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Master Thesis Financial Economics

The ECB: a new market participant?

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ABSTRACT

In the spring of 2016 the ECB announced to add the Corporate Sector Purchase Programme (CSPP), the purchase of non-financial corporate bonds, to its running Quantitative Easing (QE) programme. This paper examines the difference in bond issuance behavior, and concludes that companies whose bonds are acquired under the CSPP increase their total as well as Euro denominated bond issuance significantly compared to companies who issue eligible bonds, but who are not bought as well as non-financial companies who issue Euro denominated bonds, but are not eligible. Moreover, the paper shows a significant drop in Credit Default Swap (CDS) rates, for companies who issued bonds and are bought by the company as a result of the announcement of the latest addition to the European QE, compared to other groups of companies. These results are robust across CDS rates with different durations.

Keywords: Corporate Sector Purchase Programme, CSPP, Quantitative Easing, QE, ECB, Non-Standard Monetary Policy Measures

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1. Introduction

On the 26th of July 2012 the president of the European Central Bank, Mario Draghi, said that the ECB is prepared to do whatever it takes to preserve the Euro. This statement was made after a prolonged remediation period, following the financial crisis starting in 2008. In response to the crisis, the ECB has mainly responded by implementing standard as well as non-standard monetary policy measures, in order to reach its primary objective of maintaining the inflation below, but close to, 2% over the medium term (ECB, 2011). As part of the standard monetary policy measures, the ECB dropped its policy rates to below zero for the first time since its inception. However, these policy changes were not enough to stabilize the European economy. After implementing various non-standard monetary policy measures, the ECB joined other major Central Banks like the Federal Reserve, the Bank of Japan and the Bank of England, in 2015 with the adoption of the Quantitative Easing (QE) programme. The programme mainly targeted government bonds with a monthly purchase of €60 billion and was intended to last until at least September 2016. QE would improve monetary and financial conditions, enabling access to finance at lower costs for businesses and households in an attempt to return inflation rates towards 2%.

However, the programme did not have the desired result within the expected timeframe and the spillover effect to non-financial corporations was limited until March 2016 (Koijen, Koulischer, Nguyen, & Yogo, 2016). As a result, the ECB surprised the market completely by announcing the Corporate Sector Purchase Programme (CSPP) on March 10, 2016 as well as by the increase of the monthly purchase value of the total programme to €80 billion. The CSPP covers the purchases of investment grade Euro denominated bonds issued by non-financial corporations established in the Euro region. This is the first time that the ECB acquires non-financial corporate bonds, which makes the programme fairly unique. Preceding March 10 2016, the ECB had mainly bought government bonds or bonds issued by financial institutions to ease lending conditions and increase the credit supply for the real economy. In order to check eligibility for the monetary policy framework, only the highest available rating by S&P, Moody's, Fitch or DBRS is taken into account. These criteria, which differ from common market standards, have been heavily criticized recently by the market. The market generally takes the lowest available or the average rating, in case of missing data (Nyborg, 2015).

The ECB was recently acquitted by the Court of Justice of the European Union, after the German Constitutional Court questioned whether the Central Bank replaced governments in the function of making economic policy by the purchase of government bonds. The reason for

the acquittal is that the ECB only made purchases on the secondary market and therefore did not interfere in the market functioning (FD, 2018). This raises questions regarding the impartiality of the ECB with respect to the CSPP since they, in certain circumstances, make purchases on the primary market, in addition to their purchases on the secondary market. It is being questioned whether the ECB, by becoming a significant buyer of corporate bonds, provides an unfair competitive advantage for larger companies by further relaxing their financing costs. In comparison to large companies, it is much harder to issue eligible bonds for their smaller counterparts due to the financial costs associated with issuing bonds and getting a rating by one of the four accepted rating agencies (Manuels, 2017). Larger companies already face less severe financing costs compared to smaller companies (Beck, Demirguc-Kunt, & Maksimovic, 2005). So by buying only these bonds, issued by on average larger companies, the ECB is making the difference in financing costs even larger, which creates unfair competition.

Theory suggests that purchases by any Central Bank have no effect on the macroeconomic condition in a frictionless economy. The transactions present a change of ownership just like any other market transaction, so any quantitative easing programme should not have any impact on market prices (Woodford, 2003). However, market prices have been noticeably impacted as a result of asset purchases done by Central Banks, which are attributable to indirect effects. The "signaling channel" suggests that the purchases contain information about future intentions of the Central Bank regarding interest policies. The Central Bank indirectly affects the prices of assets by changing the expected risk free rate (Bauer & Rudebusch, 2014). The "portfolio rebalancing channel" suggests prices are affected by the purchases of Central Banks by transferring the supply surplus to riskier assets because of the scarcity of substitutes. Investors selling the assets to the Central Banks use the proceeds to purchase deputies, but because of the search for yield, investors are compelled to purchase riskier assets (Gertler & Karadi, 2013; Albertazzi, Becker, & Boucinha, 2018).

Previously published papers have shown that bond issuance has gone up since the announcement of the CSPP (Nordine & Ixart, 2018). Moreover, research has shown that there is no significant variation in the capital structure since the announcement of the CSPP which indicates that new bond issuance is a close substitute for existing balance sheet debt (Galema & Lugo, 2017). It seems that corporates are not using the newly issued debt to make long term investments, which could ultimately lead to a higher inflation, which is the goal of the ECB, but the corporates rather use the new debt to repay existing, more expensive, debt.

This paper is an addition to the currently existing literature, by researching the difference in bond issuance behavior in response to the announcement of the CSPP between three different groups, (1) companies who issued bonds which are bought by the CSPP, (2) companies who issued bonds that are eligible for the programme, but are not bought by the CSPP and (3) non-financial companies who issued Euro denominated bonds, but which are not eligible for the programme. In addition, this study will investigate whether there is a difference in the Credit Default Swap (CDS) rates with different maturities between the three aforementioned groups as a result of the announcement of the programme.

The results show a significant increase in the amount of bonds issued since the announcement of the CSPP by companies who issued bonds that are bought by the CSPP compared to the two other groups. This is valid for both the total amount issued as well as the amount issued denominated in Euro. The total issuance behavior between the other researched groups does not differ significantly since the announcement. However, results show that the amount issued denominated in Euro does increase after the announcement for companies that issue eligible bonds compared to companies that issue non-eligible bonds. The regressions regarding the CDS data, show that the CDS rates decreased significantly for companies whose bonds are actually bought by the CSPP compared to the other groups. These results are robust across different regressions which are controlled for multiple time varying company specific data as well as time and firm fixed effects.

The rest of the paper has been structured as follows. Chapter two sets out the theoretical framework, focusing on the non-standard monetary policy measures implemented by the ECB as well as CDS rates. In addition, this section will discuss the steadily growing existing literature relating to the CSPP. Chapter three will present the hypotheses. The fourth chapter will first present the data which will, amongst other things, specify how the company split has been established after which the methodology used for this paper will be clarified. Chapter five will present the results of the various analyses. Chapter six provides concluding remarks whereas the recommendations for follow-up research are proposed in the seventh and final chapter.

2. Theoretical framework

This section will provide an overview of the theoretical framework for this paper. The first part will focus on the non-standard monetary policy measures used by the ECB after the financial crisis. After this, the theory behind credit default swaps will be discussed and this section will conclude with the current related literature concerning the CSPP.

2.1. Non-standard monetary policy measures

The ECB reacted in two ways to recover the European economy after the Global Financial crisis in 2008. Firstly, she has set its policy rates close to, and even below, zero for the first time in the Bank's existence. Secondly, the ECB has implemented several non-standard monetary policy measures. These non-standard monetary policies can be split into two different groups. The first being measures to recover from the turbulence in the aftermath of the Financial Crisis ("non-standard crisis measures") and the second being measures in order to breach through the long period of low inflation in the Euro area ("non-standard inflation measures").

2.1.1. Non-standard crisis measures

In response to the financial crisis, the ECB initiated numerous non-standard policy measures in order to stabilize the European Economy. Starting in July 2009 with the first covered bond purchase programme (CBPP1). For bonds to be eligible, they required an issuance volume of at least €500 million and a first best credit rating of AA or higher, by S&P or equivalent (ECB, 2009). The programme lasted until June 2010 when it reached its intended nominal value of €60 billion (ECB, 2010). In May 2010, shortly before the end of CBPP1, the ECB started with the Securities Market Programme (SMP). The objective of the programme was defined as follows: "address the malfunctioning of securities markets and restore an appropriate monetary policy transmission mechanism". The programme mainly purchased sovereign bonds on the secondary market and intended to keep the securities until maturity. The programme was terminated in September 2012 and reached a total holding of €210 billion at its peak (ECB, 2010). On the 6th of October 2011, the Governing Council of the ECB announced CBPP2, a sequel to CBPP1. The aim of the programme was equal to the previous covered bond purchase programme, namely to ease funding conditions for credit institutions and enterprises as well as to stimulate credit institutions to increase providing loans (ECB, 2011). The intended purchase amount wat equal to €40 billion. However due to an increase in the demand by investors for Euro-area covered bonds and a limited supply, the ECB decided to limit its purchases to €16.4 billion and ended the programme in October 2012 (ECB, 2012).

Although many programmes has been implemented, the desired result was not achieved. A huge signal was given by Mario Draghi on July 26, 2012 at UKTI's Global Investment Conference:

"Within our mandate, the ECB is ready to do whatever it takes to preserve the Euro. And believe me, it will be enough." (Draghi, UKTI's Global Investment Conference, 2012)

The week following the statement of the President of the Central Bank, the Eurosystem announced the Outright Monetary Transactions (OMT) programme, to support Eurozone governments who require financial assistance. Up until the end of 2017, the OMT had not been activated as none of the Eurozone governments had met all criteria. However, the promise was enough to calm investors down, which was shown in the significant decrease across European government bond yield curves. In addition, the Eurosystem introduced open market operations with targeted longer-term refinancing operations (LLTROs), aimed at improving lending to the non-financial private sector through the banking channel in June 2014. The programme provides financing to credit institutions under favorable conditions for a period up to four year. The credit institutions are hereby incentivized to provide lending to non-financial private companies which supports the real economy (ECB, 2014).

2.1.2. Non-standard inflation measures

Non-standard inflation measures prior to CSPP

Following prior non-standard policy measures to stabilize the European economy, the ECB now faced a long period of low inflation in the Euro area. On the 22th of January 2015, the Governing Council of the European Central Bank followed other Central Banks, like the Bank of Japan and the Federal Reserve with the introduction of Quantitative Easing (QE). The ECB announced the expanded Asset Purchase Programme (APP). The Public Sector Purchases Programme[1] (PSPP) would be added to its existing private sector asset purchase programmes, with a combined monthly purchase of €60 billion (European Central Bank, 2015). The existing private sector asset purchase programmes at that time consisted of the third generation of the Covered Bond Purchase Programme (CBPP3) and the first generation of the Asset-backed Securities Purchase Programme (ABSPP) (ECB, 2014). The ABSPP further improved the transmission to non-financial corporations via the banking channel (ECB, 2014). The APP is planned to last until at least September 2016 and in any event until the ECB sees a sustainable

[1] The PSPP purchases European sovereign bonds

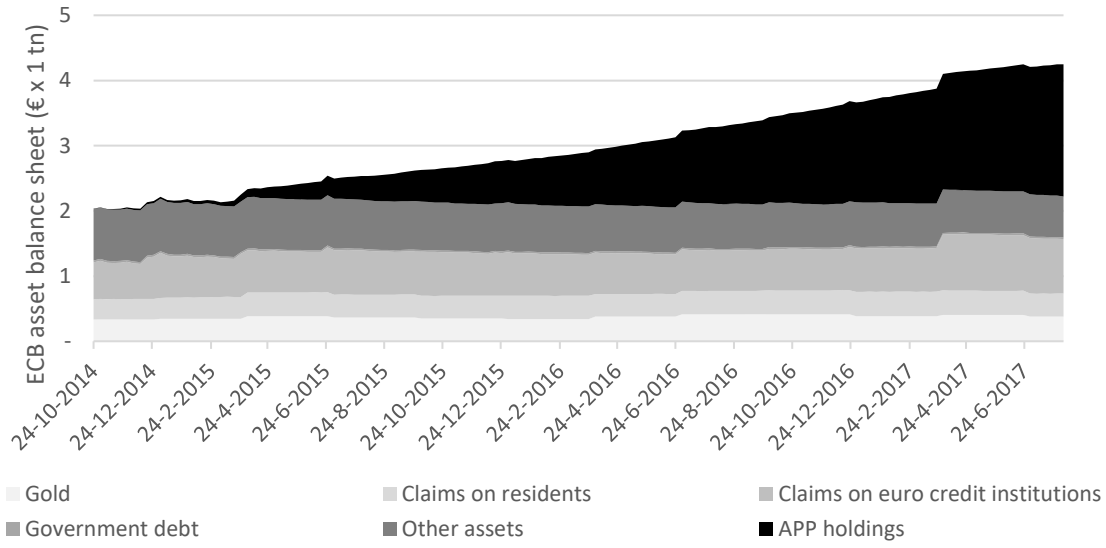
adjustment of their primary target of inflation rates below, but close to, 2% in the medium term (European Central Bank, 2018).

The expanded Asset Purchase Programme (APP) includes all purchase programmes under which private sector securities and public sector securities are being purchased in order to address the risks of a too prolonged period of low inflation (European Central Bank, 2017). These asset purchases provide monetary support to the real economy in a context where key ECB interest rates are at their lower bound. The APP consists of the following programmes:

- Third Covered Bond Purchase Programme (CBPP3)
- Asset-backed Securities Purchase Programme (ABSPP)
- Public Sector Purchase Programme (PSPP)
- Corporate Sector Purchase Programme (CSPP)

The graph below shows the asset side of the balance sheet of the ECB from the start of the APP until the 4th of August 2017. The balance sheet of the ECB has more than doubled since the start of the APP, which is mainly attributable to the APP.

Graph 1: the ECB's asset balance sheet



Graph 1 presents the asset side of the balance sheet of the ECB since the start of the APP until August 4, 2017. The graph shows that the balance sheet of the ECB has more than doubled in less than 3 years from €2.0 trillion up to €4.2 trillion. As can be seen, this increase is mainly attributable to the APP since the assets excluding the APP only increased by €0.2 trillion in the abovementioned period.

Corporate sector purchase programme

On the 10th of March 2016, the ECB surprised the market by adding the Corporate Sector Purchase Programme (CSPP) to the APP and announced that the combined monthly purchases under the programme will increase from €60 to €80 billion (European Central Bank, 2016).

The main objective of the programme was to further strengthen the pass-through of the Eurosystem's asset purchases into the financing conditions of the real economy. This goal was planned to be accomplished by purchasing investment grade Euro-denominated bonds issued by non-financial corporations established in the Euro area (European Central Bank, 2016).

On April 21, 2016, the ECB has further clarified, inter alia, the detailed eligibility criteria for the securities. They have also indicated that the programme will commence in June 2016 and will be executed by six national Central Banks (National Bank of Belgium, Deutsche Bundesbank, Bank of Spain, Bank of France, Bank of Italy and Bank of Finland) on behalf of the Eurosystem, coordinated by the ECB. Each national Central Bank is responsible to acquire bonds of issuers established in a certain geographical location. Appendix 1 provides an overview of the geographical allocation by national Central Bank. Although the national Central Banks do bare risks by taking the purchased assets on their balance sheets, both the income as well as the loss are borne by all the Eurosystem Central Banks. To qualify for the CSPP, the marketable debt instruments should comply with the following requirements (Draghi, 2016):

1. The bond issued:
    a. Is denominated in Euro;
    b. Has a first best credit rating by DBRS, Fitch Ratings, Moody's or Standard & Poor with a minimum credit quality step 3 under the ECAF. Credit quality step 3 corresponds with a rating of BBBL/BBB-/Baa3/BBB- respectively;
    c. Has a minimum remaining maturity of 6 months and a maximum maturity of less than 31 years at time of the purchase by the relevant national Central Bank;
    d. Has a yield to maturity (or yield to worst), which is above the deposit facility rate. Hence, this could be negative;
    e. Complies with the eligibility criteria for marketable assets for Eurosystem credit operations set out in the Guideline of the European Central Bank (ECB/2014/60);
2. The bond issuer:
    a. Is incorporated in a country which currency is the Euro. However, if the ultimate parent of the issuing company is incorporated outside the Euro area, they remain eligible for CSPP provided that they fulfil all other criteria;

b. Is not a credit institution. A credit institution has been defined as follows by the ECB:
    i. A company which is subject to supervision by the Single Supervisory Mechanism, as well as its subsidiaries, or a publicly-owned credit institution that is subject to supervision of a standard comparable to supervision by a competent authority (ECB/2014/60, 2014);
    ii. A company which has a parent company which is subject to banking supervision outside the Euro area.
c. Is not an investment firm, defined as any legal entity that provides investment related services to third parties on a professional basis as regular occupation (2014/65/EU, 2014);
d. Has not issued an asset-backed security. Meaning debt instruments that are backed by a variety of fixed or revolving ring-fenced financial assets (ECB/2014/60, 2014);
e. Is not eligible for the PSPP.

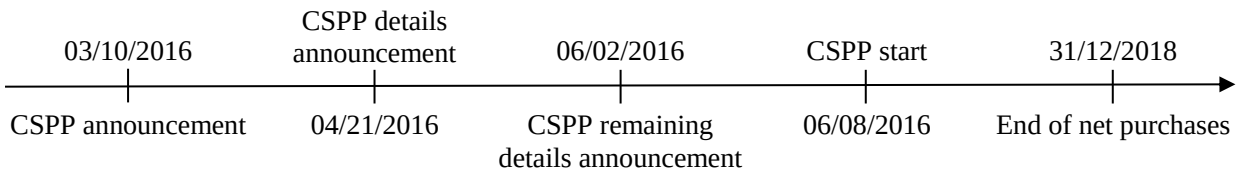
In case the bonds loses its eligibility after it has been acquired, the relevant Eurosystem Central Bank is not obliged to sell the security.

Furthermore, the ECB has set additional purchase limits, outlined below:

1. At a consolidated level of the Eurosystem Central Banks, an issue share limit of 70% based on the outstanding amount per international securities identification number (ISIN) is applicable. In specific, undefined, cases a lower share limit may apply, consistent with their treatment under PSPP;
2. An undefined limit at issuer group level has been applied to maintain a diversified allocation across issuers and issuer groups.

The announcement of the CSPP came as a complete surprise to the market in view of the reactions of the market players and the drop in bond yields. The figure below shows the different noteworthy moments for the CSPP:

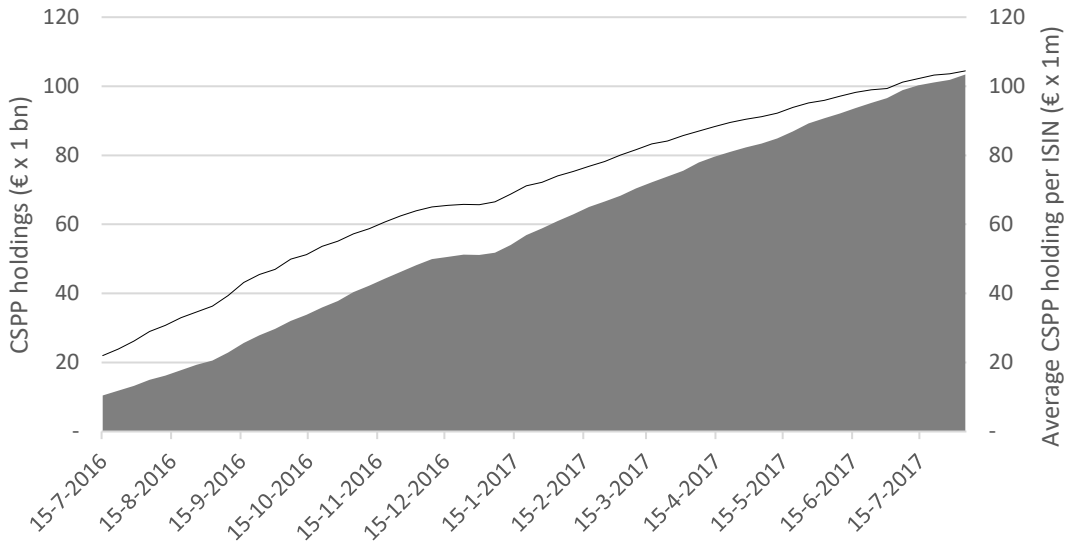
Figure 1: CSPP timeline



1. 03/10/2016 CSPP announcement: the ECB announced the addition of the CSPP to their current APP and will increase the combined monthly purchases from €60 to €80 billion. The CSPP targets investment-grade Eeuro-denominated bonds issued by non-financial corporations established in the Euro area for the Programme.
2. 04/21/2016 CSPP details the announcement: the ECB provided the remaining details for the bond eligibility criteria. In addition, they announced the six national Central Banks that will be responsible for purchases from issuers established in selective parts of the Euro area.
3. 06/02/2016 CSPP remaining details announcement: the ECB has indicated that it will start the CSPP on the 8th of June 2016 and clarified the remaining details regarding the issuer eligibility. Furthermore, they announced to publish a weekly list of the ISINs of the holdings under CSPP starting the 15th of July 2016.
4. 06/08/2016 CSPP start: the six national Central Banks purchased their first eligible bonds in their specified geographic area.
5. 31/12/2018 End of net purchases: the ECB announced the end of its net purchases of APP. However, it does continue to reinvest the principal payments from maturing assets held by the CSPP.

The graph below shows the cumulative weekly amounts held under the CSPP (€ x 1 billion) on the left axis, in combination with the average CSPP amounts held per ISIN (€ x 1 million) on the right hand side. It is noteworthy to see the average amount hold per ISIN rises sharply over time, which shows an increased issue share. On the 15th of July 2016, the national Central Banks separately published a list with their ISIN holdings for the first time. So far, they purchased together €10.4 billion across 473 unique ISINs resulting in an average value per ISIN of €22 million. On August 4, 2017, the ECB holds 990 unique ISINs on their balance sheet attributable to the CSPP worth €103.4 billion resulting in an average participation of €104 million per ISIN, an increase of 475%. Appendix 2 shows the number of unique ISINs purchased under the CSPP by every participating NCB as well as the number of unique issuing companies.

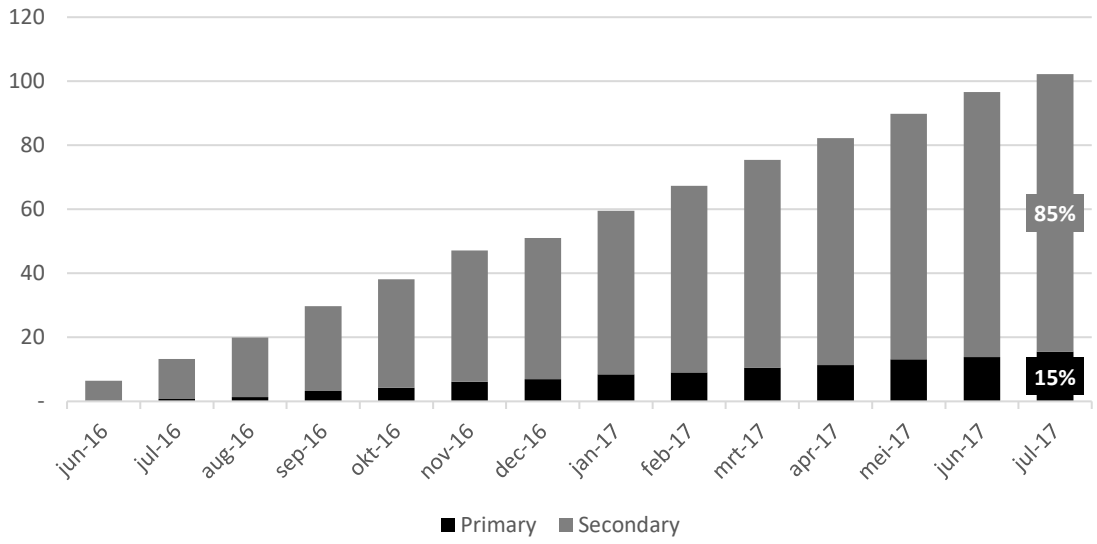
Graph 2: Purchase amount attributable to the CSPP & average amount per ISIN



Graph 2 presents the weekly cumulative amounts held by the national Central Banks regarding the CSPP in billion Euro's on the left hand side. The right hand sight shows the average amount held per unique ISIN. The CSPP holdings increase steadily over time with a small stagnation at the end of 2016, which is in line with general global bond activity around year end. The average CSPP holding per ISIN rise sharply over time as well, which indicates an increasing issue share over time.

The national Central Banks are able to make purchases in the primary as well as the secondary market. However, under CSPP, primary market purchases are forbidden for debt instruments issued by public undertakings. A public undertaking is 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. The ECB stated that is does understand the potential impact on market liquidity created by its entry into the market. Its participation in the primary market is mainly aimed at achieving a balance between the objective of the ECB as well as proper market functioning (European Central Bank, 2017). The graph below shows that the national Central Banks purchased 15% of the total amount on the primary market until July 2017.

Graph 3: cumulative holdings under CSPP split into primary and secondary acquisitions

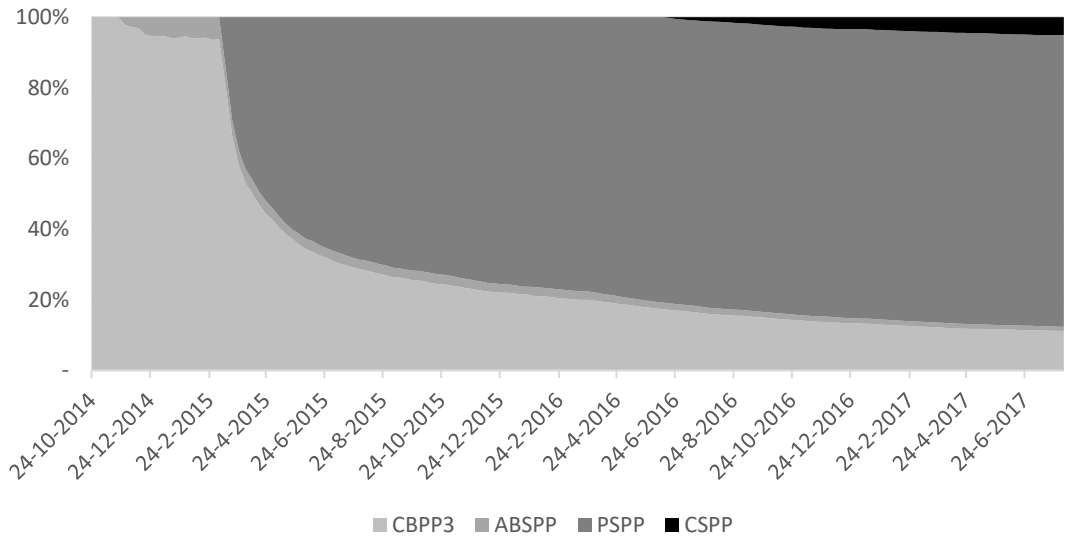


Graph 3 presents the monthly cumulative holdings under CSPP split into acquisitions made on the primary and secondary market. As of July 2017, 85% of the acquisitions have been made in the secondary market.

The graph below shows the relative amounts held on balance sheet between the different programmes within the APP over time. Although the CSPP seems fairly small in light of the total APP, it is significant compared to the total eligible Euro non-financial corporate bond market. At the beginning of June 2017, the ECB had approximately purchased 11% of the total eligible bonds[2], which makes it a significant, if not the largest, market participant.

[2] Based on outstanding value

Graph 4: relative programme size within the APP



Graph 4 presents the relative amounts hold on balance sheet within the APP since the start of the programme until the August 4, 2017. It shows the relative large share of the PSPP compared to the other programmes. However, the CSPP is significantly big compared to the total Euro non-financial corporate bond index of €850 billion at the announcement of the programme.

2.2. CDS

Besides looking at the difference in bond issuance behavior between the three groups, this research will also look at the difference in Credit Default Swap (CDS) rates between the different group of companies. CDSs are one of the most commonly used type of credit derivatives available and are designed to transfer the credit risk of fixed income products between multiple market participants. A CDS is comparable to an insurance for the holder of the bond in case of a default of the issuing company. The holder of the bond, the buyer of the CDS, pays to the seller a fixed premium (rate) periodically until the maturity date of the CDS or until the bond issuing company defaults. In case of default, the seller of the CDS will repay the par value of the bond to the bondholder. (Longstaff, Sanjay, & Eric, 2005).

The rise of the CDS market in the late 1990s and early 2000s is mainly due to the increasing demand for arbitrage possibilities, market hedging and speculation (Oehmke & Zawadowksi, 2015). Although the CDS market does represent a large volume with a $9.4 trillion outstanding notional value, it has become much smaller over the past decade compared to its peak at the end of 2007 of $61.2 trillion (Aldasoro & Ehlers, 2018). In part due to its lack of transparency at that time, the financial crisis has shown the product could affect financial markets tremendously; Warren Buffet called them: “Weapons of Mass destruction”. To create a safer

product, the G20 implemented which included, but were not limited to, a reporting obligation for all derivatives transactions (G20, 2009).

A CDS premium is being calculated on the likelihood of a default of the company and therefore CDS data is only available at company level. A high CDS rate indicates a higher probability of default perceived by the market compared to companies with a lower CDS. CDSs do provide a way to efficiently price and trade credit risk among institutions, including with illiquid products. The price of a CDS is referred to as its spread and is denominated in basis points. For example, to insure a €100 of a company with a CDS of 50, you need to pay €0.50 annually.

2.3 Related literature

The literature about the CSPP is currently fairly limited because the programme is still relatively new. This paper will complement the currently available, rapidly growing, research discussed below.

The most recent research used a rating wedge, which is created by the difference in the credit assessment of the bonds between the market and the ECB, in order to look at the difference in bond issuance behavior as well as other aspects. Most market participants[3] perceive bonds as investment-grade if the average, or the lowest rating (in case of missing data) will be BBB-, on the S&P scale or equal. In contrast, the ECB uses the highest available rating which ensures a single rating agency can have a large impact and bonds that are perceived as high yield by the market, can be seen as investment grade by the ECB. The research finds that firms that are perceived as high yield by the market, but as investment grade by the ECB, do issue significantly more bonds after the announcement of the CSPP compared to firms that are perceived as investment grade by the market as well as the ECB. Furthermore, they find that bond yield spreads decline on average fifteen basis points reacting to the announcement with the greatest impact on bonds within the rating wedge (Nordine & Ixart, 2018).

A high-frequency event study has been used by Carrieri (2017) to study the effect of the PSPP and CSPP on German and Italian bond yields. An event window of two days around the announcements has been chosen to reduce the sensibility to other events not related to the programmes. The normal returns are calculated by using the CAPM with a risk free rate equal to the 10 German government bond and the Barclays Euro Government Float adjusted bond index is used as proxy for the market return. The research has shown that corporate bond yields

[3] Amongst other, Bloomberg Barclays Indices, The Bank of America Merill Lynch, S&P 500 Bond Index and Market iBoxx

dropped significantly as a result of the announcement of the CSPP for both the German and Italian bonds. The effect has a larger magnitude for financial institutions compared to non-financial institutions. In addition, German bonds experience a greater effect than their Italian counterparts (Carrieri, 2017).

Galema & Lugo (2017) conclude that the ECB targets mostly bonds with higher credit risk. This could be explained by the portfolio rebalancing channel in light of the already existing PSPP, which targets government bonds. These corporate bonds, which in general have higher credit risk, are less close substitutes to the, by the market perceived as safe, government bonds, which enhances the effectiveness of the CSPP. Secondly, the research shows that bonds are more likely to be bought by the CSPP in case they are more liquid, contrary to the hypothesis of the liquidity premium channel. A possible explanation for this is that the ECB is trying to limit its price distortion. Finally, research shows that there exists no significant variation in the capital structure between targeted and not-targeted eligible issuers, which indicates a strong negative relationship between new debt issuance and existing balance sheet debt (Galema & Lugo, 2017).

Arce et al. (2017) researches the spillover effects of the CSPP on the bank financing possibilities for Spanish companies that do not issue eligible bonds. They show that the eligible bond yields dropped by 44 basis points following the announcement. However, this effect was also observable, albeit to a lesser extent, by bonds that are not eligible for the programme. Further implications of the programme include an increase of bond issuances by Spanish eligible companies, which reduces the demand for bank debt financing by these companies. Nonetheless, there is a positive side effect in which financial institutions, that previously provided bank loans to CSPP eligible firms, increase granting bank loans to smaller, non-eligible companies, that have limited access to fixed-income markets. In conclusion, the spillover effect reallocated the financial institutions loan books to smaller companies (Arce, Gimeno, & Mayordomo, 2017).

Another recent study focused on the availability and composition of credit possibilities for eligible firms, also examined possible indirect effects of the CSPP. The results show that mostly firms that are close to, but above, the investment grade frontier, exchange existing bank debt to new low corporate bonds. Since corporate bond financing usually has less strict covenants compared to bank financing, the research examines whether corporates that have exchanged bank financing for corporate bond debt increase their investment activity. Rueschkamp et al. found that high credit quality firms, that already had favorable financing conditions, increased

their dividend payout ratio, whereas mergers & acquisition announced by eligible firms after the programme have lower initial returns. Lastly, they document that the spillover effects include increased and more favorable bank financing activity to non-eligible companies (Grosse-Rueschkamp, Steffen, & Streitz, 2017).

3. Hypotheses

The scope of this research complements the currently existing and growing empirical research on the CSPP. When reviewing the literature on the CSPP, this seems to be one of the first papers that does look at the bond issuance behavior as a response to the announcement of the CSPP in which the companies are split in the specified groups. In addition, currently no research has been done on the impact of CDSs as a result of the purchases of corporate bonds by the ECB.

The expected increase in bond issuance finds its origin in the entrance of the ECB as a new significant market participant. Research showed that at this occurrence, market yields dropped significantly on top of the already historically low yields as a result of previous standard as well as non-standard monetary policies. However, companies will not benefit from a decreased market yield as long as they do not issue new bonds. This gives rise to the first hypothesis:

Hypothesis 1: Companies issuing bonds bought by the CSPP increase their total bond issues compared to companies whose bonds are not bought by the programme.

Although, large multinational companies, have the option to issue bonds in multiple currencies, the ECB targets Euro denominated bonds. As a result, the second hypothesis is stated below:

Hypothesis 2: Companies issuing bonds bought by the CSPP increase their Euro denominated bond issues compared to companies whose bonds are not bought by the programme.

Hypothesis three and four focus on CDSs. CDS rates move because of borrower credit risk, counterparty credit risk and liquidity risk. Assuming the CSPP has not influenced the underlying assets, potential deviation as a result of the programme should be because of the others. Although CDSs are used as insurance products against default, prior research has shown that CDS rates are also affected by CDS rate are also affected by demand and supply of the underlying market asset (Miyakawa & Watanabe, 2012). These findings lead to the third hypothesis:

Hypothesis 3: CDS rates decrease as a result of the announcement of the CSPP for companies whose bonds are purchased by the programme compared to the other groups of companies.

This paper looks at CDS rates with different durations. As the programme is intended to last until the Governing Council sees a stable path of inflation in line with its aim of below, but

close to, 2%, it is not expected to last much longer than 2018. This is the basis for the last hypothesis:

Hypothesis 4: The expected decline in CDSs is most noticeable for short-term CDSs between the different groups of companies.

4. Data & methodology

This chapter will first set out the principles on which the companies have been allocated to the various groups, after which the data for the different hypothesis will be discussed in greater detail. Finally, the methods of analysis used in this study will be explained.

4.1. Company-split

All companies used in this study will be split into three different groups based on the eligibility and actual purchase by the programme. The first group consists of all companies of which at least one bond has been acquired by the CSPP since the start until the end of August 2017, the "*CSPP bought"* group. Secondly, a group of companies that issued eligible bonds but have not been bought by the CSPP, the "*CSPP eligible"* group. Finally, a group of non-financial companies that have issued Euro denominated bonds, but are not eligible for the CSPP due to other restrictions, mostly due to the absence of, or an insufficient rating, the "*Euro corporate*" group. Although the ECB determines eligibility on the basis of the characteristics of the bonds, research has shown that bond ratings have a highly significant positive correlation with the rating of the issuing company (Nordine & Ixart, 2018). Therefore, this paper assumes that if at least one bond of a company qualifies for the programme, the company will be able to issue multiple bonds meeting the criteria.

The basis for the CSPP bought group is the manually collected data from the six participating National Central Banks (NCBs) that publish their holdings on a weekly basis. Every Monday, the NCBs separately publish a list of their holdings by the end of the previous week under the CSPP. All NCBs, except for the Finnish Central Bank, only publish the data concerning the current week and delete all previously published lists. Other Central Banks were not very keen to provide historical data to individuals, as can be seen from the following quote after requesting historically published data relating to the CSPP:

"This issue has been reconsidered and it has been decided to submit the list requested on an exceptional basis, please do not distribute it." The bank of Spain

The ECB has started publishing more detailed information on CSPP-related purchases since the end of 2017. Currently, they provide historic data on their purchases, a breakdown of primary and secondary acquisitions and bond specific data such as maturity date and coupon rate.

Bloomberg data on parent companies has been used to determine the applicable ultimate parent of the bond issuing company. Bloomberg utilizes three different data fields, which refer to parent companies. These have been used together, since none of them was superior as can

be seen in the table below. The "*Issuing ticker*" provides the bond issuer's equity ticker. In case no equity ticker is available, the equity ticker of the bond issuer's direct parent company will be displayed. The "*Parent ticker"* covers the ticker of the immediate parent company, controlling the issuer of the issued bond. Finally, the "*Ultimate parent ticker*" refers to the ultimate parent company controlling the issuance. These data fields are mentioned above in order of their seniority in the entity structure. Hence, the ultimate parent ticker is the highest entity in the structure (Bloomberg, 2018).

Secondly all Euro bonds issued since 1 January, 2009 are retrieved for the different parent tickers using Bloomberg. In this way all bonds issued within the credit family have been retrieved. After this, it has been checked whether the bond purchased by the ECB appears in the list of bonds issued since 2009 by the different parent companies. This does not happen for example with ISIN: BE0002237064. The Issuing ticker provides Proximus as parent company, whereas the other two data fields provide the Kingdom of Belgium as the parent company. The ISIN does appear in the list of bonds issued by Proximus since 2009, but does not appear in the bond issuance list of the Kingdom of Belgium. In case the bond does not show up in the list of issued bonds since 2009, the ticker is false and will not be included in the final sample for the research. In case the bond appears in the list of issued bonds of multiple tickers (issuing, parent and/or ultimate parent), the ticker which is the highest in the entity structure is chosen for the research. To further clarify: a bond which has an issuing ticker of Heineken, a parent ticker of Heineken Holding and L'Arche Green as ultimate parent ticker will eventually have Heineken Holding as applicable issuing company. The bond shows up in the bonds issued list of Heineken as well as of Heineken Holding, however it does not appear in the list for L'Arche Green.

Table 1: determination of applicable issuing company

ISIN	Issuing ticker	Parent ticker	Ultimate parent ticker	Applicable	Code
XS0804217536	Nederlandse Gasunie	Kingdom Of The Netherlands	Kingdom Of The Netherlands	Nederlandse Gasunie	Issuing ticker
XS1330434389	Heineken	Heineken Holding	L'Arche Green	Heineken Holding	Parent ticker
XS0731681556	Volkswagen Intl Finance	Volkswagen Finance Luxemburg	Volkswagen	Volkswagen	Ultimate parent ticker

The table above shows three bonds which have been bought under the CSPP and display that none of the three data fields could be used solely to determine the applicable issuing company. The first bond has an issuing ticker of the Nederlandse Gasunie, but the parent and ultimate parent ticker corresponds with the Kingdom Of The Netherlands. In case the parent ticker or ultimate parent ticker would be accurate, the bond would not be eligible for the CSPP. The applicable date field for the second bond is the parent ticker and for the third bond, the ultimate parent ticker is the accurate one.

Since the start of the programme until the 7th of August 2017, the national Central Banks purchased in total 992 unique ISINs of 196 different companies, which are all included in the

CSPP bought group. The companies of which most bonds are acquired in this period include: Daimler (21), Telefonica (21), BMW (20), AB InBev (18) and Deutsche Bahn (18).

To determine the CSPP eligible group, a Bloomberg search has been combined with a hand collected dataset based on a daily updated list of eligible marketable assets (ECB, 2018). The Bloomberg search criteria can be found in the appendix and have been discussed with the Rabobank Debt Capital Markets team, which uses similar criteria to track the total Euro non-financial bond market (Manuels, 2017). The search covered all the Euro denominated bonds issued by non-financial companies since January 1, 2009. The daily updated list of eligible marketable assets consists of all individual assets for Eurosystem operations[4], so not solely for the CSPP. The daily updated list published by the ECB has been downloaded for the period from the start of the programme until the 7th of August 2017 and filtered for duplicates. In this way, a list of individual assets eligible for all Eurosystem operations within the specified timeframe has been created. When the ISIN was found in the Bloomberg search as well as in the list of eligible marketable assets for Eurosystem operations, the ISIN has been included in the CSPP eligible bond universe. The issuing company is being determined via the same methodology as described above for the CSPP bought group. The final CSPP eligible group consists of 115 companies. These companies issued bonds that are eligible for the programme but have not been acquired by the programme.

The Euro corporate group is defined on the basis of the same datasets used to determine the CSPP eligible group. Nevertheless, the ISINs retrieved from the Bloomberg search should not match the dataset from the ECB marketable assets. The methodology used to identify the issuing company is the same as described above. The Euro corporate group consists of 1390 non-financial companies that have issued Euro denominated bonds that are not eligible for the CSPP.

This study uses data until the 7th of August 2017 and because the difference between the CSPP bought and CSPP eligible depends on whether the bond is purchased, the company split could be different if the research would be redone later. However, appendix 2 shows the number of unique ISINs purchased by the programme as well as the number of unique issuing companies. It can be seen that the number of bonds purchased increases from 473 bonds in July 2016 up until 990 in August 2017. The number of unique issuing companies rises a lot less

[4] ECB makes a disclaimer in which they state that not all eligible assets are included in this list. For example, marketable assets that do not have a rating from an external credit assessment institution for the issue, issuer or guarantor.

rapidly; from 148 up to 196 in the same time period. It could be concluded that the NCBs have a preference for certain companies and it is not expected that the number of issuing companies will increase significantly as the programme continues.

In order to be able to control the regressions for, amongst other things, fixed firm effects, static company specific data like sectors, country of incorporation and reporting currency have been retrieved using Bloomberg. In addition, quarterly time varying company data has been collected using DataStream in combination with Bloomberg. This company data includes revenue, total assets and debt/equity. Several general company characteristics of all groups can be found in appendix four. Based on BICS level 1 sector classification, the ECB has acquired relatively few financial and industrial companies compared to the CSPP eligible universe; 23.5% of the CSPP eligible group is made up by financial companies, whereas only 18.9% of the CSPP bought group are made up by financial companies. Geographically, the ECB is overweight in Germany and France within the CSPP bought group compared to the CSPP eligible group but underweight in the UK. Only 2.0% of the companies included in the CSPP bought group are located in the UK, while 26.1% of the companies in the CSPP eligible group are located there.

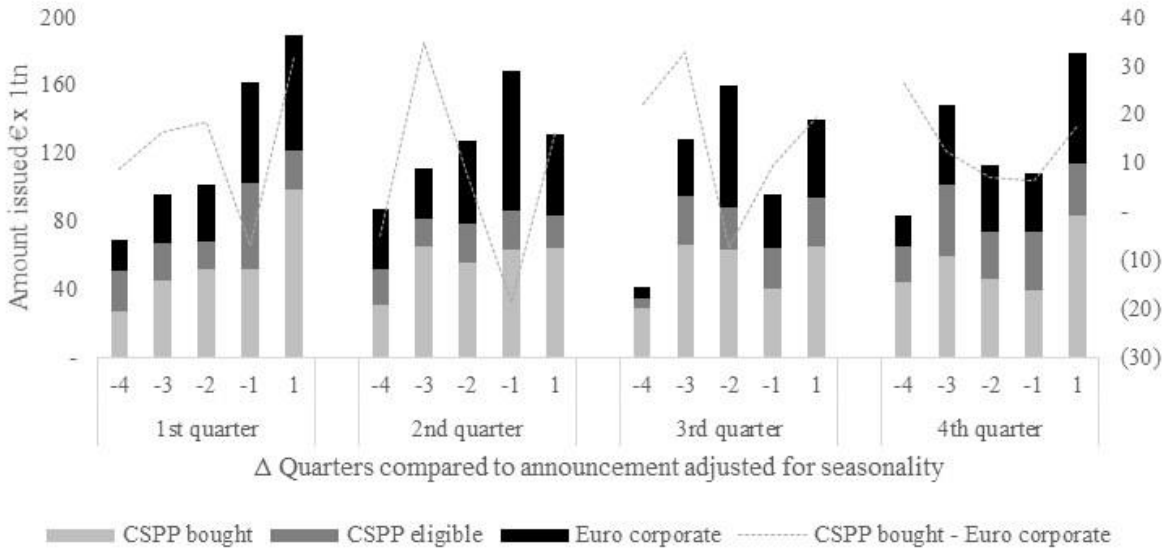
4.1.1. Bond issuance

To retrieve the bonds issued by all companies included in the study, the Bloomberg BChain function has been used. This research will focus on bond issuances since the 1st of 2010 until August 2017. Bond details including but not limited to issue date, maturity date, amount issued, rating, sector and currency have been collected using Bloomberg as well as DataStream and manually replenished where necessary in case of missing data. All data affected by currency are converted into Euros for comparison on an equal basis. Several high-over bond characteristic between the three groups can be found in the appendix.

The graph below shows the quarterly Euro denominated amount issued, in trillions of Euro, per group, adjusted for seasonality relative to the announcement date. Variable 1 in the 1st quarter section represents the first quarter following the announcement, from the 11th of March 2016 until the 11th of June 2016. Subsequently, variable -1 in the 1st quarter section represents the same period but one year before, so from March 11, 2015 until June 11, 2015. It is clearly demonstrated that in the first quarter following the announcement, the amount issued in Euro by the CSPP bought group (the lightest grey bar) issued more than the same period a year before. More specifically, the CSPP bought group issued 90.3% (€47.2 trillion) more in the quarter following the announcement compared to the same period a year earlier. In the year

following the announcement, the same group issued 59.1% (€116.1 trillion) more than in the year preceding the announcement. The dotted line within the graph below shows the relative issuance, calculated as the issuance by the CSPP bought group minus the Euro corporate issuance. For every quarter following the announcement the relative issuance is higher than the prior year, which indicates the increased bond issuance of the CSPP bought group also holds on a relative basis. Appendix 6 contains multiple graphs of the number of bond issuance on a weekly data per group.

Graph 5: quarterly Euro denominated amount issued



The graph above presents the quarterly Euro denominated amount issued, in trillion Euro, relative to the announcement date. Variable 1 in the 1st quarter section represents the first quarter in the first year following the announcement, variable 1 in the 2nd quarter represents the second quarter in the first year following the announcement and so on. The dotted line shows the bond issuance of the CSPP bought group minus the Euro corporate group.

The data descriptive table below (Table 2) shows the difference in company characteristics and issuance behavior before and after the announcement between the three groups. The average amount issued increases across all groups by 24.7%, 12.7% and 14.6% respectively for the CSPP bought, CSPP eligible and Euro corporate group. However, these increases do not differ significantly after conducting a clustered t-test. The largest issue in the dataset is placed by General Electric in 2015 at a par value of €13.8 billion with an amount issued/revenue value of 0.13. The largest relative issuance to revenue is placed by the FNG Group, a fashion company, in 2012 with an issue value of €15 million which was 500 times larger than its LTM[5] revenue. The average issue size/revenue increases the most within the

[5] Last twelve months

CSPP bought group, with 87.3% compared to 23.4% at the CSPP eligible group and a decrease of 51.9% at the Euro corporate group. Nevertheless, none of these values differ significantly after clustering by company. Based on revenue and total assets, companies in the CSPP eligible group are on average larger than the companies in the CSPP bought group, in both the period before and after the announcement of the CSPP. The CSPP bought group has an average revenue of €74.7 billion in the period before the announcement and €70.9 billion in the post announcement period, although this difference is not significant. In parallel the CSPP eligible group experienced a 21.4% average revenue growth between the pre and post period, which is not significant either. The three largest companies in this paper, based on revenue, are Wal-Mart, Royal Dutch Shell and BP. Wal-Mart has issued Euro denominated bonds, but these bonds are not eligible for the CSPP and Wal-Mart is therefore included in the Euro corporate group, Royal Dutch Shell is included in the CSPP bought group and BP is part of the CSPP eligible group. The smallest company included in the CSPP bought group is Eurosic, a France real estate company, with an average annual revenue of €136.0m in the total period. The average leverage[6] in the pre announcement period is lowest in the CSPP bought group with 1.6x, followed by the CSPP eligible group with 1.9x and is the highest in the Euro corporate group with 2.1x. The only group that increases its mean leverage in the post announcement period compared to the period prior to the announcement, is the CSPP bought group.

[6] Debt/equity

Table 2: data descriptive

		Pre announcement			Post announcement			Post - pre		
		Obs	Mean	Std. Dev	Obs	Mean	Std. Dev	Diff	Std. Dev	P value
CSPP bought	Amount issued[7]	4'844	374.194	480.474	1'169	466.781	433.910	92.587	96.818	0.156
	Revenue[8]	3'595	74.718	64.481	996	70.938	62.152	(3.780)	31.615	0.547
	Amount issued/revenue	3'594	0.086	2.393	985	0.162	3.250	0.075	1.311	0.477
	Total assets[8]	3'595	135.041	132.707	996	154.977	166.942	19.936	71.118	0.399
	Leverage	3'595	1.613	1.003	996	1.700	0.974	0.087	0.443	0.422
	CDS 2Y	15'100	44.068	31.645	1'424	35.456	22.440	(8.612)	12.410	0.245
	CDS 5Y	72'737	81.544	53.569	30'407	65.423	38.732	(16.121)	9.277	0.042
	CDS 10Y	47'319	127.383	68.871	8'439	109.770	51.795	(17.613)	20.568	0.197
CSPP eligible	Amount issued[7]	3'685	324.945	731.236	790	366.122	695.628	41.177	289.892	0.444
	Revenue[8]	2'650	97.136	72.567	677	117.929	86.924	20.793	74.762	0.391
	Amount issued/revenue	2'629	0.027	0.135	646	0.033	0.148	0.006	0.120	0.479
	Total assets[8]	2'650	230.871	193.517	677	201.427	145.375	(29.444)	195.204	0.560
	Leverage	2'650	1.887	8.948	677	1.247	16.961	(0.639)	3.620	0.570
	CDS 2Y	8'608	42.000	64.284	538	77.524	94.356	35.524	30.730	0.126
	CDS 5Y	35'374	88.669	79.130	14'422	86.508	69.474	(2.161)	20.043	0.543
	CDS 10Y	18'284	119.276	68.699	2'549	93.952	46.156	(25.324)	41.707	0.727
Euro corporate	Amount issued[7]	9'925	344.176	603.120	3'125	394.421	575.496	50.244	111.863	0.327
	Revenue[8]	6'555	33.601	41.500	2'144	49.768	55.359	16.167	18.438	0.190
	Amount issued/revenue	6'538	0.195	6.249	2'138	0.094	0.678	(0.101)	1.545	0.526
	Total assets[8]	6'542	60.932	81.435	2'142	99.163	115.541	38.231	36.839	0.150
	Leverage	6'539	2.121	17.854	2'141	1.765	10.017	(0.356)	2.803	0.449
	CDS 2Y	32'050	84.379	282.844	3'184	205.059	273.644	120.680	91.022	0.093
	CDS 5Y	81'072	132.813	232.029	29'964	136.095	348.773	3.282	43.082	0.470
	CDS 10Y	43'696	186.819	222.874	6'210	269.989	583.972	83.170	90.289	0.179

The table above shows the data descriptive of the bond issuances, time varying company specific data as well as the CDS data between the three groups. The average issue amount increases for all three groups following the announcement. The relative issue amount, increases for the CSPP bought as well as the CSPP eligible group, but decreases for the Euro corporate group since the announcement. On average, companies included in the CSPP eligible group are larger, based on revenue as well as total assets, compared to the companies in the CSPP bought group. As shown above the average CDS rates increases as the maturity of the CDS increases which is in line with a normal yield curve. The P-values have been calculated using a t-test, clustered by company.

[7] In € x 1 million
[8] In € x 1 billion

4.1.2. CDS

The CDS data used in this research was received from Prof. Dr. Mary Pieterse-Bloem and her Fixed Income team at ABN AMRO. CDS data is only available with specific corporate Bloomberg accounts, which are not owned by the Erasmus University. Although the 5 year CDS is most widely used by market participants, this study will also include the 2 and 10 year CDS data in order to assess short and long term effects on CDS rates (Aldasoro & Ehlers, 2018). Table 2 in the previous section provides an overview of the data of the different CDS rates between the three groups. In addition, a graph of the average 5 year CDS rates between the three groups can be found in the appendix 7. The graph shows the average CDS rate of the CSPP bought and CSPP eligible group moving relatively constant compared to each other over time. Nonetheless, the average CSPP bought group's CDS rate is slightly lower since 2014 compared to the average CDS rate of the CSPP eligible group. As can be seen in table 2, the CDSs increase as the maturity increases, which is in line with a normal yield curve. In the pre announcement period the mean 2, 5 and 10 year CDS between the CSPP bought and CSPP eligible group are relatively equal, with a maximum absolute difference of 8.0%. The Euro corporate group has significantly higher CDS rates than the CSPP bought group, which are on average 47.8%, 38.6% and 31.8% higher for the 2, 5 and 10 years CDSs respectively. From these differences, it can be concluded that the market considers companies in the CSPP bought and CSPP eligible group to represent approximately equal risk, whereas they expect a higher probability of default for companies in the Euro corporate group. A significant drop in the 5 years CDS is visible in the CSPP bought group. The average 5 and 10 years CDSs drop for companies in the CSPP eligible group as well, although these are not significant when conducting a clustered t-test. On the other hand, the CDS rates increase across all three time periods for companies included in Euro corporate group, with the largest increase in the 2 year CDS. Nonetheless, these differences are not significant. The company within the CSPP bought group with the lowest average CDS is Novartis, a pharmaceutical company, with a CDS of 25.1. With an average CDS of 15.2, Avinor, an air transportation services company, has the lowest CDS in the CSPP eligible group. The company with the highest average CDS in the CSPP bought group is Telecom Italia, with 212.7. The highest average CDS in the total sample belongs to Norske Skogindustrier, with 2157.4; the company was delisted in February 2018 as a result of bankruptcy.

To be able to compare bond ratings, given by one of the following rating agencies: DBRS, Moody's, S&P and Fitch[9] on a numerical scale, a harmonized rating scale has been used which can be found in appendix 8. In case multiple agencies have rated a single bond, the average of the scores has been taken. Since bond ratings are highly correlated with company ratings, the average score of the bonds included in this dataset per company is used to assign a company rating.

4.2. Methodology

This paper will look at the announcement of the program, as most of the directives were made public at that time. Under the assumption of the semi-strong market hypothesis, all public information is immediately processed by the market and reflected in all the prices, including bonds and CDSs (Fama, 1991). Moreover, large corporates with specialized finance teams that use bonds as a structural way of financing their balance sheet, are able to issue bonds with the proverbial push of a button (Manuels, 2017).

This research compares both the issuance behavior as well as the CDS rate between the three different groups of companies. The first group consists of companies that have issued bonds that are purchased by the CSPP since its inception until August 7, 2017. The second group of companies has active bonds which are eligible for the program, but are not purchased during the aforementioned period by the national Central Banks. The last group consists of non-financial companies that issue Euro bonds, but are not eligible for the programme, mostly because they do not comply with the rating criteria.

To be able to capture the difference between the three groups, multiple group dummies have been created, where E_i is a bond of company *i*:

$$Group1_i = \begin{cases} 1 & If\ E_i\ is\ included\ in\ the\ CSPP\ bought\ group \\ 0 & If\ E_i is\ included\ in\ the\ Euro\ corporate\ group \end{cases} \quad (1)$$

$$Group2_i = \begin{cases} 1 & If\ E_i\ is\ included\ in\ the\ CSPP\ eligible\ group \\ 0 & If\ E_i is\ included\ in\ the\ Euro\ corporate\ group \end{cases} \quad (2)$$

$$Group3_i = \begin{cases} 1 & If\ E_i\ is\ included\ in\ the\ CSPP\ bought\ group \\ 0 & If\ E_i is\ included\ in\ the\ CSPP\ eligible\ group \end{cases} \quad (3)$$

[9] The four credit agencies used by the ECB to determine eligibility for the programme.

A time dependent dummy is created to capture the announcement effect of the programme which equals 1 after the programme has been announced. The structure of the dataset, with bond issuance and CDS data on a daily basis, makes it possible to take the announcement date, the 10th of March 2016, as cutoff point for our analysis. For conservative reasons, the day after the announcement has been set as hurdle, where *t* equals the date:

$$Announcement_t = \begin{cases} 1 & If\ t\ \geq March\ 11, 2016 \\ 0 & If\ t\ < March\ 11, 2016 \end{cases} \quad (4)$$

To be able to perform a difference in difference (DID) regression, multiple interaction terms are constructed. A difference in difference regression is most suitable in case of a policy change which affects a part of the total sample (Conley & Taber, 2011). The DID is used to estimate the exposure of the policy change between two periods of time, first used by John Snow in 1855 and is currently one of the most regularly used tests to evaluate casual effects of policy interventions. The tests allows for differences between the groups, but filters out constant differences to determine the difference between differences (Angrist & Pischke, 2008). The basis for the DID test is the "parallel trends assumptions", which assumes an equal trend between the groups in absence of the policy change (Callaway & Sant' Anna, 2018).

$$Interaction1_{i,t} = \begin{cases} 1 & If\ group1 = 1\ \&\ Announcement_t = 1 \\ 0 & Otherwise \end{cases} \quad (5)$$

$$Interaction2_{i,t} = \begin{cases} 1 & If\ group2 = 1\ \&\ Announcement_t = 1 \\ 0 & Otherwise \end{cases} \quad (6)$$

$$Interaction3_{i,t} = \begin{cases} 1 & If\ group3 = 1\ \&\ Announcement_t = 1 \\ 0 & Otherwise \end{cases} \quad (7)$$

In order to test for fixed company effects, next to the time varying company characteristics, multiple dummies, depending on country and sector, are created. The country dummy is created on the basis of the country of incorporation of the issuing company. The sector dummy is generated using the level 1 Bloomberg Industry Classification Systems (BICS), which distinguishes between eleven different sectors[10]. The company rating has been created by taking the average bond rating of the issued bonds included in this research, following the methodology described in section 4.1.2. The corporate bond issuance market is susceptible to

[10] Communications, consumer discretionary, consumer staples, energy, financials, healthcare, industrials, materials, technology, utilities and government

seasonality and issues significantly less during the summer period and at the end of the year (Murfin & Petersen, 2014). It is for that reason that monthly dummies are included in the regression, in order to adjust for time fixed effects.

The research uses a univariate regression with the following basic regression:

$$Y = \alpha + \beta X + \varepsilon \quad (8)$$

with Y as the dependent variable, α as intercept, β represent the coefficients of the predicting variables X and ε corresponds with the error term. When including the variables used in this research, the regression looks as follows for the bond issuance regression:

$$Y = \alpha + \beta_1 \cdot Announcement + \beta_2 \cdot Group + \beta_3 \cdot Interaction + \beta X + \gamma + \delta + \varepsilon \quad (9)$$

The dependent variable differs depending on the hypothesis tested. For the bond issuance hypotheses, the dependent variable will be: log(amount issued/revenue). The bond issuance amount will be scaled by revenue to adjust for company size and the log will be taken to create a normal distribution. For the CDS hypotheses, the logarithmic function of the 2, 5 and 10 year CDS will be used. The CDS does not have to be scaled for company size, since the rates that a CDS represents, are independent of company size. The announcement, group and interaction variable refer to the variables set forth above. Variable X represents the time-varying company specific variables. The logarithms of total assets and revenue are used as proxy for company size and the leverage ratio[11] to control for the financing structure. Since the dependent variable and a number of the independent variables are log-transformed, some calculations have to be made to interpret the results in a correct manner. If the independent variable is not log-transformed, like the leverage ratio, the exponential function of the variable corresponds with the correct geometric mean. In case the independent variable has also been log-transformed, the following formula is used to calculate the geometric mean: $\beta \cdot [\log(m_2/m_1)]$. β corresponds with the coefficient and m_2/m_1 with the percentile increase of the variable (UCLA, 2018). The variables γ and δ correspond to the fixed time and company effects described above. There are no excessive variables included in the regression which enriches the regression overview. Other variables that vary over time, such as the EBITDA, cash holdings and number of employees are strongly correlated with the variables currently included.

Since both the bond issuances and CDS rates are highly correlated by company, the regressions are run while errors are being clustered by company. Via this tool, the data will be grouped by company.

[11] Debt/equity

5. Results

This section presents the empirical results. The results of the bond issuance hypotheses are discussed first, after which the CDS results will be reviewed.

5.1. Bond issuance

First of all the difference in the total amount issued, regardless of the bond currency, between the groups will be presented. Thereafter, the results will focus on the differences in the amount issued of Euro denominated bonds between the groups as a consequence of the announcement of the CSPP.

The results of the first regression are presented in table 3 below. The table shows the difference in the total amount issued between the three groups in response to the announcement of the CSPP. The dependent variable is the natural logarithmic function of amount issued divided by revenue. The first column, within every panel, provides the simplest form of the regression without taking any company or fixed time effects into account. As can be seen in panel A in table 3, the interaction dummy is highly significant. That indicates an increase in the amount issued between companies of which bonds are purchased by the ECB during the CSPP compared to companies that did not issue any eligible bonds . The interaction variable is not significant in any other panel of table 3, indicating no significant changes in the amount issued since the announcement. Since there are no time or company specific variables included in these regressions, these results should be judged carefully. In the second column of the table below, the time varying company specific variables are included in the regression. Debt/equity is included to control the leverage at company level and the logarithmic function of total assets is included to control for company size. The interaction variable of panel A loses some of its significance, but remains significant at the 90% confidence level. It is noteworthy to see that company size has a significant negative coefficient across all three panels and remains highly significant across all regressions. This shows that larger companies are less likely to issue relatively large bonds[12]. In the third column the time fixed effects are added to the regression to control for seasonality and therefore the announcement variable is dropped. As a consequence, the interaction variable in panel A becomes highly significant at the 99% confidence level as well as the interaction variable of group 3. To recap, group 3 measures the difference between the CSPP bought group and the CSPP eligible group. The regression in the fourth column controls for the firm fixed effects. Hereby the interaction variable loses its

[12] A company with a €50 billion annual revenue, is less likely to issue a bond of 50% of its revenue, than a company with €10 million annual sales.

significance across all three panels. However, in the most comprehensive regression which controls for times and firm fixed effects, the interaction effects become highly significant in panel A and C. This means that companies that issued bonds that are bought by the programme since its inception until the 7th of August 2017, see a larger increase in their amount of issued bonds compared to all other non-financial companies who issued Euro corporate bonds, irrespective of their eligibility for the programme.

Table 3: total amount issued scaled by company size

Total issuance / revenue	(1)	(2)	(3)	(4)	(5)	(1)	(2)	(3)	(4)	(5)	(1)	(2)	(3)	(4)	(5)
	Panel A: group 1					**Panel B: group 2**					**Panel C: group 3**				
Announcement	-0.347	0.087		0.139		-0.347	0.082		0.300**		0.152	0.153		0.160	
	(0.228)	(0.204)		(0.131)		(0.228)	(0.203)		(0.132)		(0.532)	(0.250)		(0.139)	
Group	-0.791	0.328	0.304			-1.702**	-0.276	-0.298			0.911	0.487	0.454		
	(0.576)	(0.249)	(0.496)			(0.709)	(0.565)	(0.561)			(0.599)	(0.298)	(0.315)		
Interaction	0.819***	0.455*	0.541***	0.328	0.458**	0.499	0.080	0.157	-0.452	-0.189	0.320	0.412	0.561***	0.343	0.492***
	(0.296)	(0.249)	(0.147)	(0.278)	(0.201)	(0.578)	(0.353)	(0.283)	(0.340)	(0.281)	(0.565)	(0.290)	(0.143)	(0.261)	(0.174)
D/E		0.003	0.003	0.002	0.002		0.001	0.001	-0.000	-0.000		-0.015***	-0.015***	-0.008	-0.008
		(0.002)	(0.002)	(0.001)	(0.001)		(0.002)	(0.002)	(0.002)	(0.001)		(0.005)	(0.005)	(0.007)	(0.007)
Log(Total assets)		-0.901***	-0.899***	-0.830***	-0.829***		-0.892***	-0.890***	-0.922***	-0.921***		-1.175***	-1.177***	-0.982***	-0.981***
		(0.120)	(0.118)	(0.039)	(0.039)		(0.120)	(0.118)	(0.050)	(0.052)		(0.094)	(0.090)	(0.078)	(0.078)
Time fixed effects	No	No	Yes	No	Yes	No	No	Yes	No	Yes	No	No	Yes	No	Yes
Firm fixed effects	No	No	No	Yes	Yes	No	No	No	Yes	Yes	No	No	No	Yes	Yes
Observations	13,255	13,236	13,236	13,236	13,236	11,950	11,931	11,931	11,931	11,931	7,853	7,853	7,853	7,853	7,853
R^2	0.016	0.307	0.308	0.603	0.603	0.070	0.360	0.361	0.663	0.662	0.042	0.403	0.405	0.526	0.527

*Table 3 presents the results of the regressions with the total amount issued, scaled by company size, as dependent variable. The interaction variable, corresponding with the difference in difference term, shows positive significant coefficients in panel A across multiple regressions. The interaction variable is not significant in panel B indicating no difference in bond issuance behavior between the CSPP eligible and Euro corporate group. After adjusting for time fixed effects, the interaction dummy becomes significant in panel C. The firm size is negative highly significant coefficients across all different regressions, meaning larger companies are less likely to issue relatively large amounts relative to their annual revenue. Standard errors are clustered at firm level. The announcement and group dummy variables are not included in the regression in case the regression is being controlled for time and firm fixed effects respectively. The 1%, 5% and 10% significance level are denoted by respectively ***, ** and *.*

Table 4 below presents the results of the regression that shows the difference between the amounts of Euro denominated bonds issued between the groups. The structure of the regression between the columns is the same as described for table 3. The dependent variable in this table is the logarithmic function of the Euro denominated amount issued divided by revenue. The interaction variable, which measures the difference in difference, becomes positive significant in panel A and C at the 99% confidence level after controlling for time and/or firm fixed effects. This means that the CSPP bought group issued more Euro denominated bonds since the announcement than the CSPP eligible and Euro corporate group. The interaction variable in panel B is positive and becomes highly significant in the third column, which controls for time fixed effects, but the interaction coefficient loses its significance after adjusting for firm fixed effects. This shows the difference in Euro denominated bond issuance behavior between the CSPP eligible and Euro corporate bond group is not very robust. In line with the previously discussed regression, the variable controlling for company size is highly significant and negative. This indicates a negative relationship between the size of the company and the bond issue size in relation to the size of the company.

It can be concluded that the announcement of the corporate sector purchase programme had a significant positive effect on the total amount of bond issues of companies whose bonds are actually bought by the programme compared to other groups of companies. The effects is even more robust for the amount of issues of Euro denominated bonds. The CSPP bought group increased their total as well as Euro denominated bond issuances compared to the CSPP eligible as well as the Euro corporate group. The CSPP eligible group seems to have increased its amount of issues of Euro denominated bonds compared to the Euro corporate group, although the results are not robust across the different regressions.

Table 4: Euro denominated amount issued scaled by company size

Euro issuance / revenue	(1)	(2)	(3)	(4)	(5)	(1)	(2)	(3)	(4)	(5)	(1)	(2)	(3)	(4)	(5)
	Panel A: group 1					**Panel B: group 2**					**Panel C: group 3**				
Announcement	0.209	0.312		-0.062		0.209	0.292		0.084		0.546***	0.465***		0.211	
	(0.457)	(0.375)		(0.231)		(0.459)	(0.390)		(0.178)		(0.208)	(0.169)		(0.184)	
Group	-1.288**	0.364	0.284			-0.858	0.127	0.040			-0.430	0.204	0.111		
	(0.653)	(0.537)	(0.465)			(0.639)	(0.612)	(0.533)			(0.449)	(0.293)	(0.284)		
Interaction	0.534	0.419	0.739***	0.930***	0.879***	0.338	0.219	0.571***	0.262	0.375*	0.197	0.261	0.726***	0.489**	0.696***
	(0.506)	(0.400)	(0.140)	(0.238)	(0.134)	(0.504)	(0.430)	(0.176)	(0.244)	(0.201)	(0.299)	(0.205)	(0.116)	(0.243)	(0.110)
D/E		0.003	0.004	0.003	0.003		0.001	0.001	0.001	0.001		-0.002	-0.004**	0.003**	0.002
		(0.005)	(0.004)	(0.003)	(0.003)		(0.002)	(0.002)	(0.002)	(0.002)		(0.002)	(0.002)	(0.001)	(0.001)
Log(Total assets)		-0.788***	-0.788***	-0.725***	-0.725***		-0.647***	-0.647***	-0.682***	-0.685***		-1.102***	-1.107***	-0.985***	-0.988***
		(0.096)	(0.095)	(0.045)	(0.047)		(0.126)	(0.124)	(0.050)	(0.051)		(0.075)	(0.074)	(0.066)	(0.065)
Time fixed effects	No	No	Yes	No	Yes	No	No	Yes	No	Yes	No	No	Yes	No	Yes
Firm fixed effects	No	No	No	Yes	Yes	No	No	No	Yes	Yes	No	No	No	Yes	Yes
Observations	4,127	4,119	4,119	4,119	4,119	2,637	2,629	2,629	2,629	2,629	2,768	2,768	2,768	2,768	2,768
R2	0.073	0.440	0.441	0.536	0.538	0.026	0.348	0.351	0.525	0.529	0.024	0.520	0.522	0.620	0.622

*Table 4 presents the regressions with the Euro denominated amount issued scaled by company size as dependent variable. The interaction dummy becomes positively highly significant after adjusting for either time of firm fixed effects. This shows an increase in Euro denominated amounts issued by companies in the CSPP bought group compared to companies included in the Euro corporate group. The interaction shows some kind of significance in the third and fifth regression, which control for time fixed effects. The interaction effect becomes highly significant again in panel C, indicating an increased Euro denominated bond issuance behavior between the CSPP bought and CSPP eligible group. Standard errors are clustered at firm level. The announcement and group dummy variables are not included in the regression in case the regression is being controlled for time and firm fixed effects respectively. The 1%, 5% and 10% significance level are denoted by respectively ***, ** and *.*

5.2. CDS

This chapter presents the results of the CDS regressions. First, the CDS with the shortest duration (two years) is discussed, followed by the five and ten year regressions.

The dependent variable in the table below is the logarithmic function of the 2 years CDS rate. The first column presents the simplest form of the regression, whereby only the announcement, group and interaction variable are included. The interaction dummy in panel A is negative and highly significant, meaning that the CDSs dropped after the announcement for the CSPP bought group compared to the Euro corporate group. In the second column, the time varying company specific variables are added. To control for company size, the logarithmic function of revenue is being used and to control for the difference in capital structure, debt over equity is used. The interaction variable remains significant in the second column of panel A. Furthermore, the company size has a significant negative relation with the 2 years CDS, meaning that larger companies have on average a lower CDS rate. The leverage variable has a significant positive coefficient across all different regressions, which could be expected since a higher leverage ratio increases the probability of default. After adding time fixed effects in column three and firm fixed effects in the fourth column and combined in the fifth column, it can be seen that the interaction dummy remains highly negatively significant, pointing at a robust effect for group 1.

The interaction dummy is much less significant in the regressions for group 2 in panel B. The dummy is positively significant in the first, third and fourth regression, indicating that the CDS rates are higher for the CSPP eligible group after the announcement than for the Euro corporate group. However, the coefficient loses its significance in the fifth column, which controls for time and company fixed effects, the most encompassing regression. The company size has a significantly negative coefficient in the second and third regression in panel C, but turns into a positively significant coefficient after controlling for firm fixed effects. Although the coefficient is only significant at the 90% confidence level and not very robust across the different regressions, it shows that larger companies have a higher CDS rate on average after controlling for time and company fixed effects. The leverage dummy loses its significance compared to panel A and B, whereas the interaction dummy becomes highly significant after controlling for firm fixed effects in the fourth and fifth column. This shows that companies included in the CSPP bought group experience on average a lower CDS rate compared to companies in the CSPP eligible group.

Table 5: 2 year CDS

2 Year CDS	(1)	(2)	(3)	(4)	(5)	(1)	(2)	(3)	(4)	(5)	(1)	(2)	(3)	(4)	(5)
	Panel A: group 1					**Panel B: group 2**					**Panel C: group 3**				
Announcement	1.523***	1.331***		-0.260*		1.523***	1.365***		-0.340**		0.324	0.664		0.218	
	(0.191)	(0.266)		(0.142)		(0.191)	(0.262)		(0.144)		(0.459)	(0.414)		(0.169)	
Group	0.197	0.361**	0.272*			0.116	0.095	-0.001			0.081	0.196	0.148		
	(0.137)	(0.140)	(0.156)			(0.153)	(0.174)	(0.187)			(0.117)	(0.131)	(0.151)		
Interaction	-1.685***	-1.441***	-0.134	-0.211	-0.465***	-1.120**	-0.501	0.877**	0.565**	0.257	-0.487	-0.803*	-0.146	-0.624***	-0.412***
	(0.214)	(0.283)	(0.120)	(0.165)	(0.090)	(0.497)	(0.464)	(0.410)	(0.283)	(0.252)	(0.470)	(0.421)	(0.100)	(0.176)	(0.078)
Log(Revenue)		-0.145**	-0.128*	0.018	0.014		-0.166**	-0.150**	-0.002	-0.006		-0.077***	-0.066**	0.056*	0.061*
		(0.060)	(0.067)	(0.037)	(0.037)		(0.067)	(0.075)	(0.041)	(0.041)		(0.026)	(0.026)	(0.031)	(0.031)
D/E		1.315***	1.513***	0.490**	0.479**		1.120***	1.316***	0.337*	0.329*		0.556	0.467	0.223	0.208
		(0.378)	(0.387)	(0.188)	(0.189)		(0.379)	(0.393)	(0.185)	(0.186)		(0.388)	(0.422)	(0.257)	(0.260)
Time fixed effects	No	No	Yes	No	Yes	No	No	Yes	No	Yes	No	No	Yes	No	Yes
Firm fixed effects	No	No	No	Yes	Yes	No	No	No	Yes	Yes	No	No	No	Yes	Yes
Observations	51,758	45,022	45,022	43,978	43,978	44,380	38,328	38,328	37,431	37,431	25,670	22,654	22,654	22,171	22,171
R2	0.108	0.187	0.1251	0.748	0.746	0.113	0.171	0.103	0.742	0.739	0.010	0.058	0.037	0.549	0.548

*Table 5 presents the results of the regression with the 2 year CDS rate as dependent variable. The interaction variable is negative significant in Panel A expect if there is solely controlled for either time of firm fixed effects. This indicates that the companies included in the CSPP bought group experienced a significant drop in their CDS rates compared to companies included in the Euro corporate group. The leverage variable is highly positive significant in panel A and B, but has no sign of significance in panel C. The interaction variable in panel B is not very robust across the different regression but shows positive significant coefficients in panel B, indicating an increased CDS rate for the CSPP eligible group compared to the Euro corporate group in reaction to the announcement. The interaction coefficient in panel C is negative highly significant for the most comprehensive regression. Standard errors are clustered at firm level. The announcement and group dummy variables are not included in the regression in case the regression is being controlled for time and firm fixed effects respectively. The 1%, 5% and 10% significance level are denoted by respectively ***, ** and *.*

Table 6 presents the regression with the 5 years CDS rate as dependent variable. The buildup of the regressions presented in panel A until to C is synonymous to table 5. The interaction variable is highly negatively significant at the 99% confidence level in all five regressions in panel A, indicating robust results. This means that the CDS rates declined for the CSPP bought group compared to the Euro corporate group as a reaction to the announcement of the CSPP. The leverage variable is also highly significant with a positive coefficient across all regressions, similar to the results for the 2 year CDS. The company size variable is significant in the second and third regression, but does not show any significant relation in the fourth and fifth regression of panel A.

The interaction variable in panel B is not significant in any of the regressions, so it can be concluded that there is no significant difference in the 5 years CDS rate after the announcement between the CSPP eligible and Euro corporate group. The leverage variable remains positively significant at the 95% confidence level. However, the company size variable is no longer significant after controlling for the firm fixed effects in the fourth and fifth regression.

Panel C presents the regression for group 3 which compares the 5 years CDS rate between the CSPP bought and the CSPP eligible group. The interaction variable is negative and highly significant, indicating a drop in CDS rates between the groups in response to the announcement on the 10th of March 2016. The leverage variables are significant in the 2nd and 3rd regression. However, the coefficient is not significant after controlling for firm fixed effects.

Table 6: 5 year CDS

5 Year CDS	(1)	(2)	(3)	(4)	(5)	(1)	(2)	(3)	(4)	(5)	(1)	(2)	(3)	(4)	(5)
	Panel A: group 1					**Panel B: group 2**					**Panel C: group 3**				
Announcement	0.017	0.010		-0.067*		0.017	0.011		-0.076*		-0.012	0.008		-0.019	
	(0.059)	(0.062)		(0.040)		(0.059)	(0.060)		(0.041)		(0.052)	(0.049)		(0.046)	
Group	-0.142	0.043	0.040			-0.109	-0.062	-0.065			-0.034	0.074	0.071		
	(0.088)	(0.098)	(0.098)			(0.109)	(0.115)	(0.115)			(0.094)	(0.097)	(0.098)		
Interaction	-0.211***	-0.187***	-0.177***	-0.171***	-0.234***	-0.029	0.019	0.030	-0.030	-0.098	-0.183***	-0.200***	-0.192***	-0.173***	-0.190***
	(0.064)	(0.069)	(0.028)	(0.054)	(0.032)	(0.079)	(0.079)	(0.049)	(0.079)	(0.062)	(0.058)	(0.055)	(0.026)	(0.053)	(0.025)
Log(Revenue)		-0.112***	-0.112***	0.036	-0.034		-0.126***	-0.126***	0.014	0.011		-0.048	-0.047	0.020	0.019
		(0.036)	(0.036)	(0.030)	(0.030)		(0.043)	(0.043)	(0.032)	(0.031)		(0.030)	(0.030)	(0.021)	(0.021)
D/E		0.776***	0.775***	0.521***	0.519***		0.556**	0.555**	0.307**	0.305**		0.614***	0.614***	0.240	0.241
		(0.221)	(0.221)	(0.153)	(0.154)		(0.228)	(0.228)	(0.148)	(0.150)		(0.225)	(0.225)	(0.168)	(0.167)
Time fixed effects	No	No	Yes	No	Yes	No	No	Yes	No	Yes	No	No	Yes	No	Yes
Firm fixed effects	No	No	No	Yes	Yes	No	No	No	Yes	Yes	No	No	No	Yes	Yes
Observations	214,180	175,329	175,329	166,983	166,983	160,832	131,505	131,505	124,788	124,788	152,940	119,824	119,824	117,767	117,767
R2	0.024	0.090	0.090	0.651	0.651	0.004	0.062	0.062	0.666	0.665	0.020	0.068	0.068	0.517	0.512

*Table 6 presents the results of the regression with the 5 year CDS rate as dependent variable. The interaction variable is positively highly significant across all regressions showing robust results. This shows the companies in the CSPP bought group decreased significantly compared to the Euro corporate group as a result of the announcement of the CSPP. The interaction dummy in panel B shows no sign of significance whereas the interaction dummy in panel C becomes negatively highly significant again. The leverage dummy is positively significant across all regression, which could be expected since the CDS is likewise an insurance. Standard errors are clustered at firm level. The announcement and group dummy variables are not included in the regression in case the regression is being controlled for time and firm fixed effects respectively. The 1%, 5% and 10% significance level are denoted by respectively ***, ** and *.*

The table below presents the results of the regression with the 10 years CDS rates as dependent variable. The coefficient of the interaction variable in panel A is significant at the 99% confidence level, after the regression controls for time fixed effects. The company size variable is significant, except for when firm fixed effects are controlled for. On the other hand, the debt dependent variable is positive and highly significant across all different regressions showing robust results. The leverage variable remains highly significant in panel B, which researches the difference between the CSPP eligible and Euro corporate group. The interaction variable does not show results as robust as the results in panel A. The variable is significant at the 95% significance level in the first and fifth regression, but does not differ significantly from zero in the other regressions. The results shown in panel C, present the difference between the CSPP bought and CSPP eligible group. The interaction effect is significantly negative in the third and fifth regression, but does not differ significantly from zero in the fourth regression, which controls for firm fixed effects but does not control for time fixed effects. The company size as well as the leverage dependent variables lose their significance after controlling for fixed company effects.

To conclude, the interaction variable in panel A across all three CDS regressions show robust negative significant coefficients. The effect is the strongest for the 5 years CDS regression, which could be due to the fact that this is the most traded type of CDS by market participants and is therefore able to capture the effects most accurately. These robust results show a significant drop in CDS rates between the CSPP bought group and the Euro corporate group. The effect in panel B across the three maturities is less clear. The interaction coefficients are significantly positive in some of the 2 years CDS regressions, but have significant negative coefficients in the most comprehensive 10 years CDS regression. There is no single evidence that the CDS rates differ between the CSPP eligible and Euro corporate group since the announcement of the CSPP. The interaction variables in panel C across all maturities, which check for differences between the CSPP bought and CSPP eligible group, present strong negative coefficients for the 2 and 5 years CDS regression. The results for the 10 years CDS are not unambiguous, but still provide highly significant results if the time fixed effects are included in the regression. Throughout all different regressions, the leverage variable shows a highly significant positive coefficient, which could be expected since CDS rates could be seen as insurance products against default. The company size variable mostly shows significantly negative coefficients in the first two regressions, but does not differ from zero significantly if the regression is being controlled for firm fixed effects.

Table 7: 10 year CDS

10 Year CDS	(1)	(2)	(3)	(4)	(5)	(1)	(2)	(3)	(4)	(5)	(1)	(2)	(3)	(4)	(5)
	Panel A: group 1					**Panel B: group 2**					**Panel C: group 3**				
Announcement	0.179	0.191		-0.065		0.179	0.195		-0.074		-0.234**	-0.155		-0.031	
	(0.179)	(0.187)		(0.068)		(0.179)	(0.187)		(0.072)		(0.118)	(0.098)		(0.049)	
Group	-0.141	-0.037	-0.062			-0.207**	-0.235**	-0.259**			0.066	0.170*	0.193*		
	(0.092)	(0.102)	(0.110)			(0.103)	(0.116)	(0.122)			(0.082)	(0.095)	(0.102)		
Interaction	-0.302*	-0.295	-0.106***	-0.077	-0.140***	-0.412*	-0.324	-0.132	-0.110	-0.178**	0.110	0.051	-0.104***	-0.088	-0.118***
	(0.181)	(0.191)	(0.031)	(0.081)	(0.031)	(0.215)	(0.219)	(0.102)	(0.130)	(0.087)	(0.122)	(0.104)	(0.029)	(0.056)	(0.025)
Log(Revenue)		-0.092**	-0.089**	0.026	0.026		-0.104**	-0.100**	0.029	0.029		-0.073**	-0.076**	-0.025	-0.026
		(0.039)	(0.039)	(0.031)	(0.031)		(0.049)	(0.050)	(0.033)	(0.033)		(0.034)	(0.035)	(0.023)	(0.023)
D/E		0.846***	0.847***	0.492***	0.497***		0.635*	0.635*	0.339**	0.347**		0.450**	0.455**	0.220	0.221
		(0.293)	(0.297)	(0.168)	(0.167)		(0.334)	(0.338)	(0.158)	(0.158)		(0.206)	(0.207)	(0.190)	(0.190)
Time fixed effects	No	No	Yes	No	Yes	No	No	Yes	No	Yes	No	No	Yes	No	Yes
Firm fixed effects	No	No	No	Yes	Yes	No	No	No	Yes	Yes	No	No	No	Yes	Yes
Observations	105,664	94,438	94,438	91,385	91,385	70,739	62,333	62,333	59,468	59,468	76,591	67,617	67,617	67,003	67,003
R2	0.025	0.101	0.097	0.647	0.647	0.033	0.091	0.086	0.699	0.699	0.019	0.078	0.075	0.550	0.549

*Table 7 presents the results of the regression with the 10 year CDS rates as dependent variable. The interaction variable shows significant coefficients, however only if the regression controls for time fixed effects. The interaction dummy only shows a significant sign in the most comprehensive regression, indicating a drop in CDS rates for the CSPP eligible group compared to the Euro corporate group. The leverage variable remains highly significant across all regressions. Standard errors are clustered at firm level. The announcement and group dummy variables are not included in the regression in case the regression is being controlled for time and firm fixed effects respectively. The 1%, 5% and 10% significance level are denoted by respectively ***, ** and *.*

6. Conclusion

Markets are already preparing for the next crisis affecting the world economy, while Europe is still recovering from the financial crisis that began 10 years ago. To restore the inflation in the European Union back towards its goal of close to, but below 2% in the medium term, the ECB implemented several measures. The ECB dropped its policy rates below 0% for the first time in its existence and adopted QE. The latest addition to the QE is the purchase of non-financial corporate bonds, CSPP. The programme is relatively new and therefore the current literature is still fairly thin. This paper researches the difference in bond issuance behavior between as well as the reaction to credit default swap (CDS) rates. Companies in the dataset are split into three different groups based on their eligibility to the programme and whether they are actually purchased. (1) Companies whose bonds are purchased by the CSPP since the start of the program until the 7th of August 2017, (2) companies that are technically eligible for the CSPP, but whose bonds are not purchased and (3) non-financial companies that have issued Euro denominated bonds, but are not eligible for the programme.

This paper shows that companies, of which bonds are purchased by the CSPP, increase their total bond issuance significantly compared to the other groups as a consequence of the announcement of the CSPP. This result becomes even more significant when looking at the Euro denominated amount issued. When looking at the total bond issuance, no significant difference between the second and third group of companies is found. Although the results are not very strong, a significant increase in Euro bond issuance for companies who are eligible for the programme compared to companies who are not eligible for the programme has been found. Across all different regressions there is a significant negative relationship between firm size and relative issuance, concluding that larger firms are less likely to issue relatively large volumes of bonds.

Regarding the CDS data, the paper finds a significant decrease in CDS rates between companies whose bonds are purchased by the ECB and the other group of companies. The effect is the strongest for the 5 years CDS rate, which is the most used maturity by the market. No unambiguous difference in CDS rates between companies that are technically eligible for the programme and companies that issue bonds who are not eligible at all, has been found. Throughout all different regressions, the leverage variables show a highly significant positive coefficient, which could be expected, since CDS rates could be seen as insurance products against default.

To conclude, the programme did succeed in easing the financing conditions for corporates, as corporate yields dropped and companies issued significantly more bonds. However to determine whether the programme helped the ECB in reaching its inflation target, further research needs to be done. When the newly issued bonds are solely used to repay existing more expensive debt, this won't directly help increase the economic activity. Furthermore, it is unclear whether the ECB granted an unfair advantage to larger corporates that are able to issue eligible bonds compared to smaller companies that already face tighter financing conditions that are not able to issue eligible bonds.

7. Shortcomings & Recommendations

Based on the robustness of the results, recommendations for further research have been created. This research used many historical data points going back to the start of 2010. Although it is an ongoing discussion how long one should go back in time, a significant volume of data points does strengthen the regression. However, it could also lead to distorted results due to other decisive events like crises. Although during the historical period used in this paper, no major shocks have been registered, follow on research could reduce the historical period to isolate the announcement of the programme in an extended way and check the robustness of the results. Moreover, this research solely focused on the amount issued regarding the bond issuance behavior. Follow-up research could provide additions to the existing literature by looking at the number of bonds issued, regardless of the size.

Since the CSPP is relatively new and similar programmes in which Central Banks purchase corporate bonds have not seen widespread implementation until now, it provides a fertile soil for further research of which some topics will be discussed below.

Further research could look at the market reaction on corporate bond yields as a result of the announcement of the programme. Prior research showed the Italian and German corporate bond yields dropped significant at the announcement date and the day after. Using a high frequency event study on the yield to maturity of corporate bonds, could investigate whether a new market segmentation has been generated. The yield to maturity is the total expected return when the bond is held until maturity.

Another opportunity for research arises from the increasing market involvement of the ECB. As can be seen in this paper, the average holding per ISIN by the ECB was €22 million at the start of the programme and has increased to over €100 million per ISIN on average in the summer of 2017. The national Central Banks purchase bonds at their discretion as long as they comply with the set out eligibility criteria. The ECB has frequently acquired a set of bonds issued by a specific company, but decided not to acquire all eligible bonds of this company. This could create dispersion between the yield curves, even though the bonds give equal rights on the underlying assets of the issuing company. To compare the yield curves from the same company, bond characteristics like remaining duration should be taken into account.

Regarding the CDS hypothesis, this research has shown that CSPP is changing the price of credit insurance in a way that is unlikely driven by a change in the credit-worthiness of the issuing companies. Ultimately, it would be interesting to investigate which part of the delta in bond yield, is explained by the delta of CDS rates.

Finally, an interesting topic of research, is the difference in long term investment decisions, although this may require more time to see the full effect. The goal of the CSPP is to relax the financing conditions of the real economy and in doing so return the inflation rates to close to 2%. If the eligible companies use the lower cost bond financing to repay existing more expensive debt, the only way the programme could contribute to the goal of the ECB is, when banks start providing loans to non-eligible companies. Another possibility is that eligible companies use these lower cost financing conditions, to make long term investments or incorporate an active M&A strategy to accelerate growth which leads to increased economic activity.

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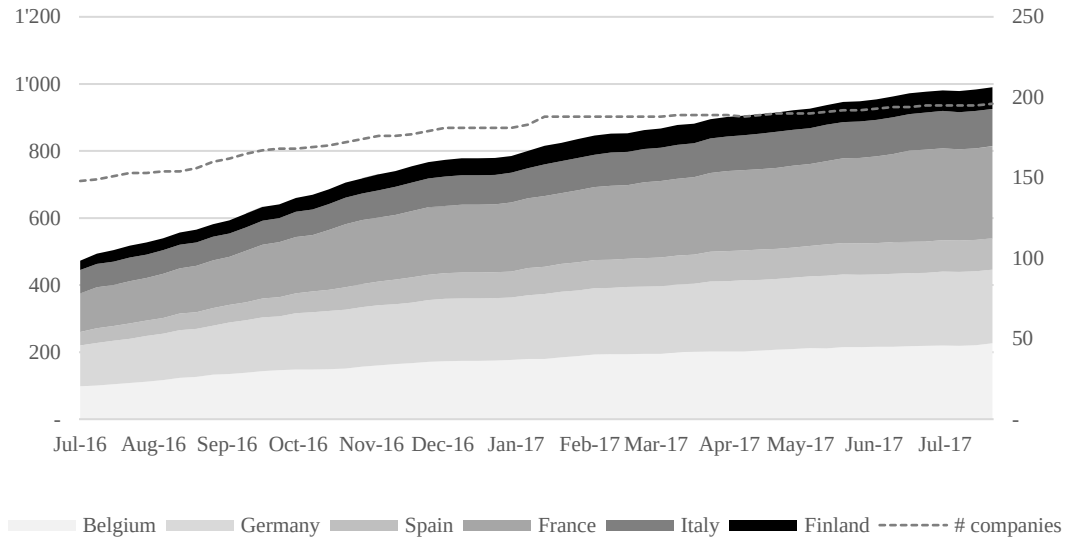
Appendix

Appendix 1: geographical allocation by national Central Bank

National central bank	Geographic location
National Bank of Belgium	BE, CY, GR, LU, MT, PT, NL[1], SI and SK
Deutsche Bundesbank	DE and NL[2]
Bank of Spain	ES and NL[3]
Bank of France	AT, EE, FI, IE, LT and LV
Bank of Italy	FR
Bank of Finland	IT and NL[4]

1: Includes bonds of issuers with NL as residence country and a country of risk other than DE, ES and IT
2: Includes bonds of issuers with NL as residence country and DE as country of risk
3: Includes bonds of issuers with NL as residence country and ES as country of risk
4: Includes bonds of issuers with NL as residence country and ES as country of risk

Appendix 2: weekly number of unique ISINs and number of issuing companies



The figure above shows the data from the weekly hand collected information regarding the number of unique ISINs purchased under the CSPP by every participating NCB. The total value of the program was only published on a consolidated basis. The dotted line represents the number of unique issuing companies. As can be seen, the number of unique ISINs grows stronger than the number of companies. This indicates a preference of the NCB for certain companies.

Appendix 3: Bloomberg search criteria CSPP eligible and Euro corporate group

Field	Inclusion	Specification
Security status	Include	Bonds: all
Currency	Include	Euro currency
BICS Classification	Exclude [match any]	Government Local or Central Bank or Winding Up Agencies or Government Development Banks or Supranationals or Government Regional or Government Agencies or Sovereigns or Financial Services or Diversified Banks or Consumer Finance or Commercial Finance or Banks
Issuer Name	Include	Deutsche Bahn AG (DBHNGR), Deutsche Boerse Finance S.A. (DBFIN), Deutsche Boerse AG (DBOERS), Eandis System Operator SCRL (GEDISC), Regie Autonome des Transports Parisiens (RATPFP), Robert Bosch Investment Nederland BV (RBOSGR), SNCF Mobilites Group (SNCF), Telekom Finanzmanagement GmbH (TKAAV), SA de Gestion de Stocks de Securite (SAGESS), Orange SA (ORAFP) (current and subs)
Issue Date	Include	Since 01-01-2009
Is Covered	..	No
Is Convertible	..	No

The table above shows the Bloomberg search criteria used to determine the Euro corporate group, which is also the basis of the CSPP eligible group.

Appendix 4: company data

Company data	CSPP purchases		CSPP eligible		Euro corporate	
	n	%	n	%	n	%
Sector						
Financials	37	18.9%	27	23.5%	272	19.6%
Consumer Discretionary	23	11.7%	12	10.4%	272	19.6%
Industrials	27	13.8%	22	19.1%	220	15.8%
Materials	13	6.6%	6	5.2%	130	9.4%
Consumer Staples	13	6.6%	7	6.1%	115	8.3%
Other	81	41.3%	41	35.7%	352	25.3%
Unknown	2	1.0%	0	0.0%	29	2.1%
Total	**196**	**100.0%**	**115**	**100.0%**	**1390**	**100.0%**
Currency						
Germany	38	19.4%	5	4.3%	186	13.4%
Italy	16	8.2%	4	3.5%	194	14.0%
France	47	24.0%	8	7.0%	151	10.9%
United States	8	4.1%	5	4.3%	144	10.4%
Britain	4	2.0%	30	26.1%	62	4.5%
Other	82	41.8%	63	54.8%	651	46.8%
Unknown	1	0.5%	0	0.0%	2	0.1%
Total	**196**	**100.0%**	**115**	**100.0%**	**1390**	**100.0%**

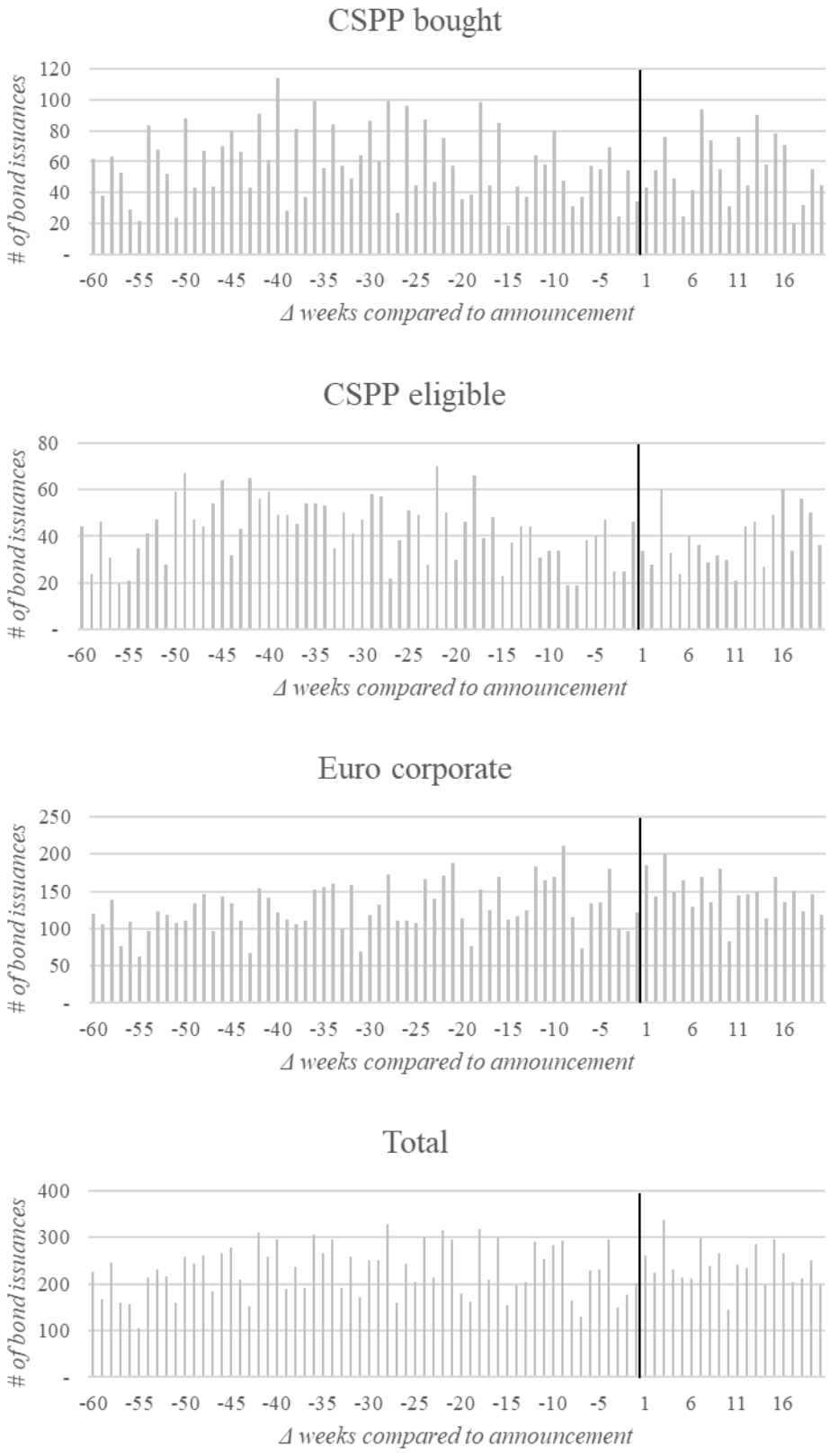
The table above shows the company data between the three different groups. The CSPP purchases seems underweight on financials and industrials compared to the CSPP eligible group. Whereas the CSPP purchases group is overweight in companies situated in Germany and France and underweight in companies situated in Britain.

Appendix 5: Bond data

Bond data	CSPP purchases		CSPP eligible		Euro corporate	
	n	%	n	%	n	%
Coupon						
x≤1.5%	1922	31.0%	1255	26.6%	1843	13.3%
1.5%<x≥3.0%	1647	26.5%	1280	27.1%	2746	19.9%
3.0%<x≥4.5%	1166	18.8%	1231	26.1%	2924	21.1%
x>4.5%	1282	20.7%	811	17.2%	5562	40.2%
Unknown	190	3.1%	146	3.1%	756	5.5%
Total	**6207**	**100.0%**	**4723**	**100.0%**	**13831**	**100.0%**
Currency						
EUR	2994	48.2%	1184	25.1%	3599	26.0%
USD	1220	19.7%	1995	42.2%	4060	29.4%
KRW	103	1.7%	0	0.0%	1388	10.0%
CNY	52	0.8%	16	0.3%	1069	7.7%
GBP	204	3.3%	196	4.1%	265	1.9%
Other	1461	23.5%	1230	26.0%	2708	19.6%
Unknown	173	2.8%	102	2.2%	742	5.4%
Total	**6207**	**100.0%**	**4723**	**100.0%**	**13831**	**100.0%**
S&P Rating						
Investment grade	2365	38.1%	2015	42.7%	4164	30.1%
Non-investment grade	118	1.9%	67	1.4%	1403	10.1%
Not rated	1721	27.7%	799	16.9%	447	3.2%
Unknown	2003	32.3%	1842	39.0%	7817	56.5%
Total	**6207**	**100.0%**	**4723**	**100.0%**	**13831**	**100.0%**

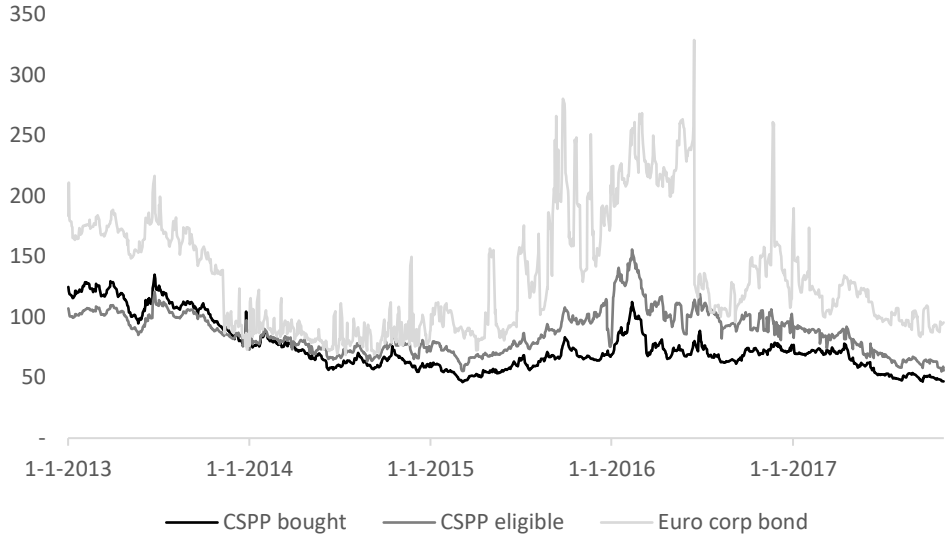
The table above shows the general bond data between the groups. The coupon between the CSPP bought and CSPP eligible seems relatively equal, although the percentage of bonds with a coupon <1.5 is high in the CSPP purchases group. The percentage of Euro denominated bonds issued by CSPP purchases group is significantly higher than the CSPP eligible and Euro corporate group. The percentage of investment grade bonds is slightly higher in the CSPP eligible group compared to the CSPP purchases group.

Appendix 6: Number of bond issuances



The figures above show the weekly number of bonds issued relative to the announcement. Number -10 on the X-axis corresponds with the week, 10 weeks before the announcement.

Appendix 7: 5 year CDS



The graph above shows the 5 year CDS between the three groups. The 5 year CDS is the most commonly used by market participants. The graphs shows, the CSPP bought & CSPP eligible groups move allegedly reasonably stable relative to each other, although the CSPP bought group has on average a slightly lower CDS since 2014 than the CSPP eligible group.

Appendix 8: harmonized rating scale

DBRS	Moody's	S&P	Fitch	Ranking
AAAu	Aaa	AAA	AAA	10
AAH	Aa1	AA+	AA+	9
AA	Aa2	AA	AA	8
AAL	Aa3	AA-	AA-	7
AH	A1	A+	A+	6
A	A2	A	A	5
AL	A3	A-	A-	4
BBBH	Baa1	BBB+	BBB+	3
BBB	Baa2	BBB	BBB	2
BBBL	Baa3	BBB-	BBB-	1
BBH	Ba1	BB+	BB+	0
BB	Ba2	BB	BB	-1
BBL	Ba3	BB-	BB-	-2
CCCH	B1	B+	B+	-3
CCC	B2	B	B	-4
CCCL	B3	B-	B-	-5
CCH	Caa1	CCC+	CCC+	-6

The table above shows the rating scale by the different rating agencies from 10 until -6 corresponding with the highest until the lowest rating. The dotted line shows the market perceived High Yield.