



ICADE Business School

NON-CONVENTIONAL MONETARY POLICY OF THE EUROPEAN CENTRAL BANK DURING THE FINANCIAL CRISIS

Autor: Francisco Javier Buendia Murcia

Director: Juan Rodríguez Calvo

Madrid
Julio 2017

Francisco Javier
Buendia
Murcia

**NON-CONVENTIONAL MONETARY POLICY OF THE EUROPEAN
CENTRAL BANK DURING THE FINANCIAL CRISIS**



Contents

Contents.....	3
Abstract	1
Objective.....	2
Methodology	2
Introduction to Monetary Policy.....	3
Economic Analysis:	3
Real activity and conditions	3
Asset prices and yields.....	4
Projections of the Macroeconomy.....	4
Monetary analysis:	4
Long-term horizon	4
Monetary and credit developments.....	4
Monetary aggregates	5
Monetary policy instruments	6
Operational Framework.....	6
Monopoly supplier of monetary base	7
Define and communicating the monetary policy strategy.....	7
Ensure correct functioning of money markets	7
Guiding principles	7
Economic drivers of Non-standard measures.	8
Economic Timeline	8
Origins.	8
Monetary policy before and after Lehman.....	9
Economic policy in times of crisis	10
European Central Bank's objectives.....	13
Price Stability.....	13
Monetary Policy Transmission Mechanism	14

The Interbanking Market	14
Covered bonds	15
Sovereign bonds	15
Other targets	15
European Central Bank's measures and stimulus	16
Main Refinancing Operations (MRO).....	16
Deposit Facility.....	17
Marginal Lending Facility	17
Non-standard measures.....	17
1. Forward Guidance.....	17
2. Quantitative Easing (QE).....	17
3. Qualitative Easing.....	19
4. Unlimited liquidity injections (LTRO & TLTRO).....	19
Assets Purchase Programme or Quantitative Easing.....	19
Risks on European Central Bank's Balance Sheet.....	21
Real consequences of Quantitative Easing	23
Tapering.....	23
Comparative of the main central banks' strategies during the crisis.....	25
Timeline.....	25
Non-conventional monetary strategies across the Globe:.....	26
A special look to the FED	28
Quantitative Easing Phase 1 (QE1).....	28
Quantitative Easing Phase 2 (QE2).....	29
Operation Twist.....	29
Maturity Extension Programme development and Quantitative Easing phase 3	30
Tapering.....	30
Outlook for the future	30
Outlook analyzed by Forward Guidance	32
Example of an economic analysis made based on the Speech by Mario Draghi, President of the ECB, at The ECB and Its Watchers XVIII Conference, Frankfurt am Main, 6 April 2017	32
Conclusions.....	35
APP	36
References.....	37

Abstract

The beginning of the financial crisis, the largest since 1929, had a devastating impact on the economy of the European Union and created a disruption in the macroeconomic indicators affecting GDP growth (-2.8% in 2009), unemployment rate (11% in 2013) or inflation, which remained negative in the second half of 2009.

The economy had a problem with the banking sector and they were bailed in with public capital. After this first period, the public debt crisis came up immediately, pushing the European Central Bank to give facilities to the countries in many ways.

This framework lead into a historical period in terms of economic measures, intended to dynamize the Eurozone's economy. An extraordinary battery of expansive monetary policies was implemented to provide liquidity to the system and maintain inflation at acceptable levels. For the first time in history, interest rates where below zero (the situation is maintained nowadays) and this factor motivated the current paper.

Objective

This study has the aim of explaining the principal motivations of the European Central Bank and describes the tools that the institution is entitled to use in order to have a clear view of the factors leading to such extraordinary non-conventional measures.

Once we have understood the economic environment since 2008, it is time to describe, analyze and assess the measures implemented to evaluate if the measures have been effective.

Methodology

The methodology employed is the assessment of the non-standard monetary policies undertaken by the European Central Bank through a descriptive and comparative analysis based on the outputs that these measures have given in the Eurozone and other economic areas.

The first part of the paper describes the evolution of monetary policies in Europe, from a description of the basics to a timeframe of the economic evolution and measures implemented.

After this first block, it is analyzed the objectives that the ECB tries to achieve and what are the principal tools it has to meet its targets, including non-conventional measures. The Asset Purchase Programme (Quantitative Easing) will be analyzed in a deeper way as it is the most complex and controversial measure and it will be provided a comparison in this specific measure among other central banks (specially the FED).

Moreover it will be developed an analysis of Forward Guidance in order to simulate the predictions investment professionals has to make from Mario Draghi's words. This part will help us to understand the outstanding implications of every word within Forward Guidance announcements.

Introduction to Monetary Policy.

The European Central Bank took charge of the monetary policy of the Eurozone in 1999, an historical fact as it is the second largest economic area just behind United States.

The monetary policy that the Central Bank has been applying during this 18 year period is fundamentally based on the experience of other central banks actions during decades and how did the economy reacted to the stimulus, with special focus on the measures that accomplished to reduce the inflation to stable and healthy levels in the 1980's.

The institutional framework of the monetary policy is supported by two main pillars:

1. Price stability: It is the principal target. The ideal scenario for the Eurozone is to create inflation in a level close to + 2% YoY, but always below this rate. Otherwise, price stability will not be possible.
2. Independence: Regarding the heterogeneity of the countries within the European Union it is critical to maintain and assure full independence of political issues to comply with this mandate. Thus, it is prohibited the monetary financing of public institutions.

Other key factors of the European Central Bank's strategy are the perspectives used to analyze risk in order to maintain the previously mentioned price stability.

Economic Analysis:

Has the mission of evaluating and measuring the factors that determine the price behavior in the short and medium term, focusing on the real activity and the cost factors directly affecting prices in the mentioned terms. This perspective takes into consideration the fact that the price evolution in short and medium term is affected by supply and demand of the goods and services markets.

Real activity and conditions

The economic analysis evaluates the short-medium term factors that determine price developments. The focus of the analysis is on the real activity and financial conditions of the economy. The economic analysis is based mainly on the fact that price fluctuations over those horizons are largely affected by the interaction of supply and demand in the goods and services markets.

For this purpose, the ECB check on a regular basis:

- Developments in overall output.
- Demand and labor market conditions.
- Several price and cost indicators.
- Fiscal policy.
- Payment balance for the Eurozone.

The economic analysis is including a scenario analysis in which shocks hit the Eurozone economy. It is also shown the impact on cost and pricing behavior and the short-medium term prospects for the propagation over the European economy.

Asset prices and yields

These variables are also analyzed to extract information about the expectations on the financial markets, such as expected future price developments. For example, when buying and selling bonds, participants in the financial markets are revealing their expectations about future increases and decreases in GDP growth and inflation. There are a wide range of techniques available for central banks in order to analyze financial prices to extract the markets' implicit expectations about future trends.

Projections of the Macroeconomy

The macroeconomic projections are developed by the European Central Bank staff implementing analytical and empirical models to create the forecasts. This projections support the structuring and synthesis of a huge amount of economic information. They provide consistency through different sources of economic evidence.

The forecasts are the basis for sharpening the assessment of economic prospects providing accuracy and reliability to the figures given, and the short-medium term variations of the inflation around its trend. In general terms, it can be affirmed that projections play a relevant role in the European Central Bank's monetary policy vision but it is not the axis around it all turns.

Monetary analysis:

This view is based on the relationship between monetary growth and inflation in a medium and long term. It is certain that long periods of inflation are linked to a strong monetary growth and monetary trends use to anticipate inflation trends.

Long-term horizon

The time horizon of the monetary analysis is longer than the economic analysis. It tries to address the long term and delayed relationship among prices and money. The monetary analysis has as a principal function to serve as a means of cross-checking, from a long term perspective, the short-medium term indicators for monetary policy coming from the economic analysis.

Monetary and credit developments

Monetary analysis is based on a detailed evaluation and assessment of monetary and credit developments with a clear objective of understanding the implications for inflation and economic growth in the future. Monetary analysis is carried on by the European Central Bank using a wide set of instruments that are continuously evolving and improving.

These instruments include a deep analysis of the developments of the monetary aggregates based on information stemming from their components and counterparts. The monetary analysis at the European Central Bank also takes advantage of the availability of an increasing number of econometric models of monetary and credit aggregates developed by both academics and economists at public institutions. Institutional and model-based analyses are key complements that enable the extraction of medium-long term signals from the monetary data.

Monetary aggregates

The core element for the definition of the Eurozone monetary aggregates is the consolidated balance sheet of the Monetary Financial Institution sector (formed by central banks, credit institutions, deposit-taking corporations and money markets funds). In general terms, the correct definition of a monetary aggregate depends on the purpose for which the aggregate is intended. Central banks usually define and monitor several monetary aggregates. Due to the fact that financial assets, transactions and means of payment are not static, they change over time; it is their nature.

The European Central Bank's definitions of Eurozone's monetary aggregates are supported on a standardized definition of the money-issuing sector and the money-holding sector as well as of standardized categories of Monetary Financial Institutions liabilities. The money-issuing sector comprises Monetary Financial Institutions resident in the Eurozone. The money-holding sector includes non-Monetary Financial Institutions resident in the Eurozone excluding the government sector. Despite the central government sector is not part of the money-issuing sector, central government liabilities of a monetary nature can be considered as a special item in the definition of monetary aggregates due to their high liquidity. Deposits of the central government with the Monetary Financial Institution sector are excluded because the central government is not included in the money-holding sector, due to the money holdings are not closely related to spending strategies.

Regarding some empirical studies and considerations, and in line with international practice, the Euro-system has stated the following categories:

- M1 – Narrow monetary aggregate.
- M2 – Intermediate monetary aggregate.
- M3 - Broad monetary aggregate.

These three levels of aggregate differ regarding the degree of liquidity (depending on transferability, convertibility, price certainty and marketability) of all the assets involved. In the following paragraphs it is going to be explained the definitions of monetary aggregates in the Eurozone.

Figure 1

Liquidity Levels

M1 comprises currency, i.e. banknotes and coins, and overnight deposits. These deposits can immediately be converted into currency or used for cashless payments.

M2 comprises M1 and, in addition, deposits with an agreed maturity of up to and including two years or redeemable at a period of notice of up to and including three months. These deposits can be converted into components of narrow money, but some restrictions may apply, such as the need for advance notification, penalties and fees.

M3 comprises M2 and certain marketable instruments issued by the resident Monetary Financial Institutions sector. These marketable instruments are repurchase agreements, money market fund shares/units and debt securities with a maturity of up to and including two years (including money market paper). A high degree of liquidity and price certainty make these instruments close substitutes for deposits. As a result of their inclusion, broad money is less affected by substitution between various liquid asset categories and is more stable than narrower definitions of money.

Source: European Central Bank website

Liquidity holdings by Eurozone inhabitants in foreign currencies can be almost-perfect substitutes for assets denominated in euros. Thus, the monetary aggregates have to take into account these assets if they are held with MFIs placed in the Eurozone.

Since the beginning of the financial crisis in 2008, the European Central Bank had been struggling to contain and minimize the consequences for the European economy. However, it is a great advantage in times of financial instability to be backed by an institution implementing solvent and solid monetary policies. Price stability was clearly the main objective of the European Central Bank during this period and around which every policy was designed for.

It was in this time frame when the monetary policy had to react to the economic and financial perturbations to lock the inflation expectations in a level below but close to 2% for a medium-term horizon.

Monetary policy instruments

Operational Framework

In order to reach the ultimate goal (price stability: inflation close but below 2%) the European Central Bank is entitled of a range of monetary policy tools and procedures. This set forms the operational framework to implement the single monetary policy.

Monopoly supplier of monetary base

The European Central Bank is the only institution in charge of issuing banknotes and bank reserves in the Eurozone. This implies a monopoly regarding monetary policy supply, which consists of

- Currency (banknotes, bills and coins) in circulation.
- Reserves held by counterparties with the EUROPEAN CENTRAL BANK.
- Recourse by credit institutions to European Central Bank's deposit facility.

These three points are registered as liabilities in the European Central Bank's balance sheet. In the particular case of Reserves, they can be divided into required and excess reserves.

In the minimum reserve system of the ECB, counterparties are forced to hold their reserves with the national central banks. Moreover, credit institutions normally hold only a small amount of voluntary excess reserves with the Eurosystem.

By the nature of the institution, central banks are in charge of managing liquidity and altering interest rates in money markets.

Define and communicating the monetary policy strategy

Manipulating interest rates by liquidity management is also a way that the central bank has to signal its monetary policy strategy to the money markets. The proper way to do this is by modifying the requirements for entering into transactions with other banks.

Ensure correct functioning of money markets

As part of its daily transactions, the European Central Bank also seeks to make sure that the money markets are functioning in a correct way and to give aid to other financial institutions in liquidity matters. It is important that this task is carried out gradually. The ECB manages this by facilitating refinancing operations to credit institutions in order to manage extraordinary liquidity issues.

Guiding principles

The operation guidelines of the European Central Bank are determined by the statements gathered in the Functioning of the European Union Treaty, which article nº 127 of the document states that the ECB may follow the principle of open market economy with free competition, enhancing resource allocation in an efficient manner.

In this Functioning of the European Union Treaty there are stated a list of guiding points to determine the operations of the Eurosystem.

1. Operational efficiency: This is the most relevant indicator that appears in the article and is defined as how monetary policy decisions are enabled by the operational framework to address in the most accurate and quick way possible ST

money market rates. This has a direct impact on prices through the monetary policy transmission mechanism.

2. Equality and standardization: There should be equal treatment between credit institutions regardless of the size or origin within the Eurozone. Rule and procedure standardization protects equality by establishing a common framework for every credit institution for the operations with the ECB within the Eurozone.
3. Decentralization: *The European Central Bank is in charge of the operations and the NCBs are the ones entitled to look after the transactions.*
4. Simplicity, transparency, continuity, safety and cost efficiency: The two first, simplicity and transparency, are intended to transmit in a clear way the strategy regarding monetary strategy and everyone is able to understand it. Continuity stands for the promotion of stability of the strategies and tools available. This means that they may not be changed frequently and the stakeholders should be familiar with them. Safety is a must when accomplishing credit operations within the ECB framework in order to transmit confidence. Lastly, cost efficiency stands for assuring a low cost level in the transactions with the ECB.

Economic drivers of Non-standard measures.

Economic Timeline

It is certainly an interesting and historic moment in which we are living now. Interest rates have been negative for a while as one of the multiple consequences of Lehman Brothers default in 2008 and the following global financial crisis.

This crisis was the largest in History since 1929's Crash and its effects are visible even in the current days. The lack of confidence, solvency and liquidity affected to the real economy causing growth problems, high unemployment rates and inflation. This environment triggered the monetary expansive policies that have been carried out by the central banks.

Even though the crisis was not caused by a deficient macroeconomic policy, it has been several mistakes that could have been corrected or at least softened if central banks would have adopted some specific measures. For this reason, it was ineludible to correct the inefficient aspects of the economy and central banks

Origins.

The current crisis resulted as the coincidence of low interest rates at the beginning of the XXI century and the deregulation trend that begun in the beginning of the 1970's. In this context, some important events like the Long-Term Capital Management fund default in 1998, the dotcom bubble in 2000 and the 9/11 terrorist attacks in 2001 have been faced from an economic point of view with a monetary relaxation via dramatic interest rates

reductions. These measures have been sustainable because of the historically low inflation figures in the main developed areas.

Low interest rates make indebtedness affordable and cheap, while return on savings instruments such as deposits and bonds diminishes, thus, people prefer to increase their leverage exposure and reduce their savings. The favorite alternative for an important part of household investors, at least in Western countries, was to acquire houses: the high demand boosts the prices in the short term and it was perceived as a safe investment so households were willing to assume a risky level of leverage in order to accomplish the transactions. Moreover, as prices were rocketing, the mortgages needed to buy the houses were bigger and the required capital by the banks decreased to maintain the demand of this financial products, completing the vicious circle that caused the financial crisis.

However, low interest rates have other benefits and that is why central banks maintained them low for such a long period of time. They stimulate the economy by promoting private consumption and investment, and have a positive impact on stocks prices due to investors increase the weights of equities in their portfolios because of a higher risk appetite and better expectations in companies' future profits.

On the other hand, credit demand is satisfied by commercial banks, which at the same time have to borrow money from other banks, so that their business is based on the spread of the borrowing interest rate and the lending interest rate. The optimal way to achieve this is to borrow money in the short term and lending it in the long term, this higher liquidity enables the access to a lower interest rate in the borrowed loans; on the contrary, a higher term of the lending loans implies lower liquidity and higher risk as likelihood of developing in non-performing loans multiplies, thus, interest rates of long term maturity loans are higher.

Monetary policy before and after Lehman

Before the deregulation period, commercial banks had in the short-term deposits their main source of capital, not paying interests in the US so they could lend them in short term and have a profit without assuming excessive risks. In addition, the insurance deposit guaranteed the savings, which stimulated its demand despite the low yield of the instrument.

The deregulation movement begun in the 1970's and was applied to the banking sector with the solely purpose of raising the efficiency of the industry, not taking into account other important considerations.

1. Regulators permitted to other institutions and intermediaries to offer similar products to the ones offered by commercial banks, such as checks. At the same time, the commercial banking regulation loosen up so that they could compete with these new financial intermediaries, but the increasing number of competitors

affected the loans typologies, raising the maturities and the level of risk. The reduction of interest rates at the beginning of the century was intended to diminish the impact of the Technology crisis, but as a collateral effect, banks were incentivized to satisfy the growing demand for loans and mortgages. Households were borrowing important amounts for consumption, instead of increasing their capital and increasing dangerously their financial leverage.

2. In this environment of competitiveness, deregulation tightened profit margins and the preferred way to raise them was through leverage (with the intrinsic risk of delinquency/non-performing). Leveraging permits boosting potential profits but also losses due to the debt is a fixed obligation that must be faced without considering EBITDA or other operative profits. With the target of reducing the risk levels of higher leverage, banks begun to perform securitization and CDS (Credit Default Swaps) transactions, which have the advantage of taking off balance some assets, spreading the risk through the whole system. However, they were also clients of these type of assets so that they secure other entities while being secured for their risk in their balance sheet. In this context, it was clear that if house prices declined in a significant percentage there would be a high number of delinquency, and every bank was interconnected in a complex way to each other and, thus, they were all vulnerable.

There was highly likely that a decrease in Real Estate prices would suppose a recession, increasing the non-performing loans/mortgages, while employment destruction would led into an increase in mortgage delinquency. Long story short, if a bank is facing 1% probability of default, a large number of banks share the same risk and if default finally came, the whole credit system goes bankrupt.

3. If banks are offering mortgages for over 90% of the house price, a decrease slightly above 10% in its price generates financial difficulties in case of delinquency, as the bank would be receiving an asset with a value below its mortgage. Moreover, if banks give mortgages for a higher amount than the market price of the house, problems are almost granted. At the same time, a bank can hardly explain to shareholders that they are staying out of the game. Reducing the risk levels implied giving up from obtaining the kind of benefits that the other banks were generating, with the consequent reduction in dividend distribution.
4. If the credit market stops working, the entire economic activity collapses because commercial activities, durable goods consumption and investment are linked to credit. With unemployment rates rocketing, households begun worrying about their leverage position and cut their expenses, so private consumption declines.

Economic policy in times of crisis

Some exceptional measures have been taken by central banks and governments even though at the beginning it was thought to be a sectorial and geographical crisis.

The most important central banks (European Central Bank and US Federal Reserve) have reacted with common measures, mainly interest rates reductions, but also with other non-that-common measures, in order to maintain the correct functioning of credit markets.

From August 2007 to October 2008, the European Central Bank not only did not loose its monetary policy, but also increased interest rates in 25 basis points in July 2008 due to the appearance of possible inflation movements. However, from August 2007 the European Central Bank proportioned liquidity to the Interbanking market increasing the maturities to 3 and 6 months and reducing them in refinancing transactions to 1 week without raising the monetary provision. As we can see in this explanation, in the first stage of the crisis the European Central Bank was carrying out a dual monetary policy.

At the other side of the Atlantic, the US government developed an incentive program for buying toxic assets, believing they were standing upon a liquidity crisis. It was believed that the financial institutions were solvent and the only problem was that the Real Estate bubble collapse was keeping them to know the assets backing the mortgages (Asset Backed Securities). After that, the decreasing house prices were creating solvency problems in certain entities and the Government decided to invest directly, increasing the solvency of the entities by capital injections in exchange of preferred shares. But the main problem was that banks were in their solvency limit and regulators should have tightened the requirements for credit access, not only for the situation of banks, but also for the risk perception of the borrowers was higher in a recession period. Furthermore, as asset prices were plummeting, banks may be considering in purchasing them at a lower price if they keep a minimum of liquidity. The alternative would have been to increase capital buying shares, like the American and British governments had to do in some cases, but with the disadvantage of making them property of the State (Non-desirable in the medium term). Another alternative considered at that time was to create a "Toxic bank" that acquires every toxic asset and non-performing portfolio, however the alternative was rejected as it was very expensive to accomplish and had many valuation issues (their market disappeared).

After the Lehman collapse in September 2008 the crisis entered in a new stage, intensifying and extending to other sectors and other regions. It also started affecting developing and emerging economies. The confidence of business owners and consumers felt dramatically in every country while the risk perception was boosting. Money markets stopped working and the economic activity freeze across the Globe. This reduced the inflation risks and at the same time increased financial instability.

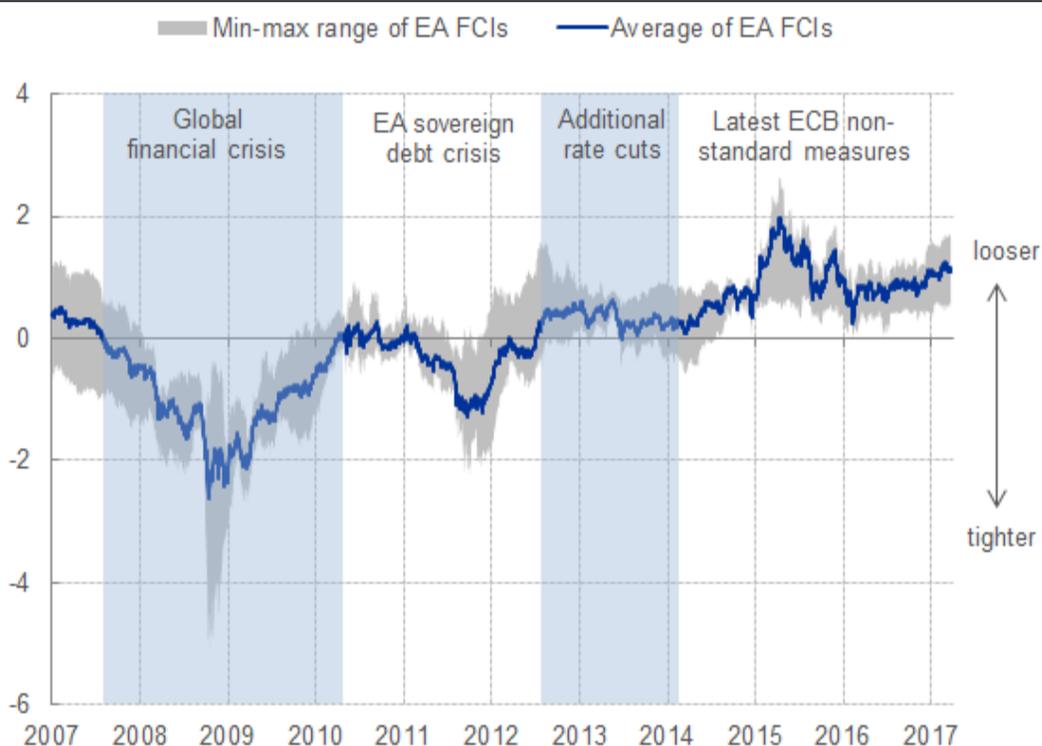
In Europe, European Central Bank cut the intervention rate in 325 basis points (up to 1%), but the Lehman collapse created a climate of distrust between private financial institutions reducing their willingness to lend money to each other, as the perception of counterparty risk was higher and there was a lack of transparency in the quality of the

assets in the balance sheet. Then central banks started applying an aggressive monetary policy increasing the monetary offer (quantitative easing) by buying private debt, essentially corporate debt. The United States did this in a total amount of \$ 800 Bn. The European Central Bank started providing an unlimited liquidity at a fixed rate against an expanded list of assets as collateral and also providing liquidity in other currencies through swaps. This derived in a large expansion of the European Central Bank balance sheet (€ 600 Bn aprox.) until April 2009, reaching a 16 % of the nominal GDP of the Eurozone. The Fed increased its balance sheet figures to reach a similar proportion of the GDP.

In May 2009, the European Central Bank agreed to start buying covered bonds in euros, financing the Eurozone banking system for 12 months. There was an increase in the amount of circulating money which promoted private consumption and stimulate economic activity. The original intention was to encourage financial entities to use that money for giving new credits; there was still demand for credits with significantly higher rates so banks could improve their profitability, and because of the creation of a guarantee program. In that sense, there was not perceived that these capital injections would be creating inflation in the future, as they could undo their positions selling the acquired assets. However, it was not that simple: banking reserves had been multiplied by significant factors but the credit situation improvement was not visible yet. Essentially, because higher risk and expectancies of possible future inflation would have led into a peak in interest rates, so demand was not existing anymore. And if central banks assure to withdraw liquidity due to inflationary tensions, the announcement would generate expectancies for a dramatic decrease in liquidity at some point, which would increase rapidly interest rates and fall into a recession.

To sum up, the willingness of lending is not linked exclusively to the amount of money, there are other important facts to take into account, like risk perception. At a certain stage of the recession, this risk perception was very high and only an increase in interest rates could compensate banking, but at the same time the risk perception of the borrowers would hit a peak and there would not be many people willing to accept loan's conditions. It is obvious that one monetary policy or another would not be enough to solve a situation like the current financial crisis. Other policies like economic aid to certain sectors (automotive in the United States, for example) are hard to justify.

Figure 2
Financial Conditions Indexes for the Eurozone



Source: ECB, Bloomberg, Goldman Sachs

As a recap of this period it is interesting to take a look to the graph (figure 2). It shows the evolution of financial conditions indexes made by Goldman Sachs and Bloomberg which take into account money markets, bond and equity indicators.

European Central Bank's objectives

In order to understand the motivations of the non-standard monetary policies implementation it is key to define and interiorize the principal objectives that the European Central Bank pursues. The correct functioning and growth in economic terms of the European Union relies on two objectives, and the whole strategy of the institution pivots around them.

Price Stability

When analyzing the objectives that the European Central Bank wants to address by changes in the monetary policy there is one that stands out over the rest: price stability. This is the main task that European governments have delegated on the European Central Bank as it is stated in the European Union Treaty.

Before the assignation of this commitment to the European Central Bank, it was needed an accurate definition for the expression "price stability", and it was the European Central

Bank as well the institution in charge of designing proper definition in order to guide further activities. From 1999 price stability has been defined as an inflation level below but close 2% in a medium term.

Monetary Policy Transmission Mechanism

The achievement of the so-called price stability requires an efficient and dynamic mechanism able to transmit the monetary policies. When this mechanism works in a proper way, every decision regarding official interest rates (in this case, the minimum bid rate in the main financing operations among banks or Euribor) must have a direct impact on inflation and real economic activity in many ways, although it is true that the implications of these decisions in the economy come with a delay.

The starting point of the monetary policy transmission mechanism is the 1-day interbank market. From this segment, interest rates are distributed over the rates curve, affected as well by the expectations on increases or reductions on interest rates in a long term horizon. In a similar way, retail and corporate banks transmit the interest rates from the monetary market to households and companies' through loans, deposits, mortgages and other products linked to interests. This is the path that follows the monetary policy from the beginning to the final impact on the economy and due to the length of the process and the nature of the financial products (i.e. loans are not an every-day service required by the economic agents) changes on interest rates could take several months to permeate into the economy.

It is important to highlight the three most important segments of the market in the Eurozone in terms of monetary policy transmission: The interbanking market, the covered bond market and finally, the sovereign debt market.

The Interbanking Market

Under standard circumstances, the European Central Bank is the one in charge of calibrating the available volume of liquidity for the banks in their financing operations in order to adjust it to the needs of liquidity of the system as a whole. The purpose of this adjustment is to make equal the probability of the banks being in a long or short position of central bank's liquidity in the last day of reserve's holding. Once this goal is reached, the price of the liquidity of the central bank in the interbanking system would be half way between the marginal interest rate of credit facility and the marginal interest rate of deposit facility. This means that it would be similar to the interest rate of the main financing operations. This kind of arbitrage assures that in the previous days to the "holding" period, the one-day interest rate equals the interest rate of the main financing operations.

However, one previous and critical condition has to be met in order to assure a correct interbanking market functioning: banks may be willing to lend money to each other to provide liquidity to the system and invigorate the market promoting consumption. The

liquidity provision of the European Central Bank is based on the aggregated liquidity needs of the banks of the system. And what is more important, if some banks are in difficulties to access the interbanking market, they may be getting higher interest rates to pay. As a consequence of this, monetary interest rates could rise significantly above the rate of the main financing operations, obstructing in this way the starting point of the monetary policy transmission mechanism.

Covered bonds

The adequate functioning of capital markets as a whole is crucial for the monetary policy transmission. But more specifically, there is a private bond segment with a particular level of importance in the Eurozone: the covered bond segment or *pfandbriefe*. This is one of the main financing sources for the Eurozone banks and, as a difference characteristic of other monetary areas, banks are the main source of credit in the Eurozone. Consequently, the conditions over the covered bonds market are a determinant factor for the capability of the Eurozone banks to meet the credit needs of their clients.

Sovereign bonds

Regarding public debt, there are three channels that worth a mention for their impact on the transmission of monetary policy:

- **Price channel:** Historically, the interest rate of public debt has been seen as a risk-free rate, and it has been the reference (minimum interest rate) for the interest rates that banks apply to their lending products and for the pricing of other contracts and securities. In fact, given the category of risk-free of the sovereign bonds, regulators use to encourage their purchase giving them a category of liquid asset. This also applies in a special way to the new regulation of liquidity risk.
- **Balance sheet channel:** The variations in the price of the sovereign bonds have a direct impact on the banks' balance sheet of the securities held for speculation purposes.
- **Liquidity channel:** sovereign bonds have developed into the most important guarantee source of the interbanking credit.

Other targets

In addition, the monetary policy transmission mechanism could target other objectives that are not related with the price stability. The European Union Treaty establishes the price stability as the most relevant objective to assess for the monetary policy, however it also states that (without affecting this main objective) the European Central Bank might support the general economic policies of the EU and act according to the free-trade and free-competition economy principle, encouraging an efficient resource distribution. This Treaty also supports the idea of the European Central Bank contributing to maintain and improve the management of the policies implemented by the authorities regarding credit entities and the stability of the financial system.

At certain periods of the economic crisis, current period included, the financial stability has been in jeopardy. According to the Treaty, once the main objective of price stability has been addressed, the European Central Bank could focus on other measures to help reinforcing financial stability. For this reason, it is not recommendable or allowed to loosen up the price stability so that the financial stability became the main priority. In fact, the price stability is a required condition to achieve financial stability in the Eurozone thus, the best contribution possible from monetary policy to financial stability.

Furthermore, it might be said that even when the stability price is assured, the European Central Bank may exclusively contribute to the adequate management of the financial system. The government of each Estate is the one in charge of addressing the financial stability while the European Central Bank has the duty of controlling prices. Moreover, if the governments react in an efficient manner according to the risks of financial stability, it is likely that there is not necessary for the European Central Bank to implement non-standard measures to reestablish monetary policy transmission mechanism.

European Central Bank's measures and stimulus

Conventional Monetary policy is defined as the purchase and sell of securities in the short-term in order to make an impact on nominal interest rates and achieve price stability (a level defined by the European Central Bank as inflation rate close but below 2%). These measures positively affect the economy by modifying the **price of the assets** and **credit availability**.

It is important to mention that there is a delay in the reaction of inflation expectations to the changes in the policy rate. In fact, stock prices, as well as bond and rate prices have a quicker reaction to changes in the monetary policy. In normal conditions, when stock and bond prices are high household's wealth increases due to the encouragement of consumption. Moreover, expansive monetary policy measures increase the amount of foreign currency available in the economy which led into a local currency depreciation encouraging exports and improving the international competitiveness of the country.

The other conventional tool regarding monetary policy is credit availability. Expansive monetary policy reliefs the negative implications of asymmetric information on credit markets, thus, financial institutions are likely to lower the requirements for credit risk. This loan surplus has a positive impact on consumption and fixes the asymmetric shape of credit's supply and demand. In addition, corporations also take advantage of this situation to increase their capacity by borrowing capital to invest in new projects.

Main Refinancing Operations (MRO)

Reversal transactions intended to provide liquidity to the system with 1-week duration and published on the European Central Bank's webpage. They offer re financing operations to the financial institutions.

Deposit Facility

This tool is used to make overnight deposits with the national central banks. The interest rate on these deposits usually serves as a floor for the overnight market rate.

Marginal Lending Facility

In this case, this measure is useful to obtain overnight liquidity from the national central banks against eligible assets. The interest rate on the marginal lending is now a ceiling for the overnight market rate.

Non-standard measures

1. Forward Guidance

The Forward Guidance is based on the intention of the European Central Bank of influencing the financial markets mainly by communication and press releases. The highest authorities of the central bank send a message to the markets in order to anticipate the path that they are going to follow in the upcoming periods in regard of monetary and fiscal policy of the institution.

The increasing use of these kinds of measures implies a significant challenge in terms of communication as central banks must be able to transmit to the public a trustful commitment in order to obtain the desired effects in the economy and maintain flexibility required to adapt to potential future changes in the economic environment. The challenging aspect of this measure is the temporal inconsistency and volatility driver if the compromises are changed frequently.

2. Quantitative Easing (QE)

The Quantitative Easing or QE consists on the issuance of new money by the central bank with the solely purpose of purchasing assets (i.e. bonds) that could be in possession of any European government or private company. This methodology has the intention of providing liquidity to the economy and has the particularity of increasing the size of the balance sheet of the central bank by the purchase of financial assets without changing the composition of the assets. The balance sheet composition depends on the weights given to the quality of the assets that the central bank wants to keep within its balance sheet.

The Quantitative Easing methodology implemented by the European Central Bank is formed by Public Sector Purchase Programme, Covered Bond Purchase Programme and Asset Backed Securities Purchase Programme.

European Central Bank QE = Public Sector Purchase Programme (PSPP) + Covered Bond Purchase Programme (CBPP3) + Asset Backed Securities Purchase Programme (ABSPP)

The Public Sector Purchase Programme was designed with the objective of purchasing public and private debt for a total amount of 60,000 million euros per month from March

2015 to September 2016, with a minimum investment estimated in 1.1 trillion euros for the period given. The risk of the purchases will spread over the national central banks and the European Central Bank.

Of course the European Central Bank is not the only central bank that implemented this type of programme. The US Federal Reserve launched three Quantitative Easing programmes named QE1, QE2 and QE3. Moreover, the bank of England has released as well its own Quantitative Easing programme. The former has implemented significant quantitative and qualitative expansion programmes, while the later has been more moderate using these non-conventional monetary measures.

In relative terms, the European Central Bank has done less quantitative expansion than the Bank of England or the Federal Reserve. However it has indeed implemented a qualitative expansion programme by accepting as guarantee in repos and permanent credit facility, low quality assets without including them on its balance sheet.

Figure 3
ECB's Quantitative Easing Programmes

CBPP3*	October 20th 2014	October 2016	Non specified at announcement	Euro-denominated covered bonds issued in the euro area	<ul style="list-style-type: none"> ◆ Purchases in both the primary and the secondary markets ◆ Be eligible by the ECB collateral criteria ◆ Securities held until maturity
	January 22nd 2015	Extended to September 2016 as part of the EAPP)	€10 billion monthly jointly with ABSPP		
	March 10th 2016	Extended to March 2017. Ongoing Program	Undefined increase of the buyouts jointly with ABSPP as part of the €80 billion of the EAPP		
ABSPP*	November 21st 2014	November 2016	Non specified at announcement	Euro area eligible asset-backed securities	<ul style="list-style-type: none"> ◆ Be eligible by the ECB collateral criteria ◆ No less than 90% of the obligors of the cash-flow generating the ABS are non-financial corporations or natural persons. ◆ No less than 95% the outstanding principal amount of the cash-flow generating the ABS issue is denominated in euro
	January 22nd 2015	Extended to September 2016 as part of the EAPP)	€10 billion monthly jointly with CBPP3		
	March 10th 2016	Extended to March 2017. Ongoing Program	Undefined increase of the buyouts jointly with CBPP3, as part of the €80 billion of the EAPP		
PSPP*	January 22nd 2015	September 2016	€50 billion monthly	Supranational, €6 billion Sovereign and national agencies debt, €44 billion	<ul style="list-style-type: none"> ◆ Secondary Market Purchases ◆ The Eurosystem will share the risk of the Supranational bonds and €4 billion of the sovereign and national agencies purchases (33% of the purchases are risk-shared) ◆ 25% limit of bond issuance for CAC bonds, 33% limit to bonds issued previous to CAC. ◆ Bonds must have a minimum investment grade rating (BBB- or equivalent) ◆ Unsterilized interventions
	March 10th 2016	Extended to March 2017, with open discretionary extension. Ongoing Program	Undefined increase of the buyouts jointly with CBPP3, ABSPP as part of the €80 billion of the EAPP.	The new share was not yet specified	

* Since January 2015 compose the EAPP.

Source: European Central Bank website

3. Qualitative Easing

The Qualitative Easing is a monetary policy tool used by central banks to reduce the quality of the in-balance assets which are backing the monetary base, adding low-quality assets without raising the size of the balance sheet. One example for this measure is extending the list of financial assets accepted as a guarantee on European Central Bank's auctions of liquidity injections.

4. Unlimited liquidity injections (LTRO & TLTRO)

The acronyms stand for Longer Term Refinancing Operations & Targeted Longer Term Refinancing Operations. These terms can be defined as placements of determined amounts of capital in open market operations depending on the overall needs of liquidity of the banking sector and the variable costs regarding liquidity demand.

The European Central Bank during the crisis lent money in long term at 1% to the European banks through LTRO operations, in order to avoid their bankruptcy and it has tripled its balance due to this activities. The LTRO objective was to be a temporary replacement of the interbanking market (money lending among banks) which was insignificant. In some way, the LTRO operations have facilitated the carry-trade of Spanish debt; several banks were financing at 1% and buying Spanish debt afterwards at a 5% rate and using it as a guarantee through a deposit with the European Central Bank.

The most significant difference between Quantitative Easing and LTRO is that QE is a direct and massive purchase of public and private bonds on the secondary market, while LTRO are simpler: they are loans for the banks and they can use the liquidity in the way they feel more convenient. The capital of the LTRO operations has been used foremost for the restructuring of the savings banks and their recapitalization.

Like many of the long term financing operations made by the European Central Bank, the LTRO operations were used to buy sovereign debt of the Southern Europe countries. However this measure was not succeeding in bringing liquidity to the real economy and for this reason the ECB the TLTRO, also known as Conditioned Loans, with the aim of improving credit availability for the non-financial private sector in the Eurozone (real economy) and to avoid banks earning money for free.

Assets Purchase Programme or Quantitative Easing

The Eurozone Asset Purchase Programme was launched at the end of 2014 with the purchases of ABS (or asset-backed securities) and covered bonds with the Asset-Backed Securities Purchase Programme (ABSPP) and Covered Bond Purchase Programme (CBPP-3), mentioned before. Facing a scenario of weak inflation levels and reduction of the expectations in longer maturities, the Governing Council decided at the beginning of 2015 the implementation of deeper quantitative measures to increase the size of the European Central Bank's balance sheet and reconfigure its composition. The mentioned

programmes were complemented with additional securities issued by Eurozone countries, and European Union institutions under the Public Sector Purchase Programme (PSPP).

According to the decision of January 2015, there would produce monthly asset purchases for a total sum of € 60 Bn to take place until at least September 2016 (later delayed until March 2017) or until the inflation reaches a level compatible with the concept of price stability of the European Central Bank (close but below 2%). After that, at the end of 2015, the Governing Council took the decision of reinvesting the principal payments on the securities purchased under the APP to maturity, for the time required no matter what. The range of securities under the PSPP includes only securities with a residual maturity in between 2 and 30 years. PSPP was intended to distribute its allocation principally in sovereign bonds (88%), and the 12% left to other assets issued by multinational institutions and development banks. Asset purchases are intended to be diversified across Eurozone countries following the European Central Bank capital criteria, which pursues the maintenance of neutrality in the market during the range of maturities stated.

In the following graph we can appreciate the enormous increase of the size of the European Central Bank.

Figure 4
Evolution of ECB's Balance sheet



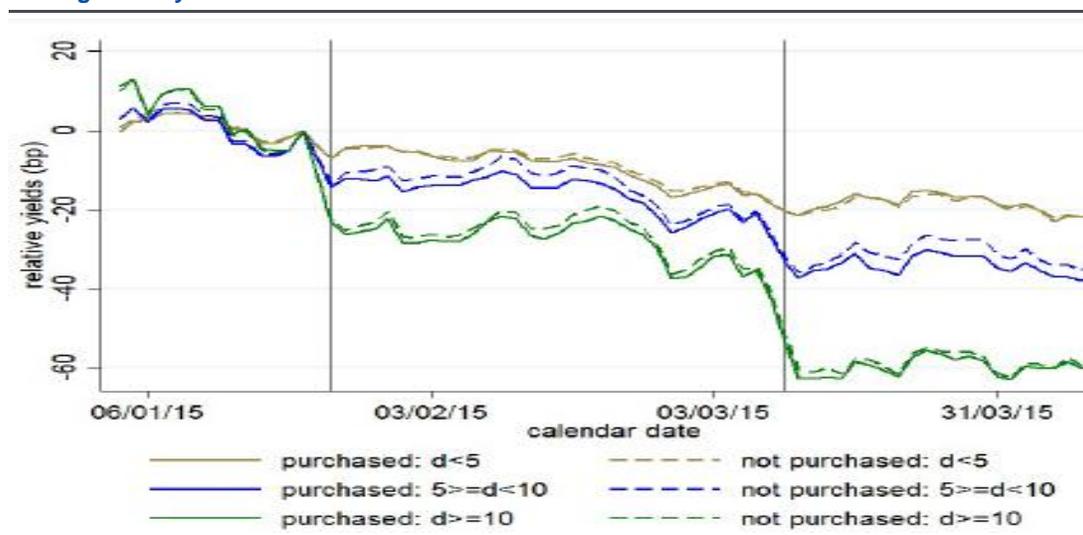
Source: Bloomberg Terminal

We can appreciate more activity since the beginning of the crisis with an easily identifiable diminishing period responding to the sovereign debt crisis in Europe. We are currently at historical levels and it is not expected to start decreasing in the short term.

In order to ensure the proper functioning of the financial markets, asset purchases had a limit of 25% of each emission (33% in nominal value). However, this limitation was extended on September 2015 to the securities share percentage making it equal to the nominal value limit: 33%, always subject to the evaluation of each case's circumstances to prevent situations of blocking minorities.

The PSPP is coordinated centrally by the European Central Bank and it is aligned with the standard monetary policy and the rest of purchase programmes, but implemented from a decentralized angle. Thus, the European Central Bank is buying directly 8% of the total emissions and limits the purchases to sovereign bonds and agency securities. The outstanding 92% is purchased by national central banks, and each of them can restrict its activity to domestic public bonds and national agencies. When the purchase programme was extended at the end of 2015, national central banks also began purchasing marketable debt securities which were issued by local governments within their nations.

Figure 5
Average bond yields after PSPP announcement



Source: European Central Bank working paper n°1956

The previous figure illustrates the evolution of average yield of the bonds with a maturity range between 2-30 years before and after the PSPP programme announcement.

Risks on European Central Bank's Balance Sheet

The European Central Bank is exposing itself to potential losses on its asset portfolio due to the purchase of risky assets. Asset purchase programmes implemented gathered the risks from the issuing banks and transfer them to the European Central Bank.

There have been several academic papers published analyzing the impact on quantitative easing measures on the balance sheet of the Federal Reserve establishing potential scenarios based on projections. The two most important are: *“The Federal Reserve’s Balance Sheet and Earnings: A primer and projections”* by Seth B. Carpenter, Jane E. Ibrig, Elizabeth C. Klee, Daniel W. Quinn, and Alexander H. Boote and *“Maintaining Central-Bank Solvency under New-Style Central Banking”* by Robert E. Hall, and Ricardo Reis. They analyze the possible evolution of interest rates and holding time of the security purchases of the FED. It is surprising that the conclusion they arrived to is that potential/possible losses are likely to be a small amount with a high confidence level.

On the second paper mentioned, it is also evaluated the European Central Bank’s exposure to sovereign default risk during the first period of the financial crisis (2009 to 2013), when the Securities Market Programme was implemented and took place several important refinancing operations. In the scenario of the default of a country, the study discusses that the position of the European Central Bank will be determined by the anticipation (or not) of the default event.

If an expected default finally produces, the price of the securities bought within the framework of the Securities Market Programme or used as collateral in the refinancing operations mentioned will be reflecting the probability of default. The inflows derived from the coupon payments would be low but also bond prices would be at low levels, which suppose that the potential losses at the end of the crisis would be assumable. On the other hand, in the event of an unexpected default, the European Central Bank would be exposed to losses from the impairments of the coupons during the crisis and the capital losses arising from the not-reflection of probability of default on prices when the securities were bought. In general terms, the European Central Bank's repo position until the year 2013 is seen as having significantly limited the risk, because the institution could only suffer losses if banks were not able to repay the debt and the loss of collateral value exceeded the “haircut”.

Both asset purchase programme, the ECB’s and the FED’s are similar and the impact on their respective balance sheets. However, the PSPP has some peculiarities that make it riskier in terms of balance sheet. One of these risks comes from the restructuring of debt, which would cause dramatic reductions in the value of some of the assets on the balance sheet of the European Central Bank. This risk of asset purchases is significantly higher in the Eurozone due to the absence of an area-wide fiscal issuer which can actually be considered as risk-free. Regarding corporate bonds, purchases might be diversified and it must be defined a clear buying strategy that allows the ECB to mitigate risks. However, it has to be taken into account that a successful Quantitative Easing strategy may have positive consequences on the macroeconomic environment and thus, decrease significantly the risk of private companies’ defaults.

In addition, there is an extra source of risk for the European Central Bank regarding duration exposure. It is certain that the European Central Bank will eventually increase the interest rates to keep up with the Eurozone's economic growth and ensure stability. However, this increase would have a negative impact on its balance sheet due to the amount of long-maturity and low-yield securities kept on the portfolio.

The Asset Purchase Programme was implemented while the Main Refinancing Operations rate was around 5 basis points and the deposit facility rate was at minus 20 basis points, and since that, several sovereign bond yields have been in negative figures. This implies that a further increase on interest rates would lead into capital losses for the European Central Bank. In fact, the significantly low sovereign bond yields decrease the returns generated by the bonds of the ECB's portfolio.

Real consequences of Quantitative Easing

The expansive Asset Purchase Programme of the European Central Bank has proven its effectiveness in transmitting the monetary policy strategy in the Eurozone's economic area. The success of the transmission has been driven by the implementation of three channels:

1. Asset Valuation Channel: The asset block of banks' balance sheets increased due to the raise in the price of the sovereign bonds they were keeping in their portfolio, and this fact was lowering the stress over their capital. In fact, this mechanism has balanced banks' margins regarding the yield curve. The implications are leverage reductions which facilitates lending and economic dynamization.
2. Signaling: The announcement of the purchase programme was followed by decreasing short-term expectations on interest rates and increasing inflation expectations. This trend makes us believe that a flattening yield curve does not imply that GDP and inflation forecasts are deteriorating.
3. Stabilizing long-term inflation expectations: The asset Purchase Programme was indeed, interfering in the macroeconomic environment and producing positive results.

Tapering

The term Tapering is quite new in the financial dictionary. It refers to the gradual decreasing of extraordinary expansive non-conventional monetary policies adopted by central banks all over the World to tackle the financial crisis of 2008, thus it can be associated with any central bank.

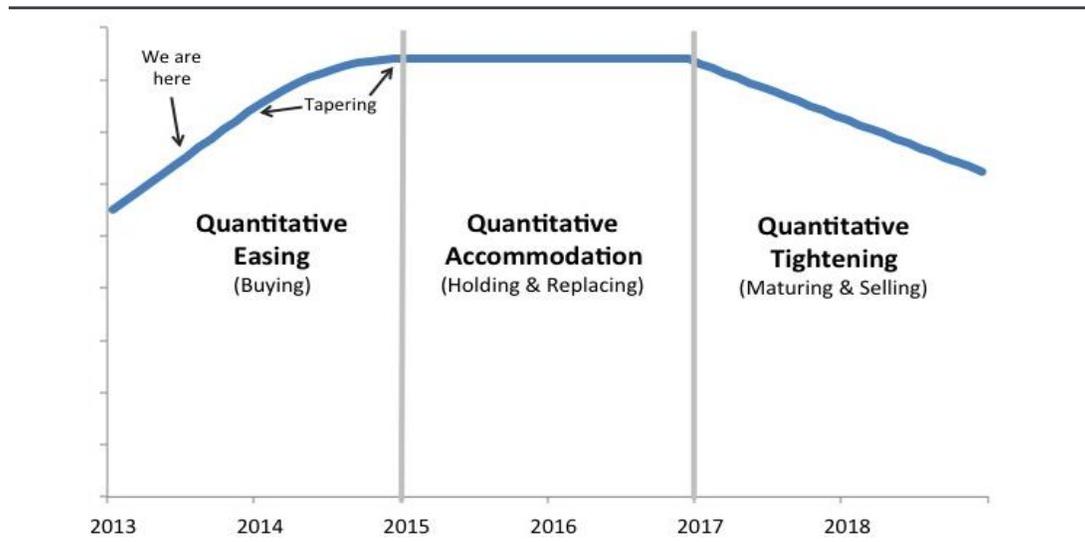
More precisely, the origin of the word comes from the reductions of non-conventional policies undergone in the United States during the financial crisis, like the gradual reduction of FED purchases of public bonds. After the FED, other central banks copied the strategies like the European Central Bank, the Bank of Japan or the Bank of England.

Tapering is not an immediate action. It is a long and gradual process extending over time in order to avoid disruptions on macro indicators and grant monetary stability. Expansive monetary measures are removed gradually whenever the main economic indicators start reacting positively to the stimulus. In this sense, key drivers to be analyzed with regard of tapering are GDP, inflation or unemployment rate for example.

If after a tapering decision it appears significant disruptions in the financial markets and macroeconomic indicators are not showing any improvement, it may be necessary to step back and redesign the strategy.

It is worth to remark that tapering does not mean tightening: While quantitative easing responds to the purchase of securities, tapering means the reduction of the purchases but the balance sheet will keep increasing. Tightening happens when the securities redeem or when they are sold so that the balance sheet of the central bank starts decreasing.

Figure 6
Tapering – Tightening illustration

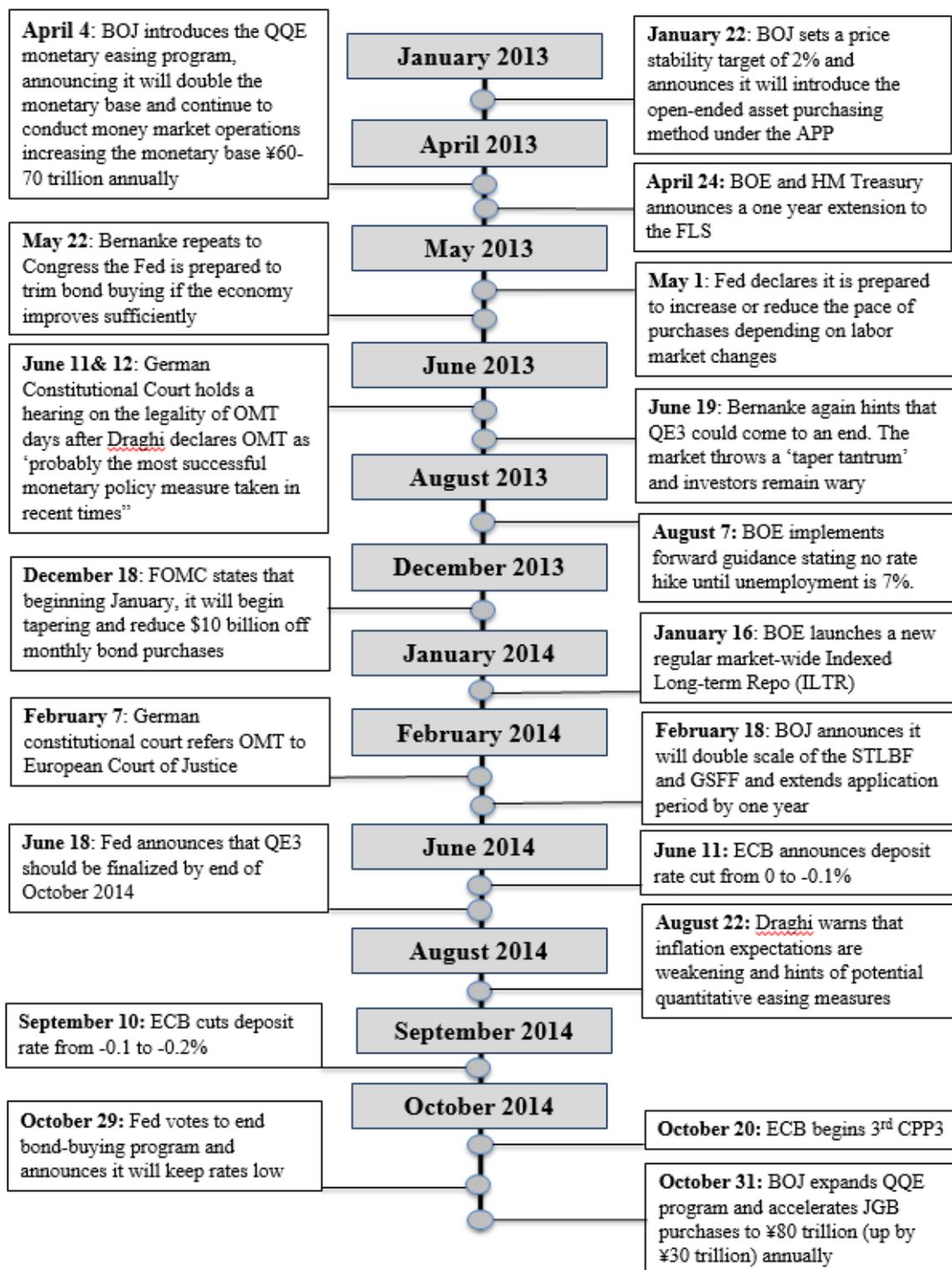


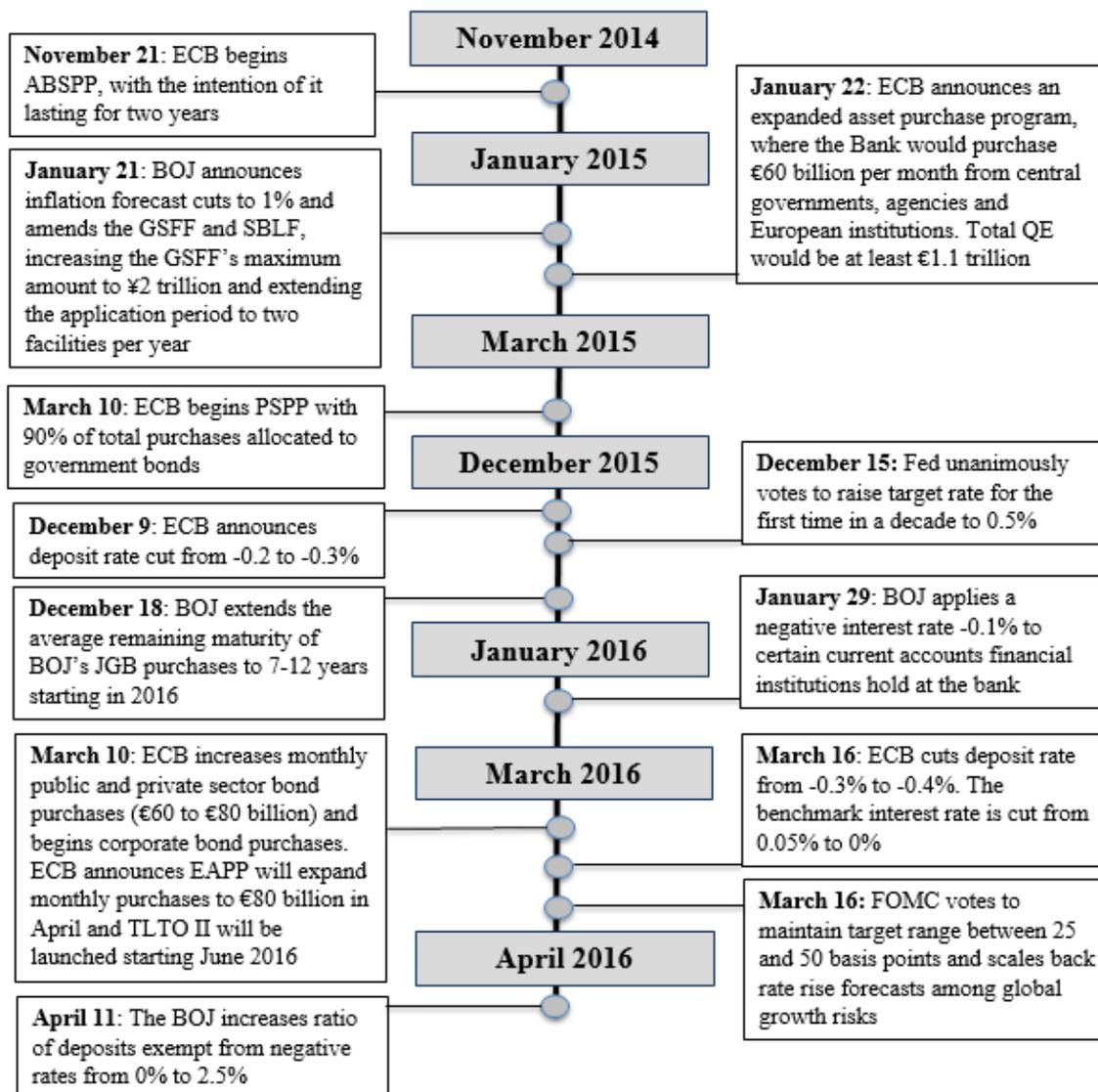
Source: Donald Marron

This graph represents a simplified timeline of the Federal Reserve purchase programme that illustrate clearly the differences between the so-popular Tapering and Tightening.

Comparative of the main central banks' strategies during the crisis

Timeline





Non-conventional monetary strategies across the Globe:

Before 2012 both the FED and BoE began proceeding with a non-conventional monetary policy by expanding their balance sheets with bond purchases. The Bank of Japan and European Central Bank revealed the model of their financial system with their decision of focusing on lending directly to the banks. All four banks had managed to carry out quantitative easing in some form by 2016. The QE programs' intricacies vary to different degrees through the four Central Banks, revealing configurations of the different specific financial systems and economies just as QE programs' motivations.

By late 2008 United States' financial markets were drowned in chaos, output was going down, there was a rise on unemployment and rates on short-term interest went to near zero. In this environment, the Fed was exhausting traditional monetary options to

alleviate conditions on credit and to pump some liquidity into the broader financial system.

It was on the 25th November 2008 when the Fed became the first Central Bank in announcing large-scale measures on asset purchasing from the purchase of \$100 Bn in private debt supported by Governments and \$500 Bn in debt backed by mortgages as collaterals (MBS). It was the initial phase of its Quantitative Easing program. At this point the Bank of Japan and the Bank of England had not undergone any non-conventional monetary measures.

Despite this, the ECB had to face deteriorating financial conditions, which were appreciated by an acute rise in October of the 3-month Euribor overnight indexed swap spread to 198 bps. The response from the ECB was the announcement of fixed-rate tender, full allotment operations (FRFA). The European Central Bank declared that it would be willing to lend any amount that banks will be requiring at a fixed rate given the fact that banks had full collateral. Even though none of them were purchases of large-scale asset, their approach was unconventional.

The Asset Purchase Facility was announced by The Bank of England in January 2009. It first purchased assets from the private sector funded by both T-bill issuances and the DMOs cash management operations. On March 5th, four months from this date, it was announced by the Bank of England the first of its QE programs through the purchasing of medium and long-term gilts. Before this announcement occurred, gilts' main holders were UK non-bank financial institutions and international investors and made up a small part of the UK non-bank financial institutions portfolios. The principal component of the BOE's QE program's initial stage was to decrease non-bank private sector's gilt holdings. As the FED and the BOE continued their massive asset purchase programs, the BOJ and ECB decided instead to continue lending money to the system.

The FED kept on since 2008 to 2012 with another two phases of asset purchases, which led to a very large expansion of its balance sheet. Nearly eight years after the United States' markets were plunged by the crisis into turmoil, the chair of the FED announced that the FOMC had voted to try to have a positive impact on interest rates by increasing the target rate to 0.5% (from 0.25%). However, the FED's activity timeline will be developed in a deeper way in the next chapter of this paper. At the other side of the ocean, the Bank of England's APP announced the last increase to £375 BN in July 2012.

Since 2012, the FED and BOE started to leave behind QE programs, and on the contrary, the BOJ and ECB started introducing programs of asset purchase. It is not entirely clear. In any case, it is clear that policies which had been adapted to the specific condition of each particular economy and financial system were introduced by both institutions. At that same time, the BOE and the Fed decided to introduce QE programs in order to react to the impending complete failing of their banking system, and with it their economy.

Differently, the BOJ and ECB have defined their massive Quantitative Easing programs with the aim of growing economies at a slow pace (but growing, after all) and as have the freedom to use monetary tools and implement programs which fits better to the specific needs of their markets.

It was in 2013 when Abenomics landed in Japan, and started to print money to buy government bonds annually. The BOJ communicated the imminent increase of the average maturities of their sovereign bonds in a range between 7 and 10 years, and that it would purchase ETFs for the first time, tracking the JPX-Nikkei Index 400. The governor of the Bank of Japan, Mr. Kuroda, explained that those actions were intended to be an adjustment as opposed expansion of Japanese Quantitative Easing. The BOJ's follows a slight different approach to the BOE's ad ECB's one as they have incorporated Quantitative and Qualitative Easing.

To provide context to the issue, the BOJ voted to purchase per month near \$70 billion government bonds. On the other hand, the US' Federal Reserve, settled to spend 85\$ billion per month having into account that the economy of the US nearly triplicates that of Japan's. The scheme of the BOJ's QE is comparatively vast. It is likely that this relates to their scarce room with which they counted for monetary maneuver; the BOJ are by this time in negative interest rates and government bonds to buy near to depletion.

Things have gone in a slightly different direction. In response to a fear of a deflationary spiral, in January 2015 the ECB decided to announce the Expanded APP. In March 2015, a few months later, the PSPP released the revealed intentions and the strategy under which the ECB planned sovereign bonds and public companies' securities from European countries. The ECB is working within a entirely different environment to all of the other Central Banks.

Monetary policy is limited as the Bank is regional, as opposed to just national. The European Central Bank announced a limitation of 33 % of each issuer's debt and no more than 25 % of each issue.

Sceptics have been heard quickly, stating that the Quantitative Easing program from the European Central Bank won't work, and as opposed to the UK and US, long-term interest rates (which Quantitative Easing should add downward pressure to) are in Europe already low.

[A special look to the FED](#)

[Quantitative Easing Phase 1 \(QE1\)](#)

On November 2008, the FED increased the non-conventional monetary policies and announced a purchase plan of \$100 Bn in GSE debt and \$500 Bn in Mortgage Backed Securities. In the origins, the Quantitative Easing programme had the aim of increasing the credit availability for the housing market because it would have positive implications in the conditions of the financial markets. However, the following decline in the housing

prices and tightening of the credit availability led to the extension of the programme in the first quarter of 2009. From the beginning of the programme until March 2010, Quantitative Easing security purchases totaled the sum of \$ 1.725 Trillion and when this first phase of the programme ended, the FED's balance sheet was twice as bigger as on 2008.

Quantitative Easing Phase 2 (QE2)

It was in summer of 2010 when the Federal Reserve announced that the size of its balance sheet would remain stable due to the reinvestment of the principal payments from GSE and MBS into securities with a longer maturity. The FOMC also confirmed that it was ready to provide extra liquidity if the economy requested so in order to ensure the economic recovery, anticipating a high likelihood of the implementation of a second phase of the purchase programme. The FOMC announced in November 2010 further extensions of Quantitative Easing of \$ 600 Bn in Treasuries maturing in the long term for the same reason as the previous one: the economy was not reacting as expected and the authorities considered that additional stimulus may be needed. Nevertheless, this announcement did not suppose a shock in the market as it had been largely discounted during the periods prior the measures implementation.

The second phase of the programme contrasts with the first one principally in the expectations of the stakeholders at the moment the implementation was announced, the second one has fewer impact. A survey conducted by the TV channel CNBC among economists and portfolio managers showed almost a 100% of expectations of QE2 to be in line with the former phase, only differing on the size of the purchases. For this reason, the impact of the second stage of the programme did not have the same impact on market players, prices and interest rates.

Operation Twist

One year after the QE2 was announced, global economy was not performing as expected, credit was not flowing and real GDP growth was worsening. On September 2011, the Federal Reserve implemented the Maturity Extension Program and Reinvestment Policy, also known as MEP. This programme was including on its strategy the purchase of LT Treasuries for the amount of \$ 400 Bn and diminishing the risk by selling ST ones. The name given (Operation Twist) is a reference to the removal of duration risk from the private sector, and "twist" the long maturity part of the yield curve while the size of the monetary base remain the same. It was designed specifically to relieve the pressure on LT interest rates with the aim of dynamize the real economy. Another measure was, the FOMC the announced by the FOMC of the modification of their reinvestment strategy and reinvest MBS and GSE debt back into MBS when they reach maturity instead of purchasing Treasuries. The main driver for these changes was the aim of boosting the housing market through mortgages.

Maturity Extension Programme development and Quantitative Easing phase 3

Unemployment rate improving pace begun to deteriorate at the beginning of 2012, which forced the FOMC to increase the duration of the Operation Twist until the end of 2012. The initial idea was to end up with the program in the first half of 2012, but at the end of the year the total purchases reached \$ 267 Bn. At this point, the MEP had some limitations like the lack of ST Treasuries holdings available for selling. At the time of close, there were no Treasuries or short term notes available on the Federal Reserve's balance sheet.

Tapering

At the end of 2013, the Federal Open Market Committee made the announcement of the gradual reduction of Quantitative Easing provided the in economic environment and employment rate. In January 2014, there was a reduction on monthly purchases of Mortgage Backed Securities and LT T-bills of \$ 5 Bn, respectively. However, the markets and interest rates did not reflect a significant reaction to the implementation of the tapering stage. This was due to the expectancy of market players of these measures long before the announcement and prices were already reflecting it.

Outlook for the future

It has been a turbulent year in Europe due to political uncertainties, elections, referendums and, sadly, terrorism, which had frozen the important decisions in financial markets and macro economy. There are still some uncertain processes to be clarified like the Brexit consequences, however, the situation in Europe is stabilizing steadily and investors and the European Central Bank are recovering their normal activities. Due to this factor, it has gained importance the further announcements of the European Central Bank. During the mentioned period the institution has adopted a cautious position and the market is now expecting important announces due to the current positive moment of the economy in the Eurozone: GDP growth of +1.7%, inflation of +1.9% and unemployment rate is at 9.5%. In addition, the private sector is publishing results at the highest levels since the last 7 years.

During the I Conference of Financial Stability in Madrid, Mario Draghi said that the Eurozone was living a solid economic recovery, driven by the relationship between employment and consumption even with supercore inflation at low levels. He also affirmed that the improvement of credit conditions among countries has boosted the effects of the recovery in the private and public sector.

Figure 7
Super core inflation in the Eurozone



Source: Eurostat, BofAML

In this figure we can track the evolution of supercore inflation since the last 15 years. It is a determinant factor in order to anticipate any movement of the European Central Bank in terms of monetary policy. Currently, this indicator is at low levels and, despite it is expected to improve its figures, it would presumably remain very far from the European Central Bank target.

All the indicators make us think of a slowdown on the expansive monetary policies of the European Central Bank and analysts are positive about this statement. To give an specific example, Anna Stupnytska, economist at Fidelity Investments believes that the economic recovery is one of the most synchronized in the last years and the current monetary policy does not fit with the economic environment anymore. The only obstacle that the analyst sees for tapering actions is the low level of inflation, not recovering at the same path as other regions.

The European Central Bank is currently purchasing € 60 Bn of debt per month (previously, € 80 Bn) and it is not expected to change at least until September, when the Asset Purchase Programme will be revised. The consensus is expecting some tapering decisions during the following year, however, due to the new dependency relation of fixed income markets to the European Central Bank's decisions it will be very complex to withdraw the whole package of measures.

According to the research made for this paper, this line of thinking is well spread. At Fidelity Investments Anna Stupnytska is not the only analyst with these expectations; it is the official prediction at the firm. Ian Speadbury affirms that the European Central Bank

would have technical problems whenever it decides to implement the tapering actions because repo rates need to keep low levels not to produce disruptions in the market, thus the measures must follow a slow pace.

At other investment firms like Bluebay the opinion is similar but more direct: Mark Dowding, portfolio manager of the company, states that it would be a very slow process due to similar reasons to the mentioned before and because the European Union is living some unstable periods that need to be rebalanced. He is sure that during 2018 the European Central Bank will continue purchasing bonds so that its balance sheet will continue to increase despite the acquisitions volume is lower. Moreover, in Bluebay the expectations over interest rates are stable for the following year and they do not see rates reaching 0% until 2019, at least.

Lastly, Mark Dowding remains sceptic over monetary union. He believes it is not a terminated product and it will not be reliable until fiscal and banking union are not implemented

At Pioneer Investments, one of its Portfolio Managers, Mauro Ratto, is very critic with the non-conventional monetary policies carried out during the period analyzed: “Quantitative Easing has proven its capacity to prevent a deeper financial crisis, however, it has failed to create growth. In fact, the speed of capital movement has collapsed in Europe”. His critic vision of QE goes further: “Quantitative Easing has created distortions on fixed income markets, boosting the prices. This is affecting the capability of calculating prices from risk relationship. In the event of the European Central Bank withdrawing its purchases, it would be easier to calculate the return and risk of the bonds. The current situation is not normal and it needs to be rebalanced.

The main concern at Pioneer Investments is the risk of disruption on fixed income durations when the stimulus came to an end. This partially explains the interest that investors are showing lately for flexible fixed income funds. They are also concerned about the distortion on the spreads Europe/United States that will produce the different speeds of the Federal Reserve and the European Central Banks. They say it could be a “dramatic change”.

Outlook analyzed by Forward Guidance

Example of an economic analysis made based on the Speech by Mario Draghi, President of the ECB, at The ECB and Its Watchers XVIII Conference, Frankfurt am Main, 6 April 2017

As part of the Non-standard measures analysis, it may be interesting to provide an Outlook simulation based on Forward Guidance, as it is the main driver for changes on analysts’ expectations. Just provide an example that shows the importance of these speeches, in the majority of trading rooms of the most important banks, like BBVA, Mario Draghi and Janet Jellen speeches are projected and the whole room stares and listens to

the information given. Trading strategies could change dramatically depending on the feelings transmitted in the speech.

According to the information available and the latest European Central Bank's publications as of the development of this academic paper, these are the main points gathered from analysts' reports according to "forward guidance" (Mario Draghi's latest speech).

- The European Central Bank left rates, Quantitative Easing, and forward guidance all unchanged at June's meeting, as had been fully expected.
- The European Central Bank tilted to the downside the balance of risks around growth but the language is getting closer to balanced. Draghi once again sounded more upbeat on the outlook for growth, both domestically and abroad.
- In the press conference though, Draghi sounded increasingly comfortable with the forward guidance as is, and while consensus is looking for the European Central Bank to drop the "or lower" guidance on rates in June, it's not clear that this is the most likely outcome.
- Because of the European Central Bank's latest statements, markets took a slightly dovish view of today's European Central Bank decision, with bund yields slipping from a high of just over 0.36% during the more upbeat opening statement to 0.33% by the end of the press conference, while the EUR followed a similar path, slipping from a high of 1.0933 to around 1.0870.
- In terms of FX notable risks are seen regarding the recent rally in EUR/USD has run out of steam (for now). Market consensus does not think investors have enough justification to chase a push above 1.0950 should one occur. As a result, this leaves EUR/USD looking a little topy for the time being.

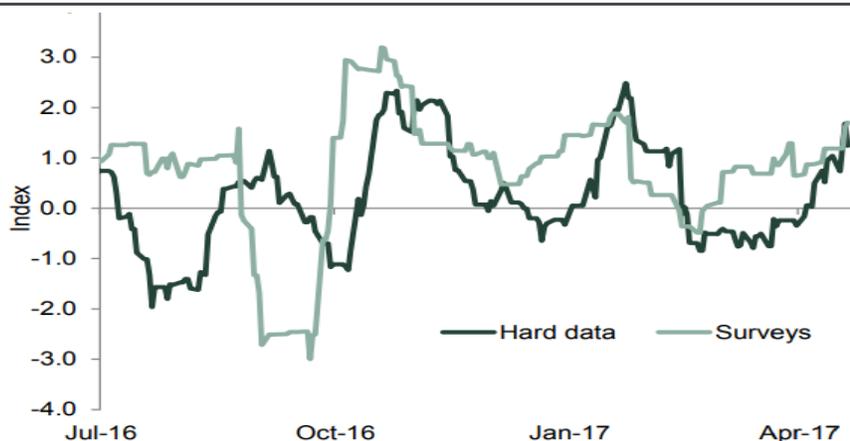
There were no big surprises in European Central Bank decision, with policy rates, Quantitative Easing and forward guidance all left unchanged. While the opening statement was largely in line with the expectations of the market, where the risks to growth remain "tilted to the downside" but the outlook in general has improved, the press conference came across as more dovish. There has been growing market chatter that the European Central Bank will have a shift in tone in June, potentially dropping the "or lower" guidance on rates, but Draghi seemed to lean against that idea, and gave the impression that the European Central Bank is quite happy with the forward guidance that's currently in place.

Growth Is "Increasingly Solid"

There were a few tweaks to the opening statement that showed the European Central Bank is increasingly upbeat on the outlook for growth. The recovery is becoming "becoming increasingly solid," and downside risks have "further diminished." Further, the European Central Bank said that, "the risks surrounding the euro area growth outlook, while moving towards a more balanced configuration, are still tilted to the downside and

relate predominantly to global factors.” Which is an upgrade from the risks being just “less pronounced” in March.

Figure 8
Eurozone’s Data Surprises Index



Source: Bloomberg Terminal

With the March minutes already pointing to “a number of members” who considered the risks to be “broadly balanced,” and after a series of qualitative upgrades, we may be looking for a further shift in language in June. It seems like a reasonable base to look for the risks to growth to be formally considered broadly balanced at that meeting.

Forward Guidance Slower to Shift

However, with respect to the European Central Bank’s forward guidance on rates and Quantitative Easing, it seems like the European Central Bank is likely to be slower to shift. When asked about the sequencing of exit and forward guidance, Draghi re-read part of a speech of his from the European Central Bank Watchers’ Conference earlier this month:

“This implies that our various policy instruments are deliberately chained together in such a way that the forward guidance applied to our asset purchase programme – which is time- and state-dependent – extends also to our interest rate policy. So our forward guidance is de facto on the entire package, not on any specific component of it. And this guidance relates not just to the conditions under which we would withdraw stimulus – i.e. the sustained adjustment in the path of inflation – but also to the sequence of measures we would use to do so.”

With the policy instruments (like rates and Quantitative Easing) “deliberately chained together,” this suggests that the asymmetric forward guidance on rates (“at present or lower levels”) and Quantitative Easing (“we stand ready to increase our asset purchase programme in terms of size and/or duration”) is also deliberately chained together.

Consequently, it looks unlikely that the European Central Bank could shift the rates guidance without changing the Quantitative Easing guidance, and we could see both parts of the guidance remaining in place for several months to come still.

So while analysts are looking for the balance of risks to shift to neutral in June, a change in language on the forward guidance appears to be further off into the distance than everyone had initially thought, and it could not be excluded the asymmetric forward guidance remaining in place through to the end of the year. Analysts should be closely watching the European Central Bank chatter over the next few weeks to see where exactly the Governing Council is leaning.

From a currency market perspective, Draghi has positioned the European Central Bank into a delicate balance. He has managed to strike a bullish tone on growth, but has done so without sounding particularly hawkish on inflation. This leaves the EUR without any strong directional cues from the Governing Council.

Overall, it is not very likely that Mr. Draghi presented markets with any real surprises. The European Central Bank has made an incremental move toward a more 'balanced' assessment of risks, but any real changes to the policy outlook are for another day. Against this backdrop, consensus is seeing notable risks that the recent rally in EUR/USD has run out of steam – for now. With the week's primary potential catalyst now behind us, investors may not have enough justification to chase a push above 1.0950 should one occur. As a result, this leaves EUR/USD looking a little topy for the time being. Spot may be vulnerable to some profit taking after a decent move higher since the end of last week.

Conclusions

As it has been mentioned several times in this academic paper, the lack of a common fiscal policy in the Eurozone has pushed the European Central Bank to undertake some aggressive and asymmetric monetary policies in order to mitigate the impact of the crisis.

These non-standard policies have demonstrated being valid to correct some distressed situations like the public debt crisis, but they have developed some malfunctions in the system like the interdependency between fixed income and asset purchases.

Mario Draghi affirmed the 14 May 2015 that the lax monetary policies maintained during a large period could lead into a weak distribution of monetary resources and this could affect to the financial stability of the Eurozone: financial institutions could be taking risky positions, deteriorating their balance sheets due to the feeling of overprotection that the European Central Bank is offering. Despite of this, the ECB is a firmly believer that the current monetary policy is helping the nations to endure their huge indebtedness, which is true, but it is creating some malfunctions as well: these monetary policies are penalizing creditors who are entitled of financial wealth and European savings in general. Pensionists

and other savers are forced to reduce their consumption and save more in order to compensate the decreasing accumulated value of their pension plans.

With the beginning of the Tapering era, the ECB and other central banks are withdrawing their stimulus for the economy and the markets and liquidity is going to be reduced (also known as artificial liquidity). The FED has announced not only tapering but tightening of its balance sheet and the ECB is going to reduce the amounts of its purchase programmes. "Policies are reverting. Central bankers are announcing that the current stimulus will be reduced ending 9 years of low interest rates and liquidity to the economy and the markets" (Raymond Dalio, 2017).

The final stage of this cycle is determined by central banks trying to maintain the balance between inflation and growth. Dalio also predicted that this is the beginning of a new recession and that the current economic recovery is only cyclical.

APP

Regarding asset purchase programmes, the European Central Bank has tried to flatten the yield curve with the aim of reducing the mid-term interest rates and achieve the same average reduction. However, a flat yield curve could affect negatively to credit creation, and would be specially affected the countries with a large dependency of banks like the ones of the Mediterranean area.

Quantitative Easing has been an obliged response for the European Central Bank as other central banks were implemented in other economic areas. It has had a demonstrated effect on the global economies but as it is an unknown field for central banks, there is not a clear guide of how to exit these procedures.

The monetary policies implemented by the United States and Europe have remained divergent in many ways. While the former has prioritized the monetary policy, the later has focused as well on fiscal consolidation, even though there is still a long way to the ideal scenario. However, Quantitative Easing in Europe could have a greater impact on the economy than the FED's provided than the deposits in the ECB are at negative rates while in the Unites States they remain slightly above 0.

The Research team of the European Central Bank noted the principal effects that the Asset Purchase Programme has had as of September 2016:

The European Central Bank's expansive asset purchase programme has proven its effectiveness in easing further the stance of monetary policy in the Eurozone's economy.

- Increasing the duration of the selected assets would boost the economic effect of the programme. There are other ways to increase the impact of the asset valuation channel like buying risky bonds, given that the spread of these assets is related to

investors' leverage limitations. In the first quarter of 2016, the Governing Council decided to launch a private-sector purchase programme can be understood in this light.

- It is preferable that clear conditional commitments about monetary decisions in the future are made with the purpose of compensating the risk of a liquidity trap maintained during a long period. One example of such conditional commitments is to communicate the potential evolution of the outstanding ECB's portfolio on the mid-term.

References

- Banco de España, *El efecto de las políticas monetarias del BCE en el período reciente*, 2015
- BBVA Research
- Bloomberg Terminal
- Damià Rey Miró, Andrea Gómez Fernández, Alejandro Refojo Rey, *La actuación de la FED, BCE, BOE y BOJ y su impacto en los activos financieros*. Bolsa de Barcelona, 2015.
- European Central Bank, *The monetary policy of the ECB*, 2011
- Eurostat website
- Gabriel Agostini, Juan P Garcia, Álvaro González, Jingwen Jia, Laura Muller, Ali Zaidi, *Comparative Study of Central Bank Quantitative Easing Program*, 2016
- Iván Werning, *Managing a Liquidity Trap: Monetary and Fiscal Policy*. MIT, 2012
- Mercè Sala Rios, Francisco X. Minguell Chillón, *Política monetaria no convencional*. *Boletín económico de ICE*, 2016
- Philippe Andrade, Johannes Breckenfelder, Fiorella De Fiore, Peter Karadi, Oreste Tristani, *The ECB's asset purchase programme: an early assessment*, 2016

- Robert E. Hall, Ricardo Reis, *Maintaining Central-Bank Solvency under New-Style Central Banking*. 2013
- Roberto A. De Santis, Frédéric Holm-Hadulla, *Flow effects of central bank asset purchases on euro area sovereign bond yields: evidence from a natural experiment*, 2017
- Seth B. Carpenter, Jane E. Ihrig, Elizabeth C. Klee, Daniel W. Quinn, and Alexander H. Boote, *The Federal Reserve's Balance Sheet and Earnings: A primer and projections* , 2013

