Where did the money go? Impact of the ECB's Corporate Sector Purchase Program on eurozone corporate spending

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Abstract

Slow corporate growth and a lack of corporate investment has plagued European markets for the past decade. As a response, the ECB began the Corporate Sector Purchase Program (CSPP) in 2016 to provide liquidity to corporate debt markets through bond purchases. Four years after the start of the program, this paper assesses its impact by looking at how companies spent this money on a micro level. In particular, it looks at the impact of long-term debt on five expenditures (fixed assets and R&D, cash balances, short-term debt, cash to shareholders, and share buybacks). We test these hypothesized expenditures based on financial statement panel data from a selection of European firms whose bonds were purchased by the ECB. The results show an increase in financial expenditures including cash balances and short-term debt and a decrease in productive investment expenditures such as fixed assets and R&D. This indicates a lack of efficacy of the corporate bond purchase program as excess liquidity provided by the ECB went towards eurozone companies refinancing existing debt rather than investing in growth ventures.

JEL Codes: G3, O16, E58

Keywords: corporate investment, capital expenditure, financial markets, ECB, monetary policy

1. Introduction

After the financial crisis of 2008, economies around the world have undergone prolonged and painful periods of recovery. Despite the stimulative measures taken by Central Banks around the world, there are still lasting impacts in the market today. Perhaps most common among these impacts is the persistence of low interest rates across Asia, Europe, and North America. It is due to these low rates that Central Banks have been forced to resort to increasingly creative tactics to encourage economic growth. This paper in particular studies the European Central Bank's use of quantitative easing and the effect that this has had on companies in the eurozone.

The ECB's Asset Purchase Program (APP), involved large scale purchases of eurozone assets with the Bank's own balance sheet. As a part of this program, the ECB purchased a total of 245 billion EUR assets from March 2015 to December 2018. While there have been some positive impacts, overall growth targets remain elusive. This is why recently the ECB has decided to restart the APP on November 1st, 2019 a second time. The APP itself is comprised of four different asset classes and programs: (1) the corporate sector purchase program (CSPP), (2) public sector purchase program (PSPP), (3) asset-backed securities purchase program (ABSPP), and the covered bond purchase program (CBPP3). The most recent publicly released update of net APP holdings was a sum of 2.6 trillion EUR in assets on the ECB's balance sheet at the end of January 2020. Of this, 187 billions of corporate bonds specifically were held in the CSPP, which is roughly 2.5% of the 7.35 trillion European corporate bonds outstanding in the market today.

Despite its prevalence in European financial markets today, the use of asset purchases or "quantitative easing" by Central Banks is a recent development in the scope of Europe's long financial history. Longer-term impacts on the behavior of market actors has not been studied.

The majority of literature examining APP impacts look at only a short window of time directly before and after the start of the program (2015-2017). 2020 is thus the perfect time to update this body of work by examining medium-to-long-term impacts. In particular, this thesis investigates the reasons why this stimulus did not in fact manifest into growth of the European economy.

The previous work was limited in scope due to two reasons: (1) time constraint, and (2) the intention for the APP to be a short-term stimulus. In terms of the former, previous researchers focused on the two year window immediately before and after the APP start. Unfortunately, this can only capture minor changes such as change in issuance volume or number of bonds in the market. Longer-term impacts such as change in corporate behavior require time to manifest. While new corporate projects and investment cannot be initiated overnight, the four year timeline that researching this topic in 2020 gives us leaves ample time for companies to develop new projects.

The latter constraint refers to the fact that initially the APP was supposed to only give a short-term liquidity injection into European markets. Traditionally, Central Bank stimulus measures are made to support the economy during times of waning growth or low liquidity. Any long-term support would be unsustainable for the Central Bank's balance sheet and contrary to the goal of free market systems in the effected nations. As the past decade has shown, however, the ECB's involvement in holding eurozone assets has become a fixture of Europe's financial system. While there was initially some rise in inflation rates, growth has not picked up significantly, averaging approximately 0.5% real GDP growth consistently since the crisis. This is significantly lower than the average of 2.6% real GDP growth in the decade prior to the crisis. Furthermore, the amount of negative yielding eurozone assets continues to grow to this day. This

lack of pick up in GDP growth and financial market activity is why after the ECB made four primary waves of purchases in the first round of the APP.

1.1 Research Goal

To narrow down the scope, this paper will study the Corporate Sector Purchase Program (CSPP) in particular. This means it will focus on the transmission mechanisms for growth on the firm rather than the consumer side. When the ECB initially began purchases of corporate bonds, the entrance of this large investor resulted in more trading liquidity in the corporate bond market. Studies by Todorov (2017), Lyonnet and Werner (2012), and Duca, Nicoletti & Martínez (2016) have all found evidence that companies issued more debt during periods of quantitative easing in Europe, the UK, and the US respectively. Todorov (2017) found this was true specifically in the case of the companies issuing debt to target the ECB's criteria of bonds eligible for purchase. What is less clear, however, is whether this increased borrowing actually resulted in increased corporate spending and investment. Thus, this paper explores how the companies allocated the additional capital they acquired through these debt issuances. Looking at financial statements, this thesis seeks to look at whether there was evidence of companies using this capital to fuel new projects or whether corporate spending for investment increased at all. Drawing from traditional indicators of firm growth common to the corporate finance literature, we will then look into five potential sources of expenditure that companies may have directed this additional debt funding towards: (1) fixed assets or research and development, (2) cash balances or bank deposits, (3) short-term debt payments, (4) cash to shareholders, or (5) share buybacks. Both firm-specific micro controls (total assets and age) and macro controls (interest rate and the Composite Leading Indicator) will be used to isolate the effect of the CSPP on each of these

metrics. If firms are shown to be spending more in unproductive expenditures compared to growth investments, this could be one explanation as to why there is a lack of broad economic pickup in response to the Asset Purchase Program.

This research is necessary as an assessment of the effectiveness of the ECB's stimulus measures. In particular, assessing the specific impacts on companies will allow the ECB to detail more specific guidelines and targets for future stimulus packages. If there was a significant pickup in investment or new projects by companies, this shows that QE was indeed an effective tool. This could potentially mean that external or macro factors are the culprit behind why corporate growth had not picked up, not a lack of effort on the companies' parts. On the other hand, if companies did not invest in productive capital, then perhaps adjustments will need to be made to future rounds of QE. Instead of indiscriminate no-strings-attached buying of debt, the ECB may be better off attaching covenants to ensure companies actually use the capital towards development.

In order to tackle this question, it is important to first consider the topics explored in the current literature that provide context around the market impacts that the APP has caused in section 2. Then, section 3 will provide an analysis of the theory behind QE itself, and disconnect between practical impacts will highlight the importance of this question and guide subsequent analysis. To set up the empirical analysis and provide background, section 4 outlines data sources and provides summary statistics on eurozone debt issuances and the firms used for study. Next, section 5 outlines an empirical framework to understand the impact of debt on corporate spending. Section 6 analyzes the five specific hypothesized sources of expenditure outlined

above. Lastly, section 7 will lead to discussion of policy implications and any potential flaws in this model.

2. Related Literature

The body of literature examining similar topics can be divided into two types: (1) those that examine macroeconomic market impacts of the CSPP, and (2) those that more generally examine the microeconomic impacts of debt on corporate growth.

2.1 Literature on CSPP Impacts

The overwhelming majority of the literature on the ECB's APP centers around macroeconomic analysis of impacts to GDP, inflation, and interest rates. In Gambetti and Musso's (2017) paper, they find that inflation did in fact pick up in the short-term with strong effects carrying over to the medium-term. In terms of GDP, short-term positive effects were strongest. They cite the credit channel as one of four transmission mechanisms of this pickup in economic activity, but do not specifically analyze the corporate credit market. Andrade et al. (2016) corroborates this claim, specifically examining sovereign bonds as a mechanism for stimulating growth. Other papers such as Bernoth, et al. (2016) analyze effects on how Central Bank quantitative easing impacts bank financing availability to firms. They find that the purchase of sovereign bonds drove domestic interest rates lower spurring more availability of bank financing. This meant that bank-extended credit was more readily available for corporations. The consensus in all of these papers is that there was some degree of economic activity spurred by the asset purchases in the time period. Due to the broad range of assets that

were purchased, it is difficult to reach a conclusion on any one specific asset impacting macro-level growth significantly. The only definitive conclusion we can reach is that there was some pick-up in GDP, inflation, and market liquidity during the period of time immediately following the APP. This paper seeks to take a more micro-level approach by analyzing the specific growth transmission channel of European companies that is currently missing from the literature.

In terms of debt markets specifically, from the primary market issuance side, Todorov (2017) found evidence that corporations issued more debt during the period of QE specifically targeting the ECB's need to buy paper of a certain yield and maturity. The criteria itself includes requiring bonds to have a maturity of 6 months to 31 years and a rating above BBB. Some of Todorov's summary statistics were mapped to visualize: (1) the skewed distribution towards the cutoff of QE-eligible ratings (BBB's), (2) an increase in trading volume of QE-eligible bonds and all corporate bonds immediately after the program began, and (4) a time series analysis of lower mean bond yields across the board. This signals a major distortion in debt markets triggered directly by the APP. Since then, there are three potential actions that corporations could have taken: (1) used the capital raised from these debt instruments to reinvest and grow, (2) used this capital to refinance existing debt or kept it as cash balances, or (3) distributed this capital in the form of dividends or retained earnings. If it is found that the capital is being used towards (2) or (3), this could be a part of the reason why there has been little pick up in European economic activity despite the stimulus measures. In Grosse-Rueschkamp, Steffen, and Streitz (2017), they deduce that the ECB's lack of discretion in choosing which specific bonds to purchase has resulted in firms with lower credit ratings turning towards the credit markets. Whereas previously they would have gone towards bank financing, the knowledge of the Central Bank's

open call for bonds to buy resulted in their taking advantage of this opportunity instead. Under this categorization, he concluded that for corporations who could issue in either the QE-eligible or QE-ineligible bond market, there was a bias towards the QE-eligible market, particularly on the cusp between eligible and ineligible ratings. The issue with these riskier companies taking advantage of market liquidity is that the risks are masked by the excess demand in the market generated by the ECB as a large investor. This results in more BBB debt that previously would have been too illiquid to issue flooding the market. Investors that hold this debt then expose themselves to higher default risk that, during a time of economic recession, could see rapid downgrades and loss in value. The logical next step then is to see where corporations spent the debt financing that they were able to obtain during this time period and if investors should worry about the risky debt they are holding. Delving into the financial statements of these companies will allow this paper to identify whether this debt is resulting in risky, unproductive expenditures or long-term productive growth expenditures such as capital expenditures or asset acquisition.

2.2 Literature on impacts of debt on corporate growth

Looking at the financial statements involves a more microeconomic assessment of corporate spending and investment. Many papers have looked at the effect of increased debt levels on firm growth in different global markets. Toy et al. (1974) found that growth rate in assets was a highly significant indicator of debt ratio magnitude in nearly all developed nations manufacturing sectors, except for France. This means that higher debt ratios should be indicative of higher growth rates in assets. However, they did not examine the potential for an inverse relationship – the impact that taking on more debt has on asset growth. Furthermore, they examine only the manufacturing sector, which has changed dramatically since 1974. Iqbal,

Hameed, and Ramzan (2012) looks at the Karachi Stock Exchange's KSE100 companies and the effect that additional debt issuances have on their market-to-book ratio. They rejected the null hypothesis that increases in debt-to-asset ratios resulted in decreases to market-book ratios. This can only tell us that taking on more debt is not necessarily harmful to company valuations. Wu, Sercu, and Yao (2002) find evidence in Japanese markets that there is in fact a positive correlation between increased leverage and market-to-book ratio. Taken together, these three point to higher debt ratios being beneficial for growth prospects or company valuations.

On the other hand, Myers (1977) looks at corporate growth opportunities as call options whose value depend on future investment by the firm. He posits that the present market value of a firm is comprised of the sum of the current market value of assets and the present value of all future investment opportunities. Since there is a risk that the firm chooses not to pursue future investment opportunities, the present value of all future investment opportunities is effectively equivalent to the present value of the firm's options to make investments. He finds that issuing risky debt is a suboptimal investment strategy because it reduces the present value of all future investment opportunities regardless of whether or not the option is taken to actually spend on future investment. In this sense, excessive leveraging of risky debt is detrimental to firm value given the risk of future growth investments. These conflicting views on the advantages and disadvantages of leverage are consistent throughout the literature studying debt impacts on company growth. This means that there is not a straightforward relationship linking debt issuances and firm growth. A deeper-dive look at precisely where firms spend debt financing is needed to reach any conclusion. This paper seeks to provide this specific analysis by not only analyzing the effect that debt has on broad corporate valuations but also the effect that debt has

on expenditures that we classify as productive (fixed asset acquisition and R&D) or unproductive (short-term debt, cash balances, shareholder returns, share buybacks).

The last remaining angle to look at is how rapidly companies are willing to adjust their capital structure in response to changing prices of debt compared to equity financing. Hovakimian and Li's (2011) study finds that the theory of companies adjusting to specific debt-equity targets overestimates the importance of debt ratios in corporate decision making. Finding that average speed of adjustment towards target debt issuances for a panel of firms is only 5-8% per year, they argue that this suggests target capital structures are not a high priority goal for the average firm. This means that the possibility of excessive leveraging simply due to changes in financing costs is very possible. Changing their capital structure is a tool that firms readily use in response to changing relative financing costs. Since the CSPP purchases of debt provided cheap and ready financing, it is then a reasonable hypothesis that firms overleveraged to take advantage of these debt issues with little regard for negative impacts it may have had on their capital structure and firm sustainability. This paper seeks to explore if this hypothesis is correct in that firms are excessively taking on debt without using it towards productive expenditures. If this is the case, this could be a reason why the CSPP is not leading to the growth in corporate growth that the ECB seeks.

The above discussions shows how, theoretical papers have examined either the CSPP or the impact of debt on corporate growth. This paper will contribute by combining these two elements to look at corporate growth impacts specifically resulting from the CSPP. This will help provide a micro-level analysis of the specific impact of Central Bank stimulus measures on

companies. It will similarly contribute to the body of work regarding impacts of leverage on corporate growth by providing empirical analysis into where companies spent the excess capital they acquired as a result of QE-induced market liquidity. The specific analysis of whether they spent the capital on productive acquisition of assets or on unproductive expenses will provide an additional layer of analysis on the link between debt acquisition and company growth prospects.

3. Theoretical Framework

The most directly relevant theory is the conventional bank channel of monetary policy and what one would expect to see out of the market afterwards. Central Banks conventionally argue that purchasing assets increases money supply. This in turn lowers rates and allows for cheaper borrowing by banks and thus the extension of credit by these banks to firms and consumers. More money in the system for firms and consumers to spend boosts the economy as we see the circulation of capital and investment in firm growth.

The other benefit of QE is its signaling effects as an indicator that the Central Bank is committed to prolonging the expansionary period as opposed to putting the brakes on rapid growth. The result should be more investment in the short-term and a pickup in economic activity if market actors buy into this sentiment effect. As the eurozone macro data shows, however, QE is not producing the desired pickup in economic activity. These results show that there is a deviation from the theory behind why QE should work, and this paper seeks to zero in on one aspect of why this theory is not playing out as expected.

Applied to the corporate sector, the ECB's assets purchases should lead to a liquidity injection in debt markets, which in turn means companies have easier access to funding. According to the Modigliani-Miller theorem on capital structure, levered firms should have higher valuations than unlevered ones. This is based on the fact that issuing equity results in taxation which can be avoided with debt issuances. They visualize this relationship as the valuation of a levered firm being the sum of the valuation of an unlevered firm and the corporate tax rate multiplied by amount of debt issued. However, the Traditional Theory of Capital Structure argues that there is an optimal level of debt and equity beyond which additional leverage begins decreasing firm value. A company with zero leverage for example will have a WACC exactly equal to their cost of equity financing, which can be reduced by adding debt. At the point at which marginal cost of debt equals the marginal cost of equity, increasing debt will again increase WACC. Thus there is a "sweet spot" of balancing equity and debt financing. The relevance of this is that artificially cheapened debt financing for select companies by the ECB may shift where this "sweet spot" is, to a point where the "sweet spot" is weighted towards more debt. While this is not necessarily harmful in the short-run, in the long-run when the ECB eventually reduces its balance sheet, companies will once again have to face previously higher costs of debt financing if the market is not able to sustain liquidity. This could be why there is a lack of sustained corporate growth following the APP.

Based on these principles, my paper seeks to look at if the additional debt financing impacted firm valuations and growth prospects positively, by allowing for more investment in productive assets; or negatively, by overleveraging with no change in growth prospects.

4. Data

There are four data sets I cross-referenced to obtain the necessary data: (1) The ECB Statistical Data Warehouse's dataset on gross debt issuances, (2) The ECB's list of CSPP bond purchases, (3) Bloomberg data on bond issuances and volumes, and (4) The Amadeus Financials Database with semiannual financial statements of European corporates.

The first dataset is from the ECB's statistical data warehouse which contains macro data on gross issuances, net issuances, growth rates, and amounts outstanding of European debt. The specific breakdowns include by maturity (long-term vs short-term) and institution (financial corporate, non-financial corporate, central government, and other general government). This data is useful in drawing initial conclusions about changes in market size and types of debt in the market. The frequency is monthly which should be sufficient considering the 20-year span of the data from 2000-2020 I use to draw the broad conclusion. Of this, the effects of broad asset purchases can be seen in the last 5 years, from 2015-2020 during which the APP was in effect. The purpose of this particular dataset is to visualize some overall trends in European debt issuances.

The other three datasets are used to examine the specific question of how CSPP companies spent their money. ECB weekly bond purchases by ISIN number enabled us to draw out a list of approximately 300 companies whose bonds were purchased by the ECB. Of these 300 companies, 200 companies issued in the primary market during the period of QE. The Bloomberg database on historical bond issuances allowed for the differentiation between these primary market-issuing firms and other secondary-market bonds. Since secondary market

purchases mean that the bonds were issued previously by companies and the ECB is simply now holding them instead of any other investor, it does not provide much insight into changes in firm behavior. On the other hand, primary market purchases mean that the bonds were newly issued by firms during that specific time period. This is a much more direct and intentional action on the firm's part, which is why this paper focuses only on the primary market bonds.

Lastly, the Amadeus Financial Database with annual financial statements for each firm allows for the examination of specific expenditures. Since the most interesting contribution this paper seeks to make is to focus at the micro level on how companies used the extra debt, this involved a deep dive into both income statements and balance sheets. In particular, sales and earnings were pulled from the revenue side of the income statement and R&D and interest expense figures were pulled from the expenses side. Asset balances, including fixed, intangible, and total, will be the primary area of focus on the balance sheets.

The issues that typically arise with cross-referencing datasets should be minor in this case. This is because ISIN numbers provide a way of standardizing bonds between the ECB's purchases and the Bloomberg database. There were some minor issues transferring company names between Bloomberg and the Amadeus database, but this only resulted in the loss of a few small companies. As the remaining panel data of 1228 data points provides enough data for analysis, these select few companies were omitted.

4.1 Summary Statistics

Primary summary statistics on the data in Figure 1 shows how short-term corporate debt showed little change during the past two decades. Long-term corporate debt, however, rose at a steady pace. This is part of the reason why my research will focus on the effect of increased long-term debt on corporate behavior. Furthermore, it is clear the level of debt began to rise at the end of 2008 around the start of both the European debt crisis and when the ECB began purchasing some covered bond assets. We similarly see in Figure 2 a sharp spike in growth rate of year-on-year long-term debt from 4% in 2008 to 20% in 2009. The start of the expanded and formalized Asset Purchase Program was 2015, during which time we predictably see a dip in debt outstanding immediately prior to the program start and then continued growth after it's start. Figure 2 maps out the growth rates in debt, and also shows a sharp spike in the growth rates for both short-term (from -2% to 25.6%) and long-term debt (from 1% to 17%) in 2017. While short-term debt appears to revert to lower growth rates in the two subsequent years, long-term debt growth rates appear to be rising again in 2019. This could in part be attributed to the announcement of the second-wave of the CSPP program in late 2019.

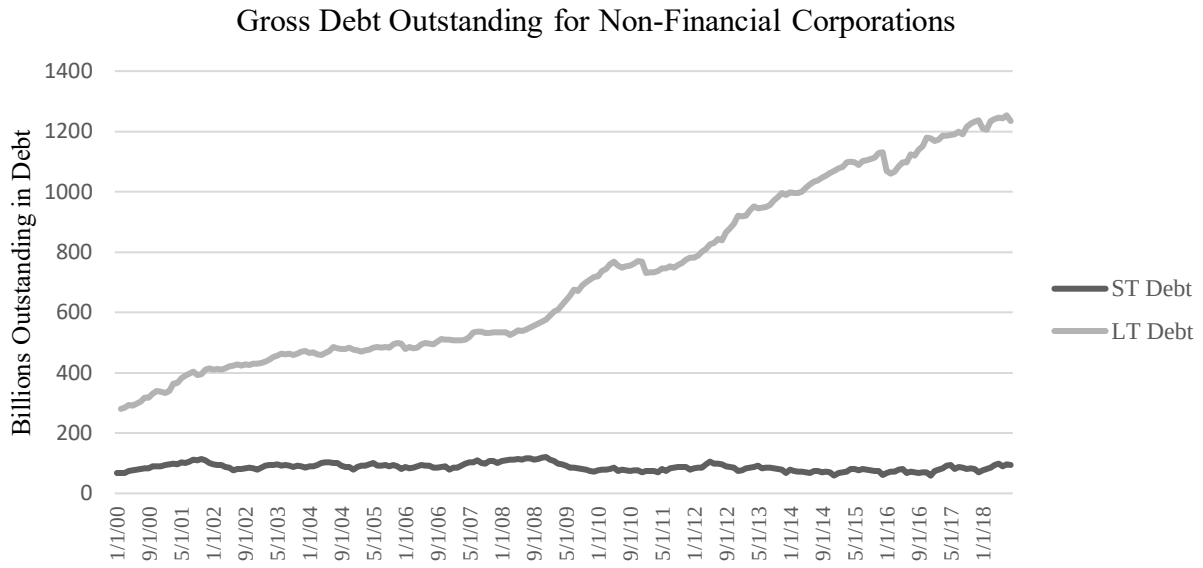

Fig. 1. Short-term and long-term non-financial corporate debt outstanding in the eurozone from 2000-2020. All figures expressed in real terms based on monthly inflation rate data from the ECB.

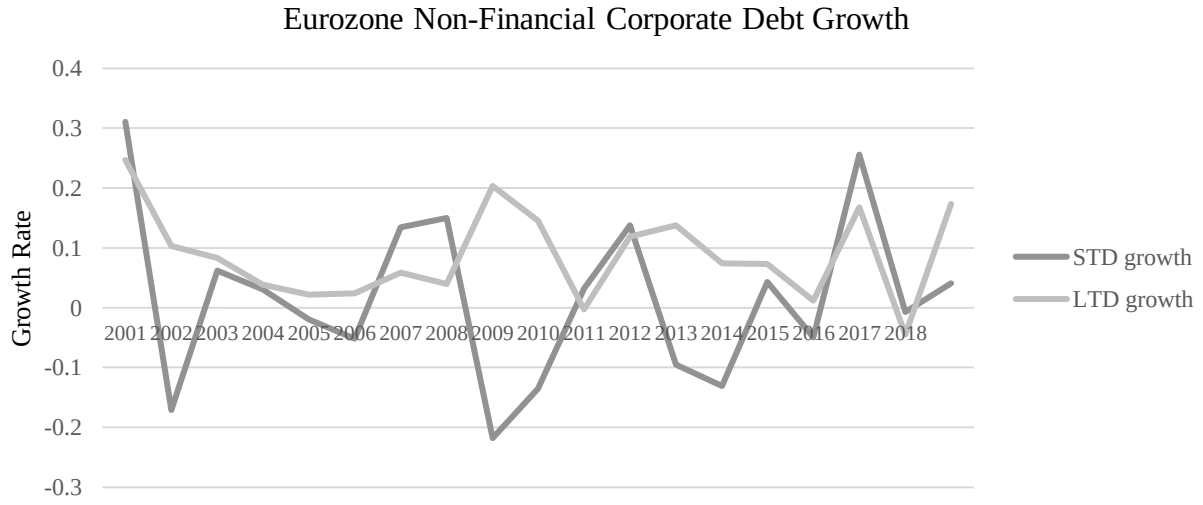

Fig. 2. Based on Fig. 1., short-term and long-term annual non-financial corporate debt growth rate from 2000-2020

For the 200 firms used in this study, summary statistics in Table 1 display various characteristics of these firms. As these were all classified in the database as very large firms, they had either over 100 million EUR in operating revenue or over 200 million EUR total assets, or over 1000 employees.

Table 1. Summary Specs for Firms Under Study

	Operating Revenue, billion EUR		**Total Assets, billion EUR**		**Long-Term Debt, billion EUR**	
	Pre-QE*	Post-QE**	Pre-QE	Post-QE	Pre-QE	Post-QE
Mean	15.9	16.6	28.8	32.6	6.4	7.2
	(26.7)	(31.1)	(49.3)	(59.9)	(10.8)	(13.9)
Quartiles						
25%	1.4	1.4	4.4	5.6	1.2	1.4
50%	5.3	5.1	10.5	11.8	2.6	3.2
75%	19.1	19.0	28.4	32.8	6.9	7.4

Note: Standard Deviation in Brackets.
*Pre-QE time period spans 2000-2016
**Post-QE time period spans 2016-2019

On average, there were increases in operating revenue, total assets, and long-term debt after the start of QE. In particular, for total assets and long-term debt, we see increases across each quartile. There is also fairly high variance between the firms in all of these three categories. Since the 50% quartile values tend to be much lower than the means, it points to the top quartile of firms being significantly larger than the second quartile. These firms have large amounts of assets, operating revenue, and debt that greatly influence the data and results it may yield. As these are the firms which were impacted by the CSPP, this skew should not matter as we are not seeking to generalize the results onto any larger population of firms. Geographically, Table 11 in the appendix shows that these firms are spread across 13 countries and dispersed evenly across regions in these countries. The largest concentrations of these firms are situated in Paris and Hauts-de-Seine, France and Roma, Italy. By country, France, Germany and the Netherlands are the most well-represented. Again, the overrepresentation of certain countries relative to others is not an issue as we do not seek to generalize this to any larger set of companies.

4.2 Dependent and Independent Variables

Table 2 provides a brief description of each of the variables drawn from the data and used in the empirical models. Furthermore, for some ambiguously named variables, formulas for calculation or method of data collection are explained.

Table 2. Variable Names and Descriptions

	Variable	**Description**
Independent		
ltdb	Long-term Debt	Long-term debt balance on specified date
Controls		
toas	Total Assets	Total asset balance on specified date
age	Age	Age of company calculated as difference between date of data point and date of incorporation
irate	Interest Rate	Calculated as the US interest rate on that particular date. US interest rate used instead of the domestic rate due to face that the US treasury curve's effect on corporate credit curves overwhelms that of all other treasury curves.
CLI	Composite Leading Indicators	Evaluated at a country level, a composite indicator created which incorporates business and consumer sentiment. Used to provide a qualitative datapoint regarding short-term economic movements and scaled to a long-term average composite of 100.
v	Fixed Effects	Takes into account other idiosyncratic factors affecting each individual firm
Dependent		
size	Size	Calculated as the log of sales
profitability	Profitability	Calculated as EBIT/total assets
growth	Growth Opportunities	Calculated as the growth rate of sales
innovation	Innovation	Calculated as the ratio of intangible to total assets
fias	Fixed Assets	Fixed asset balance on a specified date
rd	Research and Development	Research and Development expenditures over the course of the previous year
stdb	Short-Term Debt	Short-term debt balance on a specified date
rshf	Return on Shareholder Funds	Sum of the returns for all shareholders expressed as a dollar amount

shfd	Shareholder Funds	Shareholder funds. Amount held by all shareholders which allows us to measure the occurrence of share buybacks.

Based on this selection of independent, control, and dependent variables, the next section sets up a model for measuring the impact of long-term debt on corporate growth based on those used in Wu, Sercu, and Yao (2002), Iqbal, Hameed, and Ramzan (2012), and Billett, Dolly King and Mauer (2007). Additionally, it draws upon Singh and Faircloth (2005) and Charalambakisa and Psychoyios (2012) to create a model for measuring impact of long-term debt on other firm-specific factors including investment and spending.

5. Empirical Specification

Given this group of firms in Europe, these subsequent models seek to isolate relationships between changes in long-term debt values and where the excess long-term debt was spent. Throughout these models, the key independent variable used will be long-term debt and discussion below will support the use of this variable. First, a model on corporate growth will be used to look at the impact of the CSPP on firm growth on a high level. Then, the paper will look in turn at each of the five hypotheses on potential sources of expenditure: (1) long-term growth areas including fixed asset acquisition or research and development, (2) cash balances or bank deposits, (3) paying down short-term loans, (4) cash to shareholders, or (5) share buybacks. Each of these will be examined in turn. Since we hypothesize that firms do not show much growth due to anecdotal evidence, the goal of looking into these five sources is to isolate more specifically where the firm is spending the additional funding.

5.1 Independent Variable: Long-Term Debt (ltdb)

For the purposes of this study, long-term debt will be the independent variable used as a proxy to reflect the CSPP's effect on each individual firm. This variable was chosen for a few reasons. First, it is difficult to obtain specific information on how much of each specific bond that the ECB purchased. Publicly released data on purchases will only demarcate the bond purchased and which weeks it was held, but anything more specific than that cannot be obtained. But this is not a significant barrier as the CSPP's biggest market impact was to increase liquidity, which impacts all debt issued during that period of time. It shouldn't matter if the ECB itself directly purchased these bonds as any debt issued between 2016-2019 benefitted from the lower interest rates and higher trading volume that occurred during this period of time. Furthermore, as shown in the data section, short-term debt more or less remains unchanged over the past two decades while there are significant changes in firm long-term debt balances. This means studying this should yield more significant and interesting results. Lastly, since measures like the CSPP are intended as short-term stimuli for long-term sustainable growth, the intended outcome is corporate investment in long-term growth. Since long-term debt traditionally is used by companies to finance long-term expansions and growth measures, this is perfect for studying the intended outcomes of the CSPP. We will use long-term debt as the independent variable to first look at how firm growth was impacted by the CSPP.

5.2 Model 1: Impact of long-term debt on firm growth

$$g_{it} = \beta_0 + \beta_1 \text{ltdb}_{it} + \beta_2 \text{toas}_{it} + \beta_3 \text{age}_{it} + \beta_4 \text{irate}_{it} + \beta_5 \text{CLI}_{it} + v_i + u_{it} \quad (1)$$

The dependent variable (g_{it}) refers to a range of different growth variables that are common to corporate finance literature: size, profitability, growth opportunities, and innovation. Total assets (toas) are used to control for different firm sizes, interest rates (irate) are used to control for macro conditions, and age is used to control for firms in various different stages of development. Fixed effects (v_i) cover both firm and country specific effects. CLI represents the Organisation for Economic Co-operation and Development's (OECD's) Composite Leading Indicator for each country and is meant to encapsulate country-specific macro effects. The choice of a fixed effects model is due to its ability to capture changes in time for each firm compared against itself, thereby reducing individual heterogeneity.

Table 3. Model 1 Results, Fixed Effects Model Impact of Long-Term Debt Level on Growth

	Size	**Profitability**	**Growth Opportunities**	**Innovation**
	ln(sales)	*EBIT/total assets*	*sales growth rate*	*Intangible/total assets*
Long-term Debt	-1.74e-12 (4.08e-12)	-5.30e-13 (3.87e-13)	-7.23e-13 (3.75e-12)	-8.17e-13 (9.94e-13)
Variable Controls				
Total Assets	5.28e-12 (1.42e-12)**	5.29e-14 (1.35e-13)	7.90e-14 (1.39e-12)	7.65e-13 (3.47e-13)
Age	0.03 (4.83e-03)**	1.80e-03 (4.55e-04)**	9.02e-03 (5.41-03)	3.19e-03 (1.17e-03)**
Interest Rate	0.06 (0.04)	0.10 (3.45e-3)*	0.13 (0.05)**	2.48e-03 (8.74e-03)
CLI	7.78e-04 (1.06e-3)	6.41e-05 (0.02)	9.16e-04 (1.37e-03)	1.83e-03 (2.75e-04)**

Note: Standard Deviation in Brackets.
* $p < 0.05$.
** $p < 0.01$.

Given the purpose of this study, the most important findings are those concerning debt-levels or values for β_1 in this model. As expected, Table 3 shows that the four measures of

growth show a consensus regarding the lack of statistically significant correlation between long-term debt and growth. Singh and Faircloth (2005) , Kim and Sorensen (1986), and Habib, Khan, and Wazir (2016) all show a similar lack of positive impact that long-term debt has on corporate growth as is consistent throughout the literature. Table 3 also shows a lack of economic significance as a $100 increase in long-term debt corresponds to a 0.087% drop in sales, -4.99e-13 drop in profitability ratio, -6.68e-13% drop in growth opportunities, and -2.09e-13% drop in innovation ratio. The one interesting point to note here is that the negative sign on all of the coefficients point towards long-term debt being counter-productive to firm growth. Since this examines the growth measures in the same period as the debt, this does not however necessarily take into account future growth prospects. Rather, the measures simply represent current growth prospects. Furthermore, lack of statistical and economic significance across the board makes it difficult to draw any relationship between these variables or grant any legitimacy to the slightly negative correlation. Model 2 will later tackle areas of the financial statement that could signify investment in future growth. It is also worth noting that there is high standard deviation for long-term debt coefficient across companies, contributing to the inconclusiveness of any correlation between long-term debt and growth.

Three out of the four metrics (size, profitability, and innovation) do, however, show statistically significant positive correlations with age. The effect is also economically significant for size as a 1 year difference in company age correlates with a 2.6% increase in sales. It does not however, have an economically significant impact on the ratio of intangible assets to total assets or profitability. This points to only minimally increased innovation or profitability in older compared to newer companies. Another control which showed some statistical significance was

total assets, however, the lack of economically significant correlation makes it difficult to discern impacts on size or innovation. Interest rates similarly have a significant correlation with profitability and growth opportunities which is expected as macroeconomic conditions are relevant for sales and earning measures. Interestingly, however, excluding innovation, the interest rate coefficient is positive with respect to growth which could be due to reverse causality.

Overall, this shows that increased debt financing availability has little impact on firm growth and thus corroborates the story of lack of eurozone corporate growth over the past decade.

6. Investigating Five Hypothesized Potential Firm Expenditures

Given the lack of impact on overall firm growth, the next step is to examine financial statements on a more granular level to determine where on financial statements the additional funds from debt issuances are being used. Ltdb remains the independent variable for each of these models but various different dependent variables are used to test each hypothesis.

6.1 Hypothesis 1: Expenditures on long-term growth areas: fixed asset acquisition or research and development

$$m_{it} = \beta_0 + \beta_1 ltdb_{it} + \beta_2 toas_{it} + \beta_3 age_{it} + \beta_4 irate_{it} + \beta_5 CLI_{it} + v_i + u_{it} \quad (2)$$

The dependent variable in this model (m_{it}) represents total fixed assets or research and development value for country i at time t. The controls for total assets (toas), age (age), and interest rate (irate) remain the same as those in the model for firm growth. This is due to the fact that all three of these should have impacts on fixed asset acquisition for firms as well. While we expect day-to-day corporate financial decisions to have a bigger impact on the dependent variable (controls for age and total assets encompass this), we still include the macro indicator of interest rates to capture broad trends in borrowing costs and firm spending. The results are shown in Table 4 below.

Table 4. Fixed Effects Panel Regression of Long-Term Debt Level on Fixed Assets and Research and Development

	Fixed Assets	**Research and Development**
Long-term Debt	0.09 (0.04)*	-1.03e-05 (5.53e-03)
Variable Controls		
Total Assets	0.46 (0.01)**	0.02 (2.22e-03)**
Age	1.66e+07 (4.32e+07)	8.16e+06 (6.95e+06)
Interest Rate	6.34e+07 (3.24e+08)	3.40e+07 (6.02e+07)
CLI	3.80e+05 (9.69e+06)	-4.12e+05 (1.15e+07)
R-squared (within)	0.81	0.47

Note: Standard Deviation in Brackets.
* $p < 0.05$.
** $p < 0.01$.

Looking at potential uses for the excess funding made available by the CSPP, we find that long-term debt has a statistically significant effect on fixed assets. The effect is positive and signals a use of long-term debt to fund fixed asset acquisition. In particular, for each extra $100

of long-term debt, approximately $9 of additional fixed assets are acquired. An R-squared value of 0.81 corroborates the existence of a relationship between long-term debt and fixed assets. We do not, however, see a significant correlation between long-term debt and research and development. Research and development was a particularly important dependent variable to analyze as it is the best metric of measuring long-term future growth prospects – that is to say if firms are making plans for future innovation. The lack of economic significance as well shows that very little long-term debt appears to be going towards research and development. It does appear, however, to be significantly impacted by total assets, but the lack of R-squared fit, 0.47, makes it difficult to draw any firm conclusions. Thus these control variables along with the fixed effects give us little insight into what exactly drives research and development. Chiao (2010) similarly found that firms prefer to use debt to finance physical investment rather than R&D due to the riskier nature of R&D. This could be a possible explanation for the lack of measurable impact of the long-term debt on R&D. This, however, summarizes cumulative data including both before and after the CSPP program. The next step, then, is to break up the data into pre and post program groups.

A Chow test was conducted with the start of the program, 2016, as the hypothesized break point. As Table 5 shows, we find a break point at 2016 for fixed assets but not for research and development.

Table 5. Chow Tests with 2016 as Break Point

	F-statistic	**Prob > F**
H_0		
No break point at 2016 for fixed assets	F(1, 1075) = 22.25	0.00**
No break point at 2016 for research and development	F(1, 418) = 0.25	0.62

* $p < 0.05$
** $p < 0.01$

In particular, the results of the test show that we can reject the null hypotheses that there are no break points at 2016 for fixed assets as there is an F-statistic of 22.75. Since this exceeds the critical value for a 0.01 level of significance, we can conclude that there is a statistically significant break for fixed assets for firms in subgroups of pre-2016 levels and post-2016 levels. We cannot, however, reject the null hypothesis for research and development due to the exceedingly low level of significance. To ensure the structural break was not simply a lagged effect of the European debt crisis originating in 2010, the Chow test was run with hypothesized breaks in 2015, 2014, 2013, and 2012 as well. For fixed assets, there was some significance for 2015 and 2014, however the F-statistics were less significant than the values for 2016. This points to 2016 being the most likely break point.

Using 2016 as the break point we identified as significant with the Chow test, we then split the firm time-series data into the two groups of before 2016 and after to represent Pre-CSPP and Post-CSPP in Table 6.

Table 6. Long-Term Debt Coefficients from Model 2 with Dependent Variables Split into Groups

	Pre-CSPP	**Post-CSPP**
Fixed Assets	0.29 (0.06)**	-0.33 (0.05)**
Research and Development	-0.01 (0.01)*	0.02 (0.01)

Note: Standard Deviation in Brackets.
* $p < 0.05$
** $p < 0.01$

The results in Table 6 show a statistically significant correlation between long-term debt and fixed assets both in the Pre-CSPP group and Post-CSPP group. Interestingly, while there was

a significant positive correlation in the Pre-CSPP group, the relationship was significant but negative for the Post-CSPP group. For research and development, we see a slightly significant negative correlation prior to the CSPP program and no significant correlation afterwards. Table 12 and 13 show that the controls for the pre-CSPP and post-CSPP groups do not change significantly for either fixed assets or research and development.

Given the three tables above, the following relationships between these two variables and long-term debt are shown:

(1) Fixed Assets: The results suggest that prior to the CSPP, firms taking on more debt often resulted in them buying more fixed assets with the debt. After the CSPP, however, debt levels grew, but fixed asset purchases stagnated or potentially dropped off. This is a strong indicator that the firms were not investing more easily available debt funding in tangible assets conducive to growth. Thus, while the CSPP debt financing was intended for firms to use towards investment in growth, the money was in fact spent elsewhere.

(2) Research and Development: The lack of statistically significant correlation in aggregate data, grouped data, and Chow test at 2016 all point towards no measurable impact of long-term debt on research and development. This leads us to conclude that the CSPP did not cause firms to change their investment in research and development significantly.

6.2 Hypothesis 2: Expenditures on cash balances or bank deposits

In this case, the cash balances measure on balance sheets represents essentially the capital that firms have in bank deposits. This typically also represents some low-risk short-term interest

received from banks in exchange for holding the firms' capital. We would not expect cash balances to increase in economically significant amounts as current corporate finance literature argues that companies dislike leaving large cash balances on their financial statements. The reasoning is that this can sometimes be interpreted by investors as a wasted opportunity and mismanagement of funds. Investors typically would prefer instead to see this cash put towards productive uses in other places such as fixed asset acquisition or research and development expenditures.

Using Model 2 with cash balances as the dependent variable, Table 7 shows that we find cash balances highly statistically significant for the cumulative data with a negative effect. The magnitude is significant as well with an approximately 0.62 EUR decrease in cash balances corresponding to each additional dollar of long-term debt. Separating the cash balances into pre-CSPP and post-CSPP values with 2016 as the separator show us equally interesting results. We find the pre-CSPP relationship negative and statistically significant while the post-CSPP values are positive and equally significant. Looking at the magnitude of the coefficients, we find a very noteworthy shift from a slightly negative coefficient to a hugely positive one. This is evidence in favor of the theory that companies are storing excess liquidity in the form of cash balances, however, the very low R-squared values cast doubt on the link. This means we cannot draw direct conclusions about causality, however, the economic and statistical significance still show that increases in long-term debt tend to mean that companies keep more cash balances. Keeping cash in banks rather than spending it on firm operations or investing it in firm growth could be an important explanation as to why the ECB's easing measures have yielded little growth in eurozone companies.

Table 7. Fixed Effects Panel Regression of Long-Term Debt Level on Cash

	Cumulative	**Pre-CSPP**	**Post-CSPP**
Long-Term Debt	-0.62 (0.13)**	-0.82 (0.19)**	1.67 (0.34)**
Total Assets	0.29 (0.05)**	0.30 (0.05)**	-1.52 (0.29)**
Age	1.01e+08 (1.52e+08)	2.10e+08 (1.85e+08)	3.95e+07 (8.26e+08)
Interest Rate	3.61e+08 (1.14e+09)	7.55e+08 (9.50e+08)	omitted
CLI	1.56e+07 (3.41e+07)	2.17e+07 (2.81e+07)	2.83e+08 (1.20e+09)
R-Squared (within)	0.04	0.05	0.11

Note: Standard Deviation in Brackets.
* $p < 0.05$
** $p < 0.01$

Another issue to note is the omitted interest rate variable in the post-CSPP regression. This is an unfortunate consequence of lack of data points in the post-CSPP data group. While there are 136 companies in total in this group, we only have financial data for 2016, 2017, and 2018 meaning there are not sufficient data points to avoid the issue of some multicollinearity between interest rate, CLI, and other fixed effects. In this case, the collinearity issues do not affect the results significantly as the VIF for our independent variable of interest, ltdb, is 4 which is below the threshold of 5-10 that typically indicate high levels of multicollinearity. As a result, the collinearity issue is primarily between control variables which is less important as we look at the relationship between cash and long-term debt specifically.

With regards to cash balances, we conclude that firms increasing long-term debt tend to also have larger cash balances in the post-CSPP group but the low R-squared value makes a causal link between these two variables unlikely.

6.3 Hypothesis 3: Expenditures on paying down short-term loans

Typical references to short-term loans in corporate finance literature tend to represent those in the less than one year maturity range. On balance sheets, we see short-term debt similarly branded as loans that mature within one year. Again, we use Model 2 with short-term debt as the dependent variable to look at the relationship between long-term and short-term debt. The interest rate control was again omitted for the post-CSPP group for the same reason as in 6.2.

Table 8. Fixed Effects Impacts of Long-Term Debt Level on Short-Term Debt

	Cumulative	**Pre-CSPP**	**Post-CSPP**
Long-Term Debt	-0.62 (0.03)**	-0.43 (0.04)**	-0.82 (0.03)**
Total Assets	0.46 (0.01)**	0.39 (0.01)**	0.58 (0.03)**
Age	2.12e+07 (3.11e+07)	4.07e+07 (4.02e+07)	5.09e+07 (7.86e+07)
Interest Rate	3.51e+08 (2.33e+08)	2.56e+08 (2.07e+08)	omitted
CLI	-6.02e+06 (6.98e+06)	-1.01e+07 (6.12e+06)	1.13e+07 (1.14e+08)
R-squared (within)	0.78	0.75	0.74

Note: Standard Deviation in Brackets.
* $p < 0.05$
** $p < 0.01$

Table 8 shows a strongly negative correlation between long-term debt and short-term debt that is both statistically and economically significant. This is evident in both the cumulative data as well as the pre-CSPP and post-CSPP separated data. To note is that the post-CSPP group shows an almost twice as negative correlation as that of the pre-CSPP group. In other words, previously each additional dollar of long-term debt corresponded with a 0.43 EUR decrease in short-term debt. Post-CSPP, however, it corresponded with a 0.82 EUR decrease in short-term debt instead. This points towards the increased usage of long-term debt towards paying off short-term liabilities.

Furthermore, given that there is evidence of using long-term loans to pay off short-term loans, it is also possible that companies are using loans in the 10-30 year maturity range to pay off those in the 1-3 year maturity range. Both of these groups would be included in long-term debt, however, the lack of specificity in financial statements makes this difficult to empirically prove. Given the evidence that increased long-term debt balances correlates strongly with decreased short-term debt balances, it is probable that this is also occurring to some degree.

Through rejection of the null hypothesis that companies are not using long-term debt to pay off short-term debt (<1 year maturity), we find evidence that the rolling over of short-term debt into longer maturities is indeed occurring.

6.4 Hypothesis 4: Expenditures on shareholder returns

Shareholder returns are measured using a similar model to those found above. In the context of this model, shareholder returns encompasses actual cash dividends, increases in share

price, and other capital gains. We find a lack of any statistically significant relationship between long-term debt and shareholder returns in Table 9. The coefficients similarly show a lack of economic significance. This is consistent across cumulative measures as well as pre-CSPP and post-CSPP split data.

Table 9. Fixed Effects Impacts of Long-Term Debt Level on Shareholder Returns

	Cumulative	**Pre-CSPP**	**Post-CSPP**
Long-Term Debt	9.71e-11 (2.72e-10)	6.20e-11 (3.12e-10)	1.35e-10 (6.87e-10)
Total Assets	-9.80e-11 (9.63e-11)	-6.48e-12 (8.89e-11)	-1.36e-10 (5.98e-10)
Age	1.65 (0.33)**	0.92 (0.31)**	0.66 (1.67)
Interest Rate	8.49 (2.58)**	4.92 (1.72)**	omitted
CLI	0.44 (0.10)**	-1.99e-04 (0.07)	3.18 (2.39)
R-squared (within)	0.04	0.02	0.01

Note: Standard Deviation in Brackets.
* $p < 0.05$
** $p < 0.01$

6.5 Hypothesis 5: Expenditures on share buybacks

We use the net amount of funds held by all shareholders to look at the occurrence of share buybacks. Reduction in shareholder funds should signal that companies are buying shares back and vice versa. Table 10 below shows the result of a fixed effects panel regression. Again, the interest rate for post-CSPP data is omitted for the same reason as in 6.2.

Table 10. Fixed Effects Impacts of Long-Term Debt Level on Share Buybacks

	Cumulative	**Pre-CSPP**	**Post-CSPP**
Long-Term Debt	-0.10 (0.02)**	-0.23 (0.04)**	0.08 (0.03)*
Total Assets	0.30 (0.01)**	0.33 (0.01)**	0.23 (0.03)**
Age	1.10e+08 (2.54e+07)**	8.09e+07 (3.44e+07)*	1.10e+08 (8.58e+07)
Interest Rate	-3.70e+07 (1.90e+08)	-9.80e+07 (1.77e+08)	omitted
CLI	-2.36e+06 (5.70e+06)	6.78e+05 (5.25e+06)	1.11e+08 (1.25e+08)
R-squared (within)	0.81	0.78	0.56

Note: Standard Deviation in Brackets.
* $p < 0.05$
** $p < 0.01$

We find economically and statistically significant relationships between long-term debt and shareholder holdings. Prior to the CSPP, there is a negative relationship between long-term debt and shareholder funds as would be expected. Afterwards, we see a shift from a negative to positive relationship. This means that the increased long-term debt in fact correlated with more shareholder funds.

This signals that we can rule out firms using long-term debt financing to buy back shares from shareholders. This expenditure is highly unlikely to be where firms primarily allocated their excess capital.

7. Conclusion

This paper analyzed the effects of the ECB's QE program on changing how companies act through the corporate bond market. The results showed that rising long-term debt levels did not in fact correlate with any indicator of firm growth. This was universal across the five measures of growth used (size, profitability, growth opportunities, and innovation).

The paper then looked at five alternative sources of expenditure seeking to isolate where the excess debt funding was being spent if not towards growth. The following conclusions were reached for each of these five hypothesized expenditures:

(1) The CSPP did not correspond with significant changes in fixed asset acquisition or research and development. In section 6.1 we find a shift to less fixed asset acquisition as long-term debt increases and no significant relationship between long-term debt and research and development.
(2) In section 6.2, we find that increased long-term debt of firms is significantly and positively correlated with increased cash balances after the start of the CSPP compared to a significantly negative correlation prior to the program. This points to firms saving rather than spending additional capital. A low R-squared value makes a causal relationship unlikely but the economically significant relationship points to firms with higher long-term debt balances also having higher cash balances.
(3) There was indication in section 6.3 that firms were using long-term debt to pay down short-term debt (<1 year maturity). Furthermore, within the broad category of long-term

debt, we cannot rule out the possibility of using 10-30 year maturity debt to pay down shorter-maturity long-term debt in the 1-3 year maturity range.

(4) Section 6.4 finds no indication that shareholder returns were impacted by the increased debt financing.

(5) Section 6.5 finds no indication that share buybacks were occurring.

This leaves us with two positive results – hypothesis 2 and 3 still hold and show that firms were storing the excess funding as cash in addition to using it to pay off short-term liabilities. Additionally, we ruled out hypotheses 1, 4, and 5 that firms were spending the debt finance on fixed asset acquisition or research and development, shareholder returns, or share buybacks respectively.

Taken together, this paper provides empirical evidence backing up the lack of efficacy of using corporate bond purchases to stimulate growth of companies. Instead of using the excess market liquidity and availability of funding to invest in future growth, firms appear to have held on to the capital. The easing and lower funding costs led them to readjust their financials and exchange short-term liabilities with relatively higher rates for longer-term liabilities with lower rates. Some of the funding was also kept in cash balances rather than immediately used. This paints a picture of European corporates that are more highly levered than ever. The increase in long-term debt holdings that companies have taken on with little sign of productive investment suggests increasing chances of future distress. As the persistently low growth and stagnant economic conditions in Europe continue, firms will eventually have to contend with the repayment of the long-term debt and appear not to be making preparations to do so. Thus the

CSPP's lack of specific, targeted conditions of funding have resulted in firms not acting as the ECB had intended. Future regulation will need to be more stringent if the ECB is to see the type of reinvestment needed to end the period of economic stagnation that has persisted for the past decade.

A similar lack of quantitative easing efficacy can be seen in other global markets as well. The Bank of England employed a similar corporate bond purchase program in 2009, however, Lyonnet and Werner (2012) found a similar lack in pickup of corporate spending and nominal GDP growth. They found that lack of credit availability was not the issue as companies were already not using up available bank financing. In the United States, the Federal Reserve did not utilize a targeted corporate lending program, but increased overall liquidity due to lower rates also led to more corporate borrowing. While we did see steady growth in corporate investment with improving US economic conditions over the past decade, Kopp et al. (2019) attributes this to private sector expectations of future demand for products rather than government easing policy. This reveals broader macroeconomic sentiment and conditions as a stronger driving force of corporate investment than financing availability. Thus, lack of corporate investment in the eurozone may be due to a lack of improvement in other economic conditions causing European companies to forecast relatively low expectations for future demand for products. These low future demand expectations make it illogical for companies to invest in growth. But as corporate spending is conducive to economic growth, this paradoxical relationship makes it difficult for the ECB to identify one specific target to stimulate growth. Since companies appear not to be inherently incentivized to invest purely by the availability of cheaper financing, the ECB then must explore alternative ways to push companies towards spending.

While covenants are difficult to impose when making purchases from the public corporate bond market, the ECB can consider making more bespoke corporate liquidity injections in future purchases of assets. The ECB can adopt some of the techniques that smaller regional banks currently use in loan agreements such as "trip wires." These allow them to monitor credit risk and make adjustments to loan provisions at a later date in response. As outlined in Whitehead (2009), there are some issues that typically weaken covenant effectiveness. The primary weakness is that banks are incentivized to maximize loan issuance over loan quality and can simply diversify away mounting credit risk. As the ECB's primary incentive is to ensure loan quality and returns, these concerns are mitigated. The additional benefit of ECB-created covenants is the potential for increased liquidity provided by other market investors as a response. The ECB's legitimacy and reliability in acting as a compliance monitor will make other investors more willing to participate in an inherently risky bond market.

As the second wave of the CSPP recently commenced in late 2019, it appears that the ECB has chosen to continue buying public bonds without the use of covenants or other restrictions. Given the steadily worsening economic outlook in 2020, we would expect firms to act similarly to the stimulus as they did in 2016 by saving rather than spending. As there is still no guarantee that firms are taking advantage of market liquidity to make productive investments, the likelihood of seeing immediate positive impacts from the stimulus is low. For the foreseeable future, this means that the ECB's quantitative easing mechanisms are still needed and will continue to be a prominent feature in European monetary policy.

References

Albu, L. L., Lupu, R., Calin, A. C., & Popovici, O. C. (2014). Estimating the Impact of Quantitative Easing on Credit Risk through an ARMA-GARCH Model. *Romanian Journal of Economic Forecasting*, *17*(3), 39-50.

Andrade, P., Breckenfelder, J., De Fiore, F., Karadi, P., & Tristani, O. (2016). The ECB's Asset Purchase Programme: An Early Assessment. *ECB Working Paper* No. 1956.

Arce, O., Gimeno, R., & Mayordomo, S. (2017). Making Room for the Needy: The Credit-Reallocation Effects of the ECBBs Corporate QE. *Banco de Espana Working Paper No. 1743*, doi: 10.2139/ssrn.2996964

Billett, M. T., Dolly King, T., & Mauer, D. C. (2007). Growth Opportunities and the Choice of Leverage, Debt Maturity, and Covenants. *The Journal of Finance*, vol. 62, no. 2, 697–730. doi:10.1111/j.1540-6261.2007.01221.x.

Duca, M. L., Nicoletti, G., & Martínez, A. V. (2016). Global corporate bond issuance: What role for US quantitative easing? *Journal of International Money and Finance*, *60*, 114–150. doi: 10.1016/j.jimonfin.2015.07.013

Charalambakis, E.C., & Psychoyios, D. (2012) What do we know about capital structure? Revisiting the impact of debt ratios on some firm-specific factors, Applied Financial Economics, vol. 22, issue 20, 1727-1742, DOI: 10.1080/09603107.2012.676733

Fratzscher, M., Duca, M. L., & Straub, R. (2016). ECB Unconventional Monetary Policy: Market Impact and International Spillovers. *IMF Economic Review*, *64*(1), 36–74. doi: 10.1057/imfer.2016.5

Friewald, N., Jankowitsch, R., & Subrahmanyam, M. G. (2013). Illiquidity Or Credit Deterioration: A Study Of Liquidity In The Us Corporate Bond Market During Financial Crises. *Managing and Measuring Risk World Scientific Series in Finance*, 159–200. doi: 10.1142/9789814417501_0006

Gambetti, L., & Musso, A. (2017). The Macroeconomic Impact of the ECB's Expanded Asset Purchase Programme (APP). *ECB Working Paper* No. 2075.

Grosse-Rueschkamp, B., Steffen, S., & Streitz, D. (2018). A Capital Structure Channel of Monetary Policy. *Journal of Financial Economics (JFE)*, Forthcoming. doi: 10.2139/ssrn.2988158

Habib, H., Khan, F., & Wazir, M. (2016). Impact of debt on profitability of firms: Evidence from non-financial sector of Pakistan. *City University Research Journal*, *6*(01).

Hovakimian, A., & Li, G.(2011). In Search of Conclusive Evidence: How to Test for Adjustment to Target Capital Structure. *SSRN Electronic Journal*. doi:10.2139/ssrn.1364651.

Iqbal, A., Hameed, I., & Ramzan, N. (2012). The Impact of Debt Capacity on Firm's Growth. *American Journal of Scientific Research*, issue 59, 109-115.

Kim, W. S., & Sorensen, E. H. (1986). Evidence on the impact of the agency costs of debt on corporate debt policy. *Journal of Financial and quantitative analysis*, *21*(2), 131-144.

Kopp, E., Leigh, D., Mursula, S., & Tambunlertchai, S. (2019). U.S. Investment Since the Tax Cuts and Jobs Act of 2017. *IMF Working Papers*, *19*(120), 1. doi: 10.5089/9781498317047.001

Lyonnet, V., & Werner, R. (2012). Lessons from the Bank of England on 'Quantitative Easing' and Other 'Unconventional' Monetary Policies. *International Review of Financial Analysis*, vol. 25, 94–105. doi:10.1016/j.irfa.2012.08.001.

Singh, M., & Faircloth, S. (2005). The impact of corporate debt on long term investment and firm performance. *Applied Economics*, *37*(8), 875-883.

Todorov, K. (2017). Quantify the Quantitative Easing: Impact on Bonds and Corporate Debt Issuance. *Journal of Financial Economics (JFE)*, Forthcoming. Doi: 10.2139/ssrn.3139875.

Toy, N., Stonehill, A., Remmers, L., Wright, R., & Beekhuisen, T. (1974). A Comparative International Study of Growth, Profitability, and Risk as Determinants of Corporate Debt Ratios in the Manufacturing Sector. *Journal of Financial and Quantitative Analysis*, vol. 9, issue 5, 875-886

Whitehead, C. (2009). The Evolution of Debt: Covenants, the Credit Market, and Corporate Governance. *Journal of Corporation Law*, issue 3, 641-648

Wu, X., Sercu, P., & Yao, J. (2002). Reexamining the Relation between Debt Mix and Growth in Japan. *SSRN Electronic Journal*. doi: 10.2139/ssrn.296719

Zaghini, A. (2017). A tale of fragmentation: Corporate funding in the euro-area bond market. *International Review of Financial Analysis*, *49*, 59–68. doi: 10.1016/j.irfa.2016.12.004

APPENDIX

Table 11. Geographic Distribution of Firms By Country and Region

Country	Number of Firms	
Austria		3
Wien	3	
Belgium		5
Brussels-Capital	5	
Finland		9
Uusimaa	8	
Satakunta	1	
France		46
Cote-d'Or	1	
Hauts-de-Seine	17	
Val-d'Oise	1	
Paris	21	
Alpes-Maritimes	1	
Haute-Vienne	1	
Germany		22
Berlin	3	
Wolfsburg	1	
Hamburg Freie und Hansestadt	1	
Hannover	1	
Oldenburg	1	
Soest	1	
Duesseldorf	3	
Essen	2	
Leverkusen	2	
Koeln	2	
Kassel	1	
Heidelberg	1	
Rhein-Neckar	1	
Stuttgart	1	
Hochtaunuskreis	1	
Muenchen	1	
Landeshauptstadt	1	
Ireland		1
Cork	1	
Italy		18

Roma	9	
Milano	5	
Alessandria	1	
Bologna	1	
Reggio Emilia	1	
Brescia	1	
Luxembourg		2
Netherlands		20
Rotterdam	3	
Amsterdam	6	
Arnhem	2	
Heerlen	1	
S Hertogenbosch	2	
Eindhoven	1	
Veldhoven	1	
S Gravenhage	2	
Alphen Aan Den Rijn	1	
Haarlemmermeer	1	
Zaanstad	1	
Portugal		1
Lisboa	1	
Slovakia		1
Bratislava	1	
Spain		8
Madrid	7	
Islas Baleares	1	
Switzerland		1
Basel-City	1	

Table 12. Long-Term Debt Coefficients from Model 2 with Fixed Assets Split into Groups

	Pre-CSPP	**Post-CSPP**
Long-term Debt	0.29 (0.06)**	-0.33 (0.05)**
Variable Controls		
Total Assets	0.49 (0.02)**	0.80 (0.04)**
Age	-1.10e+08 (5.75e+07)	-8.02e+07 (1.27e+08)
Interest Rate	-1.42e+08 (2.96e+08)	omitted
CLI	-2.72e+06 (8.76e+06)	-6.04e+07 (1.85e+08)
R-squared (within)	0.83	0.71

Note: Standard Deviation in Brackets.
* $p < 0.05$.
** $p < 0.01$.

Table 13. Long-Term Debt Coefficients from Model 2 with Research and Development Split into Groups

	Pre-CSPP	**Post-CSPP**
Long-term Debt	-0.01 (0.01)*	0.02 (0.01)
Variable Controls		
Total Assets	0.02 (2.58e-03)**	0.01 (7.00e-03)
Age	3.29+06 (8.14e+06)	4.39e+07 (1.91e+07)
Interest Rate	2.09e+06 (4.926e+07)	omitted
CLI	-1.11e+07 (9.07e+06)	4.56e+07 (3.03e+07)
R-squared (within)	0.38	0.43

Note: Standard Deviation in Brackets.
* $p < 0.05$.
** $p < 0.01$.