Dipartimento di **Economia e Finanza**

Cattedra di **Money & Banking**

Quantitative Easing in the Eurozone.

RELATORE

Prof. Paolo Paesani

CANDIDATO

Francesco Grosso

Matricola: 187011

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Introduction:

We can certainly say that in the recent years we have not been living in any economic boom phase of the history. Maybe we soon will but for the last decade or more we had to cut on the spending and save more. As we all know the financial crisis was set off mainly by the housing bubble burst in the US where real estate assets' prices kept on growing for the past 4 years, mortgages were given to subprime customers, overvaluing securitized bundles of mortgage-backed assets. This then lead to the general global recession worldwide and in turn to the European debt crisis which was caused by several factors such as the failure of repayment of the accumulated debt by national governments and burst of local nations' real estate bubbles. The EU never really managed to fully recover having constant low GDP growth rate, high unemployment and low inflation although several measures were taken to contrast it. This is where QE comes into play, it has been adopted as a action to get inflation rate to where it belongs.

Central Banks are governmental institutions that are in charge of managing the State's currency, money supply, interest rates, framework of payment systems and most importantly supervise the banking sector making sure it complies with the laws established to avoid any frauds against individuals, government and, most definitely, avoid any financial crisis. *Ex post* the financial crisis of '07/'08, strict financial regulations were adopted to minimize the risk of any further crisis, such as the *Enhanced Framework to Prevent Abuse (MAD/R)* and the *Prevention, Management & Resolution of Bank Crisis (BRRD).* In order to reach them, monetary tools must be made use of, as we will see in the first chapter there are various tools that can be used, also simultaneously. In this paper we will be focusing more on one specific tool known as *Quantitative Easing* and more specifically the one carried out, and still being used as of August 2016, by the European Central Bank.

Quantitative Easing (QE hereinafter) is defined by the European Central Bank as "*all [*the*] purchase programs under which private sector securities and public sector*

securities are purchased to address the risks of a too prolonged period of low inflation. It consists of the third covered bond purchase programme (CBPP3), asset-backed securities purchase programme (ABSPP) public sector purchase programme (PSPP) corporate sector purchase programme (CSPP)"[1]. It has been recently used by three major Central Banks in the world, due to the financial crisis that started in 2007, in addition to the one carried out by the Bank of Japan in the early 2000s. The three banks are the Federal Reserve, the Bank of England and, of course, the European Central Bank (ECB hereinafter). The Asset Purchase Program (APP hereinafter), the acronym used by the ECB itself to refer to the QE, is still being carried out, due to an extension deemed necessary to reach the monetary policy target. As stated on the ECB's official website, the monetary policy goal is to reach an "*inflation rate of below, but close to, 2% over the medium term*".

In the first chapter we will look at the theory behind the QE, why and how it should work in general, we will then pass on to the list of the above mentioned monetary tools, one by one and the two categories in which they are divided. Moving on further we will taking a look at the ways the QE transmits to the real economy, also known more generally as the *transmission channels*, they have been individuated and analyzed one by one, all seven of them. Last but not least, we will see the possible exit strategies that must accompany a QE program.

In the second chapter we will look at the specific case of the QE program undertaken in Europe, the APP. Analysis of the situation leading to the APP will take place in the first part, therefore from the outbreak of the crisis to the announcement that took place in the beginning of 2015. The APP is and was made of several elements, several other purchase programs, therefore we will pass onto the list of them, see what they are made up of and how they are carried out effectively. Ultimately we will examine the APP itself and judge if it is working at the expected rates and levels. Conclusion and references will of course be present to end in a proper way. Enjoy the reading.

[1] As taken from ECB's website
Source: http://ec.europa.eu/finance/general-policy/policy/map-reform/index_en.htm#row8

Chapter 1:

Quantitative Easing Explained.

1.1: The Theory Behind It.

QE programs are usually undertaken when an economy has low expected inflation, is financially impaired, and the conventional monetary policies[2] are not having the desired effect, or not at the required level. What these programs usually consists in are the Central Banks buying government bonds on the secondary market in order to inject large quantities of reserves into the economy. Some QE programs also include the purchase of corporate bonds to have a similar effect, but rather impact directly the private sector. Doing this should have a series of effects. First, the yields of the governments bonds should drop drastically, once this happen the reserve holders, mainly the banking sector, should have an incentive to lend to the real economy, which include households and private sector companies. This is due, in part, also to the use of other conventional monetary tools available to the Central Banks which include the excessively low interest, if not negative, which include the overnight deposit, marginal lending, and main refinancing. High interest rates on overnight deposits discourage the banks to hold excessive amounts of reserves. On the other hand, the low financing rates available, should serve as an incentive to further loan to the real economy due to the low costs of capital. The large availability of almost interest-free loans, triggered by the injection of liquidity into the economy, benefits households and private companies who become more keen on requesting loans from banks.

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[2] Conventional monetary policy is defined as "[conventional] *monetary policy mainly acts by setting a target for the overnight interest rate in the interbank money market and adjusting the supply of central bank money to that target through open market operations. To minimize the risk exposure of the central bank's balance sheet, all liquidity-providing operations normally take place in the form of reverse transactions against a menu of eligible collateral.*"
As defined by Lorenzo Bini Smaghi, Member of the Executive Board of the European Central Bank during a keynote lecture at the International Center for Monetary and Banking Studies in Geneva on 28th April 2009.
Source: https://www.ecb.europa.eu/press/key/date/2009/html/sp090428.en.html

1.2: The List of Tools Available and When They are Used:

Let us start from defining what a monetary policy is, the tools at its disposal and how it works in normal times. A monetary policy tool is an instrument used by the Central Bank to guide the money and credit in a certain economy. Usually the monetary policy only sets the target for inflation level and regulates the supply of the reserves within the economy thanks to the help of the open market operation conventional tools. To lower the risk, i.e. Central Bank's balance sheet's exposure, all liquidity-providing operations are carried out based on the actual situation of the economy. In abnormal times though, these conventional tools are not enough to fulfill the monetary policy goal and therefore unconventional tools must be made use of. The reasons Centrals Banks make use of the latter are mainly two. The first is the economy is struck by such a powerful shock that the interest rates are brought down to zero and therefore cutting policy rates further is not possible. As for the second reason, it is usually because the transmission process of the conventional policy tool is impaired due to the economic status. Broadly speaking the actions that can be taken to add monetary stimulus is the mix of guiding medium to long-term interest expectations, changing the composition of the Central Bank's balance sheet and expanding it. Let us look at each tool, both conventional and unconventional available for the ECB, but overall the instruments are similar amongst all Central Banks.

Conventional Tools:

Standing Facilities:

- Marginal Lending Facility: "*A standing facility of the Eurosystem which counterparties may use to receive overnight credit from a national central bank at a pre-specified interest rate against eligible assets*."[3]

All definitions are taken from the ECB's glossary webpage and have the followings links:
[3] https://www.ecb.europa.eu/home/glossary/html/act4m.en.html#468

- Deposit Facility: "*A standing facility of the Eurosystem which counterparties may use to make overnight deposits at a national central bank. Such deposits are remunerated at a pre-specified interest rate*."[4]

Open Market Operations: "*An operation executed on the initiative of the Central Cank in the financial market. With regard to their aims, regularity and procedures, Eurosystem open market operations can be divided into four categories: main refinancing operations; longer-term refinancing operations; fine-tuning operations; and structural operations. As for the instruments used, reverse transactions are the main open market instrument of the Eurosystem and can be employed in all four categories of operations.* […]"[5]

Minimum Reserves Requirements: "*The minimum amount of reserves a credit institution is required to hold with a central bank. In the minimum reserve framework of the Eurosystem, the reserve requirement of a credit institution is calculated by multiplying the reserve ratio for each category of items in the reserve base by the amount of those items on the institution's balance sheet.* […]"[6]

Other Main Refinancing Operations:

- Longer-Term Refinancing Operations (LTRO): "*A regular open market operation executed by the Eurosystem in the form of a reverse transaction. Longer-term refinancing operations are carried out through monthly standard tenders and normally have a maturity of three months.*"[7]
    - Targeted Longer-Term Refinancing Operations (TLRTO): Operations that provide financing to credit institutions for periods of up to four years. They offer long-term funding at attractive

[4] https://www.ecb.europa.eu/home/glossary/html/act4d.en.html#465
[5] https://www.ecb.europa.eu/home/glossary/html/act4o.en.html#250
[6] https://www.ecb.europa.eu/home/glossary/html/glossm.en.html
[7] https://www.ecb.europa.eu/home/glossary/html/glossl.en.html

conditions to banks in order to further ease private sector credit conditions and stimulate bank lending to the real economy.

- Fine-Tuning Operations (FTO): "*A non-regular open market operation executed by the Eurosystem mainly to deal with unexpected liquidity fluctuations in the market.*"[8]
- Structural Operations: "*An open market operation executed by the Eurosystem mainly in order to adjust the structural liquidity position of the financial sector vis-à-vis the Eurosystem.*"[9]

Unconventional Tools:

Enhanced Credit Support: "*The non-standard measures taken by the ECB/Eurosystem during the financial crisis with a view to supporting financing conditions and credit flows above and beyond what could be achieved through reductions in key ECB interest rates alone.*"[10] They include:

- Full Allotment Fixed Rate*:* Primary action to maintain the availability of credit for households and companies at accessible rates.
- Securities Accepted as Collateral: The list of securities that are accepted as collateral when funding is requested by a commercial bank.
- Extension of Liquidity Provision Measures Maturity: Extending the maturity the refinancing operations.
- Currency Swap Agreements: Providing liquidity in foreign currencies. This shows the considerable degree of cooperation among Central Banks to ease the liquidity tensions in the global money markets.

[8] https://www.ecb.europa.eu/home/glossary/html/glossf.en.html
[9] https://www.ecb.europa.eu/home/glossary/html/glosss.en.html
[10] https://www.ecb.europa.eu/home/glossary/html/glosse.en.html

- Covered Bonds Purchase: Outright purchases of debt securities issued by banks, which gives the access to funding of a longer-term nature compared to usual refinancing operations.[11]

Securities Market Program: "*Interventions by the Eurosystem in public and private debt securities markets in the euro area to ensure depth and liquidity in those market segments that are dysfunctional. The objective is to restore an appropriate monetary policy transmission mechanism, and thus the effective conduct of monetary policy oriented towards price stability in the medium term. The impact of these interventions is sterilized through specific operations to re-absorb the liquidity injected and thereby ensure that the monetary policy stance is not affected.*"[12]

Asset Purchase Program: Also know more commonly as Quantitative Easing is purchase of bonds, either governmental or corporate or even both depending on the program, on the secondary market in order to ensure the transmission of liquidity to the public sector. The main difference between the Securities Market Program and the QE that the former does not absorb of the liquidity previously injected, but rather leaves it in circulation.[13]

1.2.1: Quantitative Easing in Greater Detail:

Given the implementation QE, combing it with the low interests in the banking sector this should incentivize the investment over the long run, setting the ground for price stability, and profitability for the investments themselves. Generally the QE programs focus on the purchase of longer-term government bonds from the banking sector. This is not for some random reason, but rather because the yields on government bonds serve as benchmark on privately issued

[11] As clearly stated during press release on 2nd October 2014.
Source: https://www.ecb.europa.eu/press/pr/date/2014/html/pr141002_1.en.html
[12] https://www.ecb.europa.eu/home/glossary/html/glosss.en.html
[13] As clearly stated during press release on 22nd January 2015.
Source: https://www.ecb.europa.eu/press/pr/date/2015/html/pr150122_1.en.html

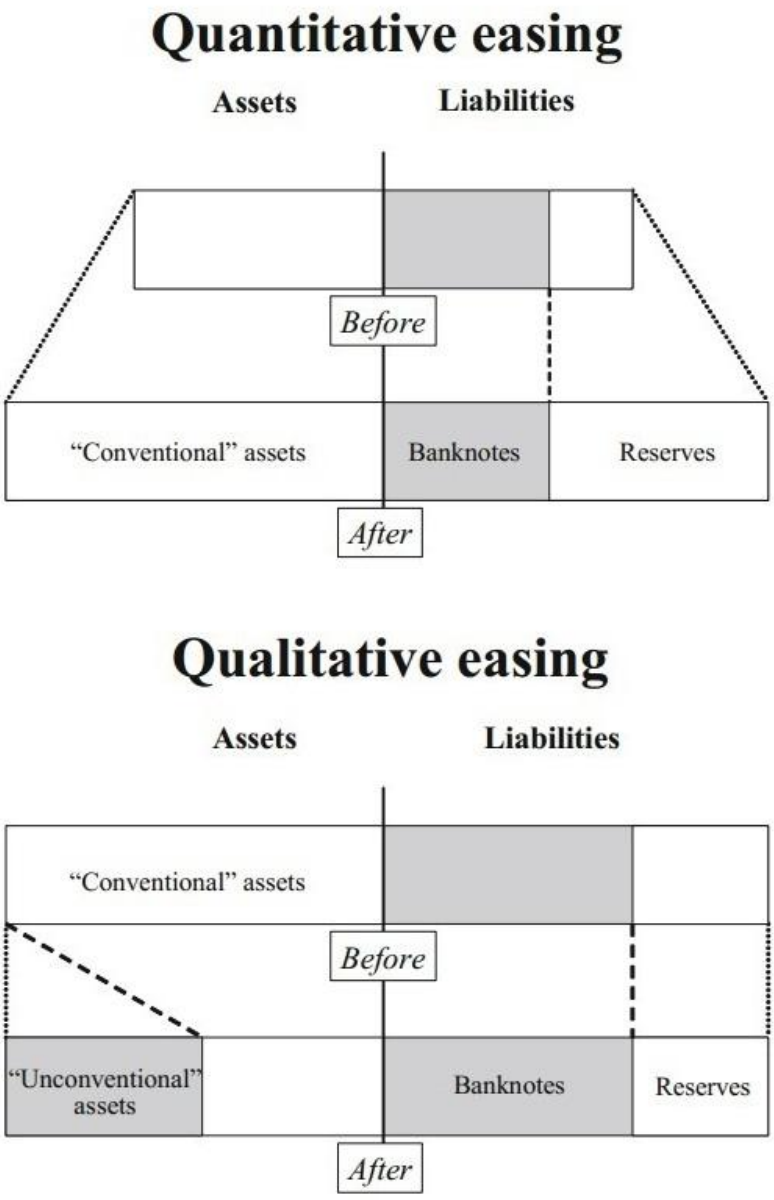
bonds. Obviously if the public sector yields decrease so do the private sector's rates. At the same time though, the commercial banks might prefer to hold on to the liquidity not reaching Central Banks targets. This risk can be mitigated by the lowering of the bank interest rates, which include deposit interest rate, and the marginal lending rate from the Central Bank, exploiting the standard interest rate channel. If the interest rate channel is not fully exploited then there might be a need to increase the Bank's balance sheet to have the same effect. By buying the private sector securities it impacts directly the individuals in seek of credit, cutting out the credit risk, which would mean an increment of interest rate if borrowed from a regular commercial bank. It is important for the authorities of the Central Bank to also carefully analyze the list of eligible securities to make sure not too much risk is burdened.

The purchase of commercial papers, corporate bonds and asset-backed securities to directly work on liquidity shortages in certain markets is known as *Direct Credit Easing.* This has more or less effect depending on the different structure of the financial system; in Europe for example the corporations rely much more on bank loaning compared to their counterparties in USA. The main feature is that by doing so the Central Banks directly interacts with the private sector and burdens the risk on herself directly. That is why the list of eligible securities must be highly scrutinized before purchase. This high scrutiny is what has lead to debates on how this Direct Credit Easing only really helps the safer companies, which in the end, are also the ones that would be more likely to granted loans by banks, consequently are seeking less liquidity from such programs.

As **Figure 1** shows easily, we can make a distinction between Quantitative Easing and the Qualitative Easing. *QE* can also be classified as *Credit Policy* which is no more than the expansion of the quantity of the assets on the Bank's Balance Sheet. This brings along an expansion of the monetary base and no

alteration in the Balance Sheet's list of financial assets; no addition of not-already-owned assets. As for the liabilities side of the Balance Sheet, the banknotes will remain the roughly the same amount, increasing only the reserves as a direct consequence of the purchase of assets. On the other hand, the *Qualitative Easing*, which can also be called *Credit Easing* according to Lenza, Pill, Reichlin (2010), is the keeping constant the size of the balance sheet but adding unconventional assets (private sector), which may include nonperforming loans and or junk bonds, at the expense of the standard assets (government).

Figure 1: Quantitative Easing vs Qualitative Easing



Source: Lenza, Pill, Reichlin (2010)

We know that these unconventional assets are the securities that can be bought directly from the private sector, e.g. equity shares. This governs whether

the Central Banks aim at replacing/by-passing a market that is weakened or directly re-activating the private activity in that market. At the same time by using this intermediation the Central Bank shall keep in mind that it creates a certain type of dependency on bank measure, therefore complicating exit strategy once the final goal has been reached.

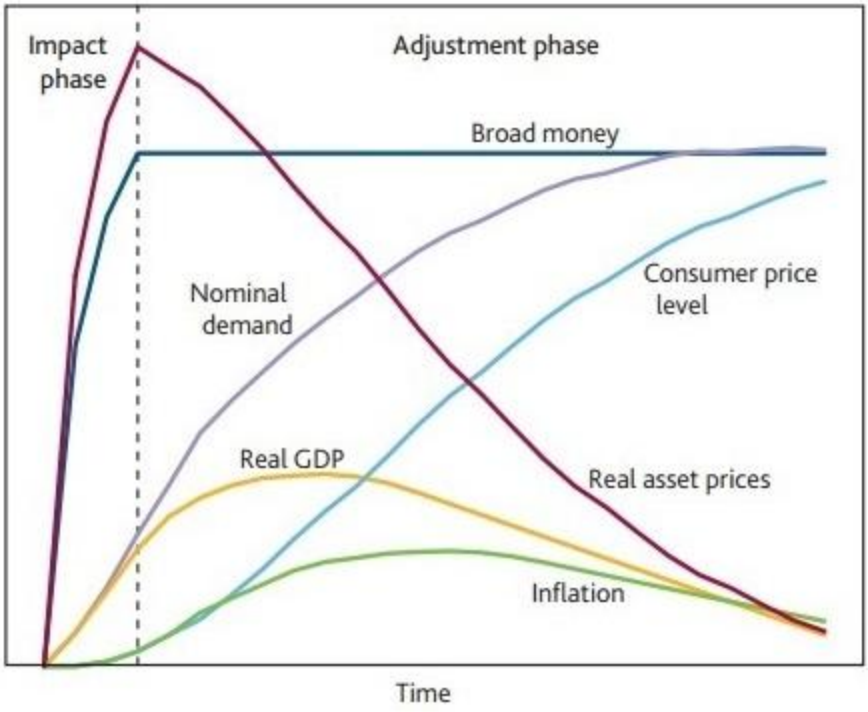
1.3: Transmission Channels of the QE program:

There are many transmission channels that the QE has which are supposed to have an effect on the inflation. Let's look at them one by one:

1.3.1: Portfolio Rebalancing:

The first one is called the *Portfolio Rebalancing* which can be divided in two main phases; the **impact phase** and the **adjustment phase**. The former is where there should be a rise in the broad money in circulation and the lessening of the quantity of medium and long-term government bonds in circulation. This creates a portfolio imbalance because money and bonds are not perfect substitutes. The purchase of government bonds leads to lower yields on them, which then are used as a benchmark for other assets' yield, as a consequence, other assets' prices rise. This is due to the fact that individuals are opting to move their funds into other assets where higher revenue should be guaranteed at least in the impact phase, 'substituting' the previously owned government bonds. Through lower borrowing costs and greater wealth, assets' aggregate demand rises, hence this then guarantees inflation. In the adjustment phase, as the prices and assets' value increase, the demand for money reduces the portfolio imbalance of the impact phase. This carries on until the balance is reached again but at higher prices. To help visualize better both phases refer to **Figure 2** taken from Joyce, Tong, Woods (2011).

Figure 2: The Qualitative Economic Impact of QE



Source: Joyce, Tong, Woods (2011)

1.3.2: Depreciation of Currency:

Once the Balance Sheet of the Central Bank has been expanded and the main effect has taken place, the lowering on interests on government bonds, there is a *depreciation of the exchange rate* of the local currency compared to the foreign currencies from which foreign investors come from. This leads to exports becoming cheaper abroad and therefore a higher demand, increasing the net exports and consequently output growth.

1.3.3: Expectation Channel:

The other transmission channel that allows inflation to increase over time is the *Expectation Channel*. In other words the households and companies know that the Central Bank will do everything in her power to increase the inflation, almost ascertaining the inflation in the future. This will have a psychological effect on the population that prices will raise and therefore also their wages must be indexed accordingly to not reduce their purchasing power in the future. This can be particularly linked to the *Forward Guidance*[14] idea also known as the *Policy Signaling*, in which the Central Bank does inform the people of their objective, and the use of tools, leading to the low interest rates, and consequently asset prices to rise. This, alongside the increased amount of liquidity, is fundamental to boost the population's confidence and let spending increase.

1.3.4: Duration Risk Channel:

The *Duration Risk Channel* has an effect on the reduction of risk premium of the longer term bonds. For this channel to have importance is it fundamental for us to keep in mind the idea that bond market is segmented and there are risk-averse investors. The more risk-averse which tend to bear less uncertainty but increase the probability of their return and the ones that like to convey more risk but also incur the risk of their return being equal to zero, or not as high as excepted. In addition to this we must also look at what kind of QE program is being carried out. If the program applies only to government bonds then the effects on corporate bonds will be lower than if the program was extended to both government and corporate bonds. With these two concepts clear in mind, and by knowing that the risk premium of a bond is also based on its maturity, we realize that once the Central Bank carries out the buying of longer term bonds the yields drop down to almost reach the shorter term bonds' yields which, generally, carry a lower duration risk premium.

[14] Defined as by the ECB: "A communication by the Governing Council as regards its expectations for the future path of the key ECB interest rates following its meeting on 4 July 2013."
Source: https://www.ecb.europa.eu/home/glossary/html/act1f.en.html#713

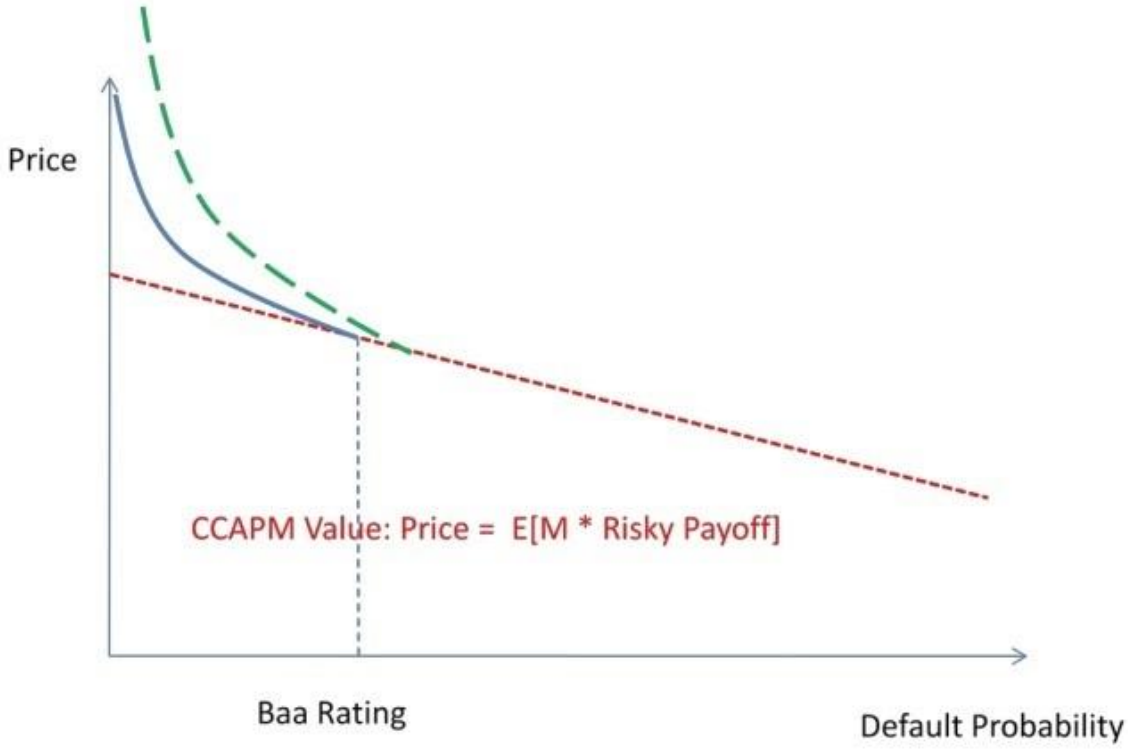
1.3.5: Liquidity Channel:

Another channel that can have an effect on the yield and prices of bonds is the *Liquidity Channel*. We know that the yield of a bond reflects many factors such as a premium on liquidity. By increasing liquidity it consequently lowers the liquidity premium on a normal bond on the market, offsetting a rise in the prices of the bonds.

1.3.6: Safety Premium Channel:

This channel can be confused with the general risk premium on bonds, but let us look at it closely and find out how it is different. As Krishnamrthy and Vissing-Jorgensen (2011) analyze, the amount of customers interested in long-term safe assets resultantly lower the yield on such assets. With a given amount of long-term assets the demand cannot be satisfied leading to an increment of the spread between AAA bonds and slightly less secure bonds BAA. By plotting a graph of price of bonds against their relative expected default rate it would look like **Figure 3**. Of course, by intuition, we can say that the lower the risk is the higher the price and vice-versa. Starting from the dotted red line, the bottom line of the CCAPM value of a risky bond, we move towards the green dotted line, as the quantity of long-term safe bonds diminishes. This is what is called 'the safety premium for a smaller amount of supplied safe assets'. The largest effects should be clearly visible on the safest assets with no effects on low-grade debt such as BAA bonds or bonds with prepayment risk such as MBS. Therefore this class bonds should form a natural threshold by safety clientele due to their feature of being the boundary between investment grade and non-investment grade securities.

Figure 3: Satefy Premium on Bonds with Near-Zero Default Risk



Source: Krishnamrthy and Vissing-Jorgensen (2011)

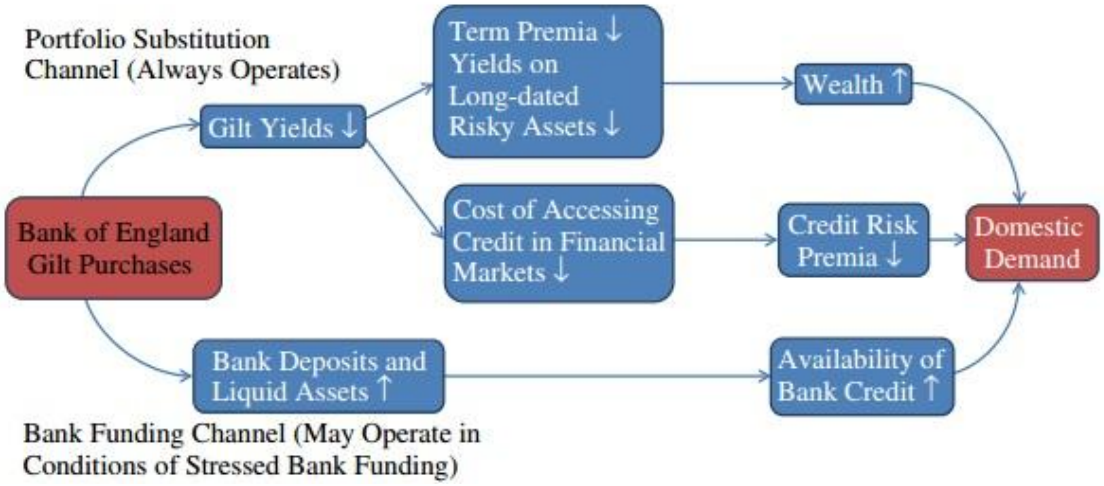
1.3.7: Default Risk Channel:

If the desired effects of a QE program, that it includes corporate bonds purchase, can be reached is also thanks to the lowering of the rates and increase in prices. This is because the investors will be more eager to invest the cheap funding into also BAA bonds, leading to a lowering of the default risk premium. This is due to the stimulation of the economy itself, alongside the psychological lower risk aversion of the investors themselves. External investors will be the ones lowering the yields on less-secure bonds, not the Central Bank. The Bank will usually never burden the risk of non investment-grade corporate (or more

vulnerable countries in the case of the ECB) bonds. The eligible bonds that can be bought are usually discussed by the authorities of the Central Bank. People argue that this aspect of the QE tends to help only the safer, and the less likely liquidity-seeking companies.

Some channels are shown graphically in **Figure 4**.

Figure 4: Channels for the Impact of the Bank of England's Gilt Purchases on Domestic Demand



Source: Joyce M., Miles D., Scott A., Vayanos D. (2012)

1.4 The Effects of QE:

There are various effects the QE can have aside from just raising the expected inflation to communicated levels; the interests reaching their lower bounds also have consequences in the economy itself. For the moment let's look at the theoretical effects:

1.4.1: Wealth Effect

Exchanging reserves for bonds we can see how this effectively does not increase the net financial assets. The main effect, which is what is wanted by the

Central Bank operating the QE program, is the *Wealth Effect* and the perception of, already-owned, assets of the investors. We could say that you would move from a savings account to a checking account and the main effect is that individuals will be more incentivized to spend, under a psychological point of view. In addition let's not forget that the population will also have access to cheap capital and therefore will guarantee themselves higher investment possibilities to further increase wealth in the near future.

1.4.2: Income Inequality Effect:

As Sakir (2015) criticizes the Wealth Effect makes the rich individuals increase their wealth, since they are the ones that take advantage of financial investing, and not only, leaving the rest in the same condition as before, therefore enhancing the inequality amongst the population. This inequality has been source of division, where some state that it could lead to lower economic growth in the country where the QE program is taking place. In addition it has been argued that although the banking sector has large amounts of money that could be lent out, the loans will still be denied to the less creditworthy, usually the lower income individuals, therefore magnifying the whole *Income Inequality Effect* by leaving the benefits of QE to the wealthier individuals.

1.4.3: Inflated Asset Prices:

Beforehand we talked how the asset's prices can increase in times of QE undertaken by Central Banks. This increase in asset's prices can also lead to a bubble which then would burst and of course not bring along any positive consequences. These consequences would definitely include economic instability, low economic growth and increase unemployment levels. We also have to take a look at the other tools the Central Bank uses, for example if it keeps low interest rates as soon as they are raised there would be an inflow of capital attracted by the newly set interest rates. This signal of stronger economy would prompt greater

returns to investments and opportunities, leading to a further increase in asset prices and consequently risks of asset price bubbles.

1.4.4: Capital Markets Use:

The fact that the other assets have raised in price due to the investment switch may lead to greater use of capital markets to raise funds rather than relying to bank loans by corporations. Although, until now we have said that the lower borrowing costs leads to a greater use of bank funding; the private sector aroused by the higher asset prices, might lead companies to sell corporate bonds and issue equity shares. These higher asset prices lower the cost of finance, raise the asset prices and of course boost investments.

1.4.5: Excessive Risk Taking:

Until now we have talked of how the QE's injection of liquidity in the economy can enhance the lowering of interests and increase the asset's price, and why this happens. We know that behind this almost interest-free loans and freshly greater wealth there is the shadow of moral hazard. Moral hazard of course means the undertaking of risk exposing others' money. Banks, as we know from recent times, are likely to incur in major risk-taking activities knowing there is a possibility of bail-out from the governments if things do not go as planned, but single individuals do not have the same back-up plan. The excessive risk taking can of course lead to serious negative outcomes, like having to declare bankruptcy when obligations are not met. By taking too much risk and buying with loans we can incur in a bubble just like it happened in USA with the mortgages in the late 2000s which definitely did not bring any good times for the world economy.

1.5: Determinants of Low Market Interest Rate:

As developments across advanced economies are highly unclear at times, it is important to understand why market interest rate can be so low from time to time. Central Banks can check if their mandate has been achieved also by looking at the market interest

rate. The interest rate must be steered/conducted closest possible to the 'equilibrium interest rate' which is the yield that serves best the economy, in the sense that the economic growth and employment level are at their maximum level, the inflation at the determined level, and there is price stability. We have talked about how in periods of QE programs all the standing facilities of the Central Bank economy are at their lower bounds. This does have a negative effect on the parties that are interest-income dependent such investment, pension and union funds and also personal savings accounts in private banks. At the same time the banks' profit's can be lowered due to deposit facility which can also be in negative ground. On the other hand one shall not lose sight of the beneficial aspects of these policies, where borrowers' capability of honoring their commitments are improved, banks' provisioning needs decline, and general already-owned assets' value are increased. As mentioned in the previous section, due to this low profitability period, parties tend to incur also in excessive risk taking which can then lead to, yet, another crisis in the future, if revenues/outcomes are not as excepted. The combination of this risk taking and the rational investments by liquidity-holders is what also drives assets value in the economy, which apparently dominates the loss on interest income of many banks, as stated by one of the surveys taken in Europe right after the APP started. Therefore we can say that the loss on interest outcome is wore off by the capital gain of assets, at least for many banks that is.

1.6: Exit Strategies Out of the QE:

Exiting a QE program is a delicate procedure that must progress at the right pace or all the effects up-until-then achieved can vanish or, even worse, bring in negative and unwanted consequences. We now know how an Asset Purchase Program works, the injection of liquidity into the economy, either directly by purchasing private sector's debt securities or by credit easing through the banking sector, supplying the latter with cheap-to-free capital to then pass onto to the public. With this addition of extra liquidity, investments and spending should increase, leading to an increase in the inflation and therefore the ultimate goal of monetary policy to be achieved. There are several ways on

how to exit the program and the possible consequences of course. In the next chapter, where we will be looking at the main three QE programs around the world that either have happened or are still going on, we will look which exit strategies have been adopted and which ones should therefore be adopted for the still undergoing programs, keeping in mind also the various structures of the economies.

We can identify the following main strategies[15]:

1. Readjusting, at a slow pace, the facilities offered by the Central Bank in order to reduce the amount of borrowed liquidity to pre-crisis values or adequate level based on economic outlook.
2. Reducing or bringing back to normal duration the lengths of regular long-term loans.
3. Redeeming agency debts and Mortgage-Backed Security as they mature or are repaid.
4. Offer depository institutions 'term deposits'.
5. Using the 'reverse repurchase agreements' to lower the quantity of reserves in circulation.
6. Through open-market operations, redeeming or selling the securities.

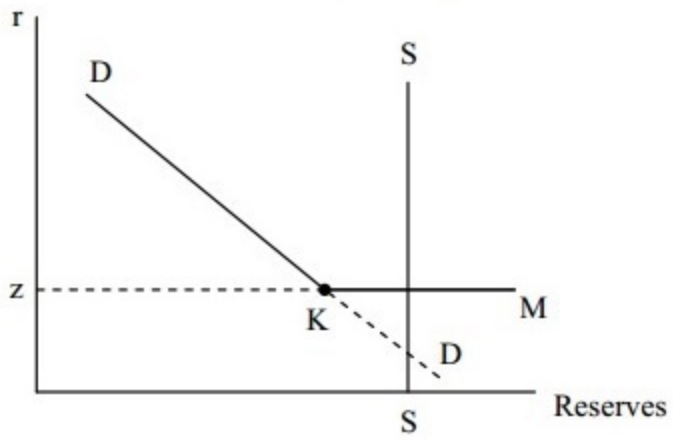
The first and third items are just part of the 'quantitative tightening' that the Central Bank can use in general, not only as an exit strategy from a QE program. Number 1 is practically immediate but the overall process is probably better to be paced slowly. It is just a matter of facilities being set, but this has a direct consequence, alongside the other items, also on the interbanking interest rate that commercial banks apply for overnight loans to each other. There is to say that this item may wear off by itself because when banks will no longer need the extra liquidity, the facilities fall into disuse, so we can say that the use of this strategy usually happens at the most appropriate period. As for number 2, this will affect the further, minimum duration of the tools that are being used to reach the monetary policy goal. Number 3, on the other hand, reabsorbs the liquidity

[15] As listed on Blinder A. (2010) on pages 11-12.

previously injected through the securities. Unless there is a massive sale of the securities some time will be needed before the balance sheet resembles the one before the QE program was initiated. The term deposits that can be offered to depositary institutions can be considered as *certificates of deposits*. It is like going from a checking account to a savings account with your bank. The catch here is that by having these certificates of deposits, the amount that they represent is not officially counted as reserves, making them be unavailable. By offering these instruments with fixed durations the Central Bank can easily control the quantity of reserves but at the same time let the corresponding interest rates be set by the market. Numbers 5 and 6 can be considered as conventional contractionary open-market operations, either temporary trough the reverse repurchase agreements or permanent if they are actually sold. These two items are the ones that probably are the ones that have the greatest effects, positive or negative, if the pace at which this tightening happens is not appropriate. Of course if it happens too fast the effects of rising inflation can vanish and, on the other hand, if it goes too slowly there might be a case of hyperinflation.

Let us look back at the facilities and how they must be handled during the exiting of the QE. It has been argued that also if there is an excess of reserves roaming in the economy this is no worries for the risk of uncontrolled inflation: let us look why this can be accurate. Starting from the fact that once the market interest rate (r) falls to the same level as the interest rate paid on reserves parked at the Central Bank (z) there is going to be a infinitely elastic demand for reserves, at the rate z = r, where the cost will be equal to zero. It is intuitive why the demand is infinitely elastic; if the rate *r* will fall below *z* then the banks with excess reserves will prefer stationing them at the Central Bank and guarantee themselves a higher return. **Figure 5** illustrates better how the demand is altered based on the interest to the quantity of reserves given.

Figure 5: Interest Rate Floor System

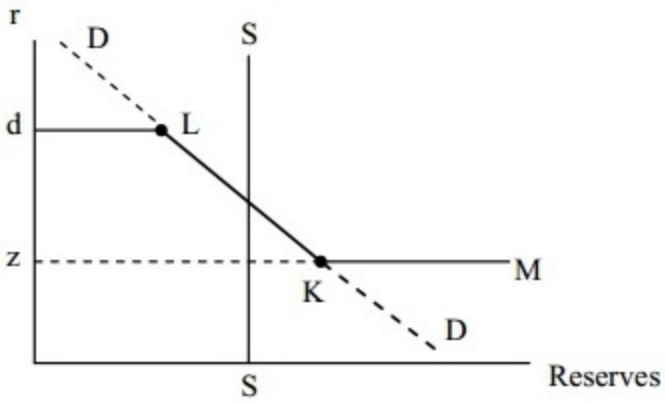


Source: Blinder (2010)

At the same time we know that the supply is fixed by the Central Bank. By looking at the image we can see that once the demand is in between K and M a higher or lower supply of reserves does not really influence anything. We can conclude that any volume of reserves can remain on banks' balance sheets indefinitely without sparking excessive inflation. This also consequently means that the Bank should focus rather on the reduction of acquired assets previously.

Another explanation is to add the an *interest rate ceiling* to the previous *interest rate floor* that we have just concluded talking about in the previous paragraph. The combination of the *floor* and the *ceiling* is known as *the corridor*. The *ceiling* is usually the overnight interest rate for which banks can have extra reserves from the Bank (d), usually to comply with reserve ratio implied by the Bank itself or to meet obligations with other banks. By setting this *corridor* and letting the overnight lending rate among banks, the Central Bank can value if it is taking out the reserves at the right pace; either too fast or too slow. If the overnight rate would tend to the ceiling than the reserves are being taken out too quickly and, on the other hand, if the overnight rate tends to the lower bound then there is a surplus of reserves. The way how the corridor works is showed in **Figure 6.**

Figure 6: Interest Rate Corridor System



Source: Blinder (2010)

With this analysis, the first chapter comes to an end. In the next one, we will be focusing more on the specific cases of QE programs in the USA, UK, Japan, and in greater detail, the European one which is still being carried out, although being the source of many debates whether it is the best option. A section will also be dedicated to the structure of the European Central Bank and how it works, being 'supranational', the Central Bank of 19 countries which at the same time have their Central Banks, but with limited authority. The theory behind the QE itself and the exit strategies have now all been mentioned, now let us look at the Eurozone's QE and its relevant details, and see if it is having the effects above stated.

Chapter 2:

Extended Asset Purchase Program

In this chapter we will be looking more at the specific implementation of the QE in the European Union lead by the European Central Bank. Taken into consideration the situation that had developed in the early years of this century we will look at the timeline of the unconventional monetary tools that the ECB first adopted before turning to the Asset Purchase Program. Then we will look at the program itself and of what it was made up of and finally we will discuss why the effects have been very limited.

2.1: *En course* to the *Asset Purchase Program*:

In 2007 the World was encountering a financial crisis. The origin, most likely, can be attributed to the burst of the subprime mortgage bubble in the US, where housing prices had dropped drastically after a period of unproportioned rise. The crisis included the bailouts of banks from national governments, dropping of stock markets, higher unemployment, failure of many companies, from smaller size to multinationals. This is what in turn gave start to the Eurozone crisis roughly at the end of 2009, aggravated over time by increasing debt deficit in many EU nations, burst of real estate bubbles (e.g. Spain) and bank bailouts. This all lead to the threatened collapse of the economies in the Mediterranean area and increased uncertainty about the future, bringing along many negative effects, such as high unemployment, low investments, low GDP growth rate and consequently overall low inflation. After the limited or no effects of the conventional tools this is when the QE was adopted. The APP was announced on 22th January 2015. The head of the ECB at the time was Mario Draghi. The press conference started off:

"*First, it [*the Governing Council*] decided to launch an **expanded asset purchase program** encompassing the existing purchase programs for asset-backed securities and covered bonds. Under this expanded program, the combined monthly purchases of public and private sector securities will amount to €60 billion. They are intended to be carried*

out until end-September 2016 and will in any case be conducted until we see a sustained adjustment in the path of inflation which is consistent with our aim of achieving inflation rates below, but close to, 2% over the medium term. In March 2015 the Eurosystem will start to purchase euro-denominated investment-grade securities issued by euro area governments and agencies and European institutions in the secondary market. The purchases of securities issued by euro area governments and agencies will be based on the Eurosystem NCBs' shares in the ECB's capital key. Some additional eligibility criteria will be applied in the case of countries under an EU/IMF adjustment program."

This is what officially set off the QE program in Europe which is still in progress, as of August 2016. The duration and amount have already been extended and augmented to €80 billion per month, and will go on until inflation will be close to, but lower than, 2%, which we know is not even close at the moment. Before making use of the unconventional monetary tool that the QE is, the ECB had been using other tools since the economic crisis in the end of the first decade of the 2000s. Let us look at a brief timeline of all the tools that the ECB used in the recent past to confront with the crisis. All the definitions of the tools have been taken from the ECB's website[16] and the dates refer to the announcements by the ECB, which do not necessarily refer to the start of the operations. In most cases the operations commenced some months after.

- September 2008 – *Special Term Refinancing Operation* (STRO) – The aim was to improve the liquidity position of the euro area banking system. Duration: 7 days.
- May 2009 - *Covered Bond Purchase Program* (CBPP1) – Amount: €60 billion. Bonds to be bought both on primary and secondary markets.
- May 2010 – *Securities Market Program* (SMP) – Including both public and private debt securities to ensure depth and liquidity in market segments which were dysfunctional. Sterilization took place after the end to ensure monetary policy stance was not affected.

[16] Link: https://www.ecb.europa.eu/press/pr/activities/ecb/html/index.en.html

- June 2010 – *European Financial Stability Facility* (EFSF) – Issuing of bonds and debt instruments on capital markets. It provided financial assistance mainly to Ireland, Portugal and Greece.
- July 2010 – *Fine Tuning Operations* (FTOs) – Smoothening of unexpected liquidity rapidly.
- September/November/December 2010 – *FTOs*
- November 2011 – *Covered Bond Purchase Program* (CBPP2) – Amount: €40 billion. To be conducted in the primary and secondary market. Mainly used for the *Credit Easing*.
- December 2011- *FTOs* – Two of them, both lasting only 1 day.
- September 2012 – *Outright Monetary Transactions* (OMT) – The purchase of government-issued bonds one to three years bonds conditioned to a set of requirements. Completely sterilized at the end.
- October 2012 – *European Stability Mechanism* (ESM) – Issued 3- and 6-months bills, medium and long term debt to raise funds. These funds were used then to satisfy requests of financial assistance by member countries.
- June 2014 – *Targeted Long-Term Refinancing Operations* (TLTRO) – Series of TLTROs to try and improve bank lending to the non-financial sector, loans to households for house purchase excluded. Duration: 2 years.
  Marginal Deposit Facility had been lowered into negative ground for the first time, at -0.10.
- October 2014 – *Asset-Backed Securities Purchase Program* (ABSPP) – Purchase program lasting 2 years. Aimed to enhance transmission of monetary policy, support provision of credit to economy and provide further monetary policy accommodation.
- November 2014 – *CBPP3* – Implemented for the same reasons as *ABSPP*. Duration totaling 2 years.
- January 2015 – *Asset Purchase Program* (APP) – The so-long attended QE program was finally announced. Expanded to include the euro government

bonds, agencies and European institutions. Initial amount of €60 billion and expected end in September 2016 or later in case of policy goal not met. Encompassed the previous *ABSPP* and *CBPP3*. Set to start in March 2016.

- March 2016 – *Corporate Sector Purchase Program* (CSPP) – Purchase of investment-grade euro-denominated bonds issued by non-bank corporations in the euro area. Aim to enhance the pass-through effects of APP to real economy, therefore the credit provision and monetary policy accommodation. Carried out by the six national banks acting on behalf of the Eurosystem but coordinated by the ECB itself.
- June 2016 to March 2017 – *TLTRO II* – 4 new operations to take place at a quarterly frequency. 4 year maturity each. Aiming at enhancing the monetary policy stance and promoting lending to real economy.

As we can see the list is of remarkable length. This list includes monetary tools both in the past, present and future. It is important to point out that the list of all the ordinary *MRO* and *LTRO* operations has not been included due to vast amount of times these operations have been made use of. A complete list of the can be found in the following link[17]. On the other hand, the conventional monetary tools such as the standing facilities and the MRO rate are shown in the **Chart 1** and **Figure 7Error! Reference source not found.** below. We can see how they have been modified over the course of the years, from 2006 to now.

[17] Link: https://www.ecb.europa.eu/press/calendars/caleu/html/index.en.html

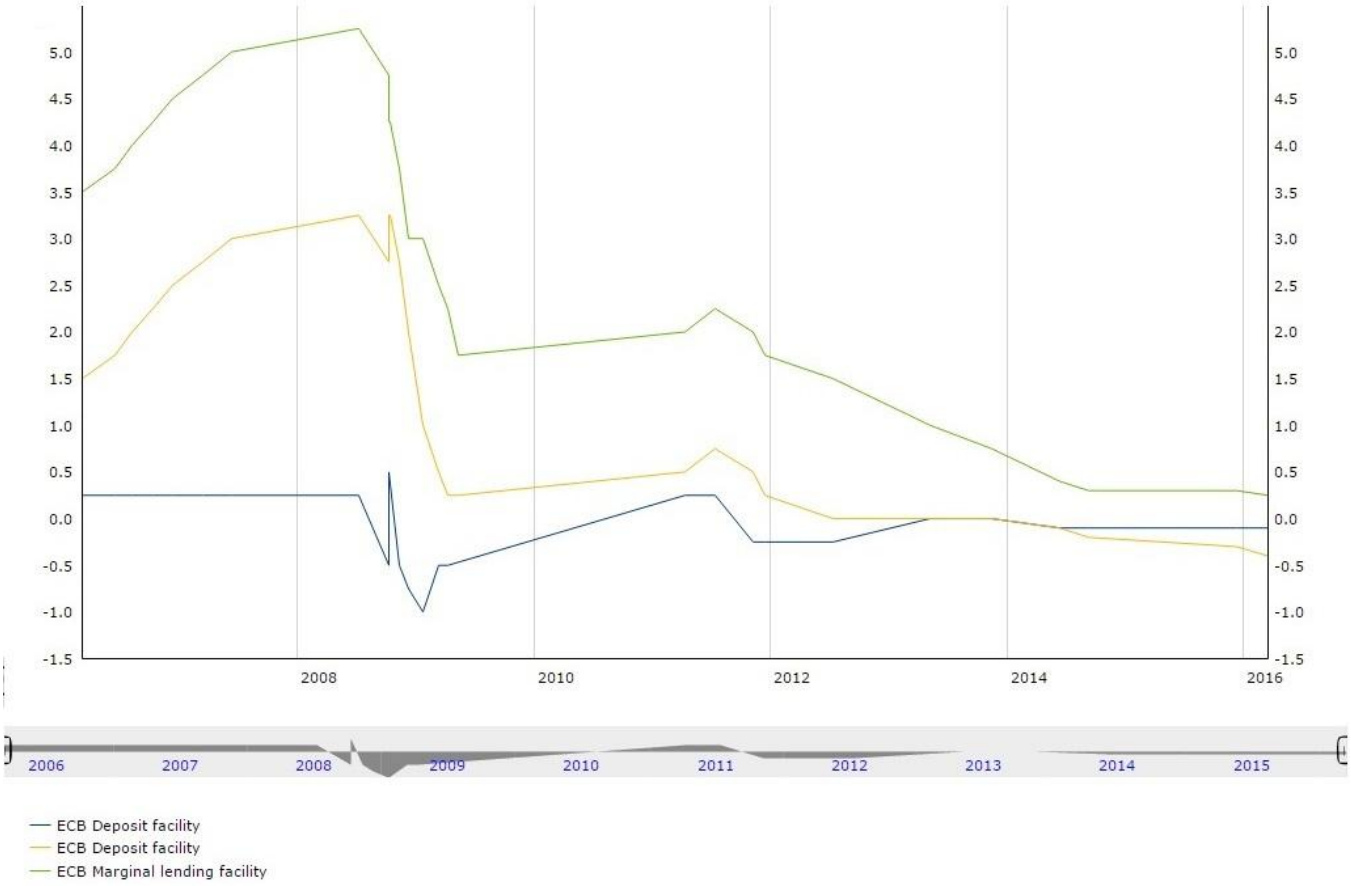
Chart 1: Time Lapse of Standing Facilities

	MDF	MLF	MRO		MDF	MLF	MRO
Mar-16	-0.40	0.25	0.00	Jan-09	1.00	3.00	2.00
Dec-15	-0.30	0.30	0.05	Dec-08	2.00	3.00	2.50
Sep-14	-0.20	0.30	0.05	Nov-08	2.75	3.75	3.25
Jun-14	-0.10	0.40	0.15	Oct-08	3.25	4.25	3.75
Nov-13	0.00	0.75	0.25	Oct-08	3.25	4.25	4.25
May-13	0.00	1.00	0.50	Oct-08	2.75	4.75	4.25
Jul-12	0.00	1.50	0.75	Jul-08	3.25	5.25	4.25
Dec-11	0.25	1.75	1.00	Jun-07	3.00	5.00	4.00
Nov-11	0.50	2.00	1.25	Mar-07	2.75	4.75	3.75
Jul-11	0.75	2.25	1.50	Dec-06	2.50	4.50	3.50
Apr-11	0.50	2.00	1.25	Oct-06	2.25	4.25	3.25
May-09	0.25	1.75	1.00	Aug-06	2.00	4.00	3.00
Apr-09	0.25	2.25	1.25	Jun-06	1.75	3.75	2.75
Mar-09	0.50	2.50	1.50	Mar-06	1.50	3.50	2.50

Legend:
MDF: Marginal Deposit Facility
MLF: Marginal Lending Facility
MRO: Main Refinancing Operation

Source: ECB

Figure 7: Facility Rates from 20016 to 2016 (%)

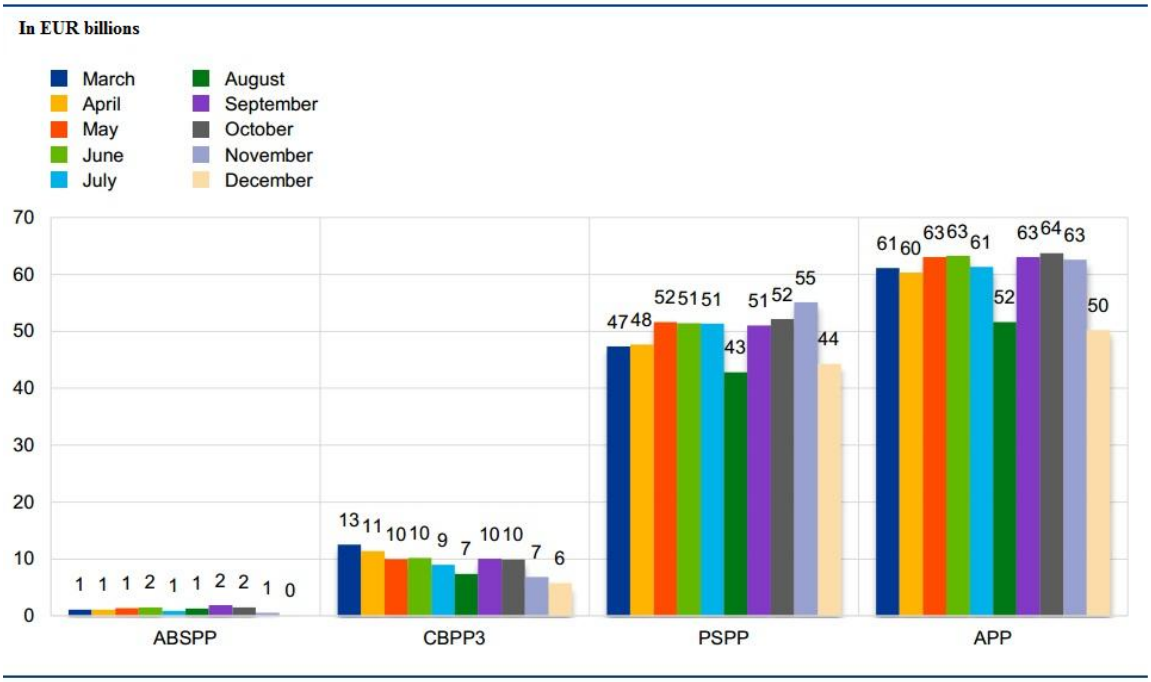


Source: ECB

As we can see, the path that led to the use of QE started in the second half of 2008, after the outbreak of the financial crisis in USA. First, the three main rates were all lowered, conversely to the incrementing that had been seen until then. The first unconventional tool deployed was the *STRO*. Following the timeline we can see how the ECB, step by step tried to inject liquidity in the dysfunctional market sectors and enhance the transmission of the monetary policy. All the operations and the variations in interest rates apparently lead the Governing Council of the ECB to turn to our beloved tool, the expanded *Asset Purchase Program* of 2015.We have to start off by saying that the *APP* was already set off with the *ABSPP* (2014) and the *CBPP* (2014), although the total amount that was being purchased was largely inferior to the one set off by the expanded

APP, which included the *Public Sector Purchase Program* (PSPP). As we can see in **Figure 8** below, for the year of 2015 the biggest share of investments was done through the *PSPP*, *CBPP* had a minor share and the *ABSPP* had tiny percent, if none at all. Let us look at what each purchase program included what kind of asset or securities; as they are often interchanged.

Figure 8: Monthly APP Purchases and the Underlying Purchase Programs



Source: ECB

2.2: The APP and Its Components:

The *Asset Backed Securities* are financial assets that have become illiquid, such as auto loans, leases and credit-card debt, which then are securitized and made into liquid assets, which are then sold from the *issuer*, often referred to as the *sponsor*, to the *investor*. The sponsors are mainly financial institutions that include banks, credit card providers, auto and consumer financing companies. These illiquid assets are then classified based on maturity and interest rates into three *tranches*; A, B, C. Respectively

going from the safest to the least safe; securities in C are often also not allowed to be sold. These securitized securities are then sold to investors, which include *Special-Purpose Vehicle* (SPV). Once the assets are transferred to the SPV they will no longer be on the institution's balance sheet and therefore is not liable for the assets. The bond holders will have no recourse over the original institution-issuing's assets, but rather only over the SPV's. This process allows the initial *issuers* to raise extra capital and permits them to issue more loans and illiquid assets. It is important to point out that the *ABS* are different from the *Mortgage-Backed Securities* (MBS) which are the same thing as *ABS* but only include loan securities for the purchase of households. In our case the ECB has pointed out the eligibility criteria for the *ABS*s which can be found on the ECB's website[18] (plus further amendment[19]). Although ABS meet the eligibility criteria the ECB may retain the discretion of purchase, which happen both on the primary and on the secondary market. In addition there is no lower or higher limit on the issuance size or maturity of the assets bought. On the other hand there is a limit to the share of the nominal amount of a tranche with the same *International Securities Identifying Number* (ISIN) of 70% and of 30% for obligations incorporated or resident in Greece or Cyprus. The asset managers themselves will be the ones carrying out the purchases, following a personal due diligence of proposed *ABS* given to the ECB, and only after the latter will undertake price checks and due diligence of its own and approve the transactions. The current asset managers are the following[20]:

- Banque de France
- Nationale Bank van België/Banque Nationale de Belgique
- Amundi and Amundi Intermédiation
- NN Investment Partners (formerly ING Investment Management)

[18] Link: https://www.ecb.europa.eu/ecb/legal/pdf/en_ecb_2014_45_f_sign.pdf?e692214479b20df3c42b0d5d3c11783f

[19] Link: https://www.ecb.europa.eu/ecb/legal/pdf/celex_32015d0031_en_txt.pdf

[20] As of 23rd September 2015
Link: https://www.ecb.europa.eu/press/pr/date/2015/html/pr150923.en.html

Originally the asset managers were four external companies: The two that are listed plus *State Street Global Advisors* and *Deutsche Asset & Wealth Management International*[21]. Their appointment was assigned through a competitive tender procedure and the contracts with all executing asset managers contain provisions to mitigate any conflict of interest, subject to checks by external auditors. The reason behind the switch from private managers to NCBs as asset managers was not clearly stated by the ECB but we can conclude that it is an attempt to exert more control over the program.

The ECB's guiding principles list factors that increase the probability for *ABSs*' eligibility for Eurosystem purchase[22]. One factor is a high degree of transparency, which include the loan-level[23] data score *A1*, and therefore no need to comply or explain future compliance with tolerance thresholds set by the ECB. Relevant, in English language, data is freely available to both current and potential investors and documentation is easily understandable and not misleading. Relevant data include definitions and probability of delinquencies, loan repurchases, default risk and loan modifications. Another attribute that the *ABS* should have in order to be more likely to be purchased is a high degree of diversification, mitigation of risk and relevant mitigation procedure taken place. Mitigation implies an hedging transaction that will pay-off when default or delinquency, of course the clearer the documents are the higher the probability of being approved. Shall the *ABS* be performing well, this is also a good incentive. An important aspect that should be included in the *ABS*'s characteristics is also a complete and thorough due diligence report on the borrower and its creditworthiness. A small amount of the loans, if the *ABS* is based on loans, should be granted to the unemployed at the closing of the transaction. Continuing on with traits that should accompany *ABS*, they should have clear processes and responsibilities in case of default. Default shall not, in anyway, lead to a disruption of the service or servicing of the underlying assets, since it is a way to minimize the losses on the investment. This, at the same time, does not imply having a

[21] Link: https://www.ecb.europa.eu/press/pr/date/2014/html/pr141030_1.en.html
[22] Link: https://www.ecb.europa.eu/mopo/implement/omt/html/abs_guiding_principles.en.html
[23] Link: https://www.ecb.europa.eu/ecb/legal/pdf/celex_02014o0060-20151102_en_txt.pdf

back-up service/r. In case of default there should be a provision of a hedging transaction and there is a liquidity facility provider as well. On top of that, the trustees', or analogous figures, shall be clearly defined and shall act in the interests of the investor, therefore the ECB in this case. It is also important for the transaction structure to be kept easy and simple but yet robust. The pool of the assets shall be static and do not undergo changes, unless they are very short in nature such as credit cards. In addition there are credit enhancements on assets classified into the tranche A even in worst-case scenarios. Last but not least, the issuer of the *ABS* shall show good financial health, intends to stay in the *ABS* markets and there should not be any conflicts of interests with ECB. Good financial health implies complying with all the supervisory requirements set by the Eurosystem, shall have passed all the regulatory stress tests (or is in the process of adjusting its capital measure upon failure), does not need, currently or in the near future, government support.

Let us move on to the next package of bonds included in the extended asset purchase program, at the third edition since it was implemented for the first two times in 2009 and 2011. We are talking about the *Covered Bond Purchase Program*, version 3.0. Covered bonds are similar to the *ABS* up until the point the assets are sold. They are still bonds created out of the securitization of various loans, mainly from the public sector and usually carry a maturity of two to ten years. In this case the bonds are not sold to the *SPV* but are kept on the financial institution's balance sheet. This allows the investors to have 'dual recourse' meaning that it has recourse over the issuer, therefore the institution plus its collateral. The *CBPP3* was set off in November 2014, a few months before the *APP* was launched. This program is supposed to last two years, therefore expected end in the last quarter of 2016. The main objectives are always the same; to enhance the monetary policy transmission mechanism, improve credit conditions and generate spillovers to other markets. The improved credit conditions are enhanced mainly because there is a tight link between the CBs and the loans that back them, so as the prices of the CBs increase banks will be more eager to create CBs to then sell. The necessary requirements for bonds to be eligible for purchase are listed below. First of all the bonds must be euro-denominated covered bonds issued in the euro area. The sales will only happen directly

and will be carried out by both the ECB itself and the NCBs, after a thorough report of due diligence and credit risk assessment. Just like the *ABSPP*, the purchases will happen on both primary and secondary markets. One important characteristic is that the underlying assets must be exposed to private and/or public entities. These bonds also must achieve a credit assessment level of at least 3 in the *Eurosystem Credit Assessment Framework* (ECAF)[24], or equivalent BBB- by an *External Credit Assessment Institution* (ECAI). The counterparties that are eligible to participate in the *CBPP3* are the same ones that are also eligible for the monetary policy operations, alongside the counterparties that are used for the investment of euro-denominated portfolios by the Eurosystem. The same percentage of issue share limit per *ISIN* for the bonds coming from Greece and Cyprus applied in the ABSPP is also applied in this purchase program. Therefore the limit is usually set to 70% for all CBs coming from the rest of the European countries, but is limited to 30% for the two Mediterranean countries. At the same time, just like applied for the *ABSPP*, there is no minimum or maximum limit to the maturity of the bonds or issuance volume of them. With the *CBPP* it is possible to give way to *matched repo transactions* which is the lending of the CBs to be then reversed. All this mean is that CBs can be lent to eligible counterparties for cash which than can be reinvested in other CBs. This is voluntary and must be decided by the Eurosystem member possessing the CB and it will individually choose the rate at which it can be lent. Greater details can be found on the published Official Journal's decision of the ECB[25].

Let us come to the most important purchase program, the one that attracted the highest attention from all over the world, mainly due to the large scale of purchases that would be carried out/is being carried out. We are of course talking about the *PSPP*, although it is more commonly, generally known as the *APP* or *QE*. As explained above, this is due to the fact that the ECB announced the expanded Asset Purchase Program which incorporates the two previous programs; the *ABSPP* and the *CBPP3* plus the newly planned program which included the purchase of public sector bonds from around

[24] Link: https://www.ecb.europa.eu/paym/coll/risk/ecaf/html/index.en.html
[25] Link: https://www.ecb.europa.eu/ecb/legal/pdf/oj-jol_2014_335_r_0010-en-txt.pdf

the EU, and the *CSPP* which we will discuss about later on. From the day it started until now some things have changed. They include the duration, amount and programs incorporated in the APP. At the beginning it was due to be the purchase of a total of €60 billion in assets on a monthly basis over the three programs. This amount has been raised to €80 billion in the recent past, to be exact in March 2016, but to come in to effect from the purchases of April 2016, and in December 2015 the program was officially extended to March 2017 or more if necessary. Let us look at the *PSPP* in greater detail. The main aim is to succeed in the price stability mandate of the ECB and avoid the risks of too prolonged period of low inflation, based on the past situation which showed present and excepted inflation close to zero if not negative. As we discussed in the previous chapter the low excepted inflation rates have a negative impact on the wage and price setting threatening the price developments. The bonds that are being bought are the ones issued by the euro area central governments, agencies and European institutions. The complete list of agencies follows, as found on the ECB's website[26]:

International or supranational institutions located in the euro area:

- Council of Europe Development Bank
- European Atomic Energy Community
- European Financial Stability Facility
- European Stability Mechanism
- European Investment Bank
- European Union
- Nordic Investment Bank

Agencies located in the euro area:

- Caisse d'amortissement de la dette sociale (CADES)
- Union Nationale Interprofessionnelle pour l'Emploi dans l'Industrie et le Commerce (UNEDIC)
- BPIFrance Financement SA
- ACOSS

[26] Link: https://www.ecb.europa.eu/mopo/implement/omt/html/pspp.en.html

- Caisse des Dépôts et Consignations (CDC)
- Agence Française de Développement (AFD)
- Instituto de Credito Oficial
- Kreditanstalt fuer Wiederaufbau Landeskreditbank Baden-Württemberg Foerderbank
- Landwirtschaftliche Rentenbank
- NRW Bank
- Cassa Depositi e Prestiti S.p.A.
- Finnvera Oyj Bank Nederlandse Gemeenten N.V. (BNG)
- Nederlandse Waterschapsbank N.V. (NWB)
- Nederlandse Financieringsmaatschappij voor Ontwikkelingslanden N.V. (FMO)
- SID - Slovenska izvozna in razvojna banka, d.d. Työttömyysvakuutusrahasto (TVR)
- ÖBB-Infrastruktur AG Autobahnen- und Schnellstraßen-Finanzierungs-AG (ASFINAG)
- Infraestruturas de Portugal S.A. (IP)
- Administrador de Infraestructuras Ferroviarias – Alta Velocidad (Adif AV)
- SNCF Réseau Caisse Nationale des Autoroutes (CNA)
- DARS d.d.
- Société Wallonne du Crédit Social (SWCS)
- Société Wallonne du Logement (SWL)
- Fonds du Logement des Familles Nombreuses de Wallonie (FLW)
- Société publique d'administration des bâtiments scolaires de Namur
- Housing Finance Agency plc
- PARPÚBLICA - Participações Públicas (SGPS), S.A.
- Fondo de Amortización del Déficit Eléctrico (FADE)
- Groupement des Centres Hospitaliers Universitaires (CHU) / Centres Hospitaliers Régionaux (CHR)
- Assistance Publique - Hôpitaux de Paris (APHP)
- Brussels Municipalities Regional Fund
- Kuntarahoitus Oyj
- Cassa del Trentino S.p.A.
- Agence France Locale (AFL)

Let us turn the focus to the eligibility criteria and the details of the program. First and foremost the bonds must be euro-denominated marketable debt securities issued by either the central governments who have adopted the euro as a currency,

or set of agencies located in the euro area or multilateral banks located in the euro area. As for the bonds themselves they must comply with a series of items, such as:

- They comply with the collateral eligibility criteria and therefore can participate in the monetary policy operations, as specified in the Guideline ECB/2011/14 in addition to the following points listed[27]:
    - The securities are issued by one of the following: central governments, certain agencies, certain international or supranational institutions in the euro area (complete list given above).
    - The issuers must reach a first-best credit assessment level of CQS3 or equivalent provided by an *ECAI*.
    - In case the CSQ3 level is not reached securities can still be eligible, as long as no minimum credit quality threshold is applied for collateral eligibility[28]. The eligibility of a security might be suspended until a positive outcome of the review[29] which is done on the context of financial assistance program for a Member State.
- At the time of the purchase of a security, it shall first of all not be covered by the *ABSPP* or *CBPP3* and secondly the maturity left on it must be of a minimum 2 year to a maximum of 30 years.
- The securities reserve the same treatment to the Eurosystem as to private investors.

[27] Link: https://www.ecb.europa.eu/ecb/legal/pdf/l_33120111214en000100951.pdf
[28] Link: https://www.ecb.europa.eu/paym/coll/html/index.en.html
[29] 'positive outcome of a review' means the later of the following two decisions: the decision by the Board of Directors of the European Stability Mechanism and, in case the International Monetary Fund co-finances the financial assistance program, the Executive Board of the International Monetary Fund to approve the next disbursement under that program, on the understanding that both decisions are necessary for the resumption of purchases under the PSPP
Source: ECB's Official Journal decision 2015/774

- NCBs can propose to the Governing Council of the ECB the purchase of non-financial[30] or Public Sector Corporation[31] securities located in the respective jurisdiction of the NCB in case the set amount of securities has not been reached. If approved the assets are eligible for purchase.
- Securities with negative yield to maturity accepted as long as the yield is above or equal to the current deposit facility[32].
- Inflation-linked and floating rates securities are eligible for purchase.
- Values are based on the nominal value and not on the market value of bonds.
- The bonds will exclusively be bought on the secondary market.

The details of the purchase program itself are the following:

- The securities bought under the PSPP are allocated across issuers from the various euro area countries on the basis of ECB's capital key[33].
- The purchases will be carried out by both the ECB and the NCBs, under the coordination of the supranational Central Bank. The ECB will not be buying the securities issued by certain international or supranational institutions located in the euro area, it will merely be left to the NCBs. The NCBs will be able to buy the securities independently of where they are located.
- All the holdings of the securities will be valued at their amortized costs, in line with Guideline ECB/2010/20[34].

[30] Definition: the non-financial corporations sector (S.11) consists of institutional units which are independent legal entities and market producers, and whose principal activity is the production of goods and non-financial services. The non-financial corporations sector also includes non-financial quasi-corporations (see paragraph 2.13(f)).
Source: Regulation (EU) No 549/2013 of the European Parliament and of the Council.
[31] Definition: For the purposes of this Regulation, 'public sector' means Community institutions or bodies, central governments, regional, local or other public authorities, other bodies governed by public law or public undertakings of Member States.
Source: Council Regulation (EC) No 3603/93
[32] Link: https://www.ecb.europa.eu/mopo/implement/sf/html/index.en.html
[33] Link: https://www.ecb.europa.eu/ecb/orga/capital/html/index.en.html

- No purchases shall be allowed in a newly issued or tapped security and the debt instrument with a remaining maturity close to the maturity of the instruments to be issued over a predetermined period, the "*Blackout Period"* set by the Governing Council. For syndication purchases the period is to be respected on the best effort basis.[35]
- For debt securities issued or fully guaranteed by the central governments, the period of purchases under the PSPP after a positive outcome of each program review shall be limited to two months, unless there are exceptional circumstances.[36]
- The eligible counterparties for purchases are those eligible for the Eurosystem's monetary policy instruments, alongside any other that have been chosen by the Eurosystem for the investment on euro-denominated portfolios.
- Securities lending will be possible by the counterparties from which securities are bought as long as they are located in the euro area.
- The transactions of purchased securities, by asset type and at amortized cost, will be published on a weekly basis and can be found the ECB's website[37].
- There is an *ISIN* share issue limit, this amounts to 25% (can be taken up to 33% subject to case-by-case verification) for the first six months of the consolidated holdings of the portfolios owned by the Eurosystem, afterwards it shall be reviewed.
- Based on the consolidated holdings of the Eurosystem's portfolio there is a limit of 33% (then taken up to 50%) aggregate ownership from one single issuer.

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[34] Link: https://www.ecb.europa.eu/ecb/legal/pdf/l_03520110209en00310068.pdf
[35] As written in Article 4 "Limitations on the execution of purchases" under the first bullet number of ECB's Official Journal decision 2015/774
[36] As written in Article 4 "Limitations on the execution of purchases" under the second bullet number of ECB's Official Journal decision 2015/774
[37] Link: https://www.ecb.europa.eu/press/pr/wfs/2016/html/index.en.html

- A limit of 12% (then taken down to 10%) of total value of purchased securities shall come from international organizations and multilateral development banks. The remaining 88% shall instead be issued by eligible central governments and agencies. The 12% shall be conducted by NCBs only.
- 92% of the total market value of securities shall be purchased by the NCBs and the remaining 8% by the ECB.
- As securities mature the money received will be reinvested into new securities, therefore we can say that there is no neutralization of the APP. On the other hand, sales of the securities do not take place although there are no clauses that impede it to happen. Upon need sales might be carried out to ensure continued compliance within the limit of framework.
- NCBs will have a degree of flexibility and leeway granted from the ECB. The Governing Council will be the one adjusting the implementation framework based on current situation and experience.

The full details and explanations can be found on the Official Journal's decision 2015/774[38].

On 3 December 2015 amendments were made to the list of the agency-issuers that were eligible to issue bonds. This was partly needed due to the start of the *Corporate Sector Purchase Program* (CSPP) of which we will talk about after. The complete and updated list is already shown above. The issuers that have been added are the last 13 of the "*agencies located in the euro area"*. Most of the new agencies that were selected to take part in the *PSPP* were mainly regional and local government agencies, this is because the ECB decided to expand the sort of issuers that were eligible for the sale of their bonds for further flexibility of the program and support of the implementation of purchases. As it is intuitive, only pertinent NCBs are allowed to carry out the purchases of these newly-eligible bonds by the agencies in their jurisdictions. The *APP* was

[38] Link: https://www.ecb.europa.eu/ecb/legal/pdf/oj_jol_2015_121_r_0007_en_txt.pdf

extended to March 2017, from the original end in September 2016. The percentage of share of EU supranational bond purchases was taken from 12% to 10% and was reasoned this by the support of the continued smooth and market-neutral implementation of the PSPP. The breakdown of the *PSPP* bond purchases as of 31 July 2016 can be found in **Figure 9**. As you can see from the image no Greek bonds appear. This is of course no mistake but rather the willingness of the ECB to not purchase the low-rating credit due to the recent not-so-stable financial situation that has developed. Criticisms have been made on the fact that this QE program will help only the already financially stable countries, such as Germany, but exclude the countries that would benefit mostly from this monetary tool, mainly to punish the 'misbehaving' by Greece in the recent past. On the other hand, in June 2016 the ECB decided to reinstate the waiver with which the Greek banks are allowed to apply for the *MRO* with their collateral, even though Greek bonds have a junk rating on them. "*The Governing Council acknowledges the commitment of the Greek government to implementing current program and expects continued compliance with its conditionality*," the ECB said. With this said, nothing being sure or established, Greece shall soon be eligible for QE bonds purchase as well, based on the risk assessment of the Greek debt. Returning back to December 2015, to be more precise on 3 December, the deposit facility was further lowered as we can see by consulting **Chart 1**. This choice was greatly influenced by the fact the ECB was running short of the bonds available for purchase based on their eligibility criteria and the fact that some bonds had reached into negative territory equalizing the deposit facility. As we know the bonds remain eligible only if their yield, even if negative, are equal or above to the current deposit facility. Therefore by lowering the facility rate this should allow new bonds to be now eligible for purchase and this is what the ECB has done.

Figure 9: Breakdown of Debt Securities Under the PSPP

as at 31 July 2016	Monthly net purchases*	Cumulative monthly net purchases*	Weighted average remaining maturity in years
Austria	1,878	24,628	9.11
Belgium	2,368	31,038	9.79
Cyprus**	0	269	5.19
Germany	17,247	225,516	7.60
Estonia	0	66	1.96
Spain	8,453	111,788	9.71
Finland	1,204	15,819	7.55
France	13,569	179,160	7.71
Ireland	986	14,237	9.31
Italy	11,867	155,876	9.24
Lithuania	72	1,844	6.50
Luxembourg	6	1,621	6.65
Latvia	27	1,050	6.56
Malta	12	598	10.89
The Netherlands	3,834	50,199	7.71
Portugal	958	20,096	10.07
Slovenia	223	3,952	8.23
Slovakia	221	7,290	7.92
Supranationals	6,732	109,158	7.05
Total	69,658	954,205	8.26

* Book value in euro million.
** Negative net March 2016 purchases in Cyprus are the result of transactions conducted to ensure continued compliance within the limit framework reflecting buyback operations by the Cypriot Public Debt Management Office.
Note: Figures may not add up due to rounding.
When assessing the weighted average remaining maturity of Eurosystem holdings relative to a market measure, deviations could reflect inter alia the 2 to 30 year maturity range of purchases, the issue share limits taking into account holdings in other Eurosystem portfolios as well as the availability and liquidity conditions in the market during the implementation period.

Source: ECB

The newly announced purchase program that has been undertaken since June 2016 is called the *Corporate Sector Purchase Program* (CSPP) and the reasons for implanting it are similar to the ones of the other programs under the *APP*. They are defined as to further strengthen the pass-through of the purchases onto the financing of the real economy and increase monetary policy accommodation to help inflation rates rise to target set. Just like the *PSPP* it will be carried out by NCBs, some of them under the supervision of the ECB. They are:

- Nationale Bank van België / Banque Nationale de Belgique
- Deutsche Bundesbank
- Banco de España
- Banque de France
- Banca d'Italia
- Suomen Pankki/Finlands Bank.

The main details of the operation are similar to the ones of the other programs, the additional requisites or different ones are the following ones: the bonds must be issued by non-bank corporations established in the euro area, and will be bought in the primary and secondary markets. Purchases in the primary markets must not involve debt instruments issued by public undertaking entities[39]. The purchases of eligible bonds do not have to necessarily happen trough public-offering, therefore the corporations can be chosen by the Eurosystem itself. The instruments must have a maturity going from a minimum of 6 months to a maximum of 30 years at the time of the purchase. The issuer must be a corporation in the euro area, if the corporation whose ultimate parent is not based in the euro area is also eligible. On the other hand the corporation must not be a credit institution[40] or have any parent undertaking in such fields or asset management vehicle[41],

[39] Public undertaking entities are defined as "Any undertaking over which the State or other regional or local authorities may directly or indirectly exercise a dominant influence by virtue of their ownership of it, their financial participation therein or the rules which govern it."
Source: Council Regulation (EC) No 3603/96

[40] Defined as a credit institution within the meaning of Article 2(5) of Directive 2013/36/EU of the European Parliament and of the Council and point (1) of Article 4(1) of Regulation (EU) No 575/2013 of

or a national asset management and divestment fund. Issuers supervised under the *Single Supervisory Mechanism* as well as their subsidiaries will also not be eligible, so are corporations that comparable to banks in term of activities carried out e.g. 'the provision of one or more investment services to third parties and/or the performance of one or more investment activities on a professional basis according to the *Markets in Financial Instruments Directive* (MiFID II)[42]. The rest of the details, which are identical to the other programs, are stated on the Official Journal's Decision 2016/948[43].

With this being said it brings an end to the end of the comprised purchase programs included in the *APP*. As we can see from the timeline of monetary tools previously taken into consideration we can see that can a new series of TLTROs will take place with the first one that already took place in June 2016 and will carry on until March 2017, month in which the APP shall end, if the Governing Council decides to not further extend the APP, as it did recently taking from June 2016 to the third month of 2017. In the next section we will briefly analyze it and discuss it.

2.3: Is the APP Having the Desired Effect?:

We have discussed how the ECB carried out all their possible tools to raise the euro area inflation to below, but close to, 2%, now the questions surges, has it or is it in the process of reaching this goal? By looking at Eurostat's, the official institution for providing statistics in the European Union, we can certainly agree on the fact that the ECB's mandate is not being fulfilled. With the help of **Figure 10** we can see the trend in HCIP inflation percentage change from January 2006 until July 2016, the latest most available month's inflation rate.

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the European Parliament and of the Council, which is subject to supervision by a competent authority; or a publicly-owned credit institution within the meaning of Article 123(2) of the Treaty that is subject to supervision of a standard comparable to supervision by a competent authority.
Source: Article 2 (14) of Guideline ECB/2014/60

[41] As defined in Directive 2014/59/EU under Article 42.2

[42] As stated on the ECB's website.
Source: https://www.ecb.europa.eu/mopo/implement/omt/html/cspp-qa.en.html

[43] Link: https://www.ecb.europa.eu/ecb/legal/pdf/celex_32016d0016_en_txt.pdf

Figure 10: Inflation Rate Percentage Rate

Source: Eurostat & EuroGeopraphics for the administrative boundaries

By looking at the lower and higher values of the Y-axis we suddenly see that since the lowest inflation rate (-0.7%) was reached in July 2009 before collapsing from the year 2008 where in the month July we had seen the highest rate topping at 4.1%. Confronting **Figure 10** with the timeline of the monetary tools undertaken and the marginal facilities rates evidently the implementation of the first *CBPP1* may have been the origin of the rise in inflation from that point onwards and over the course of the next two year reaching inflation peaks well above the set target. During the course of the of the overall rise we can see that in some cases there was a slight decrease before increasing once more, to even higher levels than before. After the peak of 3% reached in the first half of 2014 we can see that any tool adopted was not really effective, since the inflation rate only got lower apart from some random slight increases which would be offset the next month. The start of the APP had a temporary 'shock' meaning that it lead to the increase of rate but only for a short amount of time, for a couple of months only. After that there has only been the oscillating of the percentage rate around the 0% mark.

So why is the QE not working? We know that other countries such as US have also carried out the same sort of programs reaching the desired effects. The reasons behind it can be a few, and on the other hand we cannot know how the situation would have been without the implementation of the APP, who knows, maybe it could have been much worse. Experts of the field have hinged at the fact that first of all the QE in Europe was set-off too late, and therefore to counteract the tardiness it should have been carried out on a much greater scale, considering it was already said to be quite small compared to the EU economy. Other reasons include banks being reluctant to give out loans to households and credit to companies, mainly because there have been events that lead to lower confidence amongst the financial markets and the future of the European Union itself or they rather build up capital to satisfy with new regulatory requirements. When banks stop intermediating loans, this policy no longer works. QE is successful if it narrows the market spreads between the rates paid on selected credit instruments and policy rates, thereby limiting the risks of a liquidity shortfall and encouraging banks to extend credit to higher interest paying parties. The fact that banks were not passing on liquidity to non-financial companies is what probably lead the ECB to embark on the latest CSPP therefore cutting the distance between the Central Bank and the companies themselves. Although this does not necessarily mean that the corporate sector will invest more, this can lead to the deleveraging of the companies to lower risk, which does not have a direct effect on the economy, but in the long run the companies eventually become sounder. Recently there were two cases of small German banks, to be more exact co-operative banks, passing on the negative deposit facility to their own customers. Details apply such as the fact that the deposits must be of a certain amount, €500,000 in one case and €100,000 in the other case. This can be said that it will probably further enhance the goal set by the ECB to induce people to invest therefore causing a rise in overall asset prices. At the same time, at least until all the banks will be passing on the deposit 'charge' onto the customers, the latter will have the possibility of avoiding the charge just by opening more account spread across multiple banks. Yet another possibility of the non full-functioning of the purchase program is the fact that an expansionary monetary policy

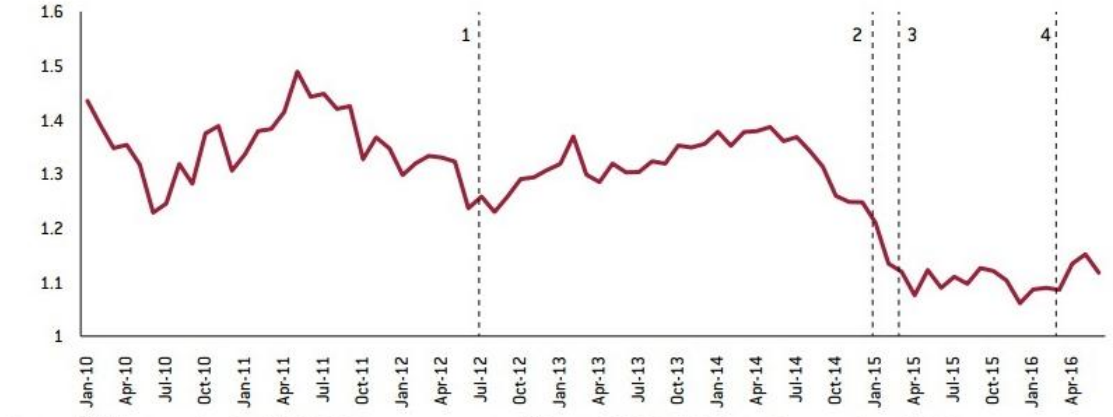
should be accompanied by an expansionary fiscal policy and structural reforms in the labor market, as France and Italy have shown. The full effects of the monetary policy will be hampered if the two are not deployed contemporarily. This is because the combination of the two leads to greater investments, also on the government's side, fewer taxes in some cases, and a better system of payments. The structural reforms on the labor market, on the other hand, allow for companies to ease up the process of hiring and firing, therefore matching the demand with the supply in the pool of workers, making it more flexible. A lower unemployment rate means more employed which should also lead to greater production and creation of GDP, which in turn, as we have said in the previous chapter, will also lead to higher inflation. In Europe though the ECB is in control and can impose monetary policy on the countries that are part of the *European System of Central Banks* (ESCB) it cannot also implement a uniform expansionary fiscal policy for all the countries served. This is left to the own governments, but apparently by looking at the current results this has not been done.

A further reasoning behind the limited effect of the European QE may be attributed to the moderate use capital markets in the Eurozone. This is due to two main reasons. First of all you need a government bond to benchmark with for credit transactions, in Europe there is no such thing as there are only various countries' bonds. A creation of the *European Bond* could let us have the same principle. The second reason for which capital markets are not as well developed is also the cultural aspect. In Europe the population tends to save rather than invest. The investment funds are then the ones that invest mostly in equity shares and give credit to *small-and-medium enterprises* (SMEs) in the economy, which is one of the ultimate goals of the QE. Capital markets in the US serve many enterprises that prefer recurring to IPOs rather than bank loaning as likely to be done by their counterparty in the EU. This possibility of gaining access to credit via capital markets is fundamental for the QE to fully transmit its effects. In the case which banks do not pass on the capital to the real economy, if capital markets are well developed, *SMEs* have access money more easily and hopefully invest it properly (and not just deleverage as said before) for inflation to rise again. At the same time this

brings the rise of wealth of households with the general rise in assets' prices. With the situation well clear this is why the ECB also launched the *CSPP* and the EU Commission has set out a plan for *Capital Market Union* which is to start setting its building blocks in 2019. As its name says there will be a capital market for EU where matching savings with needs of funding will be easier across the whole of Europe, giving an alternative to bank lending.

The question then arises, if the capital markets are indeed of different development and use, the banks are not passing on the majority of the liquidity, then those minor effects that the QE has had until now, most likely, through which transmission channels have been achieved? By looking at the value of the euro compared to the dollar like in **Figure 11** we can see how the low interest rates have depressed the value of the euro. This is good for the exports of the European goods towards mainly the USA making the goods cheaper and more attractive, at the same time the European goods become cheaper compared to American goods in the EU as well. The depreciation of the euro has been of great scale considering that from a peak of 1.4 it lowered to about 1.10, very close to parity itself. With higher exports we have higher GDP which in turn leads to higher inflation after a process of adjustment, just like it was explained in the previous chapter. Although the exports channel is a valid one the effect have been limited, there was a €3 billion increase in total exports which is miniscule compared to the €11 trillion European economy.

Figure 11: USD/EUR Exchange Rate



Notes: 1) *"Whatever it takes"*; 2) PSPP announcement; 3) Start of PSPP; 4) CSPP and expansion of PSPP.

Source: Thompson Reuters DataStream

Judging the QE effects has been made possible by the data that has been provided and here we stand criticizing the low level of effects it carried, but who would know how the situation would have developed to be if the QE had not been started? We could be in a state were low inflation could be replaced by high level of deflation, unemployment level would be higher and GDP growth well below the zero rate. According to the Annual Report of 2015 by the ECB to have the effects that we can see now but without the QE a reduction of 100 basis point on standard facilities would have been needed, if not we would be 0.5% down on inflation in 2016 and 0.33% down in 2017. In addition the GDP growth rate would be 1% lower in the years 2015-2017. These are of course predictions since no data is available for the counter-factual situation therefore all we can limit ourselves to is saying that it is not having the desired levels of effects, like the American QE had, but then again the differences in the economies explain why it is so. All us Europeans can hope for is that in the near future, confidence in the ECB still alive, the inflation level rise to close, but below to, 2% and unemployment levels fall for the best of all.

Conclusion:

We started off by analyzing the theory behind the monetary world and the standard QE program. As demonstrated the QE works by transmitting its effect on the real economy, although the main effect is to raise the inflation, there are some side effects such as the *wealth effect, inflated asset prices, income inequality, capital markets use,* and last but not least the *excessive risk taking*. Once the QE has been implemented it must also end sooner or later, this is why we have taken some time to talk about the exit strategies as well, which we hope will be needed for the European QE very soon. Finally in the second chapter we have taken a closer look at the European QE and all its components and the timeline of all the implementations. This served to let us see better the effects of the tools, to find where and when things started not going the way we hoped. Lastly we can conclude that although at the moment the desired effects are not completely achieved there is still time for them to be reached even though the more time passes by the less GDP growth *per annum*, more unemployed, less investments and more instability is perceived. We will see if the supporters of the ECB's QE will turn out to be right or if on the other hand the critics always had been right. If not the QE what other possibilities of contrasting this recession would there be? Some people tend to support the idea to give the money directly to the population, which would probably guarantee a better way for the economy to heat up with most people spending right away the new money received. On the other hand some people support the idea to transfer a part of the money that has been spent on the purchase of government bonds directly to the government in order to benefit all the ordinary people by providing the essential services, installing new infrastructures or improving the old ones. These ideas might gain populist support but at the same time they are not very professional and the outcomes are not yet sure. They could work but the risk of injecting money which will then be 'lost' is very high.

The best and most professional solution is probably to fully recognize the economic trend and structure of the economy and apply the QE program that suits the

best based on the trends and needs. The fact that the ECB is now willing to start the *ECM* and the *CSPP* probably means that they have deeply scrutinized and analyzed the anatomy of the economy, based on statistics of what was going the right direction and what not. There is no one single way of carrying out monetary policy with the relative tools, applying them in US might have different effect compared to if they are applied in Europe or in Japan.

Personally I think these two further implementations is what Europe needs to overcome the recession, considering the fact that it did not recover with the standard version of the QE programs. Governments on the other hand shall be forced to carry out structural reforms and fiscal policies by the European Union itself within a couple of years times. At the same time us Europeans shall be united and hope for the best of the outcomes, especially during these recent hard times the European Union is experiencing.

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