks can be absorbed very slowly leading to widening of effective spreads, reducing the market depth, accelerating transaction costs, thus, damaging the overall market trading. Therefore, a swift increase of liquidity absorption could be translated as a step of European Central Bank to recover strong resiliency

of the Euro area market again to ensure the functional trading on the financial segments. (Beaupain, Durré, 2012)

To compensate higher demand, additional liquidity supply was introduced via liquidity providing operations, mainly longer-term refinancing operations. However, throughout the entire crisis, liquidity absorbing monetary policies balance has been constantly overlapping total amount of liquidity providing monetary policies. Thus, the difference has reflected into the increase of European Central Bank net assets. (European Central Bank, 2014b)

Graph 17: Development of liquidity supply and demand during the crisis



Source: created by author Data: <http://sdw.ecb.europa.eu/>

The raising of liquidity supply influences the economy through two transmission channels. First of all, the higher availability of credit eases inter-bank funding and consequently improves funding conditions for households and firms. Furthermore, there is a higher pressure on lowering of lending rates, increasing loan-to-value ratio and increasing favorability of loan contracts. As a consequence, real consumption and real investment expenditures increase causing inflationary tension. On the contrary, bank benefits include

better risk mitigation, bigger credit exposure, possible asset expansion causing leverage processes.

Secondly, additional liquidity on the markets improves payment systems' functionality and market portfolio adjustments. In addition, extra liquidity provided to households and firms increases the demand for goods. In case it remains unused in the longer-term, it can be reabsorbed back as a deposit. These additional deposits can be then used by various institutions for asset purchasing leading to asset price increase, yields reduction and increase of net present value of real capital investment.

Therefore, higher liquidity supply did not only suit as an aid to the illiquid/insolvent institutions, but also has an ability to indirectly enhance market conditions and overall market robustness. (European Central Bank, 2011f)

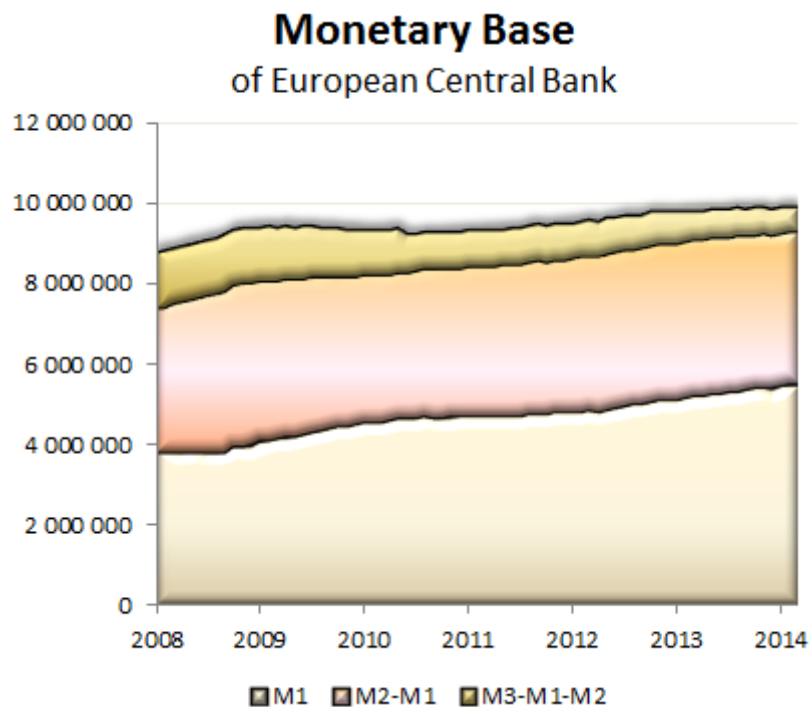
2.3.3 Monetary Base and lending conditions

The monetary base is divided into three main categories based on their degree of moneyiness:

- **Narrow aggregate M1** – currency, banknotes and coins; balances that can be used for cashless payments (such as overnight deposits) or immediately converted into currency
- **Intermediate aggregate M2** – in addition to narrow money M1, this aggregate also includes up-to-two-year maturity deposits and deposits redeemable up to three months.
- **Broad aggregate M3** – besides M1 and M2, it includes repurchase agreements, money market funds shares/units and debt securities up to two years. (European Central Bank, 2014i)

As the crisis commenced, higher liquidity demand translated into the steady increase of narrow aggregate M1, especially the amount of banknotes in circulation which has risen from €650 billion in January 2008 to €940 billion in April 2014. However, the total balance of broad aggregate M3 mostly remained at similar levels as the swift rise of M1 component was compensated by the lowering of M2 and M3 counterparts.

Graph 18: Monetary aggregates of European Central Bank (in million of EUR)



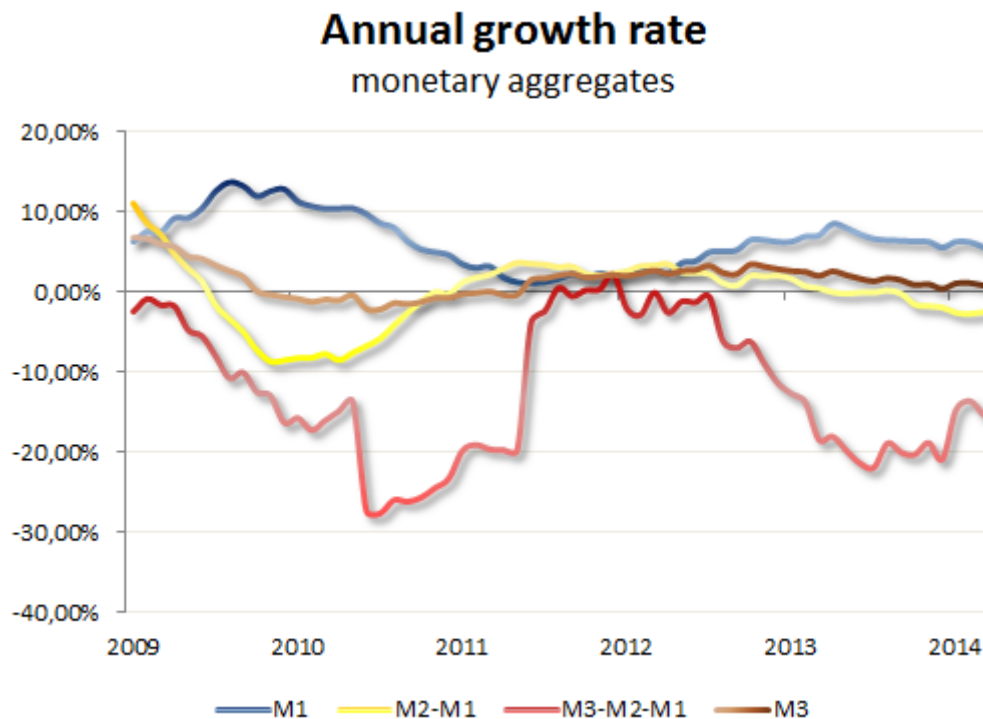
Source: created by author Data: <http://sdw.ecb.europa.eu/>

The most unfavorable situation was the overall decrease of M2 and M3 counterparts. While M1 grew at 5.6% rate in March 2014, M2 experienced decreasing trend of -2.3% and M3 negative trend of -13.6%. M2 and M3 counterparts represent the deposits and lending to the private sector, central governments and Euro area residents.

Noticeable diminishing trend of M3 in years 2009-2012 was caused by more difficult access to credit on the markets as the overall lending market activity froze. As the European Central Bank started raising liquidity supply, M3 annual growth rate started to improve. The best results were seen as the rate recovered to 0% rates when liquidity levels reached their peak in 2012.

However, as the overall liquidity started to return to its pre-crisis balances after 2012, the market lending conditions have worsened significantly. In March 2014, the annual growth rate of deposits against central governments reached -12.1%, longer-term financial deposits of Euro area residents dropped to -1.1%. In addition, growth rate of available credit to Euro area residents equaled -2.2% where -0.9% represented credit to general government and -2.5% credit to the private sector.

Graph 19: Monetary aggregates of European Central Bank (in million of EUR)



Source: created by author Data: <http://sdw.ecb.europa.eu/>

Loans to non-financial sector have reached -3.0% and loans to non-monetary financial intermediaries lowered to -10.8%. (European Central Bank, 2014j) The non-financial institutions lending struggle lies in weak loan dynamics, credit risk and ongoing adjustments in non-financial sector dynamics. Even though the credit standards have not recently progressed in a significant way, credit access was eased for households where the growth rate reached 0.4%.

Based on the graphic representation above, one can see that massive increasing of liquidity supply in 2012 indeed led to enhanced credit conditions and boost of lending activity through the transmission channels. However, despite the good development in 2012, as the liquidity balances are returning to their original values of 2008, the improvement of lending conditions and credit availability on the financial markets will probably still remain one of many important goals of European Central Bank. (European Central Bank, 2014k)

2.4 New regulation mechanisms of European Central Bank

There could be three main lessons learnt by central banks from the recent financial crisis. First of all, in times of crisis there is a high contagion of risks that leads to swift spreading of financial instability to other market sectors. Secondly, sudden outburst of financial instabilities leads to significant recessionary forces carrying downward risks for medium-term price stability. Thirdly, stable macroeconomic situation with steady prices does not guarantee the stability of the markets. Both “ex-ante” government policies and policies of central banks were not sufficient to face the excessive market risks and imbalances.

Based on the European Treaty, the ECB has taken the financial stability into account and in January 2011 it established the **European Systemic Risk Board (ESRB)** with the ECB being an integral part of the Board. The ECB delivers analytical, statistical and administrative help operating macro-prudential policy to monitor the markets and avoid future market imbalances and asset bubbles.

On the other hand, the European financial architecture still remains vulnerable and flawed. This was proved by unforeseen negative transition of financing flows and twin deficits in both public and private finances. Neither the member states nor the institutional network were adequate to solve the problems on the national level.

Jörg Asmussen, Member of the Executive Board of the ECB, suggests three possible ways to improve the financial architecture: (Asmussen, 2012)

- an establishment of a European banking supervisory authority – **the Single Supervisory Mechanism** - with the competence to cease the functioning of non-viable banks,
- an establishment of a resolution authority – **the Single Resolution Mechanism** - with adequate regulatory framework over systemically relevant institutions. An authority should be funded by the financial market itself in order to unwind systemically significant banks without the use of public expenses and taxpayers’ finances and
- redefinition or further **harmonization of deposit insurance** at the European level.

In order to successfully implement new task of the central banks, it is important to remember the main factors to separate the price stability policy and banking supervision in three steps.

- Firstly, monetary policy must not intervene with banking supervision. Therefore, banking supervision should not have any negative effect on the primary goal of price stability, which is already followed by 14 out of 18 European central banks.
- Secondly, the ECB's independence must not be deficient by the new role. Unlike monetary policy which is independent by its definition, banking supervision is connected to parliamentary and judicial control.
- Thirdly, the ECB must possess all necessary instruments to effectively and efficiently perform supervision of banking sector.

The definition of a European banking supervision is connected to the possible direct banking recapitalization through the European Stability Mechanism in the long-run. Therefore, it is rather desired to take time to correctly and successfully implement supervision than hastily introduce new under-pressure programmes that will not work in the long-run.

2.4.1 Single Supervisory Mechanism

The European Parliament has established the **Single Supervisory Mechanism (SSM)** in September 2013 and the ECB should commence administering the supervisory competences the following year. Preparations for future cooperation between the ECB and national representatives have begun for the upcoming monitoring of the European banking system and assessment of 130-140 banking groups.

Approximately 6000 banks in the Euro area will be monitored under the SSM programme. However, only about 150 banks equaling to the 80% of the Euro area banking sector will fall under the direct supervision. In addition, non-Euro area Member States banks will have a choice to willingly participate in the Single Supervision Mechanism Programme if preferred.

The new programme will also enhance the accountability of European Central Bank as the monetary and supervisory functions will be separated. Having a specialized supervisory center will allow ECB to have better and more reliable solvency analyses to effectively perform its functions without endangering ECB reputation. (Constâncio, 2013a)

Previous micro-based ECB supervision was focusing on the health of individual companies assuming that would automatically lead to the overall healthy financial system. On the other hand, in economic expansions higher lending leads to higher profitability and lower measured risks of individual banks, but can increase overall systemic risk through undiversified exposures and enormous dependence on short-term market funding. Switching from micro-based to macro-prudential approach will also include the systemic risk components and negative externalities in its calculations. (Constâncio, 2013b)

The new regulation programme will support the idea of unified integrated banking union. Integrated banking area within a monetary union will have three significant effects:

- Integrated banking area will propagate access to new capital options.
- It will increase the overall market competition leading to better allocation of existing capital through granting better access conditions to capital for small and medium-sized companies. Consequently, investment options on markets will become more favorable spurring the economic growth.
- Unified banking area will strengthen the monetary policy transmission mechanism. Transmission mechanism will become more predictable, homogenous and efficient.

The Single Supervisory programme will mainly focus on defragmenting the European financial market and empowering the relationships between banks and sovereign debtors. Central supervisory authority would not allow banks of any countries to camouflage risky assets. Improved transparency would ameliorate the trust of investors and depositors on the cross-border markets.

The scope of European Central Bank supervision will consist of huge, systemically crucial banks, however, smaller financial institutions will be indirectly supervised as well. In certain instances, ECB can transfer to the direct supervision of smaller banks at any time if necessary. The ECB evaluations will be divided into three main areas:

- Systemically significant banks will undergo centrally coordinated risk analyses. The most important asset classes and portfolios in banking books will be identified.
- Then, asset quality review will be performed through analyzing bank assets from a risk perspective. The accent will be on creating uncompromising and thorough analyses.
- Thirdly, the banks robustness will be evaluated in terms of possible future stress scenarios. (Mersch, 2013)

In November 2014, the ECB expects to start operating the day-to-day supervision of approximately 130 significant banks by running Asset Quality Reviews and Balance Sheet Assessments. The results will be conducted into the overall stress tests. (European Central Bank, 2014) The European Risk Analysis System will be created to help classify and supervise the risk levels within the Euro area. The new supervisory model will direct to regain the credibility in the European banking system since prior stress tests and policies were insufficient to do so.

Based on the Legacy Asset Quality Review and stress tests, deficient banks eligible for recapitalization will be monitored and will have to perform necessary steps to recover their original capital levels. Under these circumstances, the legacy asset losses will be covered by bank's shareholders or fiscal funds from the country where the bank resides. Such approach will decrease the moral hazard levels and unjustified mutualisation of banks' losses. In case of not successfully raising their capital level, the demanded money can be poured in from the European Stability Mechanism facilities. (Asmussen, 2013)

2.4.2 Single Resolution Mechanism

The **Single Resolution Mechanism** (SRM) will be established under the legal framework determined by the Bank Recovery and Resolution Directive (BRRD) and its main purpose will be to wind down toxic banks and avert the possible financial instability. Certain conflicts may occur in case of cross-border banks where the central authority will have key decision in resolving such complex companies. Another problem may be splitting the costs and assigning the costs shares to individual countries.

Main advantage of a clear and credible resolution mechanism is avoiding bank costs spillovers to other banks and consequently damaging overall European financial stability. Without the transparent resolution programme, the market problems can be identified incorrectly and with timely delay. In such scenario, the solution decisions are made delayed and in an improvised way of bailouts. Averting the recent bailout culture trend would not only result in improved market discipline, but it would also ensure that companies who collect the gains also cover the losses, thus, eliminating the moral hazard. (Cœuré, 2013c)

All credit institutions operating in European Union Member States will be under the programme's scope. Centralizing the decision-making role regarding resolution matters will enable to stabilize Economic and Monetary Union through three main pillars:

- Having a single system,
- Appointing a single independent decision-making authority and
- Creating a single fund which finances will be generated ex ante from banking segment. (European Central Bank, 2013b)

The main funding of programme will not originate from taxpayers' finances, but will be collected from ex ante risk-based levies. In the start-up phase, any public financing will be later on paid off from additional ex post levies in order to convey the European consensus and follow the BRRD goal that the financial sector should carry the costs of crisis. The BRRD is currently aiming to begin operating in 2015, with a possible delay of couple years.

The BRRD will monitor the minimum level of bank liabilities applicable to be bailed-in. Therefore, the majority of losses should be carried by shareholders and creditors of the failing institutions, in times of financial meltdown. In case the collected funds are not sufficient to cover all losses, the temporary public finances as a last resort might be used to bring in the necessary credit into the resolution fund. However, such bailout would remain fiscally neutral via later compensation through ex-post bank levies, thus, the financial market recovery would remain wholly financed by the private sector.

It is highly stressed that in order to maintain healthy market environment, only vital and crucial parts of the original company should survive and therefore be bailed out. The main goal of resolution programme is not to preserve the individual failing and dysfunctional institutions, but to maintain overall functionality of markets and strong financial stability of

the financial system. The eligible entities would be further bailed out via two possible channels. Firstly, the company would be transferred to the bridge bank. Second option would be selling the failing institution to the private sector purchaser. In case of the United States of America, this approach is being realized through the Federal Deposit Insurance Corporation programme.

The BRRD might also introduce a **depositor preference rule** assigning the insured deposits the highest priority. Only in unique situation the deposit guarantee schemes will be forced to pay out the finances, which would be supported by the harmonization by Deposit Guarantee Scheme Directive. (Asmussen, 2013)

2.4.3 The complementation of financial stability and monetary policy

Efficient financial stability is an essential aspect for successful application of monetary policies. The crisis has outlined that the stable financial markets are a significant determinant of stable macroeconomic situation and monetary policy transmission. Credit and liquidity constraints are becoming relevant factors in new modeling approaches. These new models are exploring the connections between the real economy and the financial sector and their influence on output and inflation rates.

Two-pillar monetary policy takes into consideration monetary and credit developments. To maintain stability in the medium/long-run, the ECB should improve measuring of short-term risks of financing flows and imbalances. Moreover, the ECB should focus not only on banks' behavior, but also closely focus on the shadow banking segment since it provides liquidity for private sector. (Asmussen, 2012)

2.5 Additional help from European Union and International Monetary Fund

2.5.1 The European Financial Stability Facility

On May 9th 2010, the **European Financial Stability Facility** has been established as a temporary institution based on the agreement of Euro area countries. Its purpose is to maintain financial stability of European monetary union via financial aid to the Euro area countries.

Original guarantee commitment of lending was €440 billion which was raised to €780 billion in October 2011.

Table 20: Euro area countries shares in European Financial Stability Facility

Country	Original Commitment		Increased Commitment	
	Amount in € million	Percentage	Amount in € million	Percentage
Austria	12 241	2,78%	21 639	2,78%
Belgium	15 292	3,48%	27 032	3,47%
Cyprus	863	0,20%	1 526	0,20%
Estonia	0	0,00%	1 995	0,26%
Finland	7 905	1,80%	13 974	1,79%
France	89 657	20,38%	158 488	20,32%
Germany	119 390	27,13%	211 046	27,06%
Greece	12 388	2,82%	21 898	2,81%
Ireland	7 002	1,59%	12 378	1,59%
Italy	78 785	17,91%	139 268	17,86%
Luxembourg	1 101	0,25%	1 947	0,25%
Malta	398	0,09%	704	0,09%
Netherlands	25 144	5,71%	44 446	5,70%
Portugal	11 035	2,51%	19 507	2,50%
Slovakia	4 372	0,99%	7 728	0,99%
Slovenia	2 073	0,47%	3 664	0,47%
Spain	52 353	11,90%	92 544	11,87%
Total	440 000	100,00%	779 783	100,00%

Source: created by author Data: <http://www.efsf.europa.eu/>

The European Financial Stability Facility entity provides help to needing countries through various channels:

- Bonds or other debt instruments are issued on the market to collect funds provided to the countries in financial trouble.
- Interventions are operated in the debt primary market and secondary markets.
- The facility acts as a precautionary programme.
- The facility recapitalizes the financial entities by providing loans to the both programme and non-programme countries.

17 Euro area states give guarantees to EFSF issues according to their share in the paid-up capital provided by European Central Bank.

Graph 21: Countries' commitments in EFSF



Source: created by author Data: <http://www.efsf.europa.eu/>

The biggest share of commitment was agreed by Germany with 27.06%, followed by France with 20.32% and then Italy with 17.86%. Their total agreed guarantee equaled to 65% of programme's funds. The other 14 countries agreed to cover the remaining third of the funds.

European Financial Stability Facility Bonds and or debt instruments are eligible as a form of collateral in ECB's refinancing operations. EFSF's bond are rated with the highest credit rating of 'AAA' by Fitch, 'AA+' by Standard & Poor's and 'Aa1' by Moody's Rating Agency. EFSF bonds can be traded on Luxembourg Stock Exchange, however, most of the trading is processed over-the-counter.

EFSF's main objective is not to directly bail out banks. On the other hand, the lending funds assigned to the Member States can be used to recapitalize the financial institutions within. Funds can be also provided to the Member State not participating in the programme to bail out the failing institutions within.

Since the EFSF was established as a temporary institution, a follow-up entity has been agreed upon as a permanent solution. Consequently, European Financial Stability Facility was terminated June 2013 when it was no longer allowed to into any new programmes. However,

the entity will continue to exist until all repayments of outstanding debt will be cleared. (EFSF, 2014)

2.5.2 European Stability Mechanism

In June 2011, the European Council agreed to create permanent stability programme called **European Stability Mechanism**. Its functions remain the same as of European Financial Stability Facility. However, new function was added into its scope which was a possibility of recapitalizing banks directly. Stability Mechanism commenced to operate in October 2012. The following year of 2013 was a transition between EFSF and ESM programmes.

Table 22: Total Capital Subscription in European Stability Mechanism

Country	Capital Subscription	Percentage
Austria	19 480	2,78%
Belgium	24 340	3,48%
Cyprus	1 370	0,20%
Estonia	1 300	0,19%
Finland	12 580	1,80%
France	142 700	20,39%
Germany	190 020	27,15%
Greece	19 710	2,82%
Ireland	11 140	1,59%
Italy	125 390	17,91%
Luxembourg	1 750	0,25%
Malta	510	0,07%
Netherlands	40 020	5,72%
Portugal	17 560	2,51%
Slovakia	5 770	0,82%
Slovenia	2 990	0,43%
Spain	83 320	11,90%
Total	700 000	100,00%

Source: created by author Data: <http://www.efsf.europa.eu/>

The European Stability Mechanism Programme total capital has been decreased from EFSF's €780 billion down to €700 billion. €80 billion out of the total subscribed capital has been provided by the Euro area countries in the form of five €16 billion tranche instalments.

However, only €500 billion out of programme's funds has been agreed to be used for lending in favor of reassuring the investors and acquiring the higher ratings from the rating agencies.

The funding structure remained the same with three top funding countries being Germany, France and Italy covering two thirds of entire portfolio and the remaining third being financed by the rest of the Euro area countries. (EFSF, 2014)

2.5.3 International Monetary Fund & European Union bailouts

During the crisis, other institutions also decided to step in. Greece was one of the countries most impacted by the economic downturn. In May 2010, **first three-year bailout stimulus** has been provided to Greece in the amount of €110 billion under the condition that the Greece will commit itself to the austerity. Greek Prime Minister George Papandreou promised €30 billion of spending cuts and tax increases in return under the quarterly monitoring of The International Monetary Fund and European Commission. (Lynn, 2011)

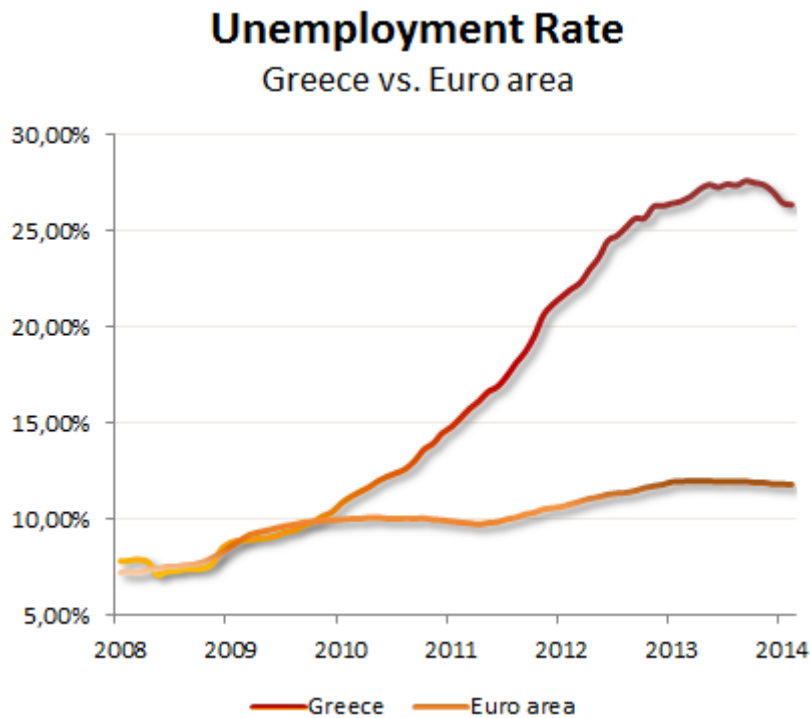
€30 billion out of the €110 billion bailout was provided by the International Monetary Fund, while the rest was provided by the European Union. Main purpose of the package was to stabilize the Euro currency and to stop the contagion spillovers into other countries. (Papadimas & Strupczewski, 2010)

In February 2012, the **second bailout package** was approved in the amount of €130 billion as the first bailout failed to avoid economic worsening of Greece. In addition, €107 billion was written off of Greek debt. On the other hand, Greece had agreed to reach several economic targets in the following years:

- Greece had promised to cut its percentage of debt compared to the gross domestic product from 160% down to 120.5% in eight years
- Greek debt private holders would cover the losses of 53.5% on their bond value with the real loss up to 70%.
- Greek economic management would be permanently monitored by the Euro area experts.
- Greek constitution would be altered to prioritize the debt repayments over the government services' funding.

- A special account would be separated from the main budget and it would always have sufficient funds to pay off the debts for the following three months.

Graph 23: Unemployment Rate in Euro area and Greece in percentage



Source: created by author, Data: <http://sdw.ecb.europa.eu/>

The main target of the package was to avert possible default in March 2012 as Greek maturing loans had to be repaid. In addition, the Greece was forced to undergo fiscal consolidation and structural reforms in order to recover its competitiveness. (Hewitt & Peston, 2012)

In February 2014, **third bailout stimulus** has been proposed in the amount of €20 billion in order to help out with Greek high debt levels of 176% of gross domestic product. (Waterfield, 2014) Overall, the stimuli packages helped to avoid the Greek bailout, but austerity politics did not stabilize the debt levels while the unemployment rate has tripled in six years.

Other smaller bailout stimuli from other countries will be omitted from the scope of this thesis as they were not directly connected to the European Central Bank bailout costs.

2.5.3.1 Sovereign Debt Levels

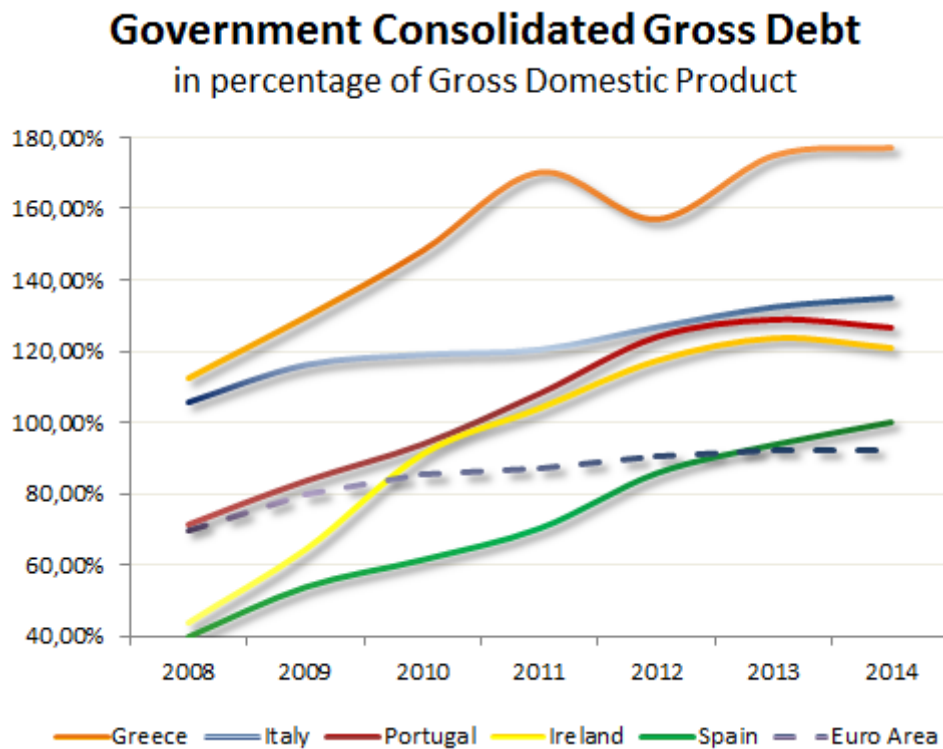
In addition to the unemployment problems in Greece as well as in Euro area, the development of sovereign debts was not preferable as well as the sovereign debts compared to the gross domestic product grew rapidly, doubling or even tripling for some countries in last six years. During the crisis, higher sovereign credit risks have not only led to the increase of yield spreads in Greece, Spain, Portugal and Ireland, but also presented possible contagion risks among Euro area countries like France and Belgium. (Santis, 2012) Poor liquidity and high volatility were the main factors causing market distortions on sovereign bond markets.

As a result, fiscal expansions were introduced to restrict increasing public debt and stabilize the bond markets, while the governments decided to bail out systematically significant financial institutions.

Main reason for European Central Bank to participate in resolving the sovereign debt crisis is that there is a strong connection between the sovereign debt markets and successful monetary policy transmission mechanism. The change in European Central Bank interest rests is the main credential in shifting the government bond yield curve. Consequently, changes in long-term government yield rates affect the corporate bond yields and lending rates. However, since 2008 changes of bond yields were predominantly affected by high and volatile premiums based on the contagion in markets and public overreaction overriding the transmission channel of European Central Bank monetary policies.

In addition, significant declines in sovereign bond yields lead to both direct and indirect losses causing unnecessary consumer savings and inhibiting the consumption. Government bonds are also crucial part of banks' collateral portfolio and the decreasing of bond yields restricts the refinancing options of banks on the market. Not only the bank has harder refinancing options on the market, but higher sovereign credit risk increases the credit risk of banks causing strong deleveraging pressures. On one hand, bank is cumulating losses on bond yields. On the other hand, bank has worsened conditions to refinance itself as it is considered riskier or troubled as the sovereign credit risk increases the bank's credit risk levels.

Graph 24: Sovereign debts as a percentage of gross domestic product



Source: created by author, Data: <http://sdw.ecb.europa.eu/>

Therefore, the sovereign crisis not only influenced the national countries' macroeconomic developments but it moreover indirectly caused various dysfunctions in banking sectors. As the sovereign debts remain high, the European Central Bank will continue in its strife for further fiscal reconsolidations. (Cœuré, 2012)

3. Total Costs of Economic Help

Based on the various programmes of aid from the European Central Bank as well as International Monetary Fund and European Union, the total amount of costs has risen to €2.883 trillion in December 2013. TARGET2 account balance summarizes liquidity provided via the programme to Ireland, Greece, Spain, Portugal and since July 2011 Italy.

Table 25: Total Costs of European Central Banks Bailouts & IMF/EU help

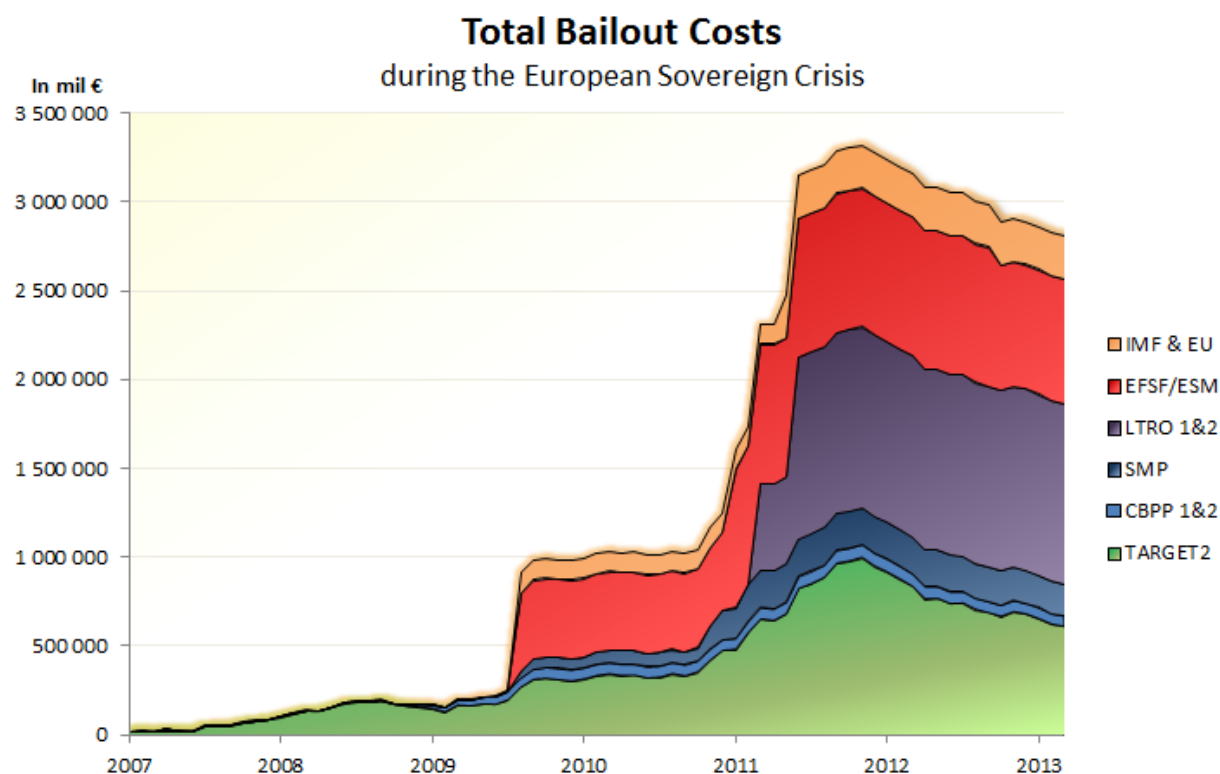
In millions of EUR	TARGET2	CBPP1&2	SMP	LTRO1&2	EFSF/ESM	IMF&EU	Total
October 2007	16 202	0	0	0	0	0	16 202
November 2007	23 954	0	0	0	0	0	23 954
December 2007	20 873	0	0	0	0	0	20 873
January 2008	29 946	0	0	0	0	0	29 946
February 2008	24 087	0	0	0	0	0	24 087
March 2008	22 828	0	0	0	0	0	22 828
April 2008	46 688	0	0	0	0	0	46 688
May 2008	50 828	0	0	0	0	0	50 828
June 2008	52 109	0	0	0	0	0	52 109
July 2008	66 966	0	0	0	0	0	66 966
August 2008	74 374	0	0	0	0	0	74 374
September 2008	83 407	0	0	0	0	0	83 407
October 2008	100 678	0	0	0	0	0	100 678
November 2008	118 127	0	0	0	0	0	118 127
December 2008	133 654	0	0	0	0	0	133 654
January 2009	130 457	0	0	0	0	0	130 457
February 2009	151 762	0	0	0	0	0	151 762
March 2009	177 404	0	0	0	0	0	177 404
April 2009	185 127	0	0	0	0	0	185 127
May 2009	181 833	0	0	0	0	0	181 833
June 2009	193 944	0	0	0	0	0	193 944
July 2009	169 863	1 370	0	0	0	0	171 233
August 2009	159 737	6 863	0	0	0	0	166 600
September 2009	156 562	12 105	0	0	0	0	168 667
October 2009	147 967	18 227	0	0	0	0	166 194
November 2009	128 919	23 139	0	0	0	0	152 058
December 2009	167 126	27 353	0	0	0	0	194 479
January 2010	162 346	30 631	0	0	0	0	192 977
February 2010	173 528	36 378	0	0	0	0	209 906
March 2010	171 213	41 777	0	0	0	0	212 990
April 2010	196 630	46 942	0	0	0	0	243 572
May 2010	267 698	52 591	35 500	0	440 000	110 000	905 789

June 2010	311 879	57 788	59 000	0	440 000	110 000	978 667
July 2010	317 075	61 113	60 360	0	440 000	110 000	988 548
August 2010	309 839	61 115	61 000	0	440 000	110 000	981 954
September 2010	302 418	61 096	63 300	0	440 000	110 000	976 814
October 2010	313 824	60 982	63 300	0	440 000	110 000	988 106
November 2010	333 420	60 962	69 200	0	440 000	110 000	1 013 582
December 2010	343 108	60 938	74 000	0	440 000	110 000	1 028 046
January 2011	333 685	60 787	76 500	0	440 000	110 000	1 020 972
February 2011	335 477	60 703	77 500	0	440 000	110 000	1 023 680
March 2011	319 240	60 654	77 000	0	440 000	110 000	1 006 894
April 2011	324 408	60 476	76 100	0	440 000	110 000	1 010 984
May 2011	344 561	60 370	74 900	0	440 000	110 000	1 029 831
June 2011	331 009	60 271	74 200	0	440 000	110 000	1 015 480
July 2011	354 677	59 979	74 000	0	440 000	110 000	1 038 656
August 2011	421 245	59 717	128 900	0	440 000	110 000	1 159 862
September 2011	475 741	59 462	160 700	0	440 000	110 000	1 245 903
October 2011	481 489	59 232	173 500	0	780 000	110 000	1 604 221
November 2011	576 956	59 586	206 900	0	780 000	110 000	1 733 442
December 2011	652 464	61 435	211 900	489 190	780 000	110 000	2 304 989
January 2012	643 088	62 557	219 200	489 190	780 000	110 000	2 304 035
February 2012	679 949	63 724	219 300	489 190	780 000	240 000	2 472 163
March 2012	824 269	65 506	214 200	1 018 720	780 000	240 000	3 142 695
April 2012	851 115	66 708	214 200	1 018 720	780 000	240 000	3 170 743
May 2012	885 957	67 992	212 100	1 018 720	780 000	240 000	3 204 769
June 2012	966 156	69 378	211 300	1 018 720	780 000	240 000	3 285 554
July 2012	978 814	69 780	211 300	1 018 720	780 000	240 000	3 298 615
August 2012	999 692	69 820	208 800	1 018 720	780 000	240 000	3 317 032
September 2012	950 627	70 413	209 500	1 018 720	780 000	240 000	3 269 260
October 2012	916 420	70 206	208 500	1 018 720	780 000	240 000	3 233 845
November 2012	877 733	69 295	208 500	1 018 720	780 000	240 000	3 194 248
December 2012	836 086	68 502	208 300	1 018 720	780 000	240 000	3 151 608
January 2013	764 951	67 403	205 400	1 018 720	780 000	240 000	3 076 474
February 2013	767 516	65 022	205 300	1 018 720	780 000	240 000	3 076 558
March 2013	737 822	63 942	205 900	1 018 720	780 000	240 000	3 046 384
April 2013	741 136	63 071	201 000	1 018 720	780 000	240 000	3 043 927
May 2013	706 271	62 248	196 900	1 018 720	780 000	240 000	3 004 139
June 2013	687 158	61 586	195 500	1 018 720	780 000	240 000	2 982 964
July 2013	667 490	60 474	192 600	1 018 720	700 000	240 000	2 879 284
August 2013	693 129	59 839	190 700	1 018 720	700 000	240 000	2 902 388
September 2013	680 514	59 268	187 700	1 018 720	700 000	240 000	2 886 202
October 2013	653 552	58 287	184 100	1 018 720	700 000	240 000	2 854 660
November 2013	623 401	57 407	184 100	1 018 720	700 000	240 000	2 823 628
December 2013	609 208	57 182	178 800	1 018 720	700 000	240 000	2 803 910

Source: created by author. Data: eurocrisismonitor.com, ecb.europa.eu

The total bailout costs reached their peak in August 2012 with the amount €3.317 trillion EUR when all European Central Bank programmes have met their bailout caps and the TARGET2 borrowings to PIIGS countries were at their highest. Soon after, one can see diminishing trend as the main bailout programmes have been terminated and their outstanding balanced are being slowly paid off and the TARGET2 lending declined.

Graph 26: Total amount of bailout costs



Source: created by author. Data: eurocrisismonitor.com, ecb.europa.eu

3.1 Forecast-Actuals Analysis

In this research part of the paper, I will be analyzing one-year and two-year European Central Bank projections of macroeconomic indicators. Based on the forecasts, expected impact of bailout costs will be quantified in the following years and then compared to the actual results delivered. Based on the Forecast-Actuals Analysis, a conclusion will be made whether real economy has over-performed or under-performed the economic projections. Consequently in the regression analysis, the thesis will focus on explaining the economic

results and their variance from the forecasts and statistically explain whether bailout costs spent has an influence on the macroeconomic development.

In the first part, the research will focus on quantifying the expected impact of bailouts on the gross domestic product (GDP) rate adjusted from the inflationary effects. First table contains predictions of European Central Bank about the expected change of GDP in one-year and two-year term. Predictions were announced each year in March for the current and the following year.

3.1.1 Gross Domestic Product – Most-Likely Scenario

Forecasts were calculated in terms of range – possible values that could occur in the upcoming period. In the analysis, middle values of each spread were chosen as the most-likely scenario.

Table 27: March Gross Domestic Product projections for one and two years

Real GDP	Actuals	March Projections							
Year		2006	2007	2008	2009	2010	2011	2012	2013
2007	2,99%	2,00%	2,5%						
2008	0,27%		2,4%	1,7%					
2009	-4,38%			1,8%	-2,7%				
2010	1,90%				0,0%	0,8%			
2011	1,62%					1,5%	2,3%		
2012	-0,61%						1,7%	-0,1%	
2013	-0,39%							1,1%	-0,5%
2014	N/A								1,0%

Source: created by author Data: <http://www.ecb.europa.eu/pub/projections/html/index.en.html>

After adjusting the data, table below shows the actual yearly percentage change of GDP, forecasted value one and two years ago and the variances between the forecast and actuals.

Table 28: Actuals and one- and two-year forecasts of GDP

Real GDP Year	Actuals	Projections			
		1 Year	Variance	2 Years	Variance
2007	3,00%	2,50%	↑ 0,50%	2,00%	↑ 1,00%
2008	0,25%	1,70%	↓ -1,45%	2,40%	↓ -2,15%
2009	-4,43%	-2,70%	↓ -1,73%	1,80%	↓ -6,23%
2010	1,89%	0,80%	↑ 1,09%	0,00%	↑ 1,89%
2011	1,63%	2,30%	↓ -0,67%	1,50%	↑ 0,13%
2012	-0,60%	-0,10%	↓ -0,50%	1,70%	↓ -2,30%
2013	-0,38%	-0,50%	↑ 0,12%	1,10%	↓ -1,48%

Source: created by author Data: <http://www.ecb.europa.eu/pub/projections/html/index.en.html>

In the Forecast-Actuals Analysis, I will be calculating what the expected GDP rate change was based on the bailout costs spent in the previous year. For the one-year term prediction data, the following formula was used

$$FAA_{1Y} = \frac{\sum \Delta \text{Gross Domestic Product}_Y (\%)}{\sum \Delta \text{Total Bailout Costs}_{Y-1}}$$

where I calculated the forecasted impact of bailout costs in period 2007-2012 on Gross Domestic Product one year later, in years 2008-2013. Based on the result, €100 billion of bailout costs spent should have ensured Gross Domestic Product increase by 0.045% in the consequent year excluding the inflation impact.

$$FAA_{1Y} = \frac{1.43\%}{3'152 \text{ bill. EUR}} = \frac{0.045\%}{100 \text{ bill. EUR}}$$

In second scenario, influence of bailouts delivered in periods 2007-2011 was compared to the forecasted GDP change two years later in years 2009-2013. Based on the calculation, additional €100 billion of bailout costs would bring 0.27% GDP growth two years later.

$$FAA_{2Y} = \frac{\sum \Delta \text{Gross Domestic Product}_Y (\%)}{\sum \Delta \text{Total Bailout Costs}_{Y-2}} = \frac{6.24\%}{2'305 \text{ bill. EUR}} = \frac{0.27\%}{100 \text{ bill. EUR}}$$

Afterwards, I have inputted the actual changes of gross domestic product throughout the years and I have received the following results:

$$FAA_{ACT,1Y} = \frac{-1.76\%}{3'152 \text{ bill. EUR}} = \frac{-0.056\%}{100 \text{ bill. EUR}} < \frac{0.045\%}{100 \text{ bill. EUR}}$$

$$FAA_{ACT,2Y} = \frac{-2.00\%}{2'305 \text{ bill. EUR}} = \frac{-0.087\%}{100 \text{ bill. EUR}} < \frac{0.27\%}{100 \text{ bill. EUR}}$$

Based on the performed Forecast-Actuals Analysis, we can see that bailout costs delivered did not have a desired effect on stabilizing the gross domestic product. Additional €100 billion of delivered bailout costs led to the -0.056% change of GDP next year, instead of originally planned +0.045%, and -0.087% change of GDP in two years, instead of forecasted +0.27%.

3.1.2 Gross Domestic Product – Pessimistic Scenario

Based on the previous Forecast-Actuals Analysis, we can conduct that the economic development had more negative outcome than originally planned and the most-likely predicted scenario did not occur.

Table 29: Actuals & Forecasts for the pessimistic scenario

Real GDP Year	Actuals	Projections			
		1 Year	Variance	2 Years	Variance
2007	3,00%	2,10%	↑ 0,90%	1,50%	↑ 1,50%
2008	0,25%	1,30%	↓ -1,05%	1,90%	↓ -1,65%
2009	-4,43%	-3,20%	↓ -1,23%	1,30%	↓ -5,73%
2010	1,89%	0,40%	↑ 1,49%	-0,70%	↑ 2,59%
2011	1,63%	1,30%	↑ 0,33%	0,50%	↑ 1,13%
2012	-0,60%	-0,50%	↓ -0,10%	0,80%	↓ -1,40%
2013	-0,38%	-0,90%	↑ 0,52%	0,00%	↓ -0,38%

Source: created by author Data: <http://www.ecb.europa.eu/pub/projections/html/index.en.html>

Therefore, I am going to repeat the Forecast-Actuals Analysis for the pessimistic scenario and analyze whether the negative outcome was included in it or whether the bailout costs have underperformed even compared to the pessimistic predictions and bailout costs failed to deliver the desired results. Based on the pessimistic predictions above, the Forecast-Actuals Analysis has been adjusted as following:

$$FAA_{1Y} = \frac{\sum \Delta \text{Gross Domestic Product}_Y (\%)}{\sum \Delta \text{Total Bailout Costs}_{Y-1}} = \frac{-1.66\%}{3'152 \text{ bill. EUR}} = \frac{-0.053\%}{100 \text{ bill. EUR}}$$

In the worst case scenario, the additional €100 billion of bailout costs should have maintained the Gross Domestic Product decline at -0.053% the following year. In terms of two years, the bailout costs should have averted the GDP decline and change the economic development into positive +0.082% growth the year after.

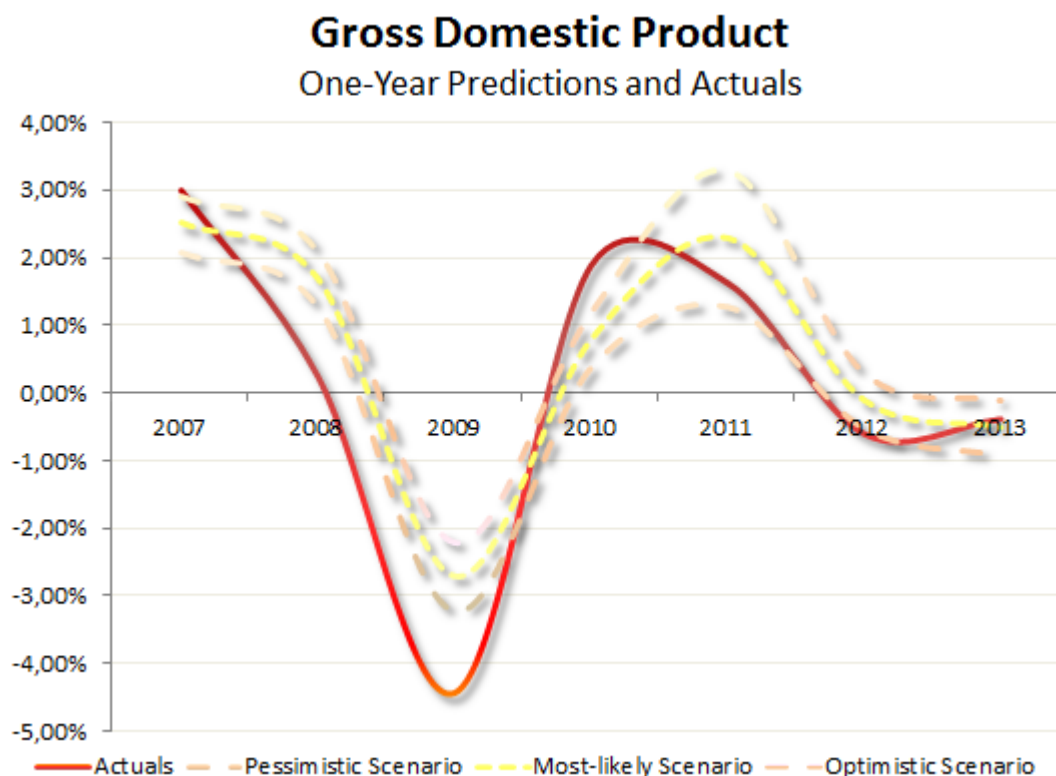
$$FAA_{2Y} = \frac{\sum \Delta \text{Gross Domestic Product}_Y (\%)}{\sum \Delta \text{Total Bailout Costs}_{Y-2}} = \frac{1.90\%}{2'305 \text{ bill. EUR}} = \frac{0.082\%}{100 \text{ bill. EUR}}$$

When the actuals were compared to the worst-scenario one-year economic predictions, one can see that in terms of medium-term the predictions turned out to be truthful and very close to the reality.

$$FAA_{ACT,1Y} = \frac{-1.76\%}{3'152 \text{ bill. EUR}} = \frac{-0.056\%}{100 \text{ bill. EUR}} < \frac{-0.053\%}{100 \text{ bill. EUR}}$$

Based on the graphic illustration below, we can see that this assumption was not supported in the starting years of 2008-2009, where the GDP strongly underperformed its expectations. This fact shows how unexpected and severe negative impact on the gross domestic product the crisis had in its beginnings, and bailout costs did not prove to stabilize the domestic product the following year during the downturn.

Graph 30: Gross Domestic Product one-year predictions and actuals



Source: created by author Data: <http://www.ecb.europa.eu/pub/projections/html/index.en.html>

This could be explained by European Central Bank initial struggles in identifying the crisis problems in time and making swift recovery decisions in times. The crisis have been proven to be more severe than originally expected and further monetary policies and bailout plans were required in years 2010 and 2011.

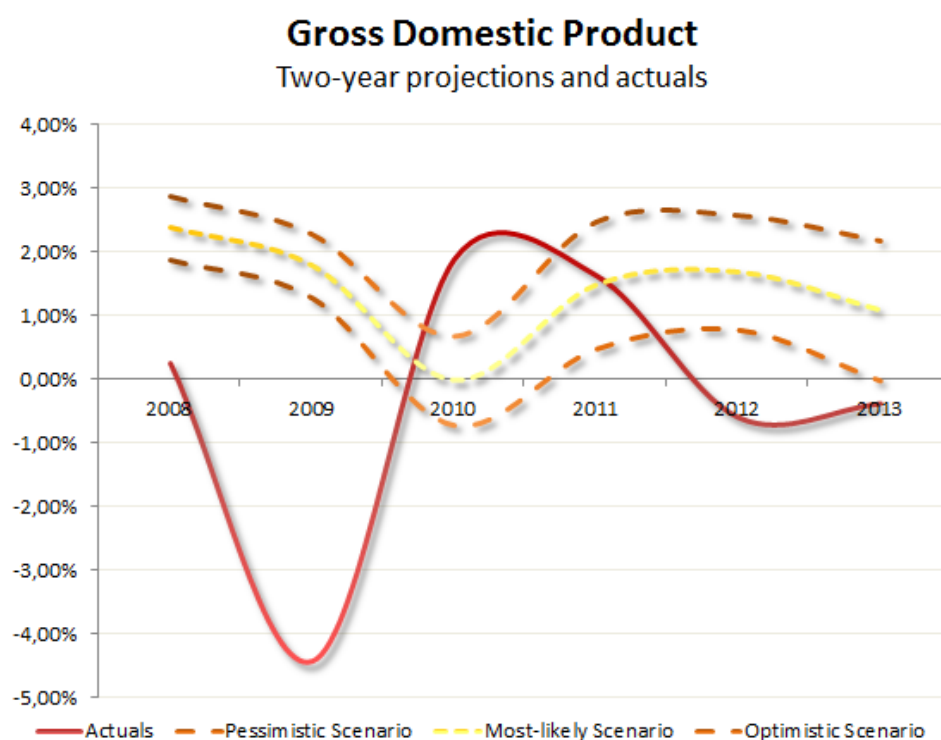
However, later on one can notice that the GDP rate stays stabilized within European Central Bank predictions and in certain momentum even over performs the optimistic scenario. According to the pessimistic scenario, the medium-term predictions were proven to be correct and additional €100 billion of bailout costs succeeded to maintain slow GDP decrease of -0.056% per year averting possible economic depression. Therefore, a conclusion can be made that with certain delay, European Central Bank has identified the flaws in its newly introduced policies, managed to fix them, and consequently managed to maintain GDP rate within the predictions variance.

Regarding the two-year projections, the actual outcome was below the expected results. In addition, it turned out to have completely opposite effect than original predicted.

$$FAA_{ACT,2Y} = \frac{-2.00\%}{2'305 \text{ bill. EUR}} = \frac{-0.087\%}{100 \text{ bill. EUR}} < \frac{0.082\%}{100 \text{ bill. EUR}}$$

While €100 billion of bailout costs should have maintained stabilized slow decrease of GDP in the first year, it should have provided economic recovery boost the year after causing GDP rate to achieve positive yearly change. The opposite occurred, where the GDP rate accelerated into even worse GDP decline than the previous year. Instead of expected growth +0.082% per year, the opposite -0.087% decline was delivered in reality. This statement can be graphically supported below where one can see that two-year projections had opposite trend than the actual GDP results achieved.

Graph 31: Gross Domestic Product two-year predictions and actuals



Source: created by author Data: <http://www.ecb.europa.eu/pub/projections/html/index.en.html>

Based on the overall Forecast-Actuals Analysis results, couple conclusions can be made. Firstly, most-likely scenario did not occur at all and European Central Banks premonitions about possible serious economic downturn were correct.

Secondly, the actual gross domestic product development has met its pessimistic scenario projections in one-year term which proved that the bailout injections helped stabilize

the economic decline the following year on manageable levels. Therefore bailout help turned out to be efficient in very short-run.

Lastly, in two-year term even worst-case scenario European Central Bank predictions turned out to be false. In the longer-term period, bailout cost spending promised economic recovery and restoration of positive gross domestic product. On the contrary, opposite situation occurred where actual GDP development even worsened from the previous year failing to recover the economic crisis. Thus, the bailout costs spent turned out to be inefficient in the medium-term period.

An assumption can be concluded that the bailout costs have generally failed to prevent negative effects of crisis on the gross domestic product in two-year span, and more time might be necessary for the bailout costs to positively reflect in the gross domestic product rate.

3.1.3 Inflation Rate – Most-Likely Scenario

In the third part of Forecast-Actuals Analysis, I have studied the projected inflation development compared to the real inflation rate. I have then compared both forecasts and actuals with the European Central Bank long-term monetary goal of being below, but close to 2% inflation over the medium-term. (European Central Bank, 2014m) The predicted inflation rates were released by European Central Bank in March of each year for the current and the following year. The projected inflation rate predictions and the actuals are following:

Table 32: Actuals and inflation projections for one-year and two-year term

Inflation Year	Actuals	Projections				Long-term Target	
		1 Year	Variance	2 Years	Variance	Target	Variance
2007	2,10%	1,80%	0,30%	2,20%	-0,10%	2,00%	0,10%
2008	3,30%	2,90%	0,40%	2,00%	1,30%	2,00%	1,30%
2009	0,30%	0,40%	-0,10%	2,10%	-1,80%	2,00%	-1,70%
2010	1,60%	1,20%	0,40%	1,00%	0,60%	2,00%	-0,40%
2011	2,70%	2,30%	0,40%	1,50%	1,20%	2,00%	0,70%
2012	2,50%	2,40%	0,10%	1,70%	0,80%	2,00%	0,50%
2013	1,40%	1,60%	-0,20%	1,60%	-0,20%	2,00%	-0,60%

Source: created by author Data: <http://www.ecb.europa.eu/pub/projections/html/index.en.html>,
http://sdw.ecb.europa.eu/quickview.do?SERIES_KEY=122.ICP.M.U2.N.000000.4.ANR

In terms of analyzing one-year projection data, I have constructed the equation where the geometric mean of yearly inflation rates from 2008 to 2013 was divided by the bailout costs spent in the previous years of 2007-2012.

$$FAA_{1Y} = \frac{\overline{Inflation Rate_Y} (\%)}{\sum \Delta Total Bailout Costs_{Y-1}} = \frac{\sqrt[N]{(1 + I_1) * (1 + I_2) * ... * (1 + I_N)} - 1 (\%)}{\sum \Delta Total Bailout Costs_{Y-1}}$$

In the most-likely scenario, the European Central Bank was predicting that the bailout costs of €3.152 billion should not conflict with the ECB primary mandate of stable inflation, and the inflation should be growing at average rate of 1.80% per year between years 2008-2013.

$$FAA_{1Y} = \frac{\overline{Inflation Rate_Y} (\%)}{\sum \Delta Total Bailout Costs_{Y-1}} = \frac{1.80\%}{3'152 \text{ bill. EUR}}$$

In case of two-year term prediction data, the following formula for forecast-Actuals analysis was used where the average mean inflation of years 2009-2013 was compared to the bailout costs in years 2007-2012.

$$FAA_{2Y} = \frac{\overline{Inflation Rate_Y} (\%)}{\sum \Delta Total Bailout Costs_{Y-2}} = \frac{\sqrt[N]{(1 + I_1) * (1 + I_2) * ... * (1 + I_N)} - 1 (\%)}{\sum \Delta Total Bailout Costs_{Y-2}}$$

One can assume that in terms of two years, the European Central Bank was including deflationary effects in the longer-term and was forecasting an average yearly inflation rate of 1.58% potentially lowered by possible market freeze and credit crunch due to certain dysfunctional financial segments and worsened lending conditions on the market.

$$FAA_{2Y} = \frac{\overline{Inflation Rate_Y} (\%)}{\sum \Delta Total Bailout Costs_{Y-2}} = \frac{1.58\%}{2'305 \text{ bill. EUR}}$$

In reality, the average inflation growth per year was 1.96% in time period of 2008-2013. Therefore, the inflation rate was very close to the original forecast. Even though the final rate was higher than originally anticipated – suggesting stronger inflationary influence – the final yearly inflation rate stays close but below 2% goal in the medium-term underlining the successful monetary policies of European Central Bank. Bailout costs did not have undesirable effects on the inflation rate.

$$FAA_{ACT,1Y} = \frac{1.96\%}{3'152 \text{ bill.EUR}} > \frac{1.80\%}{3'152 \text{ bill.EUR}}$$

In terms of two-year forecast, the geometric mean was calculated from the actual inflation rate between years 2009-2013. The average yearly inflation rate of 1.70% is again very close to the European Central Bank projection and also monetary target of 2%. Compared to the one-year forecast, European Central Bank proved to be correct in identifying longer-term deflationary trends and expecting slower growth rate.

$$FAA_{ACT,2Y} = \frac{1.70\%}{2'305 \text{ bill.EUR}} > \frac{1.58\%}{2'305 \text{ bill.EUR}}$$

More precise inflation rate growth was calculated using 72 samples of monthly inflation rates from January 2008 to December 2013. Based on the geometric mean, the average inflation rate was 1.95% a year from 2008 to 2013. Analogically, similar calculation was performed on 60 monthly inflation samples between years 2009-2013 with the geometric mean of 1.69% of inflation growth per year.

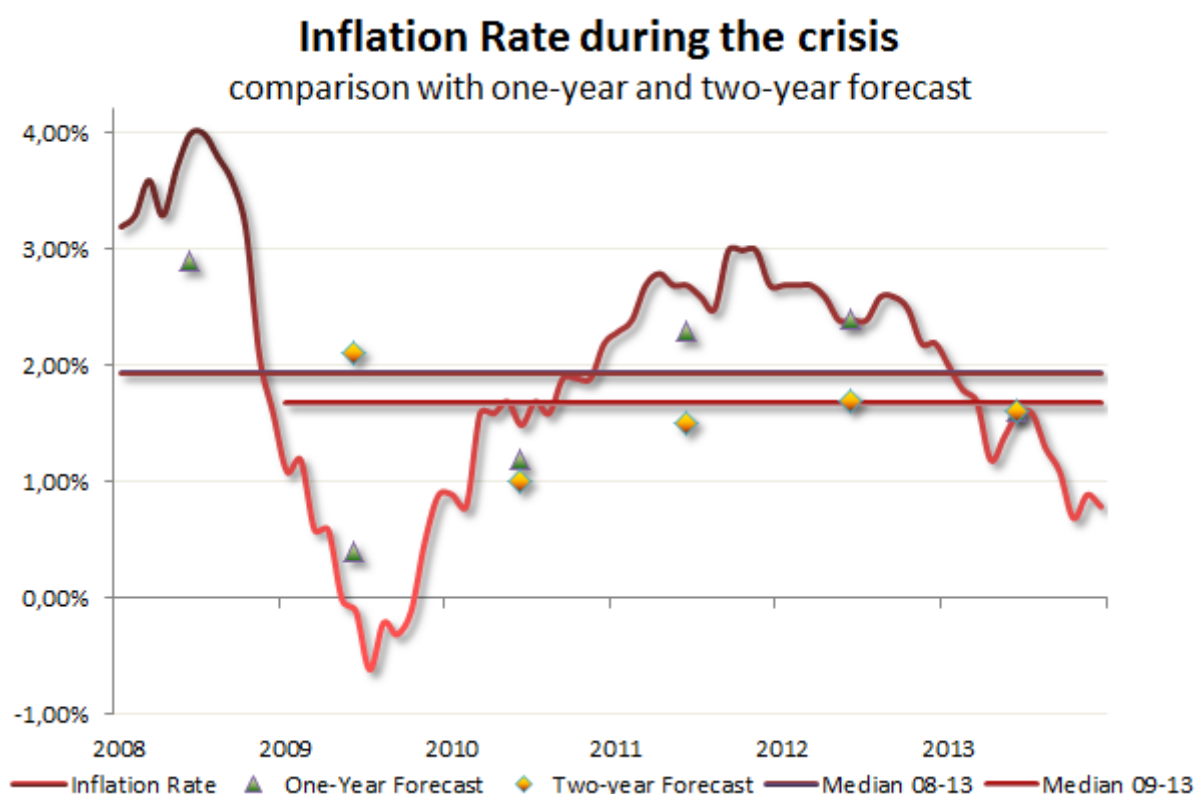
$$\overline{Inflation}_{08.'13} = \sqrt[72]{(1 + I_1) * (1 + I_2) * ... * (1 + I_{72})} - 1 (\%) = 1.95\%$$

$$\overline{Inflation}_{09.'13} = \sqrt[60]{(1 + I_1) * (1 + I_2) * ... * (1 + I_{60})} - 1 (\%) = 1.69\%$$

A graph below shows the actual change of monthly inflation rate from 2008 to 2013. One-year predictions are shown as purple triangles. One can see, that one-year predictions

were very closely predicting the actual inflation rate for the current year. Both actuals and predictions were copying a similar average trend of yearly 1.95% inflation mean (dark purple line). In two-year term projections, the forecasted values (yellow squares) are also copying the actual inflation trend, however, with a small delay. On the other hand, they are staying very close to the average stable trend of 1.69% inflation growth per year (red line).

Graph 33: Inflation Rate versus One-Year and Two-Year Predictions



Source: created by author Data: <http://www.ecb.europa.eu/pub/projections/html/index.en.html>,
http://sdw.ecb.europa.eu/quickview.do?SERIES_KEY=122.ICP.M.U2.N.000000.4.ANR

Overall, one-year and two-year projections are correctly copying the monthly inflation rate trends, however, with smaller variance from the mean. This could be explained by the statement that the forecasted values were weighted average of the expected inflation turbulences throughout the year based on the dynamic economic situation in terms of crisis. In addition, European Central Bank provides a possible spread of inflation development and for this research only middle values were chosen as the most likely scenario.

To sum up, three main conclusions can be made based on the Forecast-Actuals Analysis above. First of all, the European Central Bank predictions in terms of inflation rate

have been proven to be very precise and credit-worthy. Moreover, the most-likely scenario has been proven to be the truest scenario, underlining correct predictions of European Central Bank.

Secondly, the forecasted medium-term inflation is very close to the actual average medium-term inflation rate proving successful implementation and effectiveness of monetary policies. Both forecast and actuals were also very close but below the inflationary target of 2% growth rate.

Thirdly, the bailout costs did not seem to have undesirable effects on the inflation rate in the medium-term as the actuals stayed close to the predictions. The European Central Bank bailouts sterilization process proved to be effective, not causing significant hyper-inflationary trends, but maintaining inflation on medium-term target levels. In addition, the speculated undesirable deflationary outcomes due to possible market freeze and worsened lending market conditions in dysfunctional segments did not affect medium-term inflation as well. The European Central Bank has proven to be successfully fulfilling its primary mandate of price stability despite the hostile crisis conditions.

However, if one takes the short-term inflation into account, the inflation rate started to drop rapidly since last year. Mario Draghi adds that it is expected to stay below the 2 percent target and warns about possible deflation in upcoming years. (World Economic Forum, 2014) Short-term inflation reaching above-target values in 2012 could be explained by additional liquidity provided on the markets with strong inflationary pressure. However, as the liquidity started to decrease, so does the inflation rate.

European Central Bank did not forecast development of unemployment rate until 2014, therefore the data was not available to project Forecast-Actuals Analysis for European unemployment rate.

3.2 Regression Analyses

3.2.1 Gross Domestic Product

In the first regression analysis, the question was raised whether there was any influence of bailout costs spent on the Euro area gross domestic product. The zero hypothesis was that the amount of €1 million of bailout stimuli spent in 2008-2012 had an impact on the quarterly €1 million of gross domestic product of Euro area countries produced each quarter one year later in 2009-2013. 18 samples of quarterly data were used after being stationarized for the analysis. The zero hypothesis was

$$H_0: \text{Gross Domestic Product}_{t-2,Y} = \alpha + \beta * TBC_{t-2,Y-1} + \omega$$

where α , β are constants. ω represents random walk. TBC is the second differentiation of bailout costs spent in the previous year. Gross Domestic product represents second differentiation variable of GDP dependent on the bailout costs. Both bailout costs and GDP were further adjusted by the second differentiation as the time series were still non-stationary and were not passing unit root test after the first differentiation. The analysis result was

$$H_0: \text{Gross Domestic Product}_{t-2,Y} = 664.89 - 0.0054 * TBC_{t-2,Y-1} + \omega$$

Regression model 34: Gross Domestic Product regression analysis model

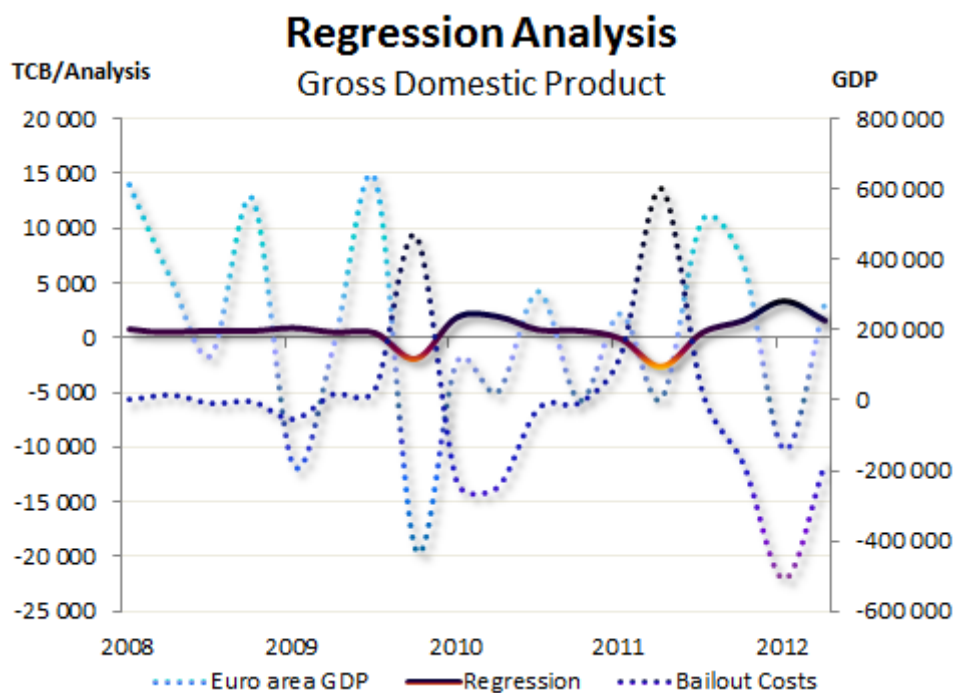
Dependent Variable: DGDP
Method: Least Squares
Date: 05/19/14 Time: 02:09
Sample (adjusted): 3 20
Included observations: 18 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	664.8959	2255.160	0.294833	0.7719
DCOSTS	-0.005408	0.009386	-0.576185	0.5725
R-squared	0.020328	Mean dependent var		702.7478
Adjusted R-squared	-0.040902	S.D. dependent var		9373.986
S.E. of regression	9563.772	Akaike info criterion		21.27379
Sum squared resid	1.46E+09	Schwarz criterion		21.37272
Log likelihood	-189.4641	Hannan-Quinn criter.		21.28743
F-statistic	0.331989	Durbin-Watson stat		2.440320
Prob(F-statistic)	0.572507			

Source: created by author in eviews

Based on the analysis, €1 million of bailout costs spent previous year lead to decrease of €5 thousand in quarterly gross domestic product in the following year. There was no autocorrelation and heteroscedasticity in the model and normality levels were acceptable.

Graph 35: Graphic representation of Regression Analysis



Source: created by author

However, the t-statistics and F-statistic were not accepted and R squared value was statistically insignificant. Therefore, the zero hypothesis was rejected. The bailout costs were proven not to have any impact on the gross domestic product. An assumption can be made that Euro area economic downturn was caused by the sovereign crisis and bailout costs unfortunately failed to influence and positively recover the economic situation.

3.2.2 Inflation Rate

In the second Regression Analysis, I studied the relation between €1 billion of total bailout costs spent and the inflation rate. The hypothesis is that the bailout costs spent in the period 2008-2012 had an impact on the Euro area inflation rate in years 2009-2013. For the

analysis, 59 samples of monthly data were studied and stationarized to remove autocorrelation of the time series and avoid spurious regression. Thus, the formula consists of the first differentiations of both bailout costs and inflation rate.

$$H_0: Inflation_{t-1,Y} = \alpha + \beta * TBC_{t-1,Y-1} + \omega$$

where α , β are constants. ω represents random walk. TBC is the variable equaling the amount of €100 billion bailout costs spent in the previous year. Inflation represents variable of inflation rate dependent on the bailout costs. After running the analysis, the final formula was

$$H_0: Inflation_{t-1,Y} = 9.8576*10^{-6} - 1.1473*10^{-6} * TBC_{t-1,Y-1}$$

Regression Analysis 36: Inflation Rate regression analysis model

Dependent Variable: DINFL

Method: Least Squares

Date: 05/19/14 Time: 03:00

Sample (adjusted): 2008M02 2012M12

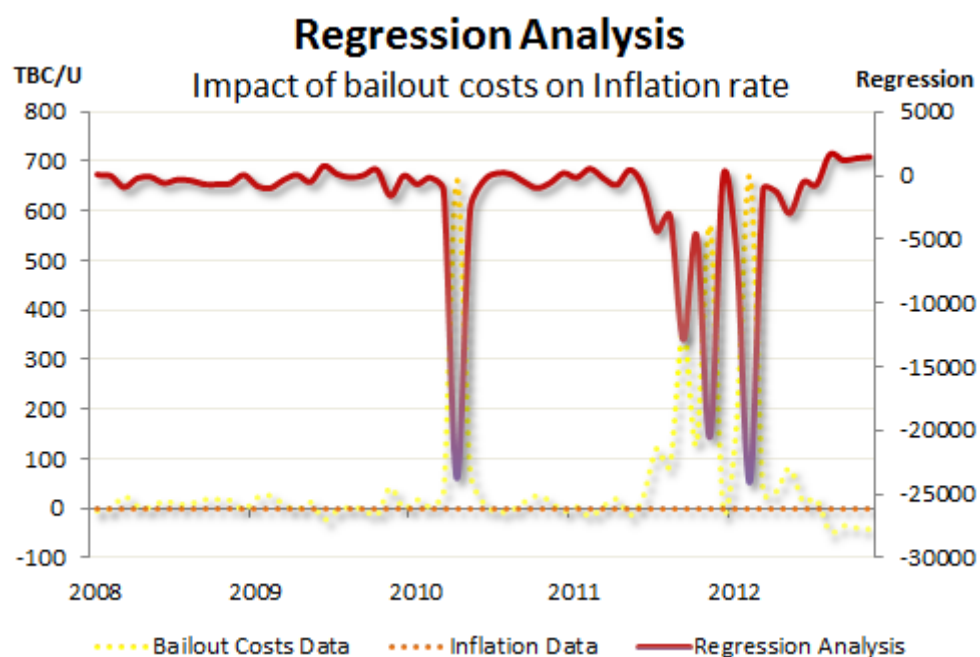
Included observations: 59 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	9.86E-06	0.000370	0.026657	0.9788
DCOSTS	-1.15E-06	2.37E-06	-0.484890	0.6296
R-squared	0.004108	Mean dependent var		-5.08E-05
Adjusted R-squared	-0.013364	S.D. dependent var		0.002655
S.E. of regression	0.002673	Akaike info criterion		-8.978149
Sum squared resid	0.000407	Schwarz criterion		-8.907724
Log likelihood	266.8554	Hannan-Quinn criter.		-8.950658
F-statistic	0.235118	Durbin-Watson stat		1.961952
Prob(F-statistic)	0.629613			

Source: created by author in eviews

The least squares linear regression was run in eviews. No autocorrelation and heteroscedasticity were present in the model and normality levels were acceptable. Based on the formula, an assumption can be made that the €100 billion of bailout costs had deflationary effect of -0.011473 % on the inflation rate.

Graph 37: Graphic representation of Least Square Regression Analysis



Source: created by author

However, the t-statistics and F-statistic were not acceptable and R squared value was also statistically insignificant. Therefore, the zero hypothesis was rejected and the bailout costs had neither inflationary nor deflationary impact on the inflation rate. This underlines the successful monetary policy of sterilizing the bailout costs and conclusion can be made that bailout costs did not have destabilizing influence on the inflation rate.

3.2.3 Unemployment Rate

In the third regression analysis, the relation between €1 billion of total bailout costs spent and the Euro area unemployment rate. The hypothesis is that the bailout costs spent in the period 2008-2012 had an effect on the Euro area unemployment rate in years 2009-2013. For the analysis, 59 samples of monthly data were studied and stationarized to remove time series autocorrelation. Consequently, the first differentiation of bailout costs and unemployment rate was analyzed.

$$H_0: Unemployment_{t-1,Y} = \alpha + \beta * TBC_{t-1,Y-1} + \omega$$

where α , β are constants. ω represents random walk. TBC is the variable equaling the amount of €100 billion bailout costs spent in the previous year. Unemployment represents dependent variable of unemployment rate. After running the analysis, the results were

$$H_0: Unemployment_{t-1,Y} = 0.00053 + 3.5898*10^{-7} * TBC_{t-1,Y-1}$$

Regression Analysis 38: Unemployment Rate Least Squares Model

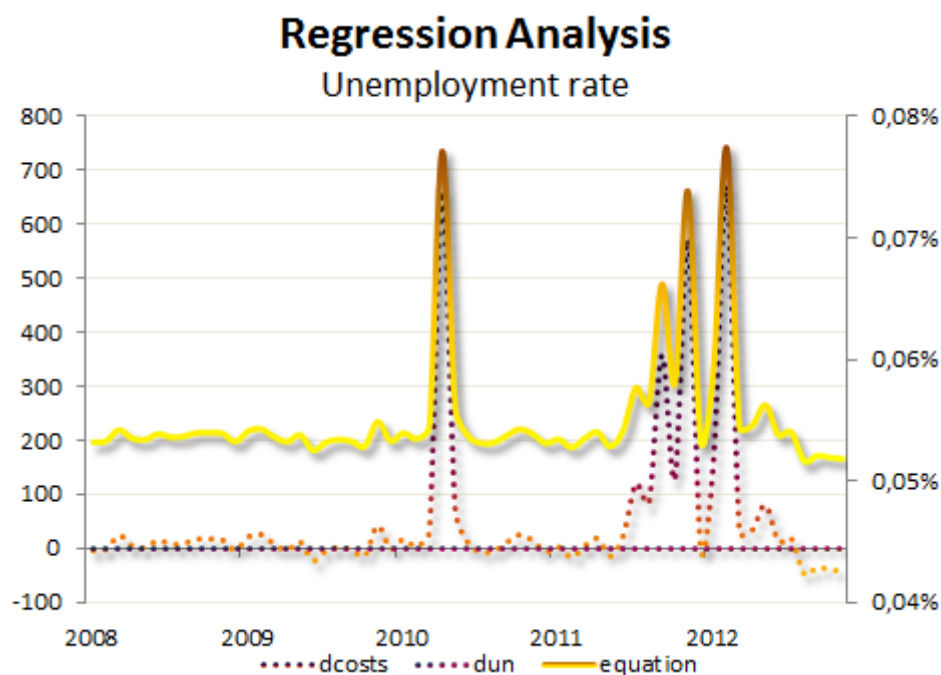
Dependent Variable: DUN
Method: Least Squares
Date: 05/19/14 Time: 03:21
Sample (adjusted): 2008M02 2012M12
Included observations: 59 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.000534	0.000113	4.739001	0.0000
DCOSTS	3.59E-07	7.20E-07	0.498306	0.6202
R-squared	0.004337	Mean dependent var		0.000553
Adjusted R-squared	-0.013130	S.D. dependent var		0.000808
S.E. of regression	0.000814	Akaike info criterion		-11.35658
Sum squared resid	3.77E-05	Schwarz criterion		-11.28616
Log likelihood	337.0192	Hannan-Quinn criter.		-11.32909
F-statistic	0.248309	Durbin-Watson stat		0.482469
Prob(F-statistic)	0.620186			

Source: created by author in eviews

There was no autocorrelation and heteroscedasticity present in the regression analysis model and normality levels were acceptable. Based on the equation, an assumption can be made that the €100 billion of bailout costs led to the positive increase of unemployment rate by +0.000359 % in the following year.

Graph 39: Graphic representation of Least Square Regression Analysis



Source: created by author

Again, the t-statistics and F-statistic were not acceptable and R squared value was statistically insignificant. Therefore, the zero hypothesis was rejected and the bailout costs had no impact on the unemployment rate.

3.3 Forecast-Actuals & Regression Analyses for USA & Comparisons

The U.S. financial crisis has commenced in 2007. In 2008 it has transformed into the global financial crisis impacting Europe as well. Several reasons were behind the creation of crisis. Firstly, the termination of Glass-Steagall Act in 1999 and introduction of Gramm-Leach-Bliley Act as a replacement caused that commercial and investment banking sector to be no longer separated. The commercial banking sector started to accept deposits from the clients and use them on riskier investment banking markets. Smaller banks were fused into bigger hybrid entities becoming too-big-to-fail as their balances became not-so-transparent for both internal and external audits.

Secondly, strong monetary expansion has been introduced as an answer to technology crisis in 2010 and 9/11 attack on World Trade Center. The former Federal Reserve governor Alan Greenspan has lowered the interest rates from 6.5% down to 1.75% in order to boost the economy. As the interest rates were at historically low values for almost 3 years, the bubble started to form on real estate and mortgage markets. When the interest rates were raised to 5.25% in 2005, lenders whose mortgages were based on flexible-rate payment terms started to become unable to meet their payment calendars.

Thirdly, as the capital became cheaper due to lowered interest rates, real estate market started to bloom. Banks' lending conditions were significantly eased. New risky lending products were introduced. For instance, liar loans were awarded without any income confirmation. Ninja loans were given to customers with no income, no job or assets. Many mortgage frauds were reported when banks or brokers have incorrectly filled out application documents on purpose in order for customer to receive the loan.

Fourthly, with the introduction of securitization, the banks started to transform their mortgages into asset-backed securities and collateral-debt obligations and sell them further on other market segments in order to decrease their leverage ratio. Once the real estate bubble burst, the dysfunctions on mortgage market started to spill over into other financial markets.

Fifthly, the rating agencies were unable to precisely rate new security instruments and their risk and the asset-backed securities became overrated in many instances. With the lack of appropriate staffing, the rating agencies were collecting two times higher fees for evaluating ABS and MBS instruments. Between 2002 and 2007, rating agencies collected \$3.2 trillion in these fees alone. As the mortgage backed securities received overly high

ratings, they became wildly traded on Wall Street. Many Wall Street companies were not allowed to buy securities with ratings below 'AA', therefore, overrating the securities was crucial in spreading the crisis into other financial segments.

Sixthly, moral hazard increased with the higher thresholds of deposit insurance. If the level of deposit insurance becomes too high, the customers are not so conscious where they are depositing their money regardless of the bank's financial health. Moreover, long-going precedent of American bailouts has decreased the risk awareness of financial companies.

Lastly, expansion of shadow banking has also contributed to the crisis as the non-banking institutions unable to accept deposits were not closely regulated by the government and became significant part of worsening the crisis. (Savkanič, 2011)

While the European Central Bank and European Union were focusing on providing additional liquidity on the markets to boost the market lending, they omitted the direct bailout help in restoring the economic situation. Alongside the Federal Reserve liquidity-providing operations, U.S. congress has commenced several restructuring packages, bailout help to crucial industries such as automobiles and nationalized multiple financial institutions. In addition, the U.S. government introduced several job aid packages in order to decrease the unemployment at the price of higher government debt. As the main goal of European Central Bank stays lowering of sovereign debt deficits in multiple Euro area countries, the fiscal cuts and reconsolidations are introduced at a price of worse economic development and unemployment rate.

Regarding the moral hazard, European Central Bank is preparing several resolution programs to improve the monitoring of banking system. Meanwhile, the U.S. Federal Reserve decided to again separate commercial and banking sector and the increase the deposit levels. While Europe focuses on regulation upgrades, the United States of America were looking for solutions in the legislative area. Both parties followed the lowering of interest rates during the crisis and multiplied their liquidity balances during the crisis in order to improve the inter-banking trading situation. (Cline, 2012)

3.3.1 Forecast-Actuals Analysis – U.S. Gross Domestic Product

The data for the Forecast-Actuals Analysis for USA were collected by Congressional Budget Office – an institution that specializes on creating analyses for U.S. Congress. Congressional Budget Office provides only one single scenario in their economic projections for future years. Therefore, the provided data set was analyzed as most-likely scenario and compared with the actuals.

The Forecast-Actuals Analysis for USA will compare the total bailout costs for U.S. economy and the yearly gross domestic product percentage change. The total bailout costs included the actual money spent in the U.S. economy as well as the U.S. guarantees and economy exposures to risk.

Table 40: Congressional Budget Office Projections for Gross Domestic Product

Real GDP	Actuals	Projections			
Year		1 Year	Variance	2 Years	Variance
2008	0,00%	1,73%	↓ -1,73%	2,89%	↓ -2,89%
2009	-2,63%	-3,02%	↑ 0,39%	2,78%	↓ -5,41%
2010	3,03%	3,04%	↓ -0,01%	2,93%	↑ 0,10%
2011	1,70%	2,69%	↓ -0,99%	2,10%	↓ -0,40%
2012	2,78%	2,12%	↑ 0,66%	3,14%	↓ -0,36%
2013	1,72%	2,26%	↓ -0,54%	-0,25%	↑ 1,97%
2014	N/A	2,68%	-	1,42%	-

Source: created by author. Data: <http://cbo.gov/>

For the one-year projections, total bailout costs spent between years of 2008-2012 in the amount of \$16'862.7 billion was considered. (Chantrill, 2014) The Forecast-Actuals Analysis analyzes the impact of bailout costs spent in period 2008-2012 and calculates the expected benefit of GDP growth rate the following year in 2009-2013. The used formula for U.S. economy stayed the same.

$$FAA_{1Y} = \frac{\sum \Delta \text{Gross Domestic Product}_Y (\%)}{\sum \Delta \text{Total Bailout Costs}_{Y-1}}$$

After inputting the gross domestic product projections divided by bailout costs, the results were following:

$$FAA_{1Y} = \frac{7.16\%}{16'862.7 \text{ bill. USD}} = \frac{0.425\%}{1'000 \text{ bill. USD}}$$

Based on the forecast-Actuals analysis, \$1 trillion of bailout costs should assure +0.425% growth of gross domestic product in the following years. When actuals were analyzed, the results were as below:

$$FAA_{ACT,1Y} = \frac{6.66\%}{16'862.7 \text{ bill. USD}} = \frac{0.395\%}{1'000 \text{ bill. USD}} > \frac{0.425\%}{1'000 \text{ bill. USD}}$$

In reality, additional \$1 trillion of bailout costs ensured +0.395% growth of GDP under-performing the forecast projections. Therefore, a conclusion can be made that the bailout costs were successful to stabilize gross domestic product growth in one-year term, however, the results were below the original expectations.

Second forecast-Actuals analysis was calculating the impact of bailout costs in years 2008-2011 on the two-year gross domestic product growth rate in years 2010-2013. The amount of total bailout costs guaranteed and spent was taken out of the total cost calculation in author's bachelor thesis 'U.S. Government and FED bailout plans in times of financial crisis' and equaled \$16'315.238 billion. The projection results for two-year term were these:

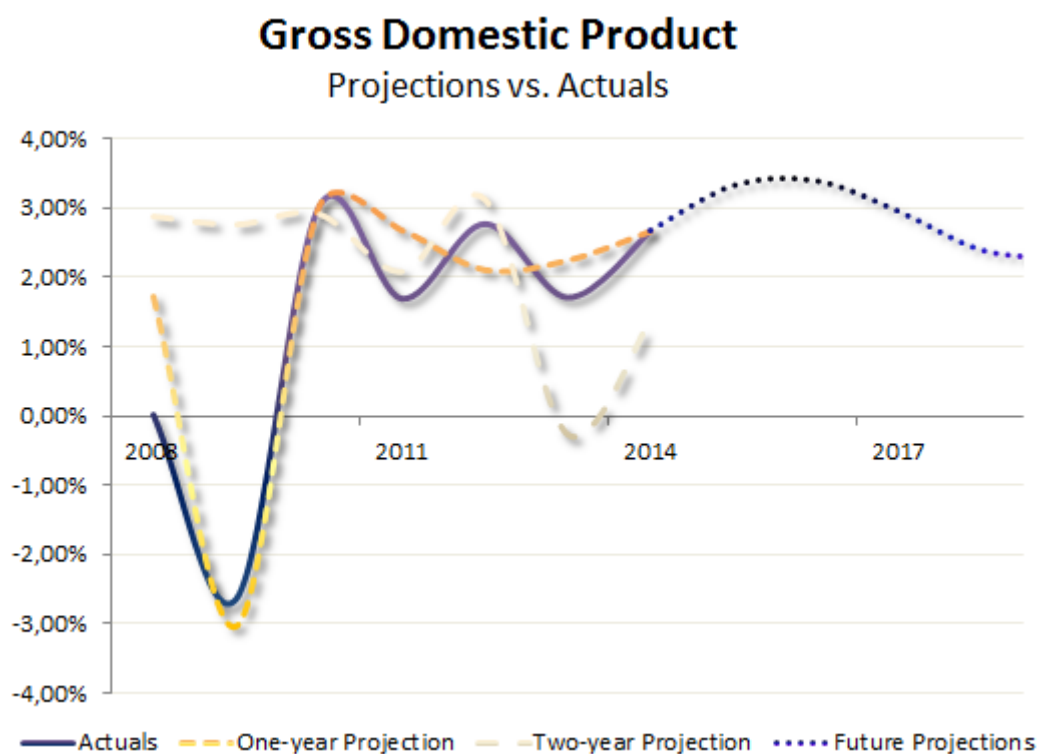
$$FAA_{2Y} = \frac{\sum \Delta \text{Gross Domestic Product}_Y(\%)}{\sum \Delta \text{Total Bailout Costs}_{Y-2}} = \frac{8.12\%}{16'315.2 \text{ bill. USD}} = \frac{0.498\%}{1'000 \text{ bill. USD}}$$

Based on the analysis, \$1 trillion of bailout costs should have ensured +0.498 growth of gross domestic product two years later.

$$FAA_{ACT,2Y} = \frac{9.54\%}{16'315.2 \text{ bill. USD}} = \frac{0.585\%}{1'000 \text{ bill. USD}} > \frac{0.498\%}{1'000 \text{ bill. USD}}$$

In reality, the results were again higher than the original forecast two years ago. \$1 trillion of bailout costs led to +0.585% growth of GDP two years later. In the graphic demonstration below, one can see that the gross domestic product struggled to grow in the first years where the bailout packages were absent. Once the bailout stimuli were introduced, the gross domestic product stabilized at positive levels years later.

Graph 41: Gross Domestic Product Projections and Reality



Source: created by author. Data: <http://cbo.gov/>

In case of one-year projection, the actuals were meeting the originally anticipated forecast, therefore, a conclusion can be made that bailout costs ensured the stable growth of GDP. In case of two-year projection, bailout costs managed to stabilize and boost the growth rate of gross domestic product with a delay of two years proving bailouts to be efficient.

3.3.2 Forecast-Actuals Analysis – U.S. Inflation Rate

In the Forecast-Actuals Analysis studying the U.S. inflation rate, an impact of bailout costs spent on the yearly inflation rate will be analyzed. The Federal Reserve longer-term inflation goal is two percent annual growth rate for personal consumption expenditures. According to the Federal Reserve, stable rate of two percent a year should maintain price stability and maximum levels of employment. A higher inflation rate could damage the public's ability of accurate longer-term financial and economic decision-making. On the contrary, a lower inflation could lead to deflation and overall decrease of wages causing weak economic situation in the country. (Federal Reserve, 2013)

Table 42: U.S. Inflation rate projections and actuals

Inflation Year	Actuals	Projections				Long-term Target	
		1 Year	Variance	2 Years	Variance	Target	Variance
2008	3,30%	2,59%	↑ 0,71%	1,98%	↑ 1,32%	2,00%	1,30%
2009	0,20%	-0,14%	↑ 0,34%	1,82%	↓ -1,62%	2,00%	-1,80%
2010	1,78%	1,46%	↑ 0,32%	1,14%	↑ 0,64%	2,00%	-0,22%
2011	2,46%	1,34%	↑ 1,12%	1,01%	↑ 1,45%	2,00%	0,46%
2012	1,85%	1,68%	↑ 0,17%	1,21%	↑ 0,64%	2,00%	-0,15%
2013	1,12%	1,31%	↓ -0,19%	1,34%	↓ -0,22%	2,00%	-0,88%
2014	N/A	1,33%	-	1,54%	-	2,00%	-

Source: created by author. Data: <http://cbo.gov/>

The Forecast-Actuals Analysis for one-year term studies the influence of bailout costs spent in 2008-2012 on yearly inflation rate growth in 2009-2013. Thus, geometric mean of overall inflation rate between years of 2009 to 2013 has been calculated as a benefit.

$$FAA_{1Y} = \frac{\overline{\text{Inflation Rate}_Y (\%)}}{\sum \Delta \text{Total Bailout Costs}_{Y-1}} = \frac{\sqrt[N]{(1 + I_1) * (1 + I_2) * ... * (1 + I_N)} - 1 (\%)}{\sum \Delta \text{Total Bailout Costs}_{Y-1}}$$

After entering the one-year projection data, the analysis shows that the bailout cost spending and guarantees should have ensured 1.13% yearly growth of inflation rate.

$$FAA_{1Y} = \frac{\overline{Inflation Rate}_Y (\%)}{\sum \Delta Total Bailout Costs_{Y.1}} = \frac{1.13\%}{16'862.7 \text{ bill.USD}}$$

After inputting the actuals into the formula, one can see that the delivered inflation yearly growth rate was 1.48%. This could suggest that the anticipated fear of deflation was proven to be wrong and that the bailout costs had positive anti-deflationary effect on the inflation rate.

$$FAA_{ACT,1Y} = \frac{1.48\%}{16'862.7 \text{ bill.USD}} > \frac{1.13\%}{16'862.7 \text{ bill.USD}}$$

A similar formula was used for analyzing two-year projections. To find out the impact of bailout costs spent in 2008-2011 on inflation rate two years later, geometric mean of inflation rates in years 2010-2013 was calculated.

$$FAA_{2Y} = \frac{\overline{Inflation Rate}_Y (\%)}{\sum \Delta Total Bailout Costs_{Y.2}} = \frac{\sqrt[N]{(1 + I_1) * (1 + I_2) * ... * (1 + I_N)} - 1 (\%)}{\sum \Delta Total Bailout Costs_{Y.2}}$$

Based on the two-year projections, the expected benefit of bailout costs was to maintain at least 0.94% yearly growth of inflation rate.

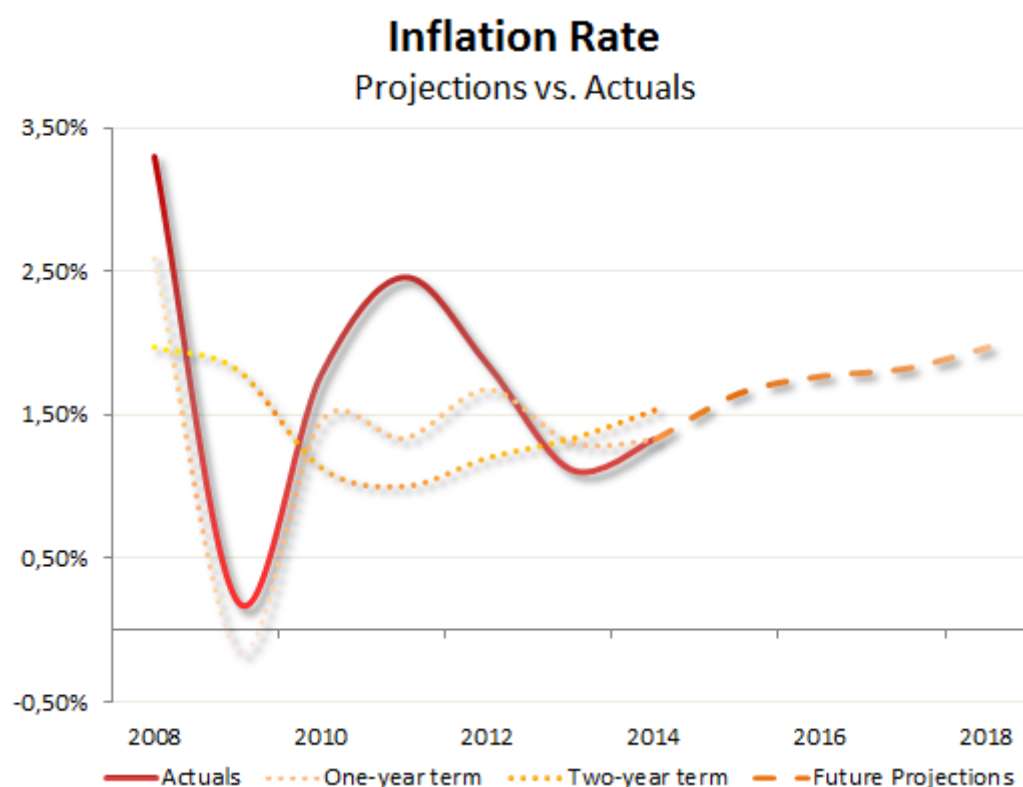
$$FAA_{2Y} = \frac{\overline{Inflation Rate}_Y (\%)}{\sum \Delta Total Bailout Costs_{Y.2}} = \frac{0.94\%}{16'315.2 \text{ bill.USD}}$$

The real output again exceeded the projections, and bailout costs led to stable yearly inflation rate growth of 1.44% two years later.

$$FAA_{ACT,2Y} = \frac{1.44\%}{16'315.2 \text{ bill.USD}} > \frac{0.94\%}{16'315.2 \text{ bill.USD}}$$

Compared to the two-year projections, the actual inflation rate was half percent higher than anticipated. Based on the graphic illustration, the actual inflation rate was higher than the one-year projections at most times. In case of two-year term, the inflation rate also mostly exceeded the forecast except the year of 2009. This could be explained by the fact that the deflationary drop of inflation rate in 2009 could not be predicted two years ago as the economic crisis did not occur until late 2007.

Graph 43: Inflation Rate Projections and Reality



Source: created by author. Data: <http://cbo.gov/>

The conclusion can be made that the actual inflation rate has exceeded both one-year term and two-year term forecasts. Therefore, one could assume that the bailout costs helped fight the deflationary effects on the real inflation rate and bring inflation rate closer to the Federal Reserve longer-term target goal of two percent inflation growth rate per rate.

3.3.3 Forecast-Actuals Analysis – U.S. Unemployment Rate

In the Forecast-Actuals Analysis studying the U.S. unemployment rate, an impact of bailout costs spent on the development of yearly unemployment rate will be analyzed. The unemployment rate was one of the main economic crisis indicators as its numbers have nearly doubled in 2009, a year after the crisis struck.

Table 44: Unemployment rate one-year and two-year projections

Unemployment Year	Actuals	Projections			
		1 Year	Variance	2 Years	Variance
2008	5,80%	5,09%	↑ 0,71%	4,69%	↑ 1,11%
2009	9,30%	8,80%	↑ 0,50%	5,35%	↑ 3,95%
2010	9,63%	9,55%	↑ 0,08%	9,02%	↑ 0,61%
2011	8,95%	9,42%	↓ -0,47%	8,97%	↓ -0,02%
2012	8,08%	8,21%	↓ -0,13%	8,43%	↓ -0,35%
2013	7,43%	8,08%	↓ -0,65%	8,76%	↓ -1,33%
2014	N/A	6,80%	-	7,94%	-

Source: created by author. Data: <http://cbo.gov/>

In the analysis of one-year term data, the forecast-Actuals analysis studies the expected outcome of bailout costs spent in 2008-2012 on unemployment rate in 2009-2013.

$$FAA_{1Y} = \frac{\sum \Delta \text{Unemployment Rate}_Y (\%)}{\sum \Delta \text{Total Bailout Costs}_{Y-1}}$$

Based on the forecast-Actuals analysis, the bailout costs should have maintained the stable rate of 8.81% unemployment rate per year averting its escalation to very high numbers. Many stimuli packages oriented on creation of new jobs as the crisis have strongly hit the real estate market leaving many jobless behind.¹

$$FAA_{1Y} = \frac{8.81\%}{16'862.7 \text{ bill. USD}}$$

¹ Bachelor thesis

Based on the actuals input, the real unemployment rate was slightly below the expected forecasts, showing that the bailout costs managed to meet the expectations of creating new job positions and creating manageable level of unemployment in the United States.

$$FAA_{ACT,1Y} = \frac{8.67\%}{16'862.7 \text{ bill. USD}} < \frac{8.81\%}{16'862.7 \text{ bill. USD}}$$

The forecast-Actuals analysis for two-year term quantified the impact of bailouts spent 2008-2011 on unemployment rate two years later in 2010-2013. As one can see, in two-year term the bailout costs should have recovered the high levels of unemployment and bring the unemployment rate down from 8.81% to 6.98%.

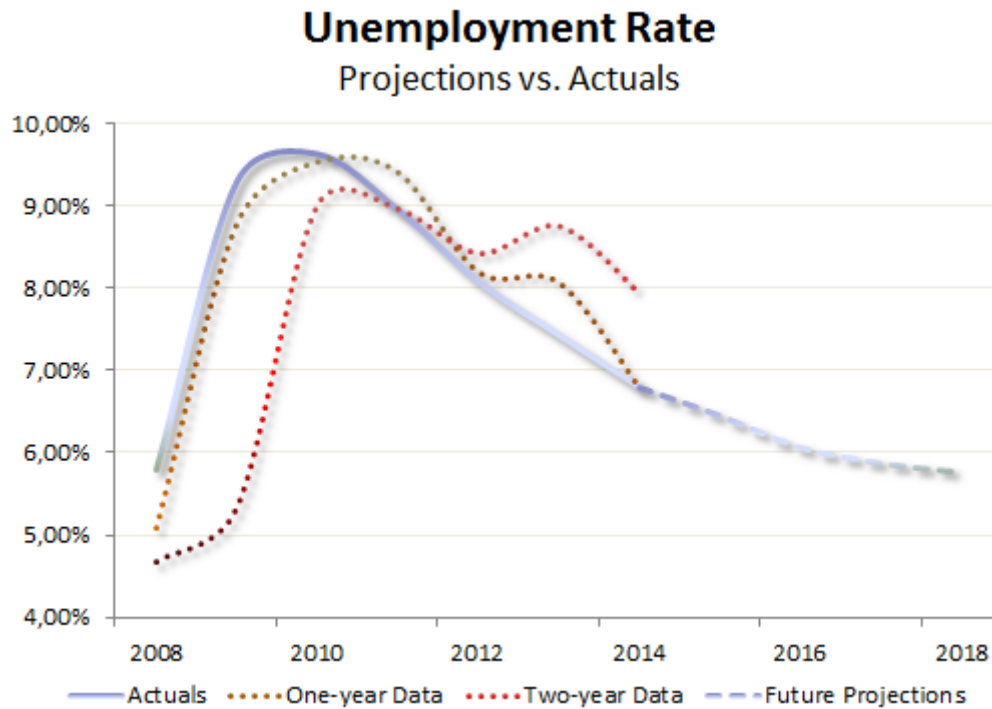
$$FAA_{2Y} = \frac{\sum \Delta \text{Unemployment Rate}_r(\%)}{\sum \Delta \text{Total Bailout Costs}_{r-2}} = \frac{6.98\%}{16'315.2 \text{ bill. USD}}$$

When compared to the reality, the results were again desirable. The actual unemployment rate has decreased below the forecasted projection suggesting that the bailout stimuli have managed to successfully lower the unemployment rate.

$$FAA_{ACT,2Y} = \frac{6.76\%}{16'315.2 \text{ bill. USD}} < \frac{6.98\%}{16'315.2 \text{ bill. USD}}$$

When the projections and actuals are compared graphically, one can see that while the actuals were above the one-year and two-year term forecast in years 2008-2010, the real unemployment rate managed to decrease at a faster pace than anticipated below lower than both one-year and two-year projections in years 2011-2013.

Graph 45: Unemployment Rate Projections and Reality



Source: created by author. Data: <http://cbo.gov/>

Based on the forecast-Actuals analysis, couple conclusions can be made. Firstly, the unemployment rate did not escalate into very high figures above the projections and have been successfully maintained stable at predicted levels. Secondly, even though the unemployment rate was above the projections in first three years, the desirable effects occurred between 2011 and 2013 suggesting that the full effect of bailout costs appeared three years later after stimuli implementation and unemployment rate is now dropping at a faster speed.

This can be supported by the latest very fast-paced unemployment rate development. In February 2014, the 222 thousand Americans were newly employed. In March, another 203 thousand have found a job. In April 2014, 288 thousand new employments have been created dropping the unemployment rate down to 6.3%. For the first time in years, the unemployment rate started to reach pre-crisis levels omitting the destructive impact of the financial crisis. (Rushe, 2013) Thus, the bailout costs oriented on creation of new jobs can be considered to be very efficient with certain time delay.

3.4 Regression Analyses of U.S. macroeconomic indicators

3.4.1 U.S. Gross Domestic Product

In the first regression analysis for USA, the zero hypothesis was whether there was any relation between bailout costs spent in the United States and U.S. gross domestic product. Did the amount of €16 trillion of bailout packages spent in 2008-2012 had an impact on the quarterly U.S. gross domestic product rate produced one year later in 2009-2013. 19 samples of adjusted quarterly data were used after being stationarized for the analysis. The zero hypothesis was

$$H_0: \text{Gross Domestic Product}_{t-1,Y} = \alpha + \beta TBC_{Y-1} + \omega$$

where α , β are constants. ω represents random walk. TBC represents the amount of bailout costs spent and guaranteed in the previous year. Gross Domestic Product represents the first differentiation variable of GDP dependent on the bailout costs. The analysis result was

$$H_0: \text{Gross Domestic Product}_{t-1,Y} = 28.208 + 4.024 TBC_{Y-1}$$

Regression Analysis 46: Gross Domestic Product regression analysis model

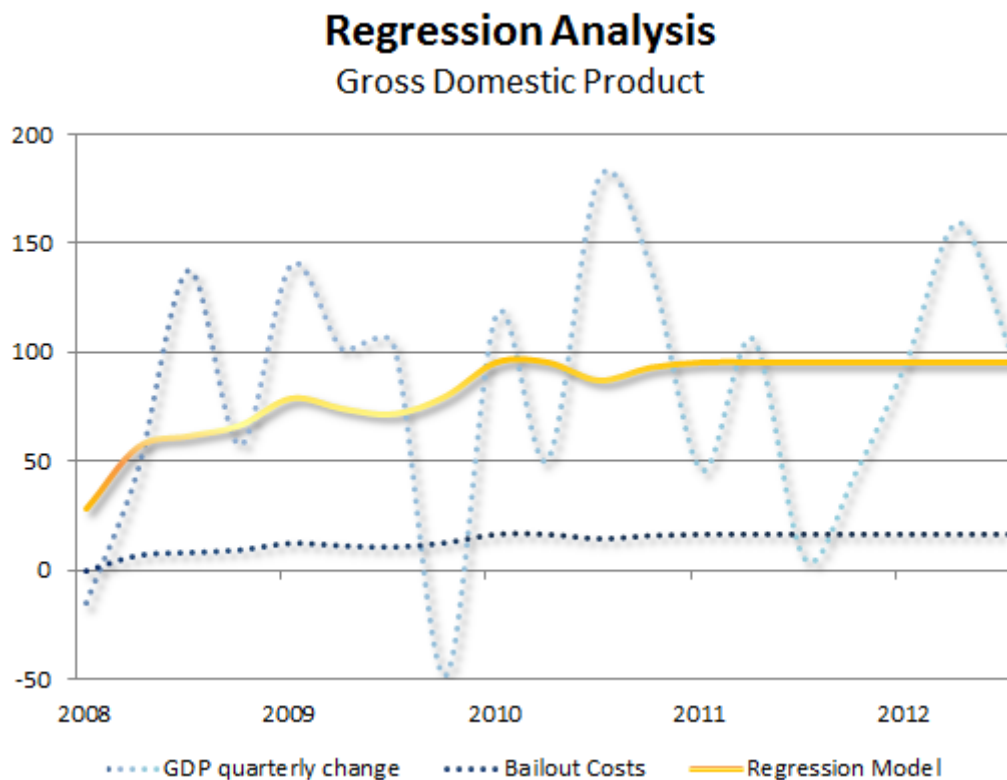
Dependent Variable: DGD
 Method: Least Squares
 Date: 05/26/14 Time: 00:01
 Sample (adjusted): 2008Q2 2012Q4
 Included observations: 19 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	28.20799	43.26050	0.652049	0.5231
TBC	4.023686	3.033889	1.326247	0.2023
R-squared	0.093765	Mean dependent var		82.64211
Adjusted R-squared	0.040457	S.D. dependent var		60.83173
S.E. of regression	59.58849	Akaike info criterion		11.11210
Sum squared resid	60363.40	Schwarz criterion		11.21152
Log likelihood	-103.5650	Hannan-Quinn criter.		11.12893
F-statistic	1.758931	Durbin-Watson stat		2.149018
Prob(F-statistic)	0.202301			

Source: created by author in eviews Data: <http://www.bea.gov/>

Based on the analysis, \$1 trillion of bailout costs spent previous year lead to an increase of \$4 billion of U.S. quarterly gross domestic product in the following year. There was no autocorrelation and heteroscedasticity in the least squares regression model and normality levels were acceptable. On the other hand, the t-statistics and F-statistic were above 5 percent and R squared value equaled 4 percent meaning the model did not find direct relation between bailout costs spent and gross domestic product. Thus, the zero hypothesis was rejected.

Graph 47: Graphic representation of Regression Analysis



Source: created by author

Just like in the regression analysis results in author's bachelor thesis, no direct relationship between U.S. bailout packages and gross domestic product was found again. Even though U.S. economy starts to slowly recover, one cannot assume that the bailout costs alone ensured the positive growth of U.S. GDP. Actuals meeting forecast predictions in the Forecast-Actuals Analysis cannot be explained by the bailout costs spent.

3.4.2 U.S. Inflation Rate

In the second Regression Analysis, the relationship between \$1 trillion of total bailout costs guaranteed and the inflation rate has been studied. The main hypothesis is that the bailout costs guaranteed in the period 2008-2012 had an influence on the U.S. inflation rate in following years 2009-2013. For the analysis, 18 samples after adjustment of monthly data were studied and stationarized to remove autocorrelation of the time series and avoid spurious regression. Inflation rate time series have been further adjusted by the second differentiation as the time series were still non-stationary and was not passing unit root test after the first differentiation. As a result, the formula analyzed the connection between the second differentiation of inflation rate and the bailout stimuli costs.

$$H_0: \text{Inflation Rate}_{t-2, Y} = \alpha + \beta TBC_{Y-1} + \omega$$

where α , β are constants. ω represents random walk. TBC is the variable equaling the total exposure of bailout costs in the previous year. Inflation represents the second differentiation variable of inflation rate dependent on the bailout costs. After running the analysis, the final formula was

$$H_0: \text{Inflation Rate}_{t-2, Y} = 0.153 - 0.011 TBC_{Y-1}$$

Regression Analysis 48: Inflation Rate regression analysis model

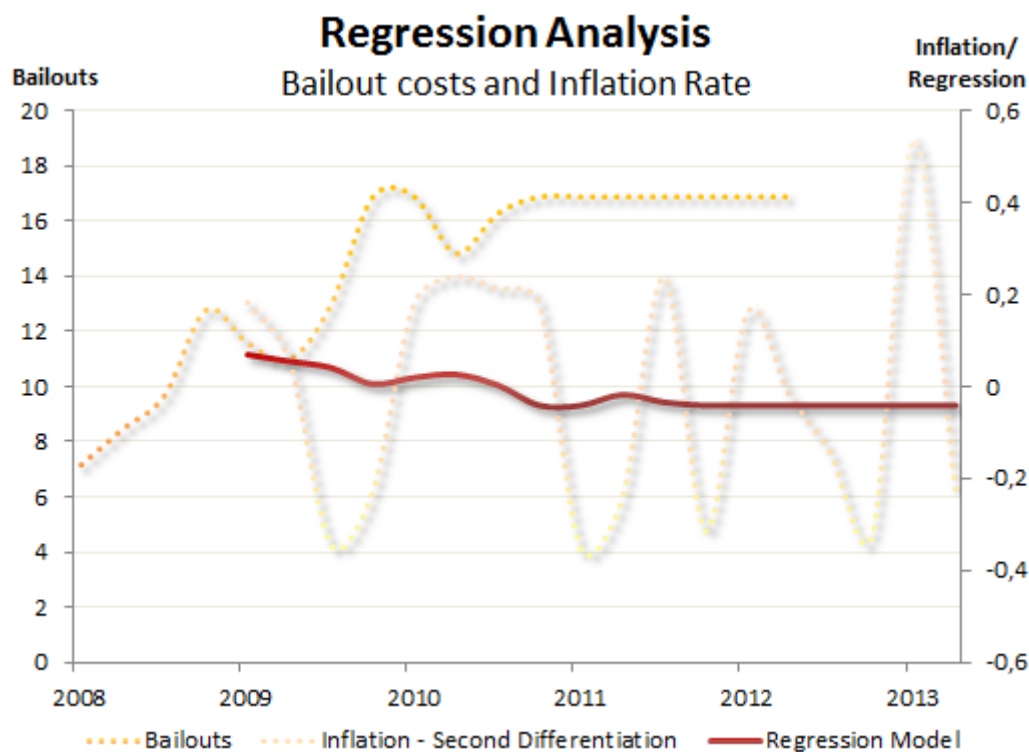
Dependent Variable: DINFL
Method: Least Squares
Date: 05/26/14 Time: 01:14
Sample (adjusted): 2008Q3 2012Q4
Included observations: 18 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.153504	0.286524	0.535744	0.5995
TBC	-0.011368	0.019558	-0.581246	0.5692
R-squared	0.020679	Mean dependent var	-0.008833	
Adjusted R-squared	-0.040529	S.D. dependent var	0.266078	
S.E. of regression	0.271416	Akaike info criterion	0.334113	
Sum squared resid	1.178668	Schwarz criterion	0.433043	
Log likelihood	-1.007015	Hannan-Quinn criter.	0.347754	
F-statistic	0.337847	Durbin-Watson stat	2.385907	
Prob(F-statistic)	0.569173			

Source: created by author in eviews Data: <http://research.stlouisfed.org/>

No autocorrelation and heteroscedasticity were present in the least squares regression model and normality levels were acceptable at 5 percent probability. According to the model, \$1 trillion of bailout costs led to the negative change of -0.011 on personal consumption expenditures inflation rate the following year.

Graph 49: Graphic representation of Least Square Regression Analysis



Source: created by author Data: <http://research.stlouisfed.org/>

In author's bachelor thesis, the inflationary relation between bailout costs and inflation rate was found in the short term. However, as longer period was studied now, a conclusion was reached that bailout costs had neither inflationary nor deflationary influence on the U.S. inflation rate in the longer term. The t-statistics and F-statistic were not rejected and R squared was not statistically significant. As the zero hypothesis is rejected, a conclusion can be reached that despite the expectations inflation rate stayed unaffected by the huge amounts of bailout costs and volume changes of Federal Reserve monetary base. In addition, average yearly inflation rate in years 2009-2013 equaled 1.48 percent being close to the 2 percent target stressing the successful monetary policy transmission mechanism.

3.4.3 Unemployment Rate

In the third regression analysis, the relation between \$trillion of spent and guaranteed bailout costs and the U.S. unemployment rate was calculated. The main hypothesis says that the bailout costs guaranteed in the period 2008-2012 had an effect on the U.S. unemployment rate the following year in years 2009-2013. For the analysis, 19 adjusted samples of quarterly data were studied and stationarized to remove time series autocorrelation. As a consequence, the bailout costs and first differentiation of unemployment rate was analyzed.

$$H_0: \text{Unemployment Rate}_{t-1, Y} = \alpha + \beta TBC_{Y-1} + \omega$$

where α , β are constants. ω represents random walk. TBC is the variable representing the bailout cost total exposure guarantees in the previous year. Unemployment Rate represents dependent variable of first differentiation of unemployment rate. After running the analysis, the results were

$$H_0: \text{Unemployment Rate}_{t-1, Y} = 0.697 - 0.057 TBC_{Y-1}$$

Regression Analysis 50: Unemployment Rate regression analysis model

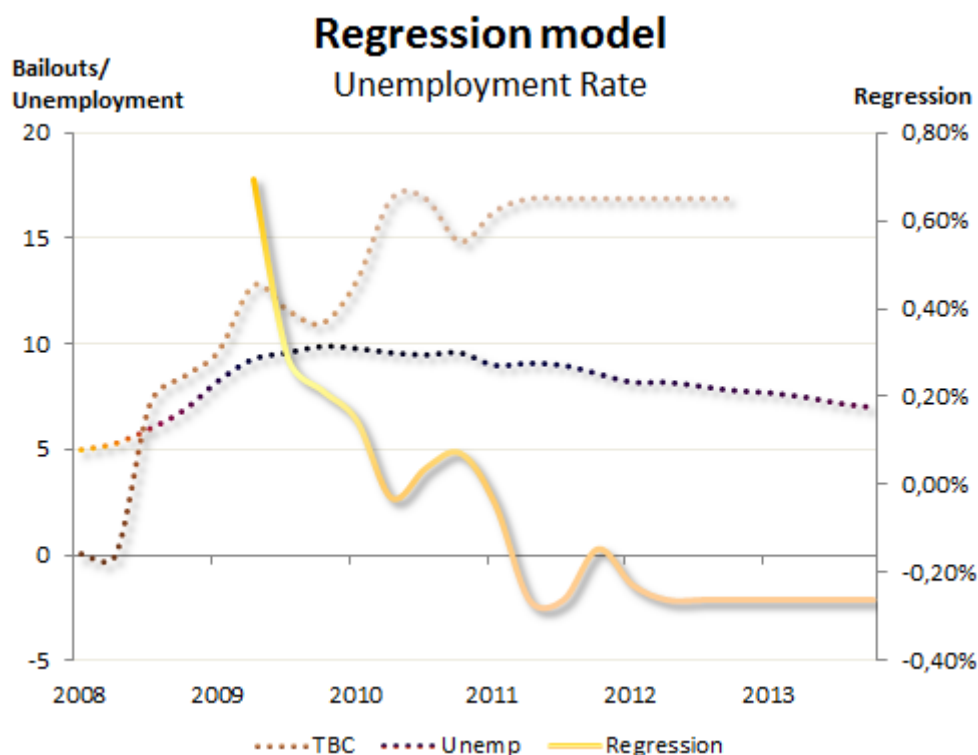
Dependent Variable: DUNEM
Method: Least Squares
Date: 05/26/14 Time: 11:33
Sample (adjusted): 2008Q2 2012Q4
Included observations: 19 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.697345	0.165648	4.209798	0.0006
TBC	-0.056604	0.011617	-4.872529	0.0001
R-squared	0.582735	Mean dependent var		-0.068421
Adjusted R-squared	0.558191	S.D. dependent var		0.343273
S.E. of regression	0.228169	Akaike info criterion		-0.018158
Sum squared resid	0.885040	Schwarz criterion		0.081257
Log likelihood	2.172501	Hannan-Quinn criter.		-0.001333
F-statistic	23.74154	Durbin-Watson stat		2.164100
Prob(F-statistic)	0.000143			

Source: created by author in eviews, Data: <http://research.stlouisfed.org/>

There was no autocorrelation and heteroscedasticity present in the least squared regression analysis model and normality levels were acceptable. The t-statistics and F-statistic were acceptable at 5 percent probability and R squared value equaled 55.8% meaning that 55.8 percent of data was explained by the regression model. Therefore, the zero hypothesis was accepted and the bailout costs spent indeed had an impact on the unemployment rate.

Graph 51: Graphic representation of Least Square Regression Analysis



Source: created by author in eviews Data: <http://research.stlouisfed.org/>

Based on the equation, a conclusion can be made that each additional \$1trillion of bailout cost guarantees led to the lowering of U.S. unemployment rate by -0.056 % in the following year. The model supports the Forecast-Actuals Analysis that the bailout packages (certain part of them oriented on new jobs creation) succeeded in creating new job positions on the market and bringing the unemployment rate in 2014 to the pre-crisis levels. Thus, the bailout costs were efficient in ameliorating the unemployment rate.

Conclusion

The thesis aim was to analyze the effectiveness of European Central Bank monetary policies and bailout costs. The ECB monetary policies have in general met their individual goals of improving certain dysfunctions in Euro area markets. As there was time pressure during the crisis outbreak, many policies were introduced hastily. The European Central Bank has managed this situation through reworking the monetary policies fixing the previous flaws or introducing new permanent programmes as a replacement oriented on averting future bailout risks and possibility of moral hazard.

On the other hand, policies did not fully succeed in repairing the lending conditions and credit availability on the markets. Even though the situation started to improve in 2012, the lowering of liquidity levels to its pre-crisis levels worsened the overall market lending. Moreover, even though sovereign debts of certain countries are rising at a slower pace, slow economic growth leads to the rising of debt/gross domestic product ratios. The sovereign problem is still not resolved and will require more time and fiscal reforms to come.

In the empirical research part, a conclusion was made that bailout costs had neither inflationary nor deflationary influence. The inflation rate was meeting European Central Bank targets in the medium-term underlying the successful European Central Bank role of price stability. However, regarding the short-term run, a possibility of deflation is still in question taking into account the development in upcoming couple years.

In case of the United States of America, the bailout costs were also proved to have no impact on inflation rate. As the medium-term inflation remained stabilized above forecasted deflationary trends, the Federal Reserve role of price stability was rated positively as well. However, if compared to the Euro area, the medium-term inflation remains lower, possibly due to stronger deflationary pressures. Therefore, the risk of possible future deflation should be considered as well.

On the contrary, based on the empirical analysis the Euro area bailout costs had no impact on improving the gross domestic product and unemployment rate. As both indicators continue to worsen, European Central Bank has failed in its new status of stepping in and enhancing the overall Euro area economic situation. Healthy gross domestic product fails to

recover and unemployment rate is reaching record values as more fiscal reforms and budget restructuring are introduced.

Meanwhile, the U.S. economy has commenced to recover. Even though there was no direct relation found between gross domestic product and bailout packages, the gross domestic product maintains at a stable positive growth rate each year recently. In addition, an inverse relation was found between bailout stimuli and unemployment rate. As more job aid packages were introduced, the unemployment rate started to recover in 2011 and even starts to reach its pre-crisis values now. Therefore, bailout packages of the Federal Reserve with the help of the U.S. congress have managed to stabilize and recover the U.S. economy and were rated as successful.

Compared to the United States of America, European Central Bank mostly strives for indirectly improving the macroeconomic situation by directly resurrecting the banking sector through various liquidity-providing operations and increasing overall market robustness. The individual countries' fiscal reforms slowly repairing the sovereign debts, however, at a price of rising unemployment rate and worsening gross domestic product. On the other hand, multiple bailout packages were spent on the U.S. economy to restructure its industries and create new jobs. Based on the actuals, this approach is rated as successful. Nonetheless, the U.S. deficit continues to increase raising the question of future economic development.

The main reason behind different economic development in Europe and the United States of America could be also explained by the different systems of public finance. While the United States as a federation is united in flat implementation of fiscal reforms, the European Central Bank has struggled in restructuring the public finances and sovereign debts in Europe based on the unwillingness of certain countries to participate in the Euro area economic recovery. Therefore, more time, fiscal reforms and better system of regulation might be needed until the positive effects of bailout costs start to reflect on Euro area gross domestic product and unemployment rate.

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Appendix

Data used in chapter 3

Eurozone	Bailout Costs	GDP
Period	in million EUR	in million EUR
Q1-2008	25 620,3	
Q2-2008	49 875,0	
Q3-2008	74 915,7	
Q4-2008	117 486,2	
Q1-2009	153 207,7	2 228 693,1
Q2-2009	186 968,0	2 224 610,6
Q3-2009	168 833,1	2 234 390,7
Q4-2009	170 910,2	2 249 688,4
Q1-2010	205 290,9	2 263 436,3
Q2-2010	709 342,9	2 289 961,4
Q3-2010	982 438,8	2 304 920,7
Q4-2010	1 009 911,3	2 319 322,1
Q1-2011	1 017 181,8	2 348 278,3
Q2-2011	1 018 764,8	2 357 893,6
Q3-2011	1 148 140,7	2 365 334,8
Q4-2011	1 880 883,6	2 367 823,5
Q1-2012	2 639 631,1	2 374 564,5
Q2-2012	3 220 355,6	2 375 595,2
Q3-2012	3 294 968,6	2 378 885,4
Q4-2012	3 193 233,6	2 376 626,6
Q1-2013		2 385 171,7
Q2-2013		2 400 584,5
Q3-2013		2 405 818,7
Q4-2013		2 414 385,7

Source: sdw.ecb.europa.eu, eurocrisismonitor.com, ecb.europa.eu

Eurozone	Bailout Costs	Inflation	Unemployment
Period	in billion EUR	in percentage	in percentage
2008-01-01	29,946		
2008-02-01	24,087		
2008-03-01	22,828		
2008-04-01	46,688		
2008-05-01	50,828		
2008-06-01	52,109		
2008-07-01	66,966		
2008-08-01	74,374		
2008-09-01	83,407		
2008-10-01	100,678		
2008-11-01	118,127		
2008-12-01	133,654		

2009-01-01	130,457	1,10%	8,61%
2009-02-01	151,762	1,20%	8,91%
2009-03-01	177,404	0,60%	9,21%
2009-04-01	185,127	0,60%	9,34%
2009-05-01	181,833	0,00%	9,45%
2009-06-01	193,944	-0,10%	9,57%
2009-07-01	171,233	-0,60%	9,68%
2009-08-01	166,600	-0,20%	9,77%
2009-09-01	168,667	-0,30%	9,87%
2009-10-01	166,194	-0,10%	9,91%
2009-11-01	152,058	0,50%	9,95%
2009-12-01	194,479	0,90%	9,98%
2010-01-01	192,977	0,90%	10,02%
2010-02-01	209,906	0,80%	10,05%
2010-03-01	212,990	1,60%	10,06%
2010-04-01	243,572	1,60%	10,12%
2010-05-01	905,789	1,70%	10,11%
2010-06-01	978,667	1,50%	10,06%
2010-07-01	988,548	1,70%	10,05%
2010-08-01	981,954	1,60%	10,07%
2010-09-01	976,814	1,90%	10,06%
2010-10-01	988,106	1,90%	10,09%
2010-11-01	1 013,582	1,90%	10,02%
2010-12-01	1 028,046	2,20%	9,98%
2011-01-01	1 020,972	2,30%	9,91%
2011-02-01	1 023,680	2,40%	9,86%
2011-03-01	1 006,894	2,70%	9,83%
2011-04-01	1 010,984	2,80%	9,76%
2011-05-01	1 029,831	2,70%	9,85%
2011-06-01	1 015,480	2,70%	9,89%
2011-07-01	1 038,656	2,60%	10,02%
2011-08-01	1 159,862	2,50%	10,12%
2011-09-01	1 245,903	3,00%	10,27%
2011-10-01	1 604,221	3,00%	10,37%
2011-11-01	1 733,442	3,00%	10,55%
2011-12-01	2 304,989	2,70%	10,61%
2012-01-01	2 304,035	2,70%	10,67%
2012-02-01	2 472,163	2,70%	10,80%
2012-03-01	3 142,695	2,70%	10,94%
2012-04-01	3 170,743	2,60%	11,10%
2012-05-01	3 204,769	2,40%	11,18%
2012-06-01	3 285,554	2,40%	11,31%
2012-07-01	3 298,615	2,40%	11,36%
2012-08-01	3 317,032	2,60%	11,40%
2012-09-01	3 269,260	2,60%	11,50%

2012-10-01	3 233,845	2,50%	11,66%
2012-11-01	3 194,248	2,20%	11,73%
2012-12-01	3 151,608	2,20%	11,82%
2013-01-01		2,00%	11,94%
2013-02-01		1,80%	11,97%
2013-03-01		1,70%	11,98%
2013-04-01		1,20%	11,99%
2013-05-01		1,40%	12,00%
2013-06-01		1,60%	11,98%
2013-07-01		1,60%	11,98%
2013-08-01		1,30%	11,99%
2013-09-01		1,10%	12,00%
2013-10-01		0,70%	11,93%
2013-11-01		0,90%	11,93%
2013-12-01		0,80%	11,87%

Source: *sdw.ecb.europa.eu, eurocrisismonitor.com, ecb.europa.eu*

USA	Bailout Costs	GDP	Inflation	Unemployment
Period	in \$ trillion	in \$ billion	CPE Index	in percentage
Q1-2008	0			
Q2-2008	0			
Q3-2008	7,2			
Q4-2008	8,49			
Q1-2009	9,7	14 372,1	99,184	8,3
Q2-2009	12,8	14 356,9	99,627	9,3
Q3-2009	11,6	14 402,5	100,252	9,6
Q4-2009	11	14 540,2	100,938	9,9
Q1-2010	13	14 597,7	101,282	9,8
Q2-2010	16,9	14 738,0	101,398	9,6
Q3-2010	16,9	14 839,3	101,698	9,5
Q4-2010	14,85	14 942,4	102,239	9,6
Q1-2011	16,3	14 894,0	102,996	9
Q2-2011	16,9	15 011,3	103,938	9,1
Q3-2011	16,9	15 062,1	104,529	9
Q4-2011	16,9	15 242,1	104,88	8,6
Q1-2012	16,9	15 381,6	105,471	8,2
Q2-2012	16,9	15 427,7	105,75	8,2
Q3-2012	16,9	15 534,0	106,193	8
Q4-2012	16,9	15 539,6	106,622	7,8
Q1-2013		15 583,9	106,909	7,7
Q2-2013		15 679,7	106,878	7,5
Q3-2013		15 839,3	107,387	7,2
Q4-2013		15 942,3	107,671	7

Sources: *authors' bachelor thesis, www.usfederalbailout.com, www.sig tarp.gov, research.stlouisfed.org, www.bea.gov*