

QUANTIFY THE CORPORATE SECTOR PURCHASE PROGRAM: IMPACT OF THE
CAPITAL STRUCTURE CHANNEL OF MONETARY POLICY APPLIED TO TARGET
SELECTION

*A thesis
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submitted by

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(August 13, 2020)**

The views stated in this thesis are those of the author and not necessarily those of the supervisor,
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Candidate's Declaration

I hereby declare that the work presented in the thesis entitled "**Quantify the Corporate Sector Purchase Program: Impact of the capital structure channel of monetary policy applied to target selection**" in fulfillment of the requirements for the award of the Degree of **Master of Science** and submitted in the Department of Erasmus School of Economics of the Erasmus University Rotterdam is an authentic record of my own work carried out during a period from February 2020 to July 2020 under the supervision of **MSc R. Spigt**, Department of Erasmus School of Economics, Erasmus University Rotterdam.

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This is to certify that the above statement made by the candidate is true to the best of our knowledge and belief.

Place: Rotterdam
Date: August 13. 2020

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Dedicated to my family, friends, and supervisor

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Sometimes you cannot stipulate the roads you walk, but by walking through the bumps and cavities of the roads you will become familiar with the destinations of the roads

(M.T. Joeman)

ABSTRACT

On March 10, 2016 the European Central Bank announced the Corporate Sector Purchase Program. The European Central Bank purchases investment grade euro denominated bonds issued by non-financial corporations established in the eurozone under the Corporate Sector Purchase Program. The purpose of the CSPP is to lower financing costs for non-financial corporations and to stimulate the real economy by more investment and employment. The main question is if the firms use the proceeds to invest in real growth projects. In this study I examine the effect of the Corporate Sector Purchase Program on the financing decisions and investment behavior of firms. The results show that eligible firms significantly increase their investments in conjunction with an increase in profitability. Moreover, targeted firms significantly increase their bond debt after the CSPP announcement relative to non-targeted firms. Further, I find no evidence that both eligible firms and targeted firms increase their cash holdings or distribute more dividends to their shareholders after the CSPP announcement. The results are robust between different groups and compared to other Quantitative Easing programs.

Keywords: ECB, QE, CSPP, unconventional monetary policy, real effects, bond debt

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List of Acronyms/Abbreviations

ABSPP	Asset-Backed Securities Purchase Program
APPs	Asset Purchase programs
Bps	basis points
CSSP	Corporate Sector Purchase Program
DiD	Difference in difference
EBA	European Banking Authority
ECB	European Central Bank
Fed	Federal Reserve
HICP	Harmonized Index of Consumer Prices
ITT	Intention to threat
LTROs	Long-Term Refinancing Operations
LSAP	Large-Scale Asset Purchases
MEP	maturity extension program
MBS	Mortgage-Backed Securities
NCBS	National Central Banks
NFCs	Non-Financial Corporations
OMT	Outright Monetary Transactions
PSPP	public sector purchase program
TFEU	Treaty on the Functioning of the European Union
TLTROs	Targeted Longer-Term Refinancing Operations
SIC	Standard Industrial Classification
QE	Quantitative Easing
SMEs	small and medium-sized enterprises
3CBPP	Third Covered Bond Purchase Program

Chapter 1

Introduction

1.1 Introduction

In the aftermath of the Global Financial Crisis and the European Sovereign Debt Crisis the eurozone experienced a period of low growth and inflation. Mario Draghi turned the bazooka of the European Central Bank (hereafter: ECB) on with the famous words: 'whatever it takes'. Since the summer of 2009, the ECB has initiated a series of both conventional and unconventional monetary policy actions to challenge these difficulties (Daetz et al., 2016). As part of the conventional monetary policy measures, the ECB dropped its policy rates below zero for the first time since its inception. After implementing various non-standard monetary policy measures, the ECB started a series of quantitative easing (hereafter: QE) programs in 2015 in line with the monetary policies of major Central Banks such as the Federal Reserve, Bank of Japan and Bank of England. In the first stage QE consisted of €60 billion monthly asset purchases in order to maintain the inflation rate below, but close to 2% over the medium term (ECB, 2016a). The scale and scope of this program demonstrate the meaning of the famous words of ECB President Mario Draghi on the 26th of July 2012: 'whatever it takes' (Hodson, 2013).

The ECB has introduced the unconventional policy measures to stimulate the economy, providing markets with extra liquidity and converging inflation towards the ECB target inflation rate (Dunne et al., 2015). The ECB announced in 2012 to start purchasing securities directly, thereafter the ECB introduced several Asset Purchase programs (hereafter: APPs) (Galema & Lugo, 2019). The APPs allow the ECB to purchase government bonds under the Public Sector Purchase Program (hereafter: PSPP), asset-backed securities under the Asset-Backed Securities Purchase Program (hereafter: ABSPP) and third covered bonds under the Third Covered Bond Purchase Program (hereafter: CBPP3).

However, the initial APPs had not the desired effect on the economy. The first stage has led to a reduction in market rates, but limited credit access for 'non-financial' firms (Koijen et al., 2016). The initial APPs had limited pass through of the monetary policy, because the initial APPs mainly targeted government bonds, which had limited impact on corporate debt yields (Galema & Lugo, 2019). The ECB introduced the Corporate Sector Purchase Program (hereafter: CSPP) on the 10th of March 2016 as part of APPs. The ECB purchases directly and indirectly investment grade euro denominated bonds issued

by non-financial corporations established in the eurozone under the CSPP. The CSPP is fairly unique in comparison to the previous APPs, because this is the first program under which the ECB acquires non-financial corporate bonds.

The initial APPs had limited pass-through on the economy, because corporate bonds are characterized by relatively higher credit risk in comparison to government bonds (Greenwood & Vayanos, 2014), therefore corporate bonds are imperfect substitutes for e.g. government bonds. This caused a limited effect of the APPs via the 'portfolio rebalancing' channel (Tobin, 1969). Furthermore, after the banks sold the securities to the ECB, the banks used the proceeds to recapitalize due to more stringent capital requirements (Demertzis & Wolff, 2016; Joyce & Spaltro, 2014), rather than using the proceeds to empower the capital markets. The limited pass-through of the monetary policy is also due to the fact that the ECB purchased the majority of securities under the initial APPs from foreign investors, instead of credit institutions. This implies limited pass-through of liquidity to the banking system (Kojien et al., 2017). Hence, the first stage has not resulted in a significant reduction in credit premia for non-financial firms and the injected liquidity of the ECB has not caused a proportional increase in lending by banks to non-financial firms (Galema & Lugo, 2019).

The ECB has introduced the CSPP to confront these negative results. The aim of the CSPP was to stimulate the real economy and directly lowering the costs and improving the availability of market-based funding for non-financial corporations. Moreover, the CSPP was also constructed to benefit smaller companies. More bond funding for large companies by the ECB, leaves more space on banks' balance sheets for providing loans to small and medium-sized enterprises (hereafter: SMEs) (ECB, 2016b). The ECB decided on March 10, 2016 to expand the APPs from 60 to 80 billion euros per month, with the intention to continue the APP to at least March 2017. Further information on the CSPP was announced on April 21, 2016 and the first purchases were executed on June 8, 2016.

Currently existing literature shows that the increase in corporate liquidity was not employed in a productive manner, as corporations did not subsequently increase their investments or employment (Daetz et al., 2016). Recent research finds evidence that non-financial corporations in the eurozone issued more long-term debt and hoarded more cash following the ECB liquidity injections. Todorov (2020) and Grosse-Rueschkamp et al. (2019) demonstrate that eligible firms use this opportunity to issue more bonds. More interestingly, the proceeds of the bond issuance are frequently used for dividend payments to shareholders. The CSPP has stimulated firms to alter their financing decisions and investment behavior. The main question behind the CSPP is if the CSPP stimulates the real economy or do shareholders only benefit from the CSPP. This research considers an in-depth examination of the CSPP, based on the following research question: *What is the effect of the CSPP on firms' financing decisions and investment behavior?*

One of the aims of the CSPP is to decrease financing costs for non-financial firms. The CSPP leads to a direct exogenous shock in the demand for eligible bonds (Galema & Lugo, 2019; Greenwood et al., 2010; Vayanos & Vila, 2009), which affects the price of corporate bonds if the demand is not perfect elastic, e.g. due to market segmentation (D’Amico & King, 2013). Secondly, the financial constraints of non-targeted firms could be relaxed by the CSPP because targeted firms use less bank debt (Arce et al., 2018). Therefore, non-targeted firms increase their bank debt after the CSPP. Thirdly, the CSPP could lead to a decrease in yields via the scarcity channel, when targeted-firms issue more bonds (Krishnamurthy & Vissing-Jorgensen, 2013). To determine the effect of the CSPP on the financing decisions of firms, I examine the bond debt, term loans, bank debt and liabilities of firms.

The ECB also intended to stimulate the real economy with the CSPP. An improvement of the real economy can be attained if the corporations use the proceeds to increase investment and employment. However, Todorov (2020) and Galema & Lugo (2019) show that eligible firms use the proceeds to fund dividend distributions to shareholders. Daetz et al. (2016) find evidence that employment and investment did not increase after the CSPP. To determine the effect of the CSPP, I examine the asset growth, working capital, EBI, cash holdings, CapEx, invested capital, PPE and dividends of firms.

The results show that the share of bond debt to total debt increases with about 4.4 pp for targeted firms when the bonds are actually purchased by the CSPP NCBs relative to non-targeted firms. Furthermore, I find evidence that the ratio invested capital to assets increases for eligible firms by approximately 5.0 pp relative to non-eligible firms post CSPP announcement.

Besides, the effect of the CSPP on eligible firms, I also examine the effect on targeted firms. Targeted firms are firms whose bonds are actually purchased by the CSPP and directly benefit from the CSPP. Secondly, I determine the eligible firms based on the actual criteria of the ECB, instead of a scientific approach. Thirdly, I incorporate a broader time-horizon to analyse the effects of the CSPP, because in general investment decisions are based on long term expectations. Todorov (2020) and Grosse-Rueschkamp et al. (2019) show that eligible firms increase their dividend distributions to shareholders after the CSPP. Smith Jr & Watts (1992) empirical finding shows that firms with more assets in place and poor investment opportunities have higher dividend payout ratios. In this study I consider if this effect holds for eligible and targeted firms (Bates et al., 2009; Ferrando et al., 2019; Jensen, 1986).

Lastly, the results contribute to evaluate the effectiveness of the monetary policy of the ECB. During, recent developments regarding the Coronavirus-outbreak, the resistance regarding the monetary policy of the ECB increased. Germany’s constitutional court expressed her disapproval for side-effects of the monetary policy of the ECB (Economist,

2020). Furthermore, various authors expressed their disapproval regarding the monetary policy of the ECB (Trouw, 2020).

Will the created money ends up on the intended places and if this is the case, what will be the effect on the real economy. Does the monetary policy of the ECB stimulate the real economy and is the effect desirable? Does the monetary policy affect the investment behavior in a way that stimulates the real economy or take the firms this opportunity to expand their cash savings for difficult periods (Bates et al., 2009)? This research focuses on the impact and effectiveness of the CSPP and therefore the effectiveness of the monetary policy of the ECB. The findings could contribute to the decision-making process regarding the monetary policy of the ECB.

The thesis will be structured as follow: Chapter 2 describes the CSPP, focusing on the targets of the CSPP, but also considers the eligibility criteria under which eligible bonds are purchased by the ECB. Thereafter, Chapter 3 presents the literature review, in this chapter the existing literature relating to the CSPP is discussed. In Chapter 4 the process and steps concerning the data and data sources are described. Chapter 5 outlines the methodology followed in the analysis. In this chapter the different models and approaches are discussed. The results of the models are presented in Chapter 6. Finally, the conclusion and final remarks will be drawn in Chapter 7.

Chapter 2

Corporate Sector Purchase Program

2.1 The purpose of the Corporate Sector Purchase Program

This chapter clarifies the targets and content of the CSPP, where the purpose, scope, eligibility criteria and execution of the CSPP will be discussed. Understanding of the implementation of the CSPP is of great importance to understand the results presented in Chapter 6.

Under the CSPP the ECB directly purchases investment grade euro denominated bonds issued by non-financial corporations established in the eurozone. At the time the ECB announced the CSPP, the euro area annual Harmonized Index of Consumer Prices (hereafter: HICP) inflation was slightly negative and real GDP growth was relatively weak, with risks to the outlook tilted to the downside. To tackle this phenomenon the Governing Council decided in March 2016 to introduce a set of policy measures in pursuit of its objectives of price stability. The policy measures can be divided into four categories, namely (De Santis et al., 2018):

- i) A further reduction in key ECB interest rates, the deposit facility rate was cut by 10 basis points from -0.3% to -0.4%;
- ii) A new series of four Targeted Longer-Term Refinancing Operations (hereafter: TLTROs) started in June 2016, each one with a maturity of four years;
- iii) An increase in monthly net asset purchases under the APPs from €60 billion to €80 billion;
- iv) The CSPP.

During the recalibration meeting of the APP on October 26, 2017 the Governing Council intended to run the purchases under the APP until the Governing Council observes sustained adjustment in the path of inflation consistent with the price stability. Furthermore, the Governing Council announced that the Eurosystem anticipated that the purchase volumes under the three Private Sector Purchase Programs (ABSPP, 3CBPP, CSPP) will remain sizeable. The CSPP holdings of the ECB on June 19, 2020 were €219.240 billion, whereof €43.212 billion in the primary market and €169.293 in the

secondary market. Evaluating the volume of the CSPP, nothing is less true as Mario Draghi said on July 21, 2016:

“If warranted to achieve its objective the Governing Council will act by using all instruments available within its mandate... I would stress readiness, willingness and ability to do so.”

The ECB aimed with the comprehensive package of policy measures at exploiting the synergies between the different instruments. The ECB intends with the CSPP to stimulate businesses across the euro area to ease financing conditions, stimulate credit provision, boost investments, accelerate the return of inflation to levels close, but below 2%, create jobs and thereby support overall economic growth (De Santis et al., 2018).

2.2 The start of the Corporate Sector Purchase Program

The ECB announced the CSPP on March 10, 2016 and provided more information about the CSPP on April 21, 2016. Thereafter, the ECB provided further information regarding the CSPP on June 2, 2016. The ECB began its operations and started purchasing CSPP eligible bonds on June 8, 2016. As of January 2019, the ECB continued to reinvest the principal payments from maturing securities held in the CSPP portfolio. The initial CSPP regained life on November 1, 2019 after the ECB announced on September 12, 2019 to restart net purchases under the CSPP. In figure 2.1, I present a timeline of the important occasions regarding the CSPP.

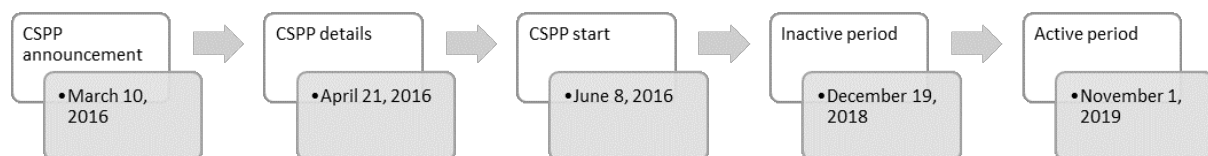


Figure 2.1: Timeline of important occasions regarding the CSPP over the period from Q1 2016 until Q4 2019

The CSPP is a decentralised purchases program of the Eurosystem, coordinated by the ECB. The term Eurosystem refers to the ECB and the National Central Banks (hereafter: NCBs) of those member states of the Eurozone. To execute the purchases of bonds under the CSPP, six NCBs have been appointed by the ECB. The six NCBs are better known under the name 'CSPP NCBs', the CSPP NCBs are the Central Banks of Belgium, Germany, Spain, Finland, France, and Italy. Each CSPP NCBs covers and is responsible for purchases in a specific market segment, these are split by jurisdictions (Overy, 2016). The following list presents the concerning CSPP NCBs and their appointed market segments:

1. Belgium: National Bank of Belgium (the NBB);
 - Belgium, Luxembourg, the Netherlands, Slovakia, Cyprus, Greece, Malta, Portugal, and Slovenia.
2. Finland: Suomen Pankki
 - Austria, Estonia, Finland, Ireland, Latvia, Lithuania.
3. France: Banque de France (the BdF);
 - France
4. Germany: Bundesbank (the BuBa);
 - Germany, the Netherlands.
5. Italy: Banca d'Italia (the BdI);
 - Italy, the Netherlands.
6. Spain: Banco de España (the BdE).
 - Spain, the Netherlands.

In Figure 2.2 we observe that most of the purchases under the CSPP are bought in France and Germany as the country of risk. If we compare these results with the contribution per Member State (see Figure 2.3), we observe that the contributions per Member State are almost identical to the CSPP purchases per country. In Figure 8.1 and Figure 8.2 the holdings under the CSPP are presented by economic sector and credit ranking. Most of the eligible bonds are purchased in the utilities, infrastructure and automotive parts sector. Moreover, the ECB purchases relatively more lower graded bonds under the CSPP, consistent with the purpose to create space on the balance sheets of banks (ECB, 2016b).

In Figure 2.3 we observe that the holdings under the APPs increase over time, where the largest part of the APPs holdings consists of holdings under the PSPP. The CSPP holdings are relatively small in comparison to the other APPs holdings. However, the absolute amount of the CSPP holdings is a significant amount of the corporate bond market. Figure 8.3 presents the purchases under the APPs, from June 2016 until December 2018 we observe purchases under the CSPP. After December 2018 till November 2019 the ECB did not purchase corporate bonds actively, but used the proceeds from the corporate bonds to reinvest. As of November 2019 the CSPP regained life. We observe that the inactive period of the CSPP in Figure 8.3 corresponds with the slope of Figure 8.3.

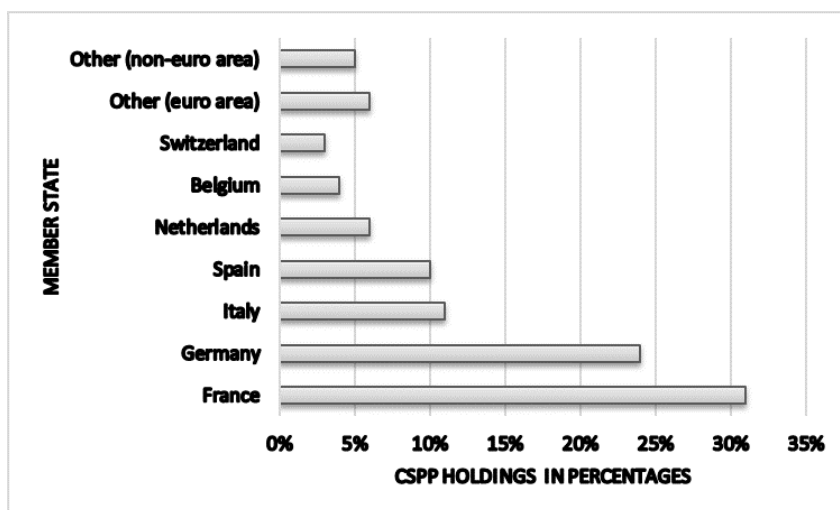


Figure 2.2: This figure presents the percentage of total holdings under the CSPP, categorised by country over the period from June 2016 till December 2018. Source: ECB (2018).

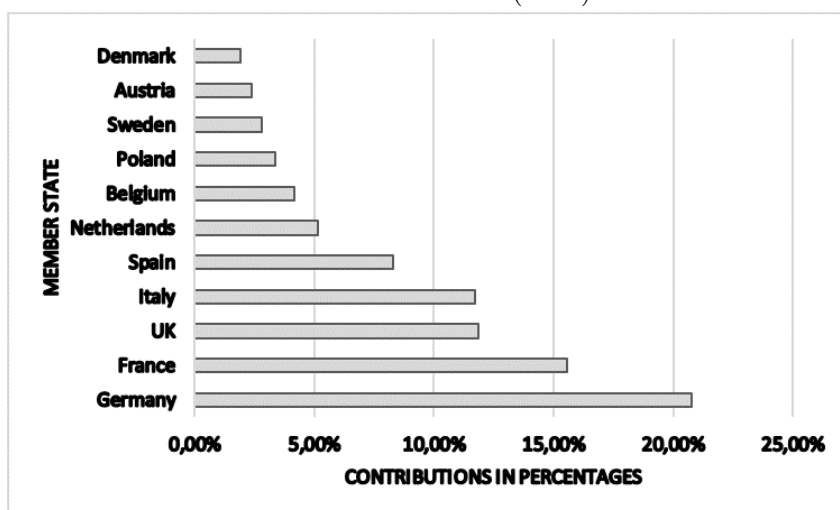


Figure 2.3: This figure presents contributions to the European Union per Member State in 2018. Source: Statista (2018).

2.3 The eligibility criteria of the CSPP

The NCB in question is responsible for purchases of corporate bonds in both primary and secondary debt capital markets. In order for a corporate bond to be purchased, certain eligibility criteria at both instrument and firm level have to be met (Grosse-Rueschkamp et al., 2019):

- i) The issuer of the bond has to be incorporated in the eurozone and itself or its ultimate parent cannot be a credit institution as meant in Article 2(14) of Guideline (EU) No 2015/510 of the ECB in conjunction with Article 4(1) of Regulation (EU) No 575/2013 of the European Parliament and of the Council, which is subject to supervision by a competent authority; or a publicly-owned credit institution within

the meaning of Article 123(2) TFEU. A credit institution is an undertaking whose business is to receive deposits or other repayable funds from the public and to grant credits for its own account, according to Article 4(1) of Directive (EU) 2006/48/EC. Secondly, investment firms are excluded from the CSPP and the issuer cannot be a public undertaking, i.e. government-sponsored enterprises;

- ii) The corporate bond must have a minimum maturity of 6 months and a maximum maturity of less than 31 years at the time of purchase. Notable is the change in maximum maturity, which was 30 years at the beginning of the program (ECB, 2016a). Possibly, would the ECB expand the bonds that are eligible for purchase. In addition, asset purchases under the program are held until the maturity and the principal is reinvested;
- iii) The issued bond has to be an investment grade bond, which corresponds with a minimum ranking of BBB-/Baa3/BBB from at least one of the four agencies Standard & Poor's, Moody's, Fitch Ratings or DBRS. If the rating agency downgrades the bond over time, the ECB is not required to sell its holdings;
- iv) The eligible bond has to be denominated in EUR and must have a yield to maturity larger than the ECB's deposit facility rate (which was -0.4% at the time of announcement);
- v) The CSPP NCBs are entitled to purchase bonds both in primary as well as in secondary markets. The purchase volume is not published ex-ante, but cumulative holdings are published ex-post;

However, beside the criteria of an eligible bond the Central Banks have to face several restrictions to consider the adverse impact of the CSPP on market liquidity (Galema & Lugo, 2019). There is no minimum issuance volume for corporate bonds to be eligible, but a maximum share limit of 70% per individual security still applies. Furthermore, a predefined limit per issuer group exists. Hence, can be concluded that a bond is eligible under the CSPP criteria if it is an investment grade euro denominated bonds issued by non-financial corporations established in the eurozone.

Moreover, the CSPP NCBs are authorized to use the corporate bonds for securities lending activity. Securities lending is an activity where the lender lends his security to the borrower in change for a compensation. The lender can require a collateral for this transaction. The security lending activity affects the availability of corporate bonds less and therefore leads to more liquidity as shown by Todorov (2020). In regard to the CSPP the CSPP NCBs are entitled to set specific rules for securities lending, apart from the rules of the Eurosystem for securities lending (Overy, 2016).

Chapter 3

Literature review

3.1 Introduction

In this chapter I review existing literature regarding the unconventional monetary policy, the transmissions channels of unconventional monetary policy that affect bonds financing and in more detail the CSPP.

3.2 Transmissions channels of unconventional monetary policy

Macroeconomics theorems argue that central bank asset purchase programs should not influence the macro-economy. In a frictionless economy central bank asset purchases would represent an allocation of assets from private investors to the central bank and therefore not influence the asset prices. Existing literature describes three main transmission channels of unconventional monetary policy through which the Central Bank is able to affect the economy (Grosse-Rueschkamp et al., 2019), the channels are *the portfolio-balance channel* (Woodford, 2012), *the signalling channel* and *the scarcity channel*.

The portfolio-balance channel consists of the following process: if the central bank holds less of certain assets and more of others, then the private investors are forced (as a requirement of equilibrium) to hold more of the former and less of the latter asset. The relative prices of the asset classes have almost always to be changed to force investors to switch from asset class under the assumption that private investors are not perfectly indifferent between the assets (Brunner & Meltzer, 1972; Gertler & Karadi, 2011; Tobin, 1958, 1969; Woodford, 2012).

Asset purchases have a narrow effect on that asset because investors such as banks are capital constrained and assets trade is a narrow and segmented market (Gertler & Karadi, 2011; He & Krishnamurthy, 2013; Vayanos & Vila, 2009). Nevertheless, spillovers are possible to the extent that an increase in asset prices reduce investors' capital constraints, which affects other asset prices or because of broader macroeconomic spillover (Demertzis & Wolff, 2016; Grosse-Rueschkamp et al., 2019). The relaxing of banks financial constraints caused by the CSPP are an example of macroeconomic spillovers. Additionally, the portfolio-balance channel of QE works largely through narrow channels that affect the prices of purchased assets with spillovers depending on particulars of the

assets and economic conditions. Asset purchase programs do not work through broad channels such as affecting the term premium on all long-term bonds.

Secondly, asset purchases of the central bank could have beneficial effects on the economy through the signalling channel. The announcement of asset purchases might be considered as a signal regarding the central banks' intentions over the path of short-term interest rates (Vissing Jorgensen & Krishnamurthy, 2011). In regard to the CSPP, an announcement of the ECB is a signal to the financial markets, which reveals some information about the future direction of quantities and prices of corporate bonds and thus have important effects on the economy.

Eggertsson & Woodford (2003) argue that non-traditional monetary policy might have a beneficial effect in lowering long-term bond yields only if such policy serves as a credible commitment by the central bank to keep interest rates low even after the economy recovers (Clouse et al., 2003). Such a commitment can be achieved when the central bank purchases a large quantity of long duration assets under QE. When the central bank increase its rates, it takes a loss on these assets. The purchases of the central bank are a credible commitment to the financial markets that the central bank will not increase its rates, to the extent that the central bank weighs such losses in its objective function (Vissing Jorgensen & Krishnamurthy, 2011).

The signalling channel affects all bond market interest rates, since lower central bank rates, via the expectation hypothesis, can be expected to affect all interest rates (Vissing Jorgensen & Krishnamurthy, 2011). Additionally, the signalling channel has a large impact in lowering intermediate maturity, with effect on 5-10 years bonds ranging from 20 to 40 basis points (hereafter: bps). Further, asset purchases cause for riskier bonds such as lower grade corporate bonds a reduction in default risk/default risk premia and a reduced prepayment risk premium.

An example of a beneficial impact on asset prices is the purchase of the mortgage-backed securities (hereafter: MBS) by the Federal Reserve (hereafter: Fed) through the scarcity channel. The risk premiums on MBS assets were particularly high due to distressed conditions in the intermediary sector feeding into illiquidity and high-risk premiums on MBS (Krishnamurthy & Vissing-Jorgensen, 2013).

After the financial conditions in the U.S. stabilized in 2011, the MBS purchases by Fed continued to have a beneficial effect in lowering the MBS yields. The Fed's purchases of a substantial amount of new issuance of MBS has led to a scarcity premium on the production coupon (e.g., MBS backed by new mortgage originations) (Krishnamurthy & Vissing-Jorgensen, 2013).

Foley-Fisher et al. (2016) show an example of the signalling channel with as finding that monetary policy could have beneficial effects on the financial constraints of firms. The maturity extension program (hereafter: MEP) of the Fed, announced on Septem-

ber 21, 2011. During, the MEP the FED sold or redeemed a total of \$ 400 billion of shorter-term Treasury securities and used the proceeds to buy longer-term Treasury securities. The purpose of the MEP was to lower long-term interest rates and ultimately the costs of longer-term credit for households and firms. Foley-Fisher et al. (2016) show that abnormal returns around the MEP's announcement were higher among firms more dependent on longer-term debt. The financial markets anticipate that the MEP would help disproportionately relax financial constraints for firms financed with long-term debt. These firms issued more long-term debt and invested more in employment and research during the MEP (Foley-Fisher et al., 2016). In contrast to the CSPP the MEP is a conventional monetary policy, however the purposes are approximately similar, namely lowering financing costs. The firms used this opportunity to issue more long-term debt.

Thirdly, the asset purchases are not beneficial in all scenarios. The Fed's purchases of long-term U.S. Treasury bonds significantly raised Treasury bonds prices, whereas the spillover effects for private sector bond yields were limited (Krishnamurthy & Vissing-Jorgensen, 2013). Treasury bonds provide high-quality collateral and a long-term extremely safe store of assets. The Fed's purchases of long-term safe assets resulted in a reduction in supply and an increase in safety premium of long-term safe bonds.

3.3 The current state of academic research in the context of CSPP

In this section I review existing literature relating to the CSPP and present the hypotheses based on the existing literature. Recent operations of the ECB as an active player in the capital market caused several changes in the capital market, this change had an effect on the firms. The CSPP has stimulated firms to alter their financing decisions and investment behavior. The research question is constructed to provide an answer on the question if the CSPP is effective in the context of stimulating the real economy, the CSPP should be the direct driver of the real economy (Galema & Lugo, 2019).

One of the aims of the CSPP is to decrease financing costs for non-financial firms. The CSPP led to a direct exogenous shock in the demand for eligible bonds (Galema & Lugo, 2019; Greenwood et al., 2010; Vayanos & Vila, 2009). In case that the demand of corporate bonds is not perfect elastic, e.g. due to market segmentation (D'Amico & King, 2013), this exogenous shock can directly affect the prices of purchased securities and thus the financing decisions of firms. Secondly, the financial constraints of non-targeted firms could be relaxed by the CSPP, because targeted firms use less bank debt (Arce et al., 2018). Therefore, non-targeted firms increase their bank debt after the CSPP. Thirdly, the CSPP could lead to a decrease in yields via the scarcity channel, when targeted firms issue more bonds (Krishnamurthy & Vissing-Jorgensen, 2013).

Abidi & Miquel-Flores (2018) show that bond yield spreads decline by around 15 bps at the announcement of the CSPP program, the effect is mostly noticeable in the sample of CSPP-eligible bonds (Zaghini, 2019). Besides, the CSPP seems to have stimulated new issuance of corporate bonds. Rischen & Theissen (2020) show that the CSPP mitigated underpricing of primary issues. Overall, the results are consistent with the explanation regarding the portfolio-balancing channel (Abidi & Miquel-Flores, 2018).

Arce et al. (2018) observe an increase in issuance of eligible bonds by Spanish firms. Secondly, due to a reduction in bank debt by eligible firms, the resident banks responded by shifting their credit offering towards other firms that do not have the same ability to issue bonds and that tend to be smaller in size (Arce et al., 2018). For each euro reduction in the outstanding debt of large companies from Spanish banks during three months after the announcement of the program, approximately 78 cents were diverted to other non-issuing firms, including small and medium-sized enterprises (hereafter: SMEs). The SMEs increased their levels of real investment significantly (Arce et al., 2018). QE was successful in boosting corporate debt issuance, firms issued €2.19 billion more in QE-eligible debt after the CSPP announcement, compared to other types of debt.

Todorov (2020) and Grosse-Rueschkamp et al. (2019) demonstrate that eligible firms use this opportunity to issue more bonds. The positive spillover Grosse-Rueschkamp et al. (2019) found was that banks with a high share in eligible firms increase lending particularly to private but not public firms after introduction of the CSPP. Existing literature finds evidence that eligible firms issued more bond debt and banks switch their lending to non-eligible companies after the CSPP announcement.

Galema & Lugo (2019) introduce a time-varying dummy variable to examine the CSPP. Eligible bonds characterized by a higher level of credit risk are the target of more timely purchases by the six central banks in charge of the CSPP operations. Galema & Lugo (2019) find evidence that firms effectively targeted under the CSPP increased their relative use of market debt and the maturity of newly issued bonds more than eligible but not (yet) targeted issuers. Galema & Lugo (2019) show that the effect of the CSPP is more pronounced for targeted firms in comparison to eligible firms. Therefore, I draw the following hypotheses in regard to the financing decisions.

Hypothesis 1 (H1) *Eligible firms respond to the favourable credit conditions created by the CSPP, by moderately increasing bond debt.*

Hypothesis 2 (H2) *Targeted firms respond to the favourable credit conditions created by the CSPP, by significantly increasing bond debt.*

Hypothesis 3 (H3) *Eligible firms respond to the favourable credit conditions created by the CSPP, by significantly increasing liabilities.*

Hypothesis 4 (H4) *Targeted firms respond to the favourable credit conditions created by the CSPP, by significantly increasing liabilities.*

Besides the intention of the ECB to decrease financing costs for non-financial firms, the ECB also intended to stimulate the real economy with the CSPP. An improvement of the real economy can be attained if the corporations use the proceeds to increase investment and employment. However, firms used the attracted funds mostly to increase dividends to the shareholders. These effects were more pronounced for longer-maturity, lower-rated bonds and for more credit-constrained, lower-rated firms (Todorov, 2020).

In this study I examine the effect of the CSPP on investment behavior of firms on both eligible and targeted firms. Research on investment behavior of targeted firms has not been carried out. However, I expect that targeted firms will behave in the same manner as eligible firms while considering the effect of the CSPP. Therefore, I draw the following hypotheses in regard to the investment behavior of firms:

Hypothesis 5 (H5) *Eligible firms and targeted firms will exploit temporarily favourable credit conditions, by significantly distributing more dividends to shareholders.*

Hypothesis 6 (H6) *Targeted firms will exploit temporarily favourable credit conditions, by significantly distributing more dividends to shareholders.*

Moreover, Grosse-Rueschkamp et al. (2019) have enriched the current knowledge with the finding that eligible firms with lower credit quality changed the composition of credit from bank-based to market-based funding, without affecting the investment decisions. High credit quality firms increase payouts to shareholders and acquisition activity. In turn, mergers announced by eligible firms after the introduction of the CSPP have lower announcement returns. Therefore I draw the following hypotheses:

Hypothesis 7 (H7) *Eligible firms will significantly increase their cash holdings after the CSPP.*

Hypothesis 8 (H8) *Targeted firms will significantly increase their cash holdings after the CSPP.*

Hypothesis 9 (H9) *Eligible firms and will not significantly increase their invested capital after the CSPP.*

Hypothesis 10 (H10) *Targeted firms will not significantly increase their invested capital after the CSPP.*

All in all, the current research focuses on the channels of asset purchases. Recently, more research has been carried out on the impact of the asset purchases by the central

bank on firms. The majority of this research has been carried out abroad and not in Europe. Furthermore, in relation to the effect of the CSPP program on firms' financing behavior and investment decisions, less research has been carried out. Nevertheless, the research regarding the CSPP was important and valuable for the current state, but on certain points less reliable or restricted.

Chapter 4

Data

4.1 The data

In this chapter I discuss the data collection process, the relevance of the variables and the descriptive statistics. This study examines the effect of the CSPP based on two samples, namely (1) eligible firms in comparison to non-eligible firms and (2) targeted firms in comparison to non-targeted firms. Eligible firms are firms that meet the eligible criteria of the CSPP. The targeted firms are firms whose bonds are actually purchased by the ECB under the CSPP, whereas non-targeted firms are firms whose bonds are not (yet) purchased by the ECB. Firstly, I discuss the collection process of all issued bonds in Section 4.1.1, in Section 4.1.2 I clarify the collection process of the firms' financials and in Section 4.1.3 I discuss the collection process of the actually purchased bonds by the CSPP NCBs.

4.1.1 The data collection of the issued bonds

One of the aims of this data collection process is to preserve an unbiased data set to estimate the effect of the CSPP on both eligible firms and targeted firms. However, the data set has to be relevant and reliable. Therefore, I partially collect the issued bonds based on the eligibility criteria, eligible bonds are investment grade euro denominated bonds issued by non-financial corporations established in the eurozone.

Firstly, I collect all investment grade and high yield bonds from Thomson One, the data set consists of in total 463,468 issued bonds. Secondly, I retain the bonds that are issued in the period from January 1, 2013 until December 31, 2018. The time-horizon is determined from January 1, 2013 until December 31, 2018, because the real economy of Europe recovered in 2013 after the previous Credit Crisis and Sovereign Debt Crisis Hoque (2013). Moreover, I determine December 31, 2018 as end date, because the first part of the active CSPP ended on December 19, 2018. Further, I do not incorporate the second active period of the CSPP in this research, because the announcement of September 12, 2019 is too short to draw valuable conclusions. Thirdly, I maintain the bonds of firms incorporated in the eurozone, the data set consists of in total 11,299 issued bonds. In contrast to existing literature I exclude the credit institutions based the juridical meaning of a credit institution as mentioned in Article 4(1) of Directive (EU)

2006/48/EC in conjunction with the register of credit institutions published by the EBA (hereafter: European Banking Authority), the data set consists of in total 4428 issued bonds.

Finally, I retain the bonds with a maturity of 6 months till 31 years on the current moment, which are denominated in euro, the data set consists of in total 2954 issued bonds. Hence, the bonds are distilled based on the eligibility criteria of of the ECB, except the investment grade bond criteria. The investment grade bond criteria is not applied because I divide the sub-samples based on this criteria.

4.1.2 The data collection process of firms' financials

To estimate the effect of the CSPP on firms' financing decisions and investment behavior, I collect the firms' financials based on the collected bonds in Section 4.1.1. The financials consist of different variables, e.g. asset and debt journal entries.

For this purpose I construct a framework to identify the relevant companies that issued the bonds. For example, on various occasions the concern uses a financing vehicle to issue the bond. In this scenario I assume that the bond issuance will have an effect on the ultimate parent company and not on the financing vehicle. Accordingly, I use the identifier of the ultimate parent company to estimate the effect of the CSPP.

Based on the identifiers, I collect the journal entries Preferred bonds, Subordinated bonds, Term loans, Bank debt and Liabilities as yearly data over the period from January 1, 2012 until December 31, 2018 from Capital IQ, this data source is an extensive source regarding the debt structure of firms. Secondly, I assemble the financial indicators: Asset growth, Working capital, EBI, Cash, CapEx, Invested capital, PPE and Assets over the period from January 1, 2012 until December 31, 2018 from Compustat Global. Noteworthy, I collect the yearly data of 2012 to calculate the change in 2013.

The data set consists of yearly data instead of quarterly data, because a significant group of the eurozone firms only provide (semi-)annual financial statements. As a result the research could be biased if the firms with only quarterly data are included, therefore I use annual data to retain balanced samples. In existing literature this problem is counteracted by replacing the missing values with data of the previous quarters (Grosse-Rueschkamp et al., 2019). However, this could result in biased coefficients and affect the impact of the CSPP on firms' financing decisions and investment behavior.

Further, I collect relevant data about the firms such as control variables and time fixed effect variables. First of all, I collect the price to earnings ratio, the price to book ratio and the dividends per share from Orbis. Subsequently, I collect the market to book ratio of the firms, the composite ask price, composite bid price and mid-price of the bonds from Bloomberg. The pricing data is used to calculate the bid-ask spread of the bonds. The firms' time-invariant characteristics have been assembled from Bureau van Dijk.

To determine the eligible firms and non-eligible firms, I collect the credit ratings of the issued bonds. Therefore, I collect the credit ratings from Bloomberg, Datastream, Thomson One and Mergent based on the credit ratings of the rating agencies Standard & Poor's and Moody's. The credit ranking was in comparison to the firms' financials not available for all firms. The most reasonable explanation for this observation is that some bonds simply do not have a credit ranking. This could influence the results, because the separation between eligible firms and non eligible firms is not optimal. All in all, after excluding the firms with missing key variables, the data set includes 330 unique eurozone firms.

4.1.3 The data collection process of purchased bonds by the CSPP NCBs

The value of this research is that I do not only focus on eligible firms, but also examine the effect of the CSPP on targeted firms. The targeted firms are an unique group, because their bonds are actually purchased by the CSPP NCBs. Therefore, this group directly benefits from the CSPP and might alter its behavior in a different way in comparison to eligible firms. To examine this effect, I manually collect the purchased bonds by the CSPP NCBs over the period from June 8, 2016 until December 31, 2018, the data collection process is structured as follows. The CSPP NCBs have started purchasing eligible bonds from June 8, 2016 onwards, the ECB publishes weekly disclosures of purchased holdings and makes these holdings available for securities lending transactions. Although, during the first years each CSPP NCB published each week a list with the ISIN numbers of the purchased bonds under the CSPP. The format of these lists differ among the CSPP NCBs, for example Banque de France only published a PFD format and Bundesbank a CSV file. In regard to the published lists of the Banque de France each ISIN number of the bonds has been collected by hand.

Besides, I collect and merge the remaining ISIN numbers of the bonds via an advanced merging technology (Gaggero, 2014). This results in a data set of in total 133,548 ISIN numbers of bonds purchased by the CSPP NCBs over the period from June 8, 2016 until December 31, 2018. The most important value of this data set is that the data set includes the date of publication of the holdings, this adds value to the time-variant approach where this study depends on. Based on the issued bonds discussed in Section 4.1.1 and the purchased bonds discussed in this section, I determine the targeted firms. To do this I compare the ISIN numbers of the issued bonds with the ISIN number of the purchased bonds, while incorporating the dates of the CSPP NCBs to determine when the bonds have been purchased and held.

4.2 The variables and their added value

To estimate the effect of the CSPP I divide the variables in two groups, namely dependent variables, and independent variables. Firstly, I discuss the dependent variables, whereafter I present the control variables. The dependent variables regarding the financing decisions are the ratios Bond debt/ Debt, Term loans/ Debt, Bank debt/ Debt and Δ Liabilities/ Assets. The variable Δ Liabilities/ Assets is based on the one period lagged Assets. Further, I define Bond debt as the sum of Senior bond debt and Subordinated bond debt.

Secondly, the dependent variables regarding the investment behavior are the ratios Asset growth, Δ Working capital/ Assets, Δ EBI/ Assets, Δ Cash/ Assets, CapEx/ Assets, Invested capital/ Assets and Δ PPE/ Assets and Dividends per share. The Assets in this context are the one period lagged total assets, I use the lagged Assets to estimate the change over time and to fulfil the independence assumption (Angrist & Pischke, 2008). Noteworthy, I use the change between two periods for journal entries in contrast to profit and lost entries.

The Asset growth, Δ Working capital/ Assets and Δ EBI/ Assets indicate the state of the firm, where Working capital indicates the operational efficiency of a firm. The EBI is a suitable profitability indicator, because it is not affected by the change in financing costs between the samples. Further, I include the variables Δ Cash/ Assets, CapEx/ Assets, Invested capital/ Assets and Δ PPE/ Assets to determine where the firms invest the proceeds in. The indication of the state of the firm in combination with the variable invested capital might indicate if the firm invests in real growth projects.

The control variables to determine the firms' demand for debt are the Market to Book Ratio, Bid-Ask Spread, LnAssets and Profitability. The market to book ratio accounts for growth opportunities. Additionally, I control for bond liquidity using the bid-ask spread (Arrata & Nguyen, 2017; Chen et al., 2007; Joyce et al., 2011). The variable Bid-Ask Spread is defined as the difference between the composite ask price and the composite bid price, expressed as a percentage of the mid-price (Duffee, 1999; Huang & Huang, 2012; Longstaff et al., 2005). Lastly, firm size is measured as the natural logarithm of total assets and firm profitability is defined as EBITDA over Assets (Faulkender & Petersen, 2006).

4.3 The interpretation of the descriptive statistics

Table 4.1 reports the summary statistics of the overall group over the period from Q1 2013 until Q4 2018, distinguished between eligible firms and non-eligible firms (see Table 8.1 and 8.2). In Table 8.3 and 8.4 I present the summary statistics of targeted firms and non-targeted firms. The summary statistics reports the mean, standard deviation,

minimum, maximum, number of observations and number of firms. Table 4.1 shows that the average change in the asset growth ratio equals 8%. The average change in the leverage ratio equals 5%. The average bond debt to debt ratio equals 58%, while the average bank debt to debt ratio is 35%. Hence, the ratio of bonds debt to debt in comparison to bank debt to debt is higher in the overall group.

The average bond debt to debt ratio of targeted firms is higher compared to non-targeted firms, 67% to 51% respectively. Moreover, the average change in cash holdings to assets is lower for eligible firms relative to non-eligible firms 0.1% to 0.7%, respectively. More importantly, if we zoom in on the summary statistics of the targeted firms and non-targeted firms, we observe that the average change in leverage ratio of targeted firms is lower compared to non-targeted firms, 3% to 7% respectively. The average bond debt to debt ratio of targeted firms is higher compared to non-targeted firms, 67% to 52% respectively. Whereas, the average bank debt to debt ratio of targeted firms is lower compared to non-targeted firms, 23% to 42% respectively. Besides, we observe a lower average bid-ask spread for targeted firms compared to non-targeted firms, 3% to 7% respectively. While, the average profitability of targeted firms is higher compared to non-targeted firms, 4% to 2%, respectively. Further, the remaining variables do not contain a noteworthy difference between the targeted and non-targeted firms based on the summary statistics. Further, Table 8.5 present the differences and p-values between the groups. The differences regarding the bond debt to debt ratio is for both groups significant. This could be caused by the CSPP, in Chapter 6 I examine this in more detail.

4.3.1 The graphical representation of the descriptive statistics

Figure 8.5 until 8.9 show a graphical representation of the variables Bond debt to Debt, Bank debt to Debt, CapEx/ Assets, Invested capital/ Assets, and lastly dividends per share. Figures 8.5 until 8.9 contain two groups, namely targeted firms and non-targeted firms. Additionally, Figures 8.5 until 8.9 contain a vertical line in 2016 that represents the breaking point of the announcement on March 10, 2016. It is important to note that the breaking point is not March 10, 2016, but the year 2016 because I use yearly data. In Figure 8.5 we observe that the ratio bond debt to debt of targeted firms increases after the CSPP announcement, contrary to the non-targeted firms. Furthermore, we observe in Figure 8.6 that non-targeted firms have more bank debt to debt compared to targeted firms. However, the bank debt to debt decreases for both groups over time. Remarkably, we observe in Figure 8.7 that the ratio CapEx to assets increases in 2017, where the slope is steeper for non-targeted firms. Whereas, Figure 8.8 shows that the ratio invested capital to assets decreases for targeted firms after the CSPP announcement. However, the ratio invested capital to assets increases in 2018.

In Figure 8.9 we observe the dividends per share across groups, this figure shows

Table 4.1: Descriptive Statistics Total Group

	Mean	SD	Min	Max	Count	Firms
Bond debt/Debt	.580	.259	.000	3.775	1563	295
Term loans/Debt	.313	.263	.000	1.458	1560	290
Bank debt/Debt	.351	.284	.000	1.571	1705	296
Liabilities/Assets	.051	.248	-.576	4.991	1894	330
Asset growth	.077	.349	-.921	6.953	1894	330
WorkCap/Assets	.005	.117	-1.900	1.402	1894	330
EBI/Assets	.006	.058	-.326	2.119	1894	330
Cash/Assets	.004	.101	-.755	1.479	1894	330
CapEx/Assets	.044	.069	.000	2.422	1894	330
InvCap/Assets	.626	.292	-.183	5.199	1894	330
PPE/Assets	.014	.097	-.474	2.589	1894	330
MB	2.356	3.318	-19.560	60.670	1800	326
BAS	.006	.010	-.032	.114	1576	264
LnAssets	8.835	1.841	1.278	16.851	1915	330
Prof	.0296	.0462	-.263	.220	1831	326
Observations	1915					

that the dividends per share across the groups have approximately the same trend. In 2018 we observe an increase in dividends per share for targeted firms and a decrease for non-targeted firms. Related to the year 2018, Figure 8.9 might suggest that the targeted firms issued more dividends to the shareholders (Grosse-Rueschkamp et al., 2019; Todorov, 2020). Though, if we focus on the period from 2013 until 2018 the trend between targeted and non-targeted firms does not differ significantly. In Chapter 6 I will elaborate on this topic.

In Figure 8.10 until 8.15, we observe the characteristics of the issued bonds and the bonds purchased under the CSPP. In Figure 8.10 we observe that the bond issuance over the period from Q1 2013 until Q4 2018 follows a linear trend. Further, we observe in Figure 8.11 and 8.12 that a large group of the firms are investment grade firms. Figure 8.14 shows that most of the bond issuers are active in the industrial markets. Lastly, most of the firms have France as ultimate country (see Figure 8.15).

Chapter 5

Methodology

5.1 Research design

In this section I describe the methods that are used to examine the effect of the CSPP. The ECB announced the CSPP on March 10, 2016 and laid down the eligibility criteria to purchase a bond. In fact, the ECB distinguishes two groups by introducing the eligibility criteria, namely (1) eligible firms and non-eligible firms. Furthermore, the ECB created two more groups by purchasing some of the eligible bonds, namely (2) targeted firms and non-targeted firms. Hence, we observe that there are in each scenario two groups in the period before and after the CSPP announcement.

In this study I examine the effect of the CSPP based on two samples, namely (1) eligible firms in comparison to non-eligible firms and (2) targeted firms in comparison to non-targeted firms. Eligible firms are firms that meet the eligible criteria of the CSPP, whereas non-eligible firms do not meet the criteria of the CSPP. The targeted firms are firms whose bonds are actually purchased by the ECB under the CSPP, whereas non-targeted firms are firms whose bonds are not (yet) purchased by the ECB. The groups are described as follows, where i equals 1 represents the treatment group and i equals 0 the control group:

$$Group1_i = \begin{cases} 1, & \text{If } E_i \text{ fulfils the ECB eligibility criteria of the CSPP} \\ 0, & \text{If } E_i \text{ does not fulfil the ECB eligibility criteria of the CSPP} \end{cases} \quad (5.1.1)$$

$$Group2_i = \begin{cases} 1, & \text{If } E_i \text{ is actually purchased by the ECB under the CSPP} \\ 0, & \text{If } E_i \text{ is not actually purchased by the ECB under the CSPP} \end{cases} \quad (5.1.2)$$

To examine the effect of the CSPP I use a difference-in-differences (hereafter: DiD) methodology for eligible firms and a panel data regression for targeted firms. The DiD is appropriate to examine the CSPP effect, because the DiD methodology enables to examine the effect of a policy measure on a certain moment on two different groups. Conley & Taber (2011) show that the DiD is especially valuable in applications where the observed number of policy measures is small. The DiD is based on a specific occasion

in time, in this context the policy measure is the announcement of the CSPP on March 10, 2016.

The financials are collected on a yearly basis, therefore is set the breaking point on the fiscal year 2016. Where I assume that all public available information is immediately processed by the market and reflected in the prices of the bonds (Fama, 1991; Yalçın, 2010). The breaking point is constructed as follows, where t represents the year:

$$Post_i = \begin{cases} 1, & \text{If } t \geq 2016 \\ 0, & \text{If } t < 2016 \end{cases} \quad (5.1.3)$$

The DiD is appropriate because the methodology enables to draw causal inferences. Furthermore, the DiD allows for differences between groups, but eliminates the constant differences to determine the difference between differences (Angrist & Pischke, 2008). The interaction term for the DiD is constructed as follows:

$$Interaction_{i,t} = \begin{cases} 1, & \text{If Group1} = 1 \text{ and Announcement} = 1 \\ 0, & \text{If Group1} = 0 \text{ and/or Announcement} = 0 \end{cases} \quad (5.1.4)$$

$$Purchased_{i,t} = \begin{cases} 1, & \text{If Group2} = 1 \text{ and Announcement} = 1 \\ 0, & \text{If Group2} = 0 \text{ and/or Announcement} = 0 \end{cases} \quad (5.1.5)$$

5.2 Empirical design

In this section is describe the models that I design to estimate the effect of the CSPP on firms' financing decisions and investment behavior. As presented in Section 5.1 there are two groups, namely eligible firms in comparison to non-eligible firms and targeted firms in comparison to non-targeted firms. In this section I present first the applied model of eligible firms, whereafter I discuss the applied model of targeted firms.

5.2.1 The difference-in-differences model of eligible firms

Firstly, I design a model to estimate the effect of the CSPP on the financing decisions and investment behavior of eligible firms in comparison to non-eligible firms. Where an eligible firms is a firm that issued a bond which is an investment grade euro denominated bond issued by non-financial corporations established in the Eurozone. To empirically implement the identification strategy and test how the CSPP affects the financial constraints of eligible firms, I run the following DiD specification where the companies are the individuals ($i = 1, \dots, n$) and there are multiple points in time ($t = 1, \dots, t_{t+x}$):

$$\text{Leverage}_{i,t} = \alpha_i + \alpha_{kt} + \alpha_{ct} + \beta_1 \text{Post}_t + \beta_2 (\text{Eligible}_i) + \beta_3 (\text{Post} * \text{Eligible}_{i,t}) + \theta' Y_{i,t} + \epsilon_{i,t} \quad (5.2.1)$$

Where *leverage* can take the following form (1) the ratio of bond debt to debt (*Bond debt/ Debt*), (2) the ratio of term loans to debt (*Term loans/ Debt*), (3) the ratio of bank debt to debt (*Bank debt/ Debt*), (4) the ratio of total liabilities to assets ($\Delta \text{Liabilities/ Assets}$) of firm *i* at time *t*.

In this study I focus on the period from January 1, 2013 until December 31, 2018. The period from January 1, 2013 till December 31, 2018 will be divided in two parts to examine the effects of the CSPP. The ECB introduced the CSPP on March 10, 2016, I expect that the market participants will alter their behavior based on this announcement (Fama, 1991). Due to the yearly data, I set 2016 as breaking point as discussed in Section 5.1. During, this period the European economy was stable and the Sovereign Debt Crisis and Global Financial Crisis were left behind (Hoque, 2013). Therefore, the starting point of 2013 minimizes the spillovers that might influence the effect of the CSPP on eligible firms. The end date matches with the end of the first active CSPP period, namely December 19, 2018. However, the ECB announced on September 12, 2019 a reintroduction of the CSPP, due to a short time span this announcement is not considered.

Post is a dummy variable that equals one from 2016 onwards, i.e. 2016 until 2018, and zero otherwise. *Eligible* is a dummy variable that equals one if the firm is an eligible firm and zero otherwise. ($Y_{i,t}$) is a set of firm characteristics that determine a firms' demand for debt and account for exogenous demand shocks in the bond market: the control variables are the market to book ratio (Faulkender & Petersen, 2006; Nini et al., 2009), bid-ask spread, natural logarithm of total assets and profitability.

In contrast to current literature the control variables are not based on a one period lag, because the data of this research is yearly data. Market participants will base their decisions on most recent information. The most recent information is not the information of the year before, but the most recent available data. For ratios as the bid-ask spread and the market to book ratio the data can be retrieved on a daily basis. Therefore, I do not incorporate lagged control variables. Further, I include firm fixed effects (α_i), e.g. date of incorporation and legal status (Boneu et al., 2016). Industry x year fixed effects ($\alpha_{k,t}$), and country x year fixed effects ($\alpha_{c,t}$). The fixed effects capture specific effects over time that are attributable to specific categories, with fixed effects I control for this time-invariant heterogeneity. The coefficient of interest (β_3) captures the interaction effect and shows the effect of the CSPP on a firms' capital structure. In all tests I cluster standard errors at firm level, i.e. the level of treatment (Correia, 2015; Nichols et al., 2007; Stock & Watson, 2008). To avoid that the estimations are inaccurate due to serial correlation

and heteroskedasticity (Bertrand et al., 2004).

To estimate the impact of the CSPP on investment behavior of eligible firms, I use the following DiD specification:

$$\text{Investment}_{i,t} = \alpha_i + \alpha_{kt} + \alpha_{ct} + \beta_1 \text{Post}_t + \beta_2 (\text{Eligible}_i) + \beta_3 (\text{Post} * \text{Eligible}_{i,t}) + \theta' Y_{i,t} + \epsilon_{i,t} \quad (5.2.2)$$

Where *Investment* can take the following form (1) the asset growth (*Asset growth*), (2) the ratio of change in working capital to assets ($\Delta \text{Working capital} / \text{Assets}$), (3) the ratio of change in earnings before interest to assets ($\Delta \text{EBI} / \text{Assets}$), (4) the ratio of change in cash to assets ($\Delta \text{Cash} / \text{Assets}$), (5) the ratio of capital expenditures to assets (*CapEx* / *Assets*), (6) the ratio of invested capital to assets (*Invested capital* / *Assets*), (7) the ratio of change in property, plant and equipment to assets ($\Delta \text{PPE} / \text{Assets}$) or (8) dividend per share (*Div*). *Post* is a dummy variable that equals one in the period from 2016 onward, i.e. from 2016 until 2018, and zero otherwise. *Eligible* is a dummy variable that equals one if the firm is an eligible firm and zero otherwise. ($Y_{i,t}$) is a set of firm characteristics that determine a firm's demand for debt and account for exogenous demand shocks in the bond market: the control variables are the market to book ratio (Faulkender & Petersen, 2006; Nini et al., 2009), bid-ask spread, natural logarithm of total assets and profitability. Moreover, I include firm fixed effects (α_i), industry x year fixed effects ($\alpha_{k,t}$) and country x year fixed effects ($\alpha_{c,t}$).

5.2.2 The panel data regression of targeted firms

In addition, I estimate the effect of the CSPP on financing decisions and investment behavior of targeted firms. Targeted firms are firms whose bonds are actually purchased by one of the CSPP NCBs. The examination of this groups is enabled by the 133,548 manually collected ISIN numbers of the actually purchased bonds. The targeted firms are an important group to consider, because this group actually benefits from the CSPP and therefore the CSPP could have a different effect on targeted firms in comparison to eligible firms. Important to note is that the DiD methodology is not suitable for targeted firms, because the targeted firms change over time (Angrist & Pischke, 2008). To empirically implement the identification strategy and test how the CSPP affects the financial constraints of targeted firms, I run the panel data regression specification where the companies are the individuals ($i = 1, \dots, n$) and there are multiple points in time ($t = 1, \dots, t_{t+x}$):

$$\text{Leverage}_{i,t} = \alpha_i + \alpha_{kt} + \alpha_{ct} + \beta_1 (\text{Purchased}_{i,t}) + \theta' Y_{i,t} + \epsilon_{i,t} \quad (5.2.3)$$

Where *leverage* can take the following form (1) the ratio of bond debt to debt (*Bond debt/ Debt*), (2) the ratio of term loans to debt (*Term loans/ Debt*), (3) the ratio of bank debt to debt (*Bank debt/ Debt*), (4) the ratio of liabilities to assets ($\Delta Liabilities/ Assets$) of firm i at time t .

Purchased is a time-variant dummy variable that equals one from the moment that the bond of the firm is actually purchased by one of the CSPP NCBs and zero otherwise, i.e. in 2016, 2017 and/or 2018. ($Y_{i,t}$) is a set of firm characteristics that determine a firms' demand for debt and account for exogenous demand shocks in the bond market: the control variables are the market to book ratio (Faulkender & Petersen, 2006; Nini et al., 2009), bid-ask spread, natural logarithm of total assets and profitability. Further, I include firm fixed effects (α_i), e.g. date of incorporation and legal status (Boneu et al., 2016). Industry x year fixed effects ($\alpha_{k,t}$), and country x year fixed effects ($\alpha_{c,t}$). The coefficient of interest (β_1) shows the effect of the CSPP on a firms' capital structure. In all tests I cluster standard errors at firm level, i.e. the level of treatment (Correia, 2015; Nichols et al., 2007; Stock & Watson, 2008).

To estimate the impact of the CSPP on the investment behavior of targeted firms, I use the following DiD specification:

$$\text{Investment}_{i,t} = \alpha_i + \alpha_{kt} + \alpha_{ct} + \beta_1(\text{Purchased}_{i,t}) + \theta'Y_{i,t} + \epsilon_{i,t} \quad (5.2.4)$$

Where *Investment* can take the following form (1) the asset growth (*Asset growth*), (2) the ratio of change in working capital to assets ($\Delta Working\ capital/ Assets$), (3) the ratio of change in earnings before interest to assets ($\Delta EBI/ Assets$), (4) the ratio of change in cash to assets ($\Delta Cash/ Assets$), (5) the ratio of capital expenditures to assets (*CapEx/ Assets*), (6) the ratio of invested capital to assets (*Invested capital/ Assets*), (7) the ratio of change in property, plant and equipment to assets ($\Delta PPE/ Assets$) or (8) dividend per share (*Div*). *Purchased* is a time-variant dummy variable that equals one from the moment that the bond of the firm is actually purchased by one of the CSPP NCBs and zero otherwise, i.e. in 2016, 2017 and/or 2018. ($Y_{i,t}$) is a set of firm characteristics that determine a firm's demand for debt and account for exogenous demand shocks in the bond market: the control variables are the market to book ratio (Faulkender & Petersen, 2006; Nini et al., 2009), bid-ask spread, natural logarithm of total assets and profitability. Moreover, I include firm fixed effects (α_i), industry x year fixed effects ($\alpha_{k,t}$) and country x year fixed effects ($\alpha_{c,t}$).

Chapter 6

Results

6.1 Introduction

In this chapter I present the results of the empirical analysis. The results provide an answer on the question how the CSPP influences the financing decisions and investment behavior of firms. Where I expect that eligible firms and targeted firms will increase bond debt and liabilities after CSPP announcement in comparison to non-eligible firms and non-targeted firms, respectively. On the other hand, I hypothesize that eligible firms and targeted firms distribute more dividends to shareholders, not alter their investment decisions and increase their cash holdings. To elaborate the effect of the CSPP, I start with the effect of the CSPP on eligible firms. Secondly, I present the effect of the CSPP on targeted firms. Thirdly, I employ two robustness checks, to examine whether the findings are robust. Lastly, I design a placebo test to rule out that the results are influenced by other factors.

6.2 The effect of the CSPP on financing decisions and investment behavior of firms?

6.2.1 The effect of the CSPP on the financing decisions of eligible firms

In a first step, I analyse the impact of the ECB's CSPP on financing decisions of eligible firms. Particularly, I test whether eligible firms increase their bond issuance activity following the CSPP announcement on March 10, 2016 and whether this has led to an overall increase in leverage (or whether firms substitute other debt with bond debt leaving the overall leverage ratio unchanged). Moreover, I consider the impact of the CSPP on the relaxation of financial constraints for non-eligible firms (Arce et al., 2018). The results are presented in Table 8.6.

The first column of each regression per variable represents a model without control variables and fixed-effects. The second column of each variable represents a model with firm-level control variables to control for the heterogeneity in firm characteristics, but without country, industry and year fixed effects. The third column of each variable represents the most saturated model with control variables and fixed effect. The fixed

effects that are included in the model are firm fixed-effects, industry x year fixed effects and country x year fixed effects. These fixed effects accounts for shocks at a narrowly defined industry group in each year and shocks at the country year level that might affect a firms' choice of bond debt. In columns (1), (2) and (3) of Table 8.6, I present the results using *Bond debt/ Debt* as dependent variable. Column (1) shows that the share of bond debt to debt increases post CSPP announcement by around 4.8 pp for eligible firms relative to non-eligible firms and relative to the pre-CSPP announcement period. This effect is not only statistically significant, it also economically meaningful: given an average share of bond debt to debt of approximately 58% in the sample, the CSPP announcement increases bond debt to debt by more than 8% relative to the unconditional mean. The effect is also significant if I consider the control variables, country, industry and year fixed effects. Figure 6.1 presents a graphical representation of the development of the ratio Bond debt/ Debt for eligible firms relative to non-eligible firms. It is important to note that the data point 2016 includes the CSPP announcement, due to yearly data. The figure shows an increase in bond debt to debt in 2016. If I account for firm fixed effects in the model, the effect of the CSPP on the ratio Bond debt/ Debt of eligible firms relative to non-eligible firms is not significant. This finding contradicts the finding of Todorov (2020) and Grosse-Rueschkamp et al. (2017), where the ratio Bond debt/ Debt increased after the CSPP announcement. Figure 6.1 shows that in the subsequent years the ratio bond debt to debt remains approximately constant, this may clarify the insignificant results of column (3) in Table 8.6.

Columns (4), (5) and (6) report the results using *Term loans/ Debt* as dependent variable. Based on the results I find no evidence that eligible firms significantly reduce term loans after the CSPP announcement. The same finding holds for bank debt as presented in columns (7), (8) and (9), eligible firm do not reduce bank debt significantly after the CSPP announcement. More interestingly, columns (10), (11) and (12) show the results using $\Delta Liabilities/ Assets$ as dependent variable. The most saturated model (column 12) shows that the change in liabilities to assets increased post CSPP announcement by approximately 5.8 pp for eligible firms relative to non-eligible firms and relative to the pre-CSPP announcement period. This effect is statistically significant at the 1% level. Overall, eligible firms do not significantly increase their share of bond debt after the CSPP announcement. By way of contrast eligible firms increase their leverage relative to non-eligible firms. Figure 8.18 shows a steep increase in the change of liabilities to assets after the CSPP announcement.

6.2.2 The effect of the CSPP on the investment behavior of eligible firms

Table 8.6 presents the results of the effect of the CSPP announcement on the investment behavior of eligible firms. In columns (13), (14) and (15) of Table 8.6, I present the

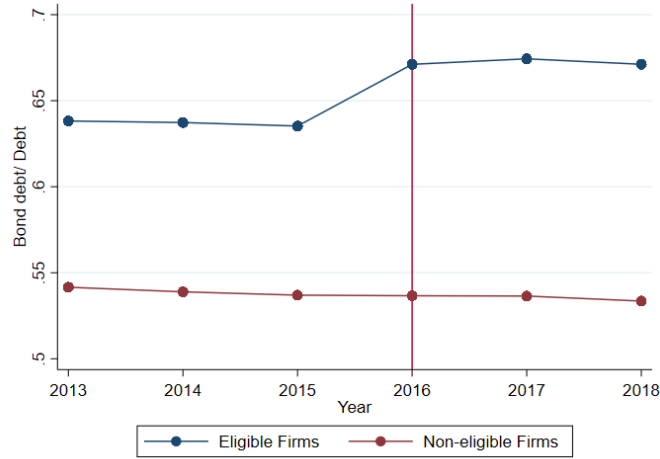


Figure 6.1: Ratio Bond debt/ Debt with dummy variable that equals one if the bond is eligible and zero otherwise. The post dummy is time invariant and equals one after the 2016 and zero otherwise.

results using *Asset growth* as dependent variable. The most saturated model (column (15)) shows that asset growth increased post CSPP announcement by about 6.3 pp for eligible firms relative to non-eligible firms. This effect is statistically significant at the 5% level. The asset growth of eligible firms may be explained by the change in total liabilities to assets of around 5.8 pp, respectively. An increase in liabilities increases the assets of a firm. Therefore, I conclude that the liabilities increase more than the assets. In Figure 8.19 we observe an increase in Asset growth after the CSPP announcement.

Columns (16), (17) and (18) report the results using $\Delta WorkCap/ Assets$ as dependent variable. Based on the results I find no evidence that the CSPP affects the change in working capital to assets of eligible firms relative to non-eligible firms. In columns (19), (20) and (21) I report the results using $\Delta EBI/ Assets$ as dependent variable. The most saturated model (column (21)) shows that the change in EBI to assets increases with 0.8 pp for eligible firms relative to non-eligible firms after the CSPP announcement. This effect is statistically significant at the 5% level.

The results do not show a significant increase in $\Delta Cash/ Assets$ (columns (22), (23) and (24)) and $CapEx/ Assets$ (columns (25), (26) and (27)) after the CSPP announcement for eligible firms relative to non-eligible firms. Arce et al. (2018) argue that non-eligible firms benefits from positive spillovers of the CSPP, as described, the CSPP relaxes the financial constraints of banks. The non-eligible firms could use the bank debt to increase capital expenditures. In contrast to eligible firms, because these firms experience less difficulties when they participate on the capital markets. This could explain the negative results for the ratio CapEx to assets.

More interestingly, in columns (28), (29) and (30) I present the results using $InvCap/ Assets$ as dependent variable. The most saturated model shows that the ratio invested

capital to assets increases for eligible firms by approximately 5.0 pp relative to non-eligible firms post CSPP announcement. This effect is statistically significant at the 5% level and economically meaningful given the average ratio invested capital to assets of approximately 63%. The CSPP announcement has led to an increase in the ratio invested capital to assets by around 8% relative to the unconditional mean. More interestingly, in Figure 8.24 we observe an increase of the change in invested capital to assets for eligible firms. From 2013 until 2015 the change in invested capital to assets was lower for eligible firms in comparison to non-eligible firms. After the CSPP announcement the change in invested capital to assets steeply increases. This finding could mean that the eligible firms use the proceeds of the issued bonds to invest more.

Furthermore, column (21) shows that the change in EBI to assets increases for eligible firms relative to non-eligible firms after the CSPP announcement. Which means that that eligible firms are more profitable in comparison to a non-eligible firm after the CSPP announcement. The EBI as profit measure does not incorporate the decrease in financing costs for firms, due to the CSPP announcement (ECB, 2016b). Therefore, the EBI is a neutral measure and an appropriate indicator to indicate the unaffected profitability of a firm. An increase of the change in EBI to assets in conjunction with an increase in the ratio invested capital to assets, could indicate that the firms have used the proceeds of the bonds issuance to invest in real growth projects. Further, in columns (31), (32) and (33) I present the results using $\Delta PPE / Assets$ as dependent variable. The results do not indicate that the CSPP has influenced the change in PPE to assets of eligible firms relative to non-eligible firms after the CSPP announcement.

Overall, we observe that the total liabilities to debt, the asset growth, the change in EBI to assets and the ratio invested capital to assets increase for eligible firms relative to non-eligible firms post CSPP announcement.

6.2.3 The effect of the CSPP on the financing decisions of targeted firms

In Section 6.2.1 and Section 6.2.2 I discussed the results of the effect of the CSPP on eligible firms. The results indicate that the ratio bond debt to debt does not increase while considering the most saturated model. On the other hand, the results indicate more investment in real growth projects after the CSPP. In this section I consider the effect of the CSPP on targeted firms whose bonds are actually purchased and directly benefit from the CSPP. The research design is based on the manually collected ISIN Number of bonds holdings published by the CSPP NCBs. Galema & Lugo (2019) show that targeted firms issued more bond debt after the CSPP announcement. In Table 6.1 I present the result of the effect of the CSPP on the financing decisions of targeted firms.

Table 6.1: This table reports the results from the estimation of a panel regression analyzing the effect of CSPP. The dependent variables are Bond debt/ Debt (1), Term loans/ Debt (4), Bank debt/ Debt (7), Δ Liabilities/ Assets (10). The time varying independent variable Purchased equals one when the bonds of the eligible firms are actually purchased and zero otherwise. The sample period is 2013 until 2018. I report t-values based on robust standard errors clustered at the firm-level in parentheses. ***, **, * denote significance at the 1, 5 and 10% level, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	Bond debt/Debt	Bond debt/Debt	Bond debt/Debt	Term loans/Debt	Term loans/Debt	Term loans/Debt	Bank debt/Debt	Bank debt/Debt	Bank debt/Debt	Liabilities/Assets	Liabilities/Assets	Liabilities/Assets
Purchased	0.155*** (0.0216)	0.147*** (0.0329)	0.0440* (0.0223)	-0.155*** (0.0199)	-0.0707*** (0.0197)	-0.0133 (0.0206)	-0.192*** (0.0192)	-0.0821*** (0.0194)	-0.0132 (0.0283)	-0.0262** (0.0104)	-0.0144 (0.00931)	0.0451** (0.0198)
Country x year FE	No	No	Yes	No	No	Yes	No	No	Yes	No	No	Yes
Industry x year FE	No	No	Yes	No	No	Yes	No	No	Yes	No	No	Yes
Firms FE	No	No	Yes	No	No	Yes	No	No	Yes	No	No	Yes
Controls	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes
Observations	1563	1278	1165	1560	1207	1105	1705	1336	1225	1894	1514	1366
Adjusted R^2	0.055	0.067	0.749	0.046	0.082	0.711	0.065	0.108	0.674	0.001	0.000	0.089

Bond debt/ Debt: .1470 ***

Term loans/ Debt: .0597**

Bank debt/ Debt: -.0847 ***

Liabilities/ Assets: .0150

(Post*Eligible coefficient of Model with country x year FE, industry x year FE and controls)

In columns (1), (2) and (3) of Table 6.3, I present the results using *Bond debt/ Debt* as dependent variable. The most saturated model (column (3)) shows that the share of bond debt to total debt increases with about 4.4 pp for targeted firms when the bonds are actually purchased by the CSPP NCBs relative to non-targeted firms. This effect is statistically significant at the 5% level and economically meaningful, if the average change in bond debt to debt of 58% is taken into consideration. In Figure 6.2 we observe a significant increase in the ratio bond debt to debt after the CSPP announcement. The ratio bond debt to debt of targeted firms was lower than the bond debt to debt ratio of non-targeted firms before the CSPP announcement. The ratio of targeted firms has become higher than the bond debt to debt ratio of non-targeted firms.

More interestingly, in columns (4), (5) and (6), I present the results using *Term loans/ Debt* as dependent variable and in columns (7), (8) and (9) I report the results using *Bank debt/ Debt* as dependent variable. Columns (4) and (5) show that the ratio term loans to debt decrease with 15.5 pp and 7.1 pp, respectively. Columns (7) and (8) show that the ratio bank debt to debt decrease with 19.2 pp and 8.2 pp, respectively. In contrast to the results of eligible firms, columns (4) and (5) show for the ratio term loans to debt and in columns (7) and (8) the ratio bank debt to debt decrease for targeted firms relative to non-targeted firms after the CSPP announcement. These effects are statistically significant if firm fixed effects are not included at the 5% and 1% level and economically significant: given the unconditional mean of the change in term loans to total debt and change in bank debt to total debt of 31% and 35%, respectively.

This effect could be caused by two factors, the first factor is the portfolio-balance channel for targeted firms that decreases the yield of bonds (Abidi & Miquel-Flores, 2018; Woodford, 2012). In Figure 8.27 we observe that the bank debt to debt of targeted firms decreases over time, whereas in Figure 6.2 we observe that the bond debt to debt increases over time for targeted firms. The second reason for this observation could be caused by the relaxation of the financial constraints of banks, this factor increases the distribution of bank debt to non-targeted firms (Arce et al., 2018; Foley-Fisher et al., 2016). In columns (10), (11) and (12), I present the results using $\Delta Liabilities/ Assets$ as dependent variable.

6.2.4 The effect of the CSPP on the investment behavior of targeted firms

In the current literature Todorov (2020) and Grosse-Rueschkamp et al. (2019) argue that eligible firms use the proceeds of bond issuance to distribute dividends to shareholders. In Table 6.2, I present the results of the CSPP effect on investment behavior of targeted firms. In Columns (1), (2) and (3) I report the results, using *Asset growth* as dependent variable. The results do not indicate an increase in Asset growth for targeted firms relative to non-targeted firms after the CSPP announcement if I consider the fixed effects.

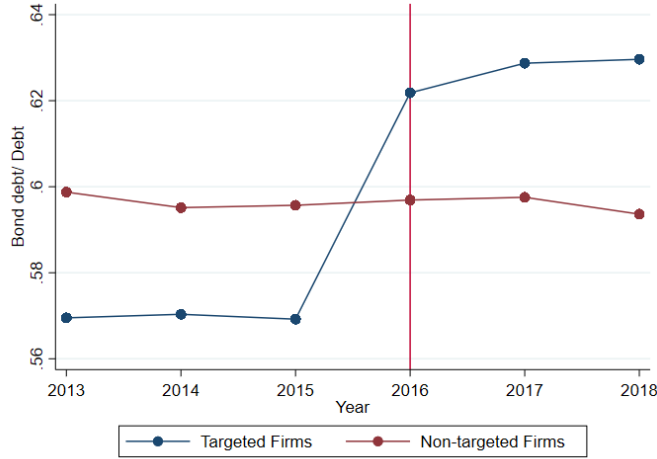


Figure 6.2: Ratio Bond debt/ Debt based on the time-variant purchase variable.

Columns (4), (5) and (6) do not provide evidence that the $\Delta WorkCap/ Assets$ increase for targeted firms relative to non-targeted firms after the CSPP announcement. In columns (7), (8) and (9), I present the results using $\Delta EBI/ Assets$ as dependent variable.

In columns (10), (11) and (12), I report the results using $\Delta Cash/ Assets$ as dependent variable and in columns (13), (14) and (15), I present the results using $CapEx/ Assets$ as dependent variable. The results provide no evidence that the change in cash to assets and the ratio $CapEx/ Assets$ of targeted firms increase relative to non-targeted firms after the CSPP announcement. In columns (16), (17) and (18) I report the findings using $InvCap/ Assets$ as dependent variable. Further, in columns (19), (20) and (21) I present the results using $\Delta PPE/ Assets$ as dependent variable. The results do not indicate that the CSPP influence the change in PPE to assets of targeted firms relative to non-targeted firms after the CSPP announcement.

In Table 6.3, I report the results using (*Dividend per share*), (*Issued bonds by a firm*) and (*Bond proceeds of a firm*) as dependent variable. In columns (1), (2), (3) and (4) I present the results, using *Div* as dependent variable. Columns (1) and (2) present the effect of the CSPP on the dividend per share of eligible firms, whereas columns (3) and (4) show the effect of the CSPP on dividend per share of targeted firms. The results do not provide evidence that eligible firms significantly distribute more dividends to their shareholders relative to non-eligible firms after the CSPP announcement. However, we observe that targeted firms increase their bond issuance by 1.9 bonds (columns (5) and (6)) and bond proceeds (column (7) and (8)) by 192.2 million. Nevertheless, I have to notice that the number of observations used in column (1), (2), (3) and (4) differs substantial from the number of observations that are used in the other models, due to unavailable data. All in all, based on the results eligible firms and targeted firms do not increase their dividend distribution to shareholders, in contrast to the findings of Todorov (2020). The difference in outcome could be caused by the longer time period.

Table 6.2: This table reports the results from the estimation of a panel regression analyzing the effect of CSPP. The dependent variables are Asset growth (1), Δ Working capital/ Assets (4), Δ EBI/ Assets (7), Δ Cash/ Assets (10), Δ CapEx/ Assets (13), Δ Invested capital/ Assets (16) and Δ PPE/ Assets (19). The time varying independent variable Purchased equals one when the bonds of the eligible firms are actually purchased and zero otherwise. The sample period is 2013 until 2018. I report t-values based on robust standard errors clustered at the firm-level in parentheses. ***, **, * denote significance at the 1, 5 and 10% level, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Asset growth	Asset growth	Asset growth	WorkCap/Assets	WorkCap/Assets	WorkCap/Assets	EBI/Assets	EBI/Assets	EBI/Assets
Purchased	-0.0341** (0.0162)	0.00157 (0.0226)	0.0455 (0.0288)	0.00285 (0.00377)	-0.00386 (0.00570)	0.00505 (0.0107)	-0.00114 (0.00222)	-0.00186 (0.00193)	0.00605* (0.00317)
[1em] Country x year FE	No	No	Yes	No	No	Yes	No	No	Yes
Industry x year FE	No	No	Yes	No	No	Yes	No	No	Yes
Firms FE	No	No	Yes	No	No	Yes	No	No	Yes
Controls	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes
Observations	1894	1514	1366	1894	1514	1366	1894	1514	1366
Adjusted R^2	0.001	0.009	0.112	-0.000	0.021	-0.065	-0.000	0.108	0.117

	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)
	Cash/Assets	Cash/Assets	Cash/Assets	CapEx/Assets	CapEx/Assets	CapEx/Assets	InvCap/Assets	InvCap/Assets	InvCap/Assets	PPE/Assets	PPE/Assets	PPE/Assets
Purchased	-0.00230 (0.00241)	0.00276 (0.00404)	0.00378 (0.00659)	-0.00467 (0.00316)	-0.00215 (0.00488)	-0.00221 (0.00377)	-0.00740 (0.0186)	0.0196 (0.0287)	0.0369* (0.0219)	-0.00850* (0.00458)	-0.00166 (0.00613)	0.00828 (0.00869)
Country x year FE	No	No	Yes	No	No	Yes	No	No	Yes	No	No	Yes
Industry x year FE	No	No	Yes	No	No	Yes	No	No	Yes	No	No	Yes
Firms FE	No	No	Yes	No	No	Yes	No	No	Yes	No	No	Yes
Controls	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes
Observations	1894	1514	1366	1894	1514	1366	1894	1514	1366	1894	1514	1366
Adjusted R^2	-0.000	-0.001	-0.169	0.000	0.012	0.584	-0.000	0.037	0.511	0.001	0.009	0.052

Table 6.3: This table reports results from the estimation of a panel regression analyzing the effect of CSPP. The dependent variables are Div (dividend per share), Bonds (total number of bonds issued by a firm), Proceeds (total proceeds of issued bonds by a firm), for more information about the variables see the variables description in the Appendix. The first column of each variable (except for the variable Div) is based on a DiD regression, where Eligible equals one if the firms is an eligible firms and zero otherwise. Post equals one after 2016, and zero otherwise. The second column is bases on a regression, where the time varying independent variable Purchased equals one when the bonds of the eligible firms are actually purchased and zero otherwise. The sample period is 2013 until 2018. I report t-values based on robust standard errors clustered at the firm-level in parentheses. ***, **, * denote significance at the 0.1, 1 and 5% level, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Div	Div	Div	Div	Bonds	Bonds	Proceeds	Proceeds
Post*Eligible	0.143 (0.387)	0.0188 (0.623)			0.0278 (0.156)		-0.537 (15.28)	
Eligible	-0.261 (0.363)				1.355** (0.670)		244.4*** (64.61)	
Purchased			0.827 (0.630)	1.278 (1.074)		1.922*** (0.565)		192.2*** (53.97)
[Iem] Country x year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry x year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firms FE	No	Yes	No	Yes	No	No	No	No
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	779	756	779	756	1738	1738	1738	1738
Adjusted R^2	0.068	-0.069	0.075	-0.054	0.184	0.186	0.314	0.301

6.3 Robustness checks

6.3.1 Robustness check based on investment grade firms

In this section I discuss the robustness check, the robustness check is based on the effect of the CSPP on investment grade firms. The criteria investment grade firm is not a criteria of the eligibility criteria of the CSPP. Although, investment grade firms are almost similar to eligible firms, because investment grade firms issue most likely investment grade bonds. Therefore, I expect an approximately similar outcome in comparison to eligible firms. To examine the effect the of the CSPP, I employ a DiD model. The results of the effect of the CSPP on the financing decisions and investment behavior of investment grade firms are presented in Table 8.7

The results in Table 8.7 show a less strong, but similar effect of the CSPP on investment grade firms. In column (1) and (3) we observe that the ratio bond debt to debt increase by 4.7 pp and 5.8 pp, respectively. This could be caused by the reason that investment grade firms, issue most of the time investment grade bonds, which could be purchased by the ECB.

6.3.2 Parallel trend assumption

The core assumption of the DiD is the parallel trend assumption, which means that the average change in outcome for the treated in the absence of treatment equals the average change in outcome for non-treated (Mora & Reggio, 2012). In other words, the average change in outcome between eligible firms and non-eligible firms should be the equal without the CSPP announcement. In Figure 8.36 until 8.47 I present the development of the dependent variables for both eligible firms and non-eligible firms over the period from Q1 2013 until Q4 2018. In Figure 8.39 we observe that the variable $\Delta\text{Liabilities}/\text{Assets}$ does not fulfil the parallel trend assumption. Furthermore, in Figure 8.43 the variable $\Delta\text{Cash}/\text{Assets}$ clearly does not fulfil the parallel trend assumption. Both variables are influenced by firm and time dependent factors, therefore I control for these factors in the DiD.

6.4 Placebo test

In March 2016 the ECB not only announced the introduction of the CSPP but also an extension of the PSPP. The PSPP could affect the financing decisions and investment behavior of firms and therefore affect the results of this research. A potential concern might be that the results are driven by the government bond purchases but not by corporate bond purchases. The ECB could affect the government prices through the same channels as described for the corporate bond prices, namely the portfolio balance channel, the signalling channel, and the scarcity channel. Government bond purchases might reduce interest rate risk (i.e. duration risk), which increases government bond prices (Grosse-Rueschkamp et al., 2017). Higher government bond prices lead to a higher valuation of assets on bank balance sheets, this increases a bank's capacity to lend.

To eliminate this concerns I employ a DiD model, I present the results in Table 8.8. Column (1) shows the effect of the PSPP on the ratio bond debt to debt of eligible firms, whereas column (2) reports the effect of the PSPP on the ratio bond debt to debt of targeted firms. The dummy variable Post equals one after the PSPP announcement in January 2015 and zero otherwise. The results do not indicate that the ratio bond debt to debt significantly increased after the PSPP announcement for both eligible firms and targeted firms relative to non-eligible firms and non-targeted firms, respectively. Therefore, I find evidence that the main driver of the increase of the ratio bond debt to debt of targeted firms is the CSPP and the results are robust.

Chapter 7

Conclusion and recommendations

7.1 Conclusion

In this chapter I discuss the results and I draw a conclusion. The ECB initiated the CSPP on March 10, 2016, by announcing the program. The ECB initiated the CSPP to stimulate the inflation and to lower the financing costs for non-financial corporations. Existing literature shows that the CSPP did not improve employment and investment. Moreover, the firms frequently used the proceeds to increase their cash holdings or distribute dividends to shareholders. Firstly, I discuss the results of financing decisions, whereafter I consider the results of investment behavior.

The results provide no evidence that eligible firms moderately increase their bond debt to debt relative to non-eligible firms after the CSPP announcement. Although, Todorov (2020) and Grosse-Rueschkamp et al. (2019) show that eligible firms increase their bond debt to debt after the CSPP announcement. Therefore, I conclude that eligible firms were motivated to increase their bond debt to debt ratio short after the CSPP announcement, but when the eligible firms experienced that their bonds were not purchased by the CSPP. The eligible firms did not increase the bond debt to debt ratio in the years thereafter. On the other hand, I find evidence that targeted firms significantly increase their bond debt to debt ratio relative to non-targeted firms after the CSPP announcement, the results are in line with the empirical findings of Galema & Lugo (2019). Targeted firms increase their bond debt to debt ratio to benefit from the low financing costs. This observation is also observable in the years after the CSPP announcement.

Secondly, we observe that the change in liabilities to assets of eligible firms significantly increases after the CSPP announcement. This observation could be explained by the fact that the CSPP lowers financing costs. Therefore, eligible firms are motivated to increase their liabilities. Besides, I do not find evidence that targeted firms significantly increase their change in liabilities to assets after the CSPP announcement. This effect could be the result of an increase in bond debt for targeted firms. Though, at the moment that the targeted firms observe that their bonds are purchased by the ECB, the targeted firms decrease other sorts of debt. The results indicate a decrease in the ratios; term loans to debt and bank debt to debt if the firm fixed effects are not incorporated.

Thirdly, I find no evidence that eligible firms significantly distribute more dividends to

their shareholders relative to non-eligible firms after the CSPP announcement. Besides, I find no evidence that targeted firms significantly distribute more dividends to shareholders relative to non-targeted firms after the CSPP.

The CSPP should not be effective if the firms used the proceeds to increase their cash holdings for difficult moments. Large cash holdings could increase poor management and could cause principal-agent conflicts (Hardin et al., 2009; Jensen, 1986). Based on the results I find no evidence that both eligible firms and targeted firms increase their cash holdings after the CSPP announcement.

On the other hand, I find evidence that eligible firms invest more relative to non-eligible firms after the CSPP announcement. One of the purposes of the CSPP is to stimulate the real economy by increasing investment and employment. For eligible firms we observe that the EBI increases in combination with an increase in invested capital. This indicates that the ECB partly fulfils its purposes by stimulating the real economy with the CSPP. Though, I find no evidence that targeted firms increase their investments after the CSPP.

In conclusion, the results show that targeted firms increase their bond debt after the CSPP. This indicates that the CSPP lowers the financing costs for targeted firms. Further, I conclude that the CSPP partly meets its purposes. The CSPP has led to more investment by eligible firms and on the other hand the eligible firms simultaneously do not increase the dividend distribution to shareholders and cash holdings.

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Chapter 8

Appendix

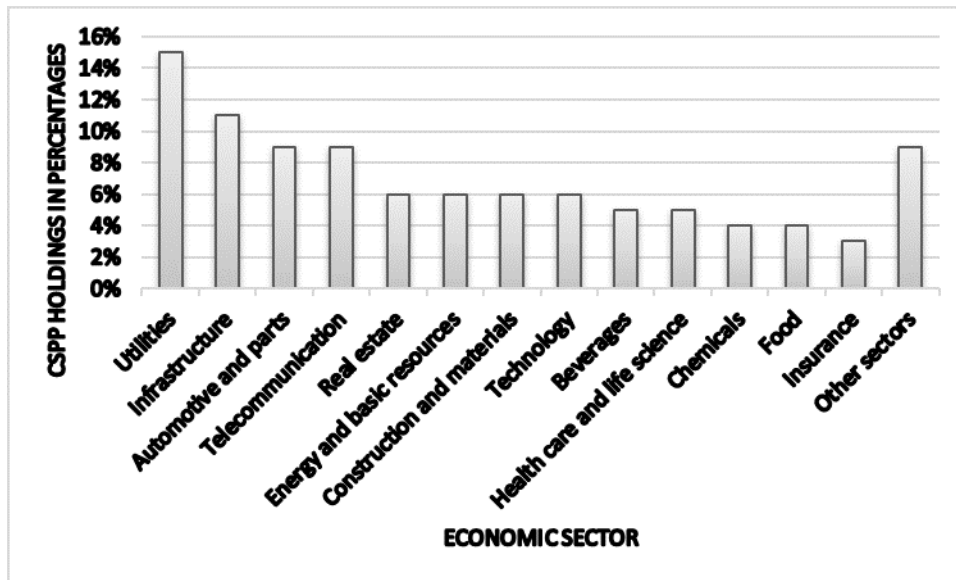


Figure 8.1: This figure presents the percentage of total holdings under the CSPP, categorised by the economic sector of the issuer over the period from June 2016 till December 2018. Source: ECB (2018).

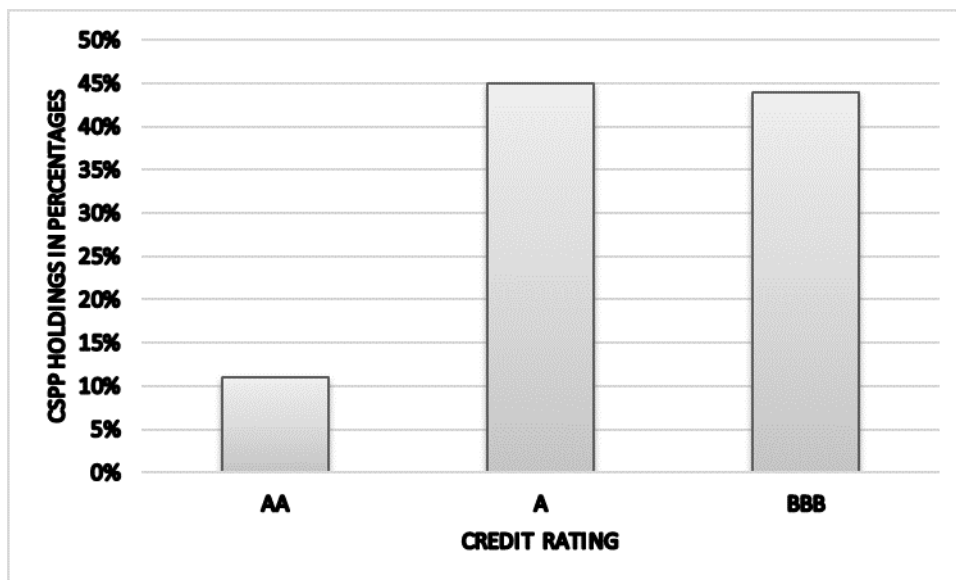


Figure 8.2: This figure presents the percentage of total holdings under the CSPP, categorised by the credit rating of the bond over the period from June 2016 till December 2018. Source: ECB (2018).

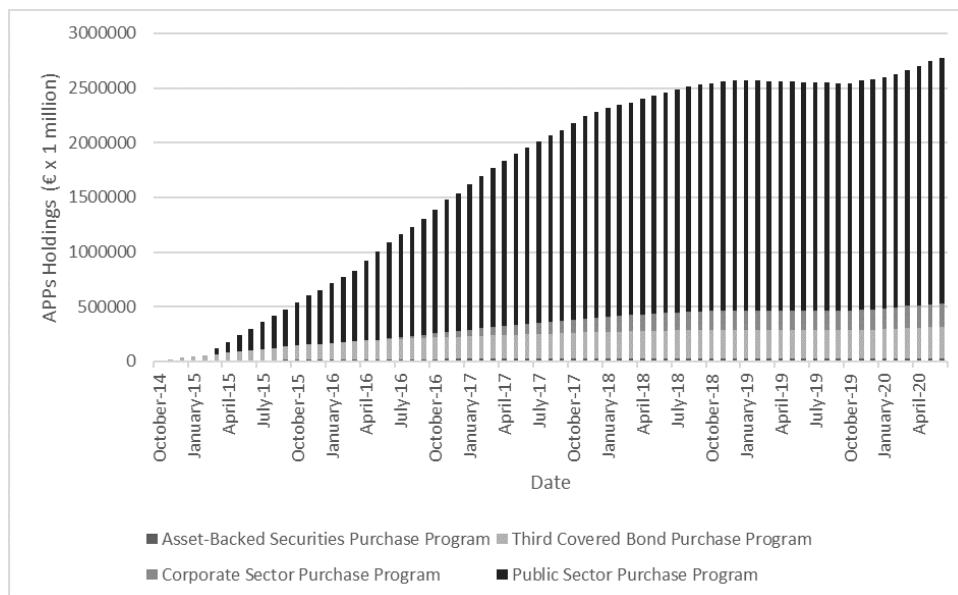


Figure 8.3: This figure presents the CSPP holdings over the period from Q4 2014 until Q2 2020. Source: ECB (2020).

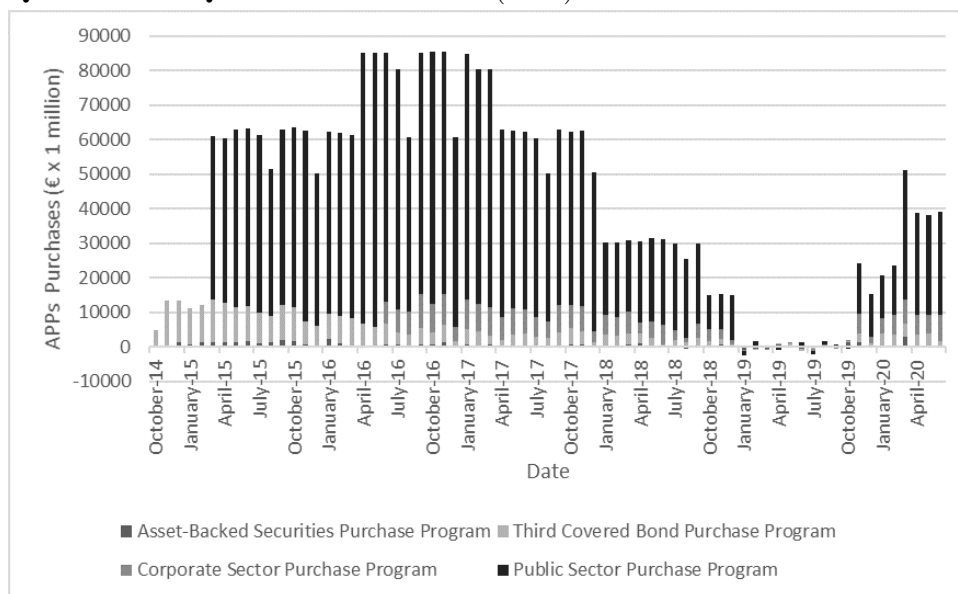


Figure 8.4: This figure presents the CSPP purchases over the period from Q4 2014 until Q2 2020. Source: ECB (2020).

Table 8.1: Descriptive Statistics Eligible Firms

	Mean	SD	Min	Max	Count	Firms
Bond debt/Debt	.672	.234	.000	3.775	683	174
Term loans/Debt	.228	.214	.000	1.000	622	174
Bank debt/Debt	.240	.225	.000	1.000	712	175
Liabilities/Assets	.026	.116	-.563	.917	855	185
Asset growth	.045	.177	-.921	2.762	855	185
WorkCap/Assets	.001	.070	-.529	.470	855	185
EBI/Assets	.003	.021	-.101	.142	855	185
Cash/Assets	.001	.061	-.299	.239	855	185
CapEx/Assets	.041	.028	.000	.245	855	185
InvCap/Assets	.603	.210	-.075	2.914	855	185
PPE/Assets	.007	.054	-.292	.796	855	185
MB	2.506	3.447	-19.560	54.050	831	182
BAS	.003	.004	.000	.042	806	129
LnAssets	10.094	1.382	7.327	16.850	859	185
Prof	.039	.041	-.234	.205	834	182
Observations	859					

Table 8.2: Descriptive Statistics Non-eligible Firms

	Mean	SD	Min	Max	Count	Firms
Bond debt/Debt	.510	.254	.000	1.367	880	121
Term loans/Debt	.370	.278	.000	1.458	938	116
Bank debt/Debt	.430	.295	.000	1.571	993	121
Liabilities/Assets	.071	.317	-.576	4.991	1039	145
Asset growth	.103	.442	-.797	6.953	1039	145
WorkCap/Assets	.007	.144	-1.900	1.402	1039	145
EBI/Assets	.008	.076	-.326	2.118	1039	145
Cash/Assets	.006	.125	-.755	1.480	1039	145
CapEx/Assets	.047	.090	.000	2.422	1039	145
InvCap/Assets	.645	.344	-.183	5.199	1039	145
PPE/Assets	.020	.120	-.474	2.586	1039	145
MB	2.226	3.200	-12.690	60.670	969	144
BAS	.008	.0129	-.032	.114	770	135
LnAssets	7.810	1.502	1.280	12.456	1056	145
Prof	.022	.048	-.263	.220	997	144
Observations	1056					

Table 8.3: Descriptive Statistics Targeted Firms

	Mean	SD	Min	Max	Count	Firms
Bond debt/Debt	.674	.236	.034	3.775	629	110
Term loans/Debt	.222	.203	.000	1.000	579	106
Bank debt/Debt	.233	.215	.000	1.037	652	110
Liabilities/Assets	.026	.118	-.481	.917	789	133
Asset growth	.046	.182	-.921	2.762	789	133
WorkCap/Assets	.002	.068	-.529	.470	789	133
EBI/Assets	.004	.021	-.076	.142	789	133
Cash/Assets	.001	.061	-.299	.273	789	133
CapEx/Assets	.042	.029	.000	.245	789	133
InvCap/Assets	.606	.210	.008	2.914	789	133
PPE/Assets	.009	.056	-.292	.796	789	133
MB	2.575	3.546	-19.560	54.050	769	132
BAS	.004	.004	.000	.042	750	125
LnAssets	10.003	1.222	6.732	13.035	793	133
Prof	.040	.038	-.231	.205	770	132
Observations	793					

Table 8.4: Descriptive Statistics Non-targeted Firms

	Mean	SD	Min	Max	Count	Firms
Bond debt/Debt	.518	.254	.000	1.367	934	185
Term loans/Debt	.366	.280	.000	1.458	981	184
Bank debt/Debt	.424	.297	.000	1.570	1053	186
Liabilities/Assets	.069	.309	-.576	4.991	1105	197
Asset growth	.099	.429	-.797	6.953	1105	197
WorkCap/Assets	.007	.142	-1.900	1.402	1105	197
EBI/Assets	.008	.074	-.326	2.119	1105	197
Cash/Assets	.005	.122	-.755	1.479	1105	197
CapEx/Assets	.046	.087	.000	2.422	1105	197
InvCap/Assets	.640	.338	-.183	5.200	1105	197
PPE/Assets	.018	.117	-.474	2.586	1105	197
MB	2.192	3.129	-12.690	60.670	1031	194
BAS	.008	.012	-.032	.114	826	139
LnAssets	8.009	1.756	1.278	16.851	1122	197
Prof	.0218	.050	-.263	.220	1061	194
Observations	1122					

Table 8.5: T-test for differences between eligible firms and non-eligible firms and targeted and non-targeted firms. First column presents the difference between the groups and the second column presents the p-value.

	Eligible Firms		Targeted Firms	
	Diff	P-value	Diff	P-value
Bond debt/Debt	-.162	.000	-.156	.000
Term loans/Debt	.142	.000	.144	.000
Bank debt/Debt	.191	.000	.190	.000
Liabilities/Assets	.045	.000	.043	.000
Asset growth	.058	.000	.053	.001
WorkCap/Assets	.006	.273	.005	.364
EBI/Assets	.005	.0546	.004	.137
Cash/Assets	.004	.377	.004	.382
CapEx/Assets	.006	.052	.004	.274
InvCap/Assets	.042	.001	.034	.012
PPE/Assets	.012	.004	.009	.039
MB	-.279	.075	-.382	.016
BAS	.003	.000	.004	.000
LnAssets	-2.283	.000	-1.995	.000
Prof	-.017	.000	-.019	.000

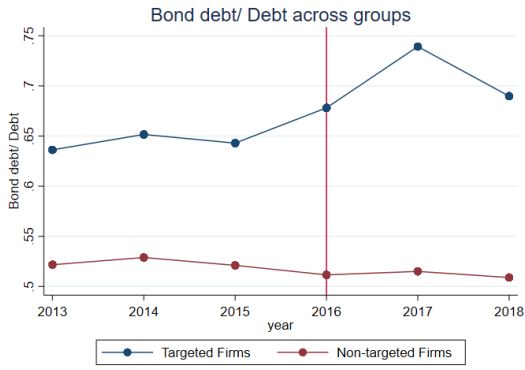


Figure 8.5: Ratio Bond debt/ Debt across groups over the period from 2013 until 2018

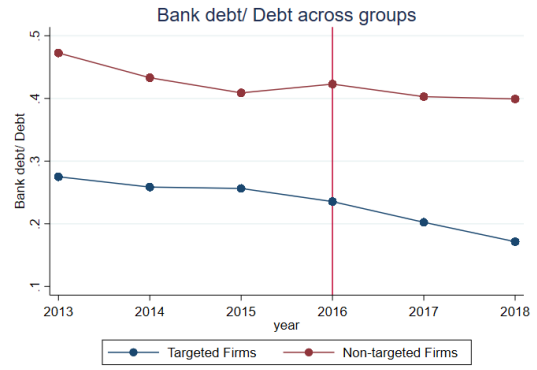


Figure 8.6: Ratio Bank debt/ Debt across groups over the period from 2013 until 2018

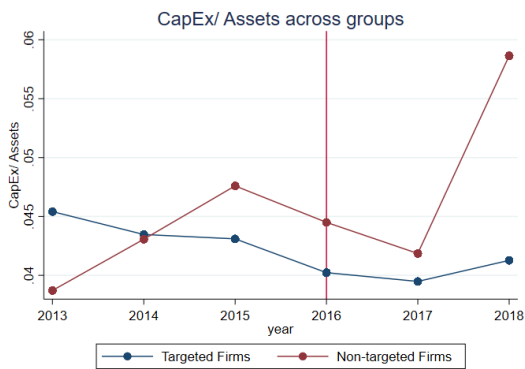


Figure 8.7: Ratio CapEx/ Assets across groups over the period from 2013 until 2018

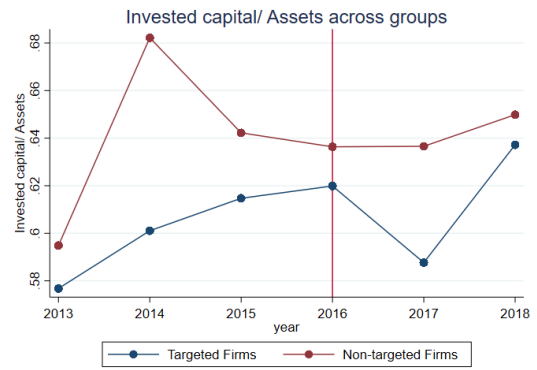


Figure 8.8: Invested capital/ Assets across groups over the period from 2013 until 2018

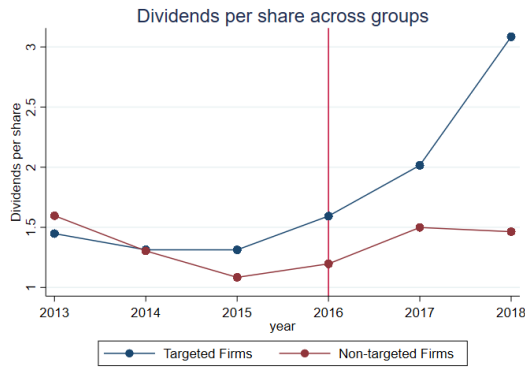


Figure 8.9: Dividends per share across groups over the period from 2013 until 2018

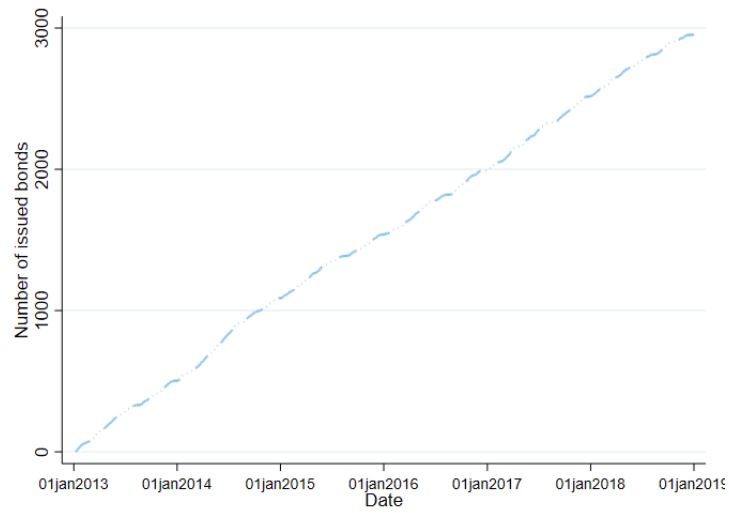


Figure 8.10: This figure presents issuance of bonds from January 2013 until December 2018.

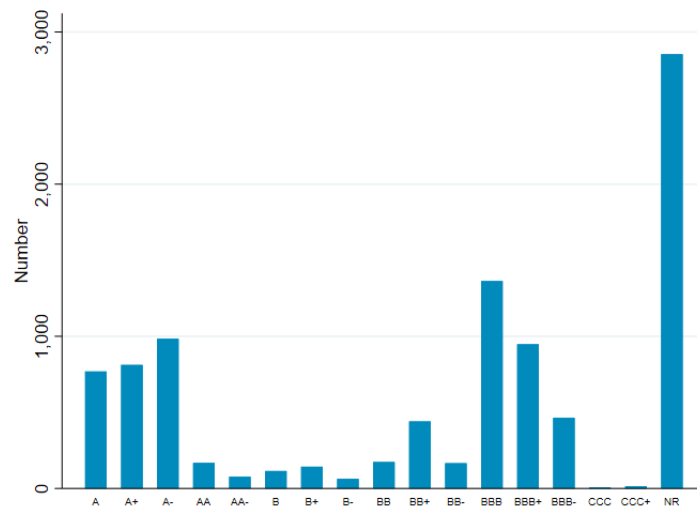


Figure 8.11: This figure presents ratings by S & P of bonds issued over the period from January 2013 until December 2018.

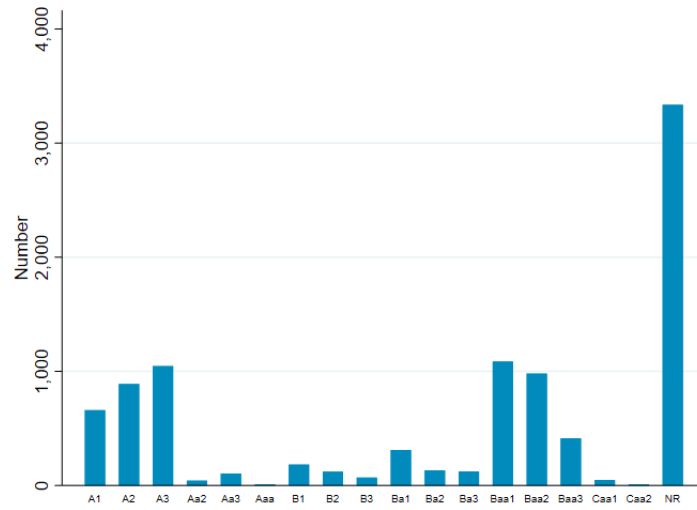


Figure 8.12: This figure presents ratings by Moody's of bonds issued over the period from January 2013 until December 2018.

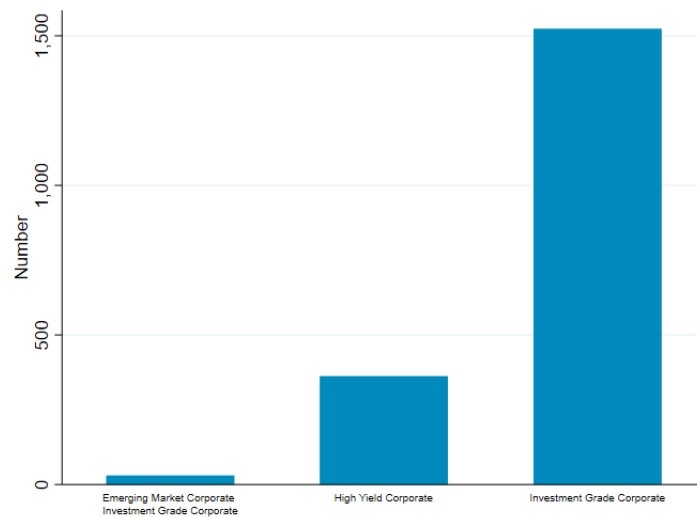


Figure 8.13: This figure presents bonds issued over the period from January 2013 until December 2018, categorized by type of issuer.

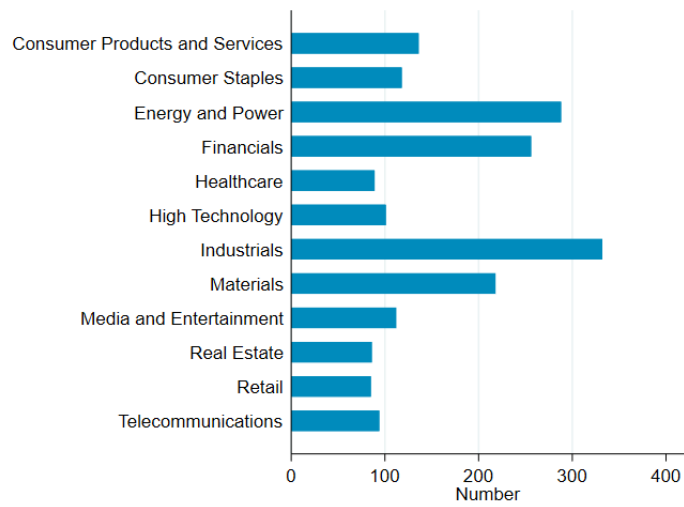


Figure 8.14: This figure presents bonds issued over the period from January 2013 until December 2018, categorized by industry of issuer.

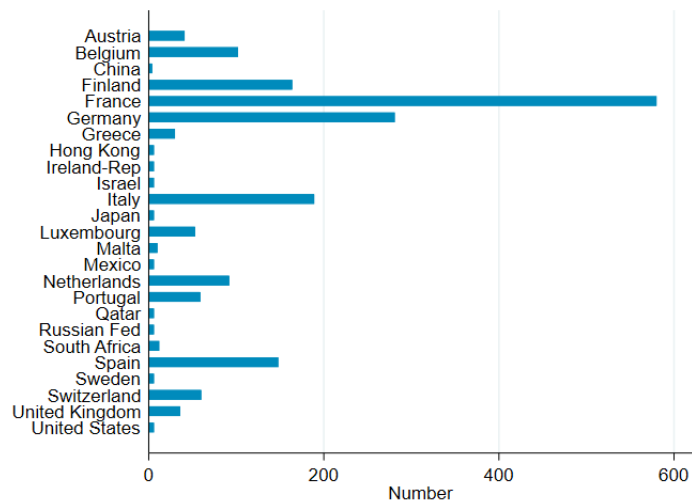


Figure 8.15: This figure presents bonds issued over the period from January 2013 until December 2018, categorized by ultimate country of the concern.

Table 8.6: This table reports the results from the estimation of a panel regression analyzing the effect of CSPP. The dependent variables are Bond debt/ Debt (1), Term loans/ Debt (4), Bank debt/ Debt (7), Δ Liabilities/ Assets (10), Asset growth (13), Δ Working capital/ Assets (16), Δ EBI/ Assets (19), Δ Cash/ Assets (22), Δ CapEx/ Assets (25), Δ Invested capital/ Assets (28) and Δ PPE/ Assets (31). Post equals one after 2016, and zero otherwise. Eligible equals one if the firm is an eligible firm and zero otherwise. The sample period is 2013 until 2018. I report t-values based on robust standard errors clustered at the firm-level in parentheses. ***, **, * denote significance at the 1, 5 and 10% level, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	Bond debt/Debt	Bond debt/Debt	Bond debt/Debt	Term loans/Debt	Term loans/Debt	Term loans/Debt	Bank debt/Debt	Bank debt/Debt	Bank debt/Debt	Liabilities/Assets	Liabilities/Assets	Liabilities/Assets
Post*Eligible	0.0475** (0.0209)	0.0489** (0.0211)	0.0361 (0.0220)	-0.0132 (0.0199)	-0.00431 (0.0194)	-0.00650 (0.0211)	0.00544 (0.0221)	0.00913 (0.0230)	0.0107 (0.0276)	0.0357 (0.0217)	0.0385* (0.0201)	0.0576*** (0.0206)
Eligible	0.138*** (0.0268)	0.131*** (0.0347)		-0.135*** (0.0286)	-0.0931** (0.0359)		-0.193*** (0.0293)	-0.119*** (0.0376)		-0.0628*** (0.0194)	-0.0594** (0.0230)	
Post	-0.00327 (0.0152)	-0.000514 (0.0167)		-0.0304** (0.0133)	-0.0321** (0.0161)		-0.0431** (0.0170)	-0.0395** (0.0200)		-0.0251 (0.0205)	-0.0328* (0.0187)	
Country x year FE	No	No	Yes	No	No	Yes	No	No	Yes	No	No	Yes
Industry x year FE	No	No	Yes	No	No	Yes	No	No	Yes	No	No	Yes
Firms FE	No	No	Yes	No	No	Yes	No	No	Yes	No	No	Yes
Controls	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes
Observations	1563	1278	1165	1560	1207	1105	1705	1336	1225	1894	1514	1366
Adjusted R^2	0.099	0.097	0.751	0.072	0.097	0.714	0.113	0.125	0.677	0.008	0.009	0.096

Bond debt/ Debt: .0445*

Term loans/ Debt: .0007

Bank debt/ Debt: 0.0126

Liabilities/ Assets: .0541***

(Post*Eligible coefficient of Model with country x year FE, industry x year FE and controls)

	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)
	Asset growth	Asset growth	Asset growth	WorkCap/Assets	WorkCap/Assets	WorkCap/Assets	EBI/Assets	EBI/Assets	EBI/Assets
Post*Eligible	0.0287 (0.0285)	0.0346 (0.0278)	0.0631** (0.0296)	-0.00277 (0.00931)	0.00557 (0.00793)	0.00606 (0.0113)	0.00610 (0.00413)	0.00591** (0.00233)	0.00802** (0.00333)
Eligible	-0.0724*** (0.0266)	-0.0781** (0.0319)		-0.00454 (0.00582)	-0.0107 (0.00684)		-0.00818* (0.00448)	-0.0109*** (0.00222)	
Post	-0.0183 (0.0260)	-0.0288 (0.0253)		0.00884 (0.00843)	-0.000228 (0.00714)		-0.00249 (0.00385)	-0.00253 (0.00191)	
Country x year FE	No	No	Yes	No	No	Yes	No	No	Yes
Industry x year FE	No	No	Yes	No	No	Yes	No	No	Yes
Firms FE	No	No	Yes	No	No	Yes	No	No	Yes
Controls	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes
Observations	1894	1514	1366	1894	1514	1366	1894	1514	1366
Adjusted R^2	0.006	0.015	0.120	0.000	0.021	-0.063	0.001	0.125	0.121

	(22)	(23)	(24)	(25)	(26)	(27)	(28)	(29)	(30)	(31)	(32)	(33)
	Cash/Assets	Cash/Assets	Cash/Assets	CapEx/Assets	CapEx/Assets	CapEx/Assets	InvCap/Assets	InvCap/Assets	InvCap/Assets	PPE/Assets	PPE/Assets	PPE/Assets
Post*Eligible	0.00713 (0.00598)	0.00742 (0.00482)	0.00543 (0.00696)	-0.0119** (0.00574)	-0.00568* (0.00295)	-0.00398 (0.00425)	0.0124 (0.0223)	0.0305 (0.0210)	0.0501** (0.0225)	-0.00558 (0.00897)	-0.00137 (0.00680)	0.00806 (0.00876)
Eligible	-0.00771** (0.00340)	-0.00223 (0.00341)		-0.000236 (0.00395)	0.0000616 (0.00549)		-0.0485* (0.0262)	-0.0509 (0.0365)		-0.0100* (0.00579)	-0.0100 (0.00637)	
Post	-0.00367 (0.00551)	-0.00232 (0.00423)		0.00682 (0.00560)	0.00119 (0.00261)		0.00207 (0.0195)	-0.0196 (0.0182)		0.000986 (0.00808)	-0.00328 (0.00535)	
Country x year FE	No	No	Yes	No	No	Yes	No	No	Yes	No	No	Yes
Industry x year FE	No	No	Yes	No	No	Yes	No	No	Yes	No	No	Yes
Firms FE	No	No	Yes	No	No	Yes	No	No	Yes	No	No	Yes
Controls	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes
Observations	1894	1514	1366	1894	1514	1366	1894	1514	1366	1894	1514	1366
Adjusted R^2	-0.001	-0.002	-0.170	0.002	0.012	0.621	0.004	0.040	0.517	0.003	0.011	0.057

Asset growth: .0537*; EBI: .0072 **; InvCap/ Assets: .0460 ** (Post*Eligible coefficient of Model with country x year FE, industry x year FE and controls)

Table 8.7: This table reports the results from the estimation of a panel regression analyzing the effect of CSPP. The dependent variables are Bond debt/ Debt (1), Term loans/ Debt (4), Bank debt/ Debt (7), Δ Liabilities/ Assets (10), Asset growth (13), Δ Working capital/ Assets (16), Δ EBI/ Assets (19), Δ Cash/ Assets (22), Δ CapEx/ Assets (25), Δ Invested capital/ Assets (28) and Δ PPE/ Assets (31). Post equals one after 2016, and zero otherwise. Treatment equals one if the firm is an investment grade firm and zero otherwise. The sample period is 2013 until 2018. I report t-values based on robust standard errors clustered at the firm-level in parentheses. ***, **, * denote significance at the 1, 5 and 10% level, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	Bond debt/Debt	Bond debt/Debt	Bond debt/Debt	Term loans/Debt	Term loans/Debt	Term loans/Debt	Bank debt/Debt	Bank debt/Debt	Bank debt/Debt	Liabilities/Assets	Liabilities/Assets	Liabilities/Assets
Post*Treatment	0.0470*	0.00954	0.0580*	0.00751	0.0163	0.00251	-0.0102	0.0130	-0.00839	0.0492	0.0171	-0.00457
	(0.0264)	(0.0280)	(0.0302)	(0.0232)	(0.0275)	(0.0359)	(0.0290)	(0.0312)	(0.0417)	(0.0465)	(0.0412)	(0.0282)
Treatment	-0.0243	-0.00776		-0.0277	-0.0114		-0.0301	-0.0154		-0.0566	-0.0425	
	(0.0366)	(0.0400)		(0.0354)	(0.0386)		(0.0380)	(0.0401)		(0.0427)	(0.0373)	
Post	-0.0227	0.00974		-0.0415**	-0.0426*		-0.0346	-0.0410		-0.0483	-0.0258	
	(0.0236)	(0.0254)		(0.0202)	(0.0248)		(0.0260)	(0.0282)		(0.0457)	(0.0404)	
Country x year FE	No	No	Yes	No	No	Yes	No	No	Yes	No	No	Yes
Industry x year FE	No	No	Yes	No	No	Yes	No	No	Yes	No	No	Yes
Firms FE	No	No	Yes	No	No	Yes	No	No	Yes	No	No	Yes
Controls	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes
Observations	1563	1278	1165	1560	1207	1105	1705	1336	1225	1894	1514	1366
Adjusted R^2	0.000	0.036	0.746	0.004	0.072	0.711	0.007	0.095	0.673	0.003	0.004	0.085

	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)
	Asset growth	Asset growth	Asset growth	WorkCap/Assets	WorkCap/Assets	WorkCap/Assets	EBI/Assets	EBI/Assets	EBI/Assets
Post*Treatment	0.0632	0.0351	-0.00162	-0.00574	-0.00492	-0.00200	0.00187	0.00374	0.00508
	(0.0582)	(0.0561)	(0.0342)	(0.0130)	(0.0144)	(0.0157)	(0.00419)	(0.00362)	(0.00412)
Treatment	-0.0718	-0.0642		0.00674	0.00566		-0.00154	-0.00481	
	(0.0537)	(0.0510)		(0.00711)	(0.00794)		(0.00405)	(0.00317)	
Post	-0.0557	-0.0378		0.0121	0.00697		-0.00125	-0.00227	
	(0.0569)	(0.0548)		(0.0118)	(0.0140)		(0.00323)	(0.00345)	
Country x year FE	No	No	Yes	No	No	Yes	No	No	Yes
Industry x year FE	No	No	Yes	No	No	Yes	No	No	Yes
Firms FE	No	No	Yes	No	No	Yes	No	No	Yes
Controls	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes
Observations	1894	1514	1366	1894	1514	1366	1894	1514	1366
Adjusted R^2	0.002	0.012	0.111	-0.000	0.020	-0.065	-0.002	0.109	0.115

	(22)	(22)	(24)	(25)	(26)	(27)	(28)	(29)	(30)	(31)	(32)	(33)
	Cash/Assets	Cash/Assets	Cash/Assets	CapEx/Assets	CapEx/Assets	CapEx/Assets	InvCap/Assets	InvCap/Assets	InvCap/Assets	PPE/Assets	PPE/Assets	PPE/Assets
Post*Treatment	-0.00305	-0.00409	-0.00779	0.00789	0.00531	0.00496	0.0568	0.0220	0.0102	0.0176	0.0137	0.00874
	(0.00695)	(0.00718)	(0.0106)	(0.00516)	(0.00451)	(0.00596)	(0.0434)	(0.0402)	(0.0246)	(0.0124)	(0.0110)	(0.00962)
Treatment	0.00151	0.00342		-0.00886	-0.0140*		-0.0575	-0.0326		-0.0137	-0.0153	
	(0.00407)	(0.00409)		(0.00607)	(0.00760)		(0.0490)	(0.0490)		(0.0110)	(0.0101)	
Post	0.00197	0.00479		-0.00485	-0.00611		-0.0376	-0.0208		-0.0156	-0.0149	
	(0.00586)	(0.00677)		(0.00345)	(0.00423)		(0.0422)	(0.0390)		(0.0113)	(0.0104)	
Country x year FE	No	No	Yes	No	No	Yes	No	No	Yes	No	No	Yes
Industry x year FE	No	No	Yes	No	No	Yes	No	No	Yes	No	No	Yes
Firms FE	No	No	Yes	No	No	Yes	No	No	Yes	No	No	Yes
Controls	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes
Observations	1894	1514	1366	1894	1514	1366	1894	1514	1366	1894	1514	1366
Adjusted R^2	-0.002	-0.002	-0.169	-0.000	0.025	0.580	0.002	0.037	0.511	0.000	0.011	0.052

8.1 Regression figures based on eligibility criteria

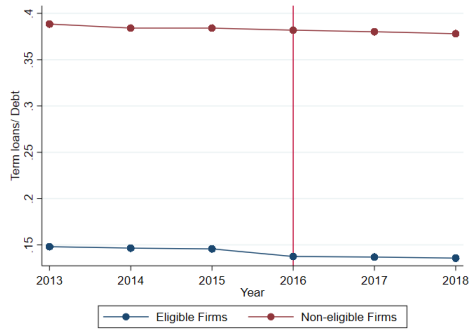


Figure 8.16: Ratio Term loans/ Debt

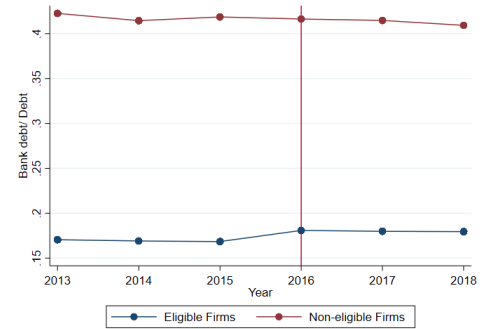


Figure 8.17: Ratio Bank debt/ Debt

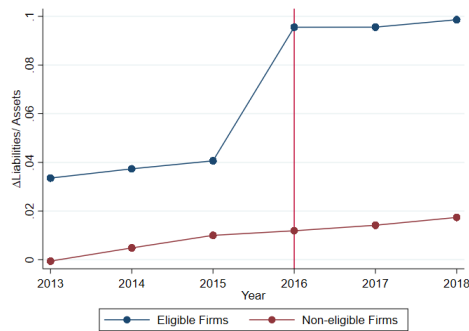


Figure 8.18: Δ Liabilities/ Assets

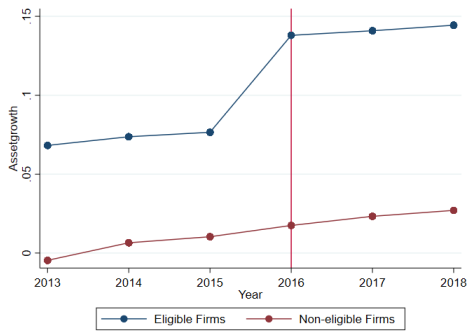


Figure 8.19: Asset growth

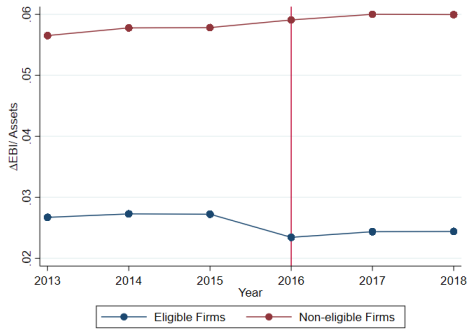


Figure 8.21: ΔEBI/Assets

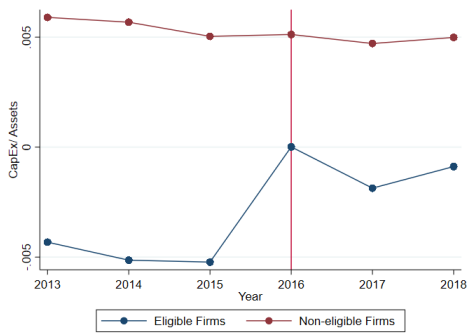


Figure 8.23: Ratio CapEx/Assets

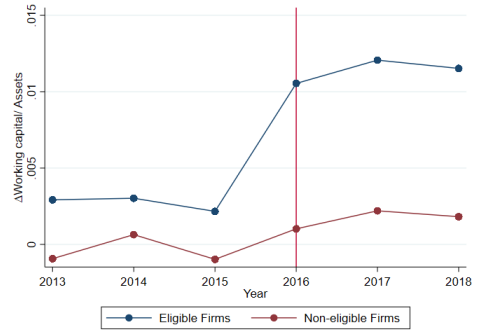


Figure 8.20: ΔWorking capital/Assets

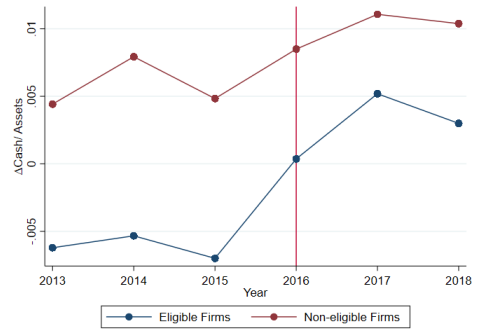


Figure 8.22: ΔCash/Assets

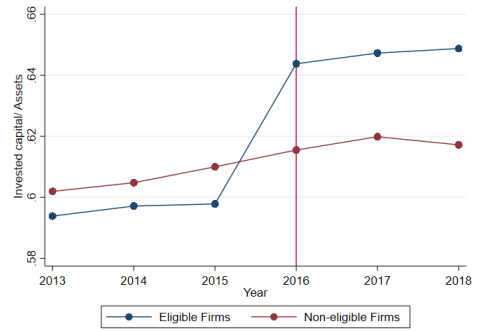


Figure 8.24: Ratio Invested capital/Assets

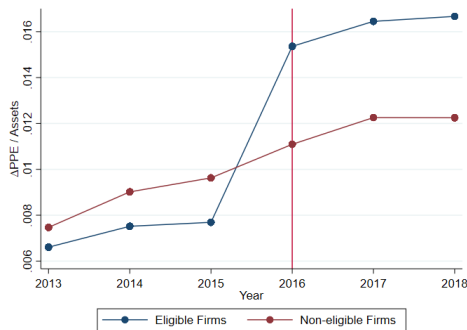


Figure 8.25: ΔPPE/Assets

8.2 Regression figures based on time-varying actual purchases

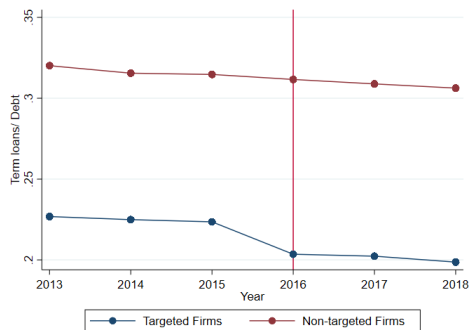


Figure 8.26: Ratio Term loans/ Debt

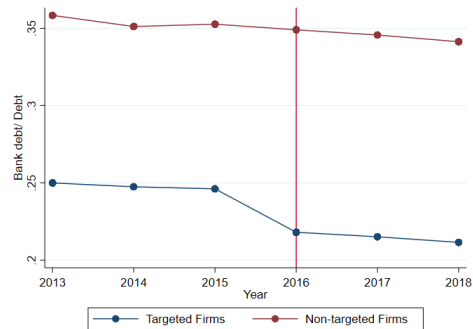


Figure 8.27: Ratio Bank debt/ Debt

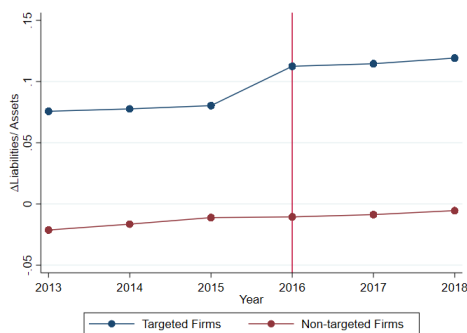


Figure 8.28: Δ Liabilities/ Assets

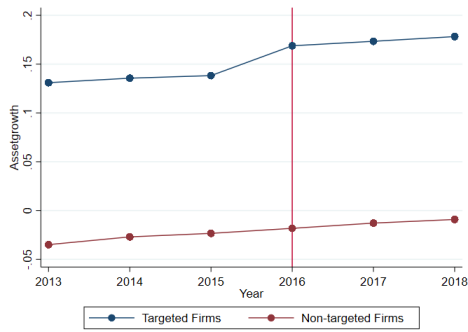


Figure 8.29: Asset growth

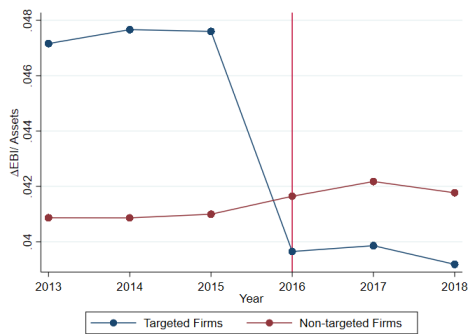


Figure 8.31: ΔEBI/ Assets

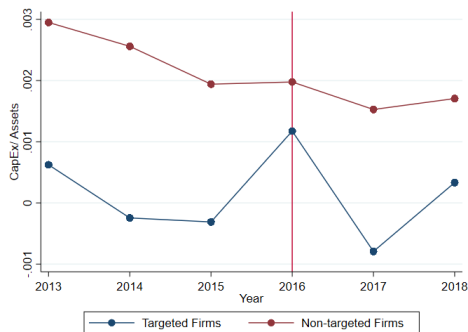


Figure 8.33: Ratio CapEx/ Assets

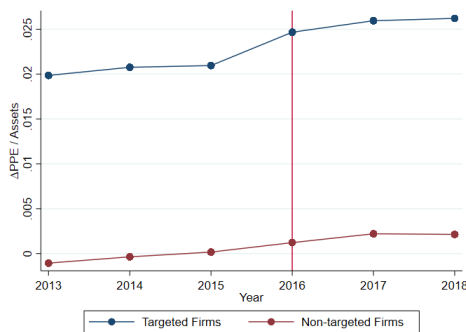


Figure 8.35: ΔPPE/ Assets

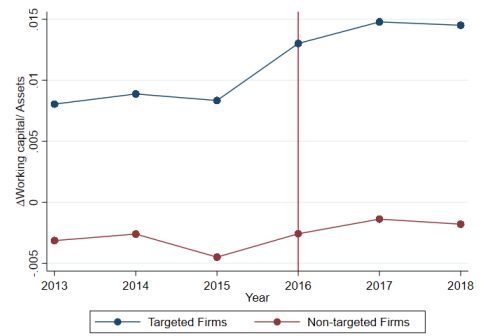


Figure 8.30: ΔWorking capital/ Assets

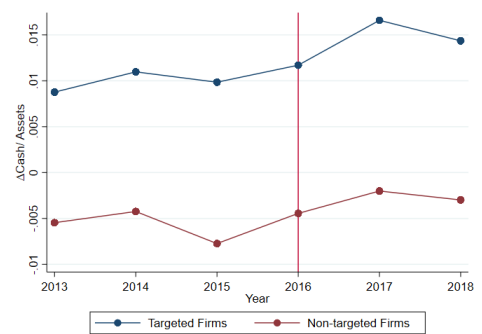


Figure 8.32: ΔCash/ Assets

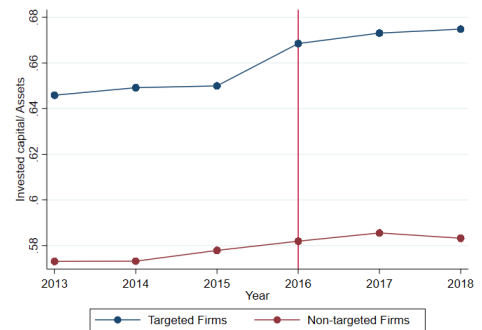


Figure 8.34: Ratio Invested capital/ Assets

8.3 Parallel trend assumption: eligible firms and non-eligible firms

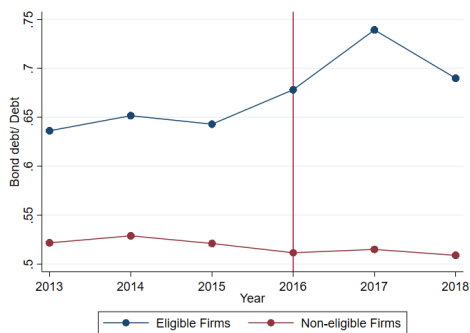


Figure 8.36: Ratio Bond debt/ Debt

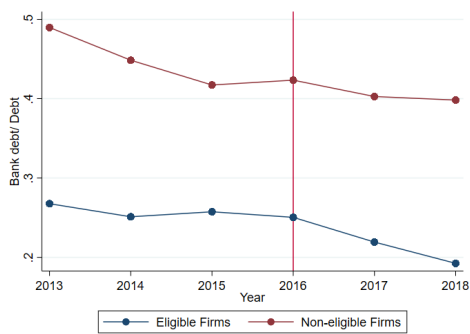


Figure 8.38: Ratio Bank debt/ Debt

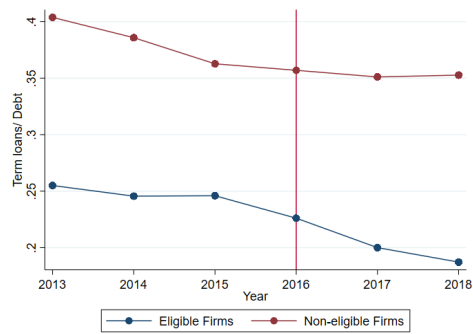


Figure 8.37: Ratio Term loans/ Debt

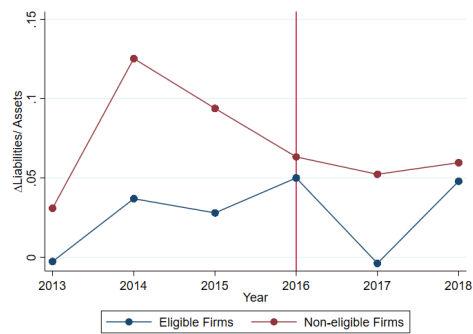


Figure 8.39: ΔLiabilities/ Assets

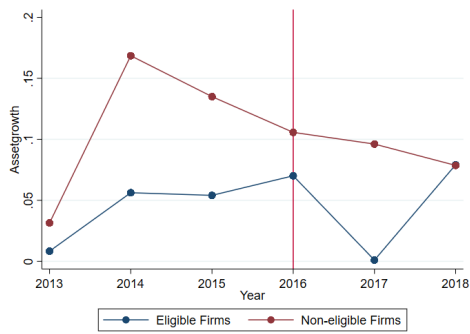


Figure 8.40: Asset growth

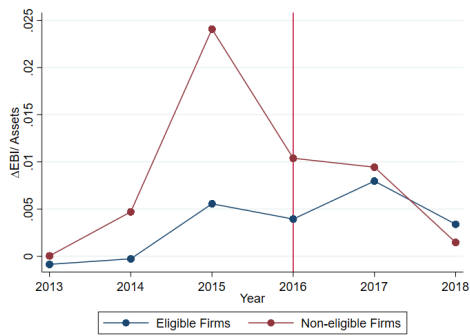


Figure 8.42: ΔEBI/ Assets

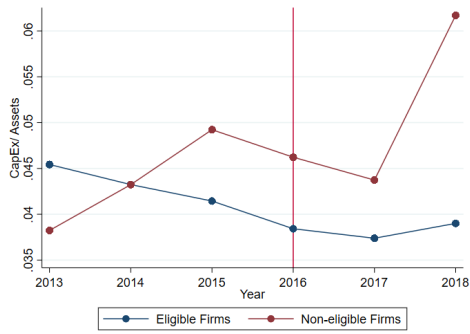


Figure 8.44: Ratio CapEx/ Assets

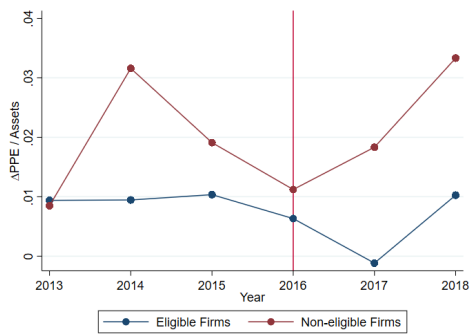


Figure 8.46: ΔPPE/ Assets

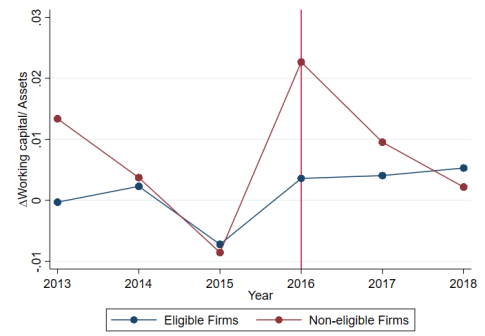


Figure 8.41: ΔWorking capital/ Assets

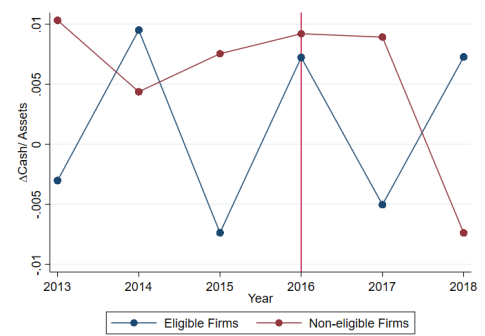


Figure 8.43: ΔCash/ Assets

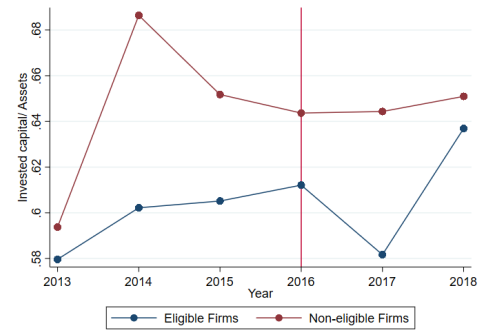


Figure 8.45: Ratio Invested capital/ Assets

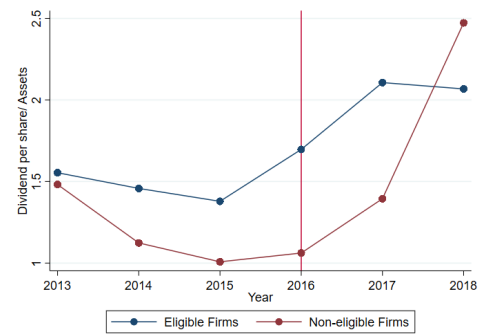


Figure 8.47: Dividend per share

Table 8.8: This table reports the results from the estimation of a panel regression analyzing the effect of CSPP. The dependent variable is Bond debt/ Debt. The column (1) presents the effect of the PSPP on eligible firms and column (2) shows the effect of the PSPP on targeted firms. The sample period is 2013 until 2015. I report t-values based on robust standard errors clustered at the firm-level in parentheses. ***, **, * denote significance at the 1, 5 and 10% level, respectively.

	(1)	(2)
	Bond debt/Debt	Bond debt/Debt
Post*Eligible	0.00382 (0.0208)	
Purchased		0.00313 (0.0204)
[1em] Country x year FE	Yes	Yes
Industry x year FE	Yes	Yes
Firms FE	Yes	Yes
Controls	Yes	Yes
Observations	541	541
Adjusted R^2	0.656	0.655

Variables

Bond debt/ Debt	Total bond debt divided by total debt
Term loans/ Debt	Total term loans divided by total debt
Bank debt/ Debt	Total bank debt divided by total debt
ΔLiabilities/ Assets	The change in total liabilities divided by lagged total assets
Asset growth	The change in assets divided by lagged total assets
ΔWorking capital/ Assets	The change in working capital divided by lagged total assets
ΔEBI/ Assets	The change in EBI divided by lagged total assets
ΔCash/ Assets	The change in cash divided by lagged total assets
Capex/ Assets	Capital expenditures divided by lagged total assets
Invested capital/ Assets	Invested capital divided by lagged total assets
ΔPPE/ Assets	The change in PPE divided by lagged total assets
Div	Dividend per share
Bonds	Total number of issued bonds by a firm
Proceeds	Total proceeds of issued bonds by a firm
MB	Market to book ratio
BAS	Bid-ask spread
LnAssets	Natural logarithm of total assets
Prof	Profitability