Voluntary disclosures and monetary policy: evidence from quantitative easing

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Abstract

This study investigates the influence of central bank private-sector quantitative easing (QE) policies on firms' voluntary disclosures. While the effects of QE on borrowing costs and asset prices are well documented, spillovers in the disclosure realm remain understudied. This study specifically analyzes the effects of the Corporate Sector Purchase Program (CSPP), a private-sector QE policy implemented by the European Central Bank (ECB) in 2016 targeting corporate bonds in the euro area. Applying a difference-in-differences methodology to pre- and post-CSPP periods, I find that firms whose bonds the central bank purchased under the CSPP decreased their voluntary disclosures, particularly those related to cash flows and liabilities. My analysis attributes this decrease to reduced demand for firm-specific information from the central bank. My findings highlight the indirect consequences of QE monetary policy tools on corporate disclosure and contribute to the understanding of the transmission of monetary policy and investor-clientele dynamics.

Keywords Bond Market · Voluntary Disclosure · Corporate Sector Purchase Program · Quantitative Easing · Monetary Policy · Investor Clientele

JEL Codes G14 · E58

1 Introduction

In response to the global financial crisis of 2007–2009 and the subsequent sluggish recovery, central banks worldwide implemented expansionary quantitative easing (QE) interventions through large-scale asset purchases (Dell'Ariccia et al. 2018; Bernanke 2022). While extensive research has examined the direct effects of QE policies on the economy, including changes in borrowing costs, asset prices, and

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credit supply (Rodnyansky and Darmouni 2017; Chari et al. 2020; Di Maggio et al. 2019), the spillover effects on firms' voluntary disclosure practices remain largely unexplored. This paper aims to fill this gap.

In addition to their primary focus on government and bank securities, central bank QE interventions extended to long-term debt securities issued by nonfinancial corporations. This practice sparked a debate, with proponents highlighting potential benefits at the firm and market levels, such as enhanced liquidity and improved access to capital (Grosse-Rueschkamp et al. 2019). Conversely, critics voiced concerns that the interventions might weaken bondholders' discipline on corporations, potentially distorting capital allocation and distribution decisions (Bianco 2019; Todorov 2020). My study contributes to this debate by offering insights into how QE monetary policy tools, originally designed to stabilize the macroeconomy, also shape firms' disclosure decisions.

Central bank interventions targeted toward the debt of nonfinancial corporations can impact firm disclosures in various ways. First, by reducing funding costs and facilitating debt access for the targeted firms, the interventions contribute to a decrease in credit risk (Boyarchenko et al. 2022). This reduction in credit risk may, in turn, lessen investors' demand for credit-related information and the supply of such information by the targeted firms. I refer to this argument as the *cost-of-credit* channel.

Central banks have different information needs and incentives than conventional credit investors, creating the basis for a second channel through which QE can affect firm disclosure. Specifically, central banks prioritize the transmission of monetary policy and the provision of liquidity to the financial system and emphasize less the quality and quantity of information that individual firms disclose (ECB 2017; Beuve et al. 2019; U.S. Federal Reserve 2020). Moreover, the presence of central banks in the bond market can crowd out traditional institutional investors, such as insurance companies or asset managers, which typically have a stronger incentive to demand firm information (Boone and White 2015; Bird and Karolyi 2016). Consequently, firms may experience reduced pressure to disclose voluntarily, leading to a decrease in their overall level of disclosure. I refer to this argument as the *central bank-clientele* channel.

However, counterforces may intersect with these channels. Contextual factors encompassing heightened public scrutiny stemming from QE policies (Bennani 2018), firms' desire to underscore transparency when they receive public support (Huang 2022), and the incentive for firms to amplify the positive signal stemming from a direct central bank investment may motivate them to maintain or even enhance voluntary disclosures.

To assess these divergent predictions, I investigate the impact of the Corporate Sector Purchase Program (CSPP), a QE initiative introduced by the European Central Bank (ECB) in 2016, which targeted investment-grade bonds issued by nonfinancial firms within the Eurozone. My approach for assessing disclosure hinges on the analysis of management forecasts, with particular emphasis on forecasts related to both income-statement and non-income-statement line items (Beyer et al. 2010; Merkley et al. 2013; Miao et al. 2016). Employing a difference-in-differences research design, I classify firms whose bonds were acquired by the ECB through the CSPP as treatment observations, while I establish a control group comprising

eurozone-incorporated nonfinancial companies whose bonds were not purchased by the central bank.

My analysis unveils a reduction in voluntary disclosure among firms subjected to large-scale QE purchases, observable in both the frequency and the likelihood of issuing guidance. Notably, however, this effect is concentrated among cash flow and liability disclosures, aligning with research that underscores the importance of these factors to creditors (DeFond and Hung 2003; Gurun et al. 2016; Hugon et al. 2016). As a result, I infer that the firms targeted by the central bank, which experienced a substantial shift in their access to credit, adjusted disclosures related most directly to credit evaluation, without altering other forms of performance guidance.

I deploy several approaches to better understand how QE affects disclosure decisions. My first objective is to isolate the specific effect stemming from reduced screening and monitoring by the central bank (the central bank-clientele effect) while controlling for the influence of the cost-of-credit channel. To achieve this, I leverage the portfolio rebalancing effects of the CSPP, which determined a reduction in the cost of debt of a subset of eurozone firms *not purchased* by the central bank (Krishnamurthy and Vissing-Jorgensen 2011; Zaghini 2019; Zaghini 2020). By comparing the treated observations subject to ECB purchases with this subset of control firms that also witnessed a decrease in their cost of debt, I identify a decrease in voluntary disclosure. This empirical evidence substantiates the existence of the central bank-clientele channel.

I then proceed to investigate the *cost-of-credit* effect on disclosure while controlling for the central bank-clientele channel. This analysis involves a comparison between two distinct sets of firms not targeted by the central bank. First, I rely on firms that experienced lower funding costs due to QE but whose bonds the ECB did not purchase. Second, I identify a sample of U.S. bond issuers that were ineligible for CSPP purchases and did not experience a decrease in their cost of debt following the CSPP. By comparing the observations from these two samples, I can disentangle the impact of the cost of credit on disclosure resulting from QE. Employing a difference-in-differences specification, I find no indications that firms benefiting from QE policies, as evidenced by lower bond spreads, but without direct investment from the central bank significantly change their voluntary disclosures. This outcome suggests that the impact of QE on disclosure is less likely to be attributed to the cost-of-credit channel.

To mitigate selection bias and address potential concerns about my identification strategy, I provide several additional tests. First, I match firms in the baseline treatment and control groups based on observable characteristics. This helps ensure comparability between treated and control firms. Second, I adopt a research design that incorporates a continuous-treatment variable. This variable captures the proportion of CSPP-eligible bonds issued by a firm that was purchased by the central bank, rather than relying on a binary treatment assignment. Third, I use a difference-in-differences approach that identifies the post-CSPP period based on the first firm-specific ECB purchase of eligible securities, rather than relying on the generic timing of the CSPP implementation. My findings endure across these alternative specifications. Furthermore, I assess and find supporting evidence for the assumption that forms the basis of my identification strategy. Specifically, I show that, in the period

leading up to the CSPP, the treatment and control firms exhibited similar trends in their disclosures of credit-relevant information.

I also illuminate the mechanisms that connect large-scale QE policies and firm disclosure practices by conducting a series of cross-sectional tests. I find that the decrease in credit-relevant voluntary disclosure predominantly emerges among firms that either issue new bonds or are expected to do so in the near future. This trend can be attributed to the heightened scrutiny firms face from investors during bond offerings (Houweling et al. 2005; Pasquariello and Vega 2009), leading managers to curtail disclosures comparatively more following the central bank intervention. Consistent with prior research (Verrecchia 1983; Kothari et al. 2009; Leuz and Wysocki 2016), an additional cross-sectional analysis shows that managers decrease credit-relevant disclosure more following QE when their firms are performing poorly and when the cost of disclosing information is higher due to proprietary costs and litigation risk.

In a final set of tests, I show that my findings extend beyond the prevalence of credit-relevant disclosure. Firms with securities purchased by the ECB provide less segment-specific and more nonnumeric credit-relevant guidance. Consistent with research on the characteristics of corporate guidance (Hutton et al. 2003; Bozanic et al. 2018; André et al. 2019), these findings show that management forecasts of firms with bonds purchased by the central bank become more qualitative.

This paper makes several contributions. First, it adds to the literature on the impact of monetary policy on the behavior of individual firms. While recent research has illuminated the significance of accounting information and internal information systems in the transmission of monetary policy (Armstrong et al. 2019; Binz et al. 2023), limited research addresses how firms adjust disclosures in response to shifts in monetary policy (Gallo and Kothari 2019). My study fills this gap. Although I acknowledge that my findings may not apply directly to more conventional monetary policies, analyzing the effects of QE on disclosure is valuable, given its prominence over the past decade. My research thus contributes to the overall understanding of the transmission of monetary policy and the role of corporate activities in this process (Adelino et al. 2022).

Second, I add to the literature on disclosure and investor clientele. Studies have demonstrated that firms tailor their disclosures to the demands of institutional investors, retail investors, and lenders (Lo 2014; Kalay 2015; Boone and White 2015; Bird and Karolyi 2016; Sethuraman 2019). Extending this literature, I examine the impact of large-scale investments by a novel and influential investor—the central bank. This analysis is important, given the significant amounts injected by central banks worldwide into financial systems through purchases of corporate bonds. By investigating how firms respond to these investments, my research contributes to a deeper understanding of the relationship between firms, disclosure practices, and the evolving landscape of investor clientele.

Third, my study contributes to the literature on management guidance. First, building on research indicating that creditors have distinct information needs (Ball et al. 2008; Shivakumar et al. 2011) and that cash-flow and capital-structure information is particularly relevant to them (DeFond and Hung 2003; Gurun et al. 2016; Hugon et al. 2016), I study firms' disclosure of credit-relevant line items in

management guidance. I show that firms provide guidance on specific financial items not only to enhance the credibility of their disclosures (Merkley et al. 2013) but also in response to the particular needs of various stakeholders, including public creditors. In addition, I examine the management guidance practices of international corporations, a topic underexplored elsewhere (Li and Yang 2016; Tsang et al. 2019; Guan et al. 2020). I thus contribute to the understanding of management guidance across borders. Last, my study leverages a novel source of management guidance information, which recent research describes as more comprehensive than guidance captured by conventional databases (Mayew et al. 2023).

2 Institutional background

2.1 Private sector quantitative easing policies

In response to the global financial crisis of 2007–2009 and the subsequent slow recovery, central banks worldwide implemented extraordinary measures to enhance market functioning and stimulate national economies (Dell'Ariccia et al. 2018; Bernanke 2022). In a context characterized by binding zero lower-bound interest rates and general impairments to the conventional transmission of monetary policy, the most important of these measures included the implementation of negative interest rates on deposits, the provision of forward guidance regarding future policy intentions, and, most notably, the adoption of large-scale asset purchases, commonly referred to as *quantitative easing* (Kuttner 2018; Evanoff et al. 2018; Neely and Karson 2020).

These asset purchases entailed the acquisition of assets issued by the private sector. The ECB, for example, undertook various outright investments in financial firms. These initiatives, collectively known as the Covered Bond Purchase Program (CBPP), involved significant acquisitions of covered bonds backed by pools of mortgage loans (Fratzscher et al. 2016). Notably, central banks also launched extensive QE programs aimed at public debt issued by *nonfinancial* firms. The Bank of Japan took the lead in 2009 by announcing the inclusion of nonfinancial corporate bonds and commercial paper in its asset holdings (IMF 2013).[1] In 2016, amid deflationary pressures, the ECB and the Bank of England introduced large-scale corporate bond purchases intended to impart monetary stimulus by lowering the yields in the corporate bond market (ECB 2017; BOE 2018). More recently, central banks from various regions, such as the Federal Reserve (the Fed), the ECB, and the central banks of Canada, England, and Japan, introduced QE measures targeting bonds issued by nonfinancial corporations to stabilize market functioning and facilitate credit flow to firms during the COVID-19 pandemic (Haas et al. 2020; Cavallino and De Fiore

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[1] The size of the corporate bond and commercial paper purchases carried out by the Bank of Japan under the 2009 Comprehensive Monetary Easing program was relatively small compared to more recent initiatives. The total amount of purchases reached approximately ¥2.6 billion, approximately equal to 0.5 percent of the bank's balance sheet.

2020). These policies, including the Fed's Primary Market Corporate Credit Facility (PMCCF) and the Secondary Market Corporate Credit Facility (SMCCF), with a combined size of up to \$750 billion, garnered media attention (Arnold 2020; Pisani 2020). Several observers have questioned the perceived temporary status of the measures (Lombardi et al. 2018; Kennedy and Dodge 2020; Borio 2020), given indications that the policies are likely to become increasingly prevalent in the near future.

The emergence of QE policies targeting the public debt of nonfinancial corporations has led to a literature examining their effects. Key findings suggest that firms whose bonds become eligible for direct central bank purchases experience lower bond yield spreads (Boneva et al. 2018; Suganuma and Ueno 2018; De Santis et al. 2018) and improved bond market liquidity (Boyarchenko et al. 2022; Kargar et al. 2021), leading to a higher likelihood of raising capital through public debt. The effects extend beyond eligible firms, impacting such things as bank lending and investors' portfolio rebalancing, ultimately affecting the real economy (Ertan et al. 2020).

2.2 ECB's corporate sector purchase program

In March 2016, the ECB announced the CSPP, which aimed to support investment and growth and bring eurozone inflation back to its target level. The CSPP was part of a more extensive set of policies that included an expansion in Targeted Longer-Term Refinancing Operations (TLTRO)—the Eurosystem's operations that provide liquidity to lenders—and an increase in monthly net government bond purchases.[2]

The eligibility criteria for the CSPP were extensive and encompassed a diverse range of securities. To be eligible, corporate bonds had to satisfy the following conditions (ECB 2016): they had to (i) be denominated in euros, (ii) possess a minimum investment-grade credit rating (i.e., at least BBB-), (iii) exhibit a remaining maturity between six months and 31 years at the time of purchase, and (iv) be issued by a nonfinancial corporation incorporated in the eurozone. The ECB did not impose any restrictions or conditions on CSPP-eligible issuers that could directly impact firms' disclosure decisions.[3]

CSPP purchases commenced in June 2016 and were conducted in both the primary and secondary markets. Market neutrality guided the purchases, with the aim of mitigating the impact on relative prices and avoiding unintended consequences on market functioning. In this context, market neutrality meant that the central bank maintained holdings of corporate bonds—by issuer, country, and sector—as closely aligned as possible with the respective market shares within the overall corporate

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[2] Although these supplementary tools may have influenced the debt issuance and cost of credit for firms in the eurozone, they provided similar stimulus to both firms whose bonds were purchased by the ECB under the CSPP and those whose bonds were not. Furthermore, the changes related to the TLTRO and the purchase of government bonds resulted in only marginal increases in the scale of these initiatives, while the CSPP was introduced as a novel and unexpected tool in March 2016. Therefore my difference-in-differences analysis is unlikely to be confounded by the effects of these supplementary tools.

[3] A Bianco (2019) article noted: "Nowhere in the [CSPP] rules were considerations such as coverage ratios, debt to equity percentages, use of cash, or management plans.".

bond market.[4] The ECB conducted monthly net purchases ranging from €3 billion to €10 billion, resulting in a total accumulated value exceeding €180 billion. These purchases accounted for approximately 25 percent of the European investment-grade nonfinancial corporate bond market and represented around 4 percent of the ECB's balance sheet (Beuve et al. 2019). In December 2018, the ECB announced the cessation of net asset purchases under the CSPP while continuing to reinvest principal payments from matured securities.

The CSPP has characteristics that make it an ideal setting for examining the implications of central bank direct investments in the nonfinancial private sector. First, like other monetary policies, it was formulated based on overall economic output and can be considered relatively exogenous to individual firms' decisions. Second, market participants could not anticipate the CSPP due to the absence of prior large-scale purchases of nonfinancial corporate bonds by the ECB.[5]

Consistent with studies examining other monetary policies targeting nonfinancial firms' debt (O'Hara and Zhou 2021; Nozawa and Qiu 2021), research on the consequences of the CSPP offers several key findings. Firms whose securities were targeted by the central bank had a higher propensity to issue bonds (Todorov 2020; Arce et al. 2021). These targeted firms also saw a notable reduction in their cost of debt (Grosse-Rueschkamp et al. 2019). Subsequent research conducted by Zaghini (2019) and the Zaghini (2020) shows that the effects of the CSPP extended beyond the directly purchased eligible firms, with *nonpurchased* eligible firms experiencing reduced cost of debt immediately after CSPP implementation and ineligible companies within the eurozone experiencing a similar reduction with a delay of approximately four quarters, starting from the first quarter of 2017. The effects on *nonpurchased* securities occurred via portfolio rebalancing (Krishnamurthy and Vissing-Jorgensen 2011), where central bank asset purchases generated scarcity in the targeted segment and prompted institutional investors to realign their portfolios toward other securities. This shift raised the prices of a broader swath of financial assets and lowered their yields.

3 Hypothesis development

I anticipate that the CSPP can influence the disclosure decisions of targeted firms through two key channels, which I refer to as the cost-of-credit effect and the central bank-clientele effect. First, the cost-of-credit effect may play a role. It is

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[4] As shown in Appendix 2, the distribution across countries of issuance and rating classes of the bonds in the ECB's portfolio closely overlap with the distribution of eligible securities.

[5] According to the International Capital Market Association (ICMA, 2016) bulletin: "The announcement by the ECB on March 10 to extend its Asset Purchases Program to include investment grade non-bank corporate bonds took the market by complete surprise." The CSPP holds a unique position as the first program to target the capital of nonfinancial corporations on a very large scale. This characteristic gives the CSPP a longer post-implementation period, allowing for a more comprehensive evaluation of the program's implications compared to more recent initiatives, such as those implemented during the COVID-19 pandemic.

well-established that firms disclose more information to access the debt market on more favorable terms (Sengupta 1998; Ertugrul et al. 2017). Following the CSPP, firms whose bonds were purchased by the central bank experienced improved access to credit and lower funding costs. These changes translate into lower credit risk, which can result in less demand for disclosure by investors (Shivakumar et al. 2011). Consequently, managers may perceive the disclosure of private information as less beneficial. This assessment could result in less voluntary disclosure by firms targeted by the central bank's outright investments.

Second, the *central bank-clientele* effect may come into play. Extensive research (Lo 2014; Kalay 2015; Boone and White 2015; Bird and Karolyi 2016; Sethuraman 2019) suggests that firms disclose information that caters to the specific demands of different investors, both in the equity and debt markets. When a private sector-oriented QE program like the CSPP is implemented, the investor composition for targeted firms shifts, as the central bank becomes a significant bondholder, crowding out other bond investors. During QE purchases, the central bank primarily focuses on monetary policy objectives and overall financial system stability rather than corporate disclosures for screening and monitoring purposes (ECB 2017; De Santis et al. 2018). Consequently, targeted firms may perceive a lower demand for voluntary disclosures from the central bank, compared to other bond investors, who traditionally prioritize information transparency and comprehensiveness. This reduced demand could incentivize firms to disclose less information voluntarily.[6]

Considering the cost-of-credit and central bank-clientele effects, it is reasonable to anticipate a decrease in voluntary disclosure by firms whose bonds are acquired under the CSPP and comparable private sector-oriented QE initiatives. Building upon these considerations, I formulate my primary hypothesis in the alternative form:

H1: After the introduction of the CSPP, firms whose securities are purchased by the central bank reduce their voluntary disclosures.

This hypothesis is not without tension. First, considering that unconventional monetary policies attract substantial public attention (Bennani 2018), the very fact that firms benefit from QE policies might subject them to heightened media and regulatory scrutiny. In anticipation of this increased attention, firms may opt to sustain or even amplify their disclosures, aiming to engage a broader and more attentive audience (Miller and Skinner 2015; Lock 2020). Second, firms receiving public funding strive for a reputation for transparency and thus provide more disclosures (Huang 2022). Likewise, with the central bank stepping in as a significant bondholder, firms might feel a heightened sense of public responsibility. Consequently, they may opt to enhance their disclosures to underscore their stewardship

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[6] The significant impact of the CSPP on bond prices (Grosse-Rueschkamp et al. 2019) implies that the ECB played a pivotal role as the marginal investor in the European bond market. Drawing on established disclosure models, such as that of Verrecchia (1983), managers' incentives to disclose information are influenced by the information demand of the marginal investor.

of QE funds and their commitment to accountability. Third, in line with a signaling framework (Lev and Penman 1990), firms could use the very fact that they have been targeted for the CSPP as a positive signal to the market and other stakeholders. One way to amplify this signal is by maintaining or even increasing disclosure, potentially with the aim of showcasing the robustness of their financials. In summary, despite the foundations upon which my prediction rests, the extent to which the hypothesized baseline effect prevails over these concurrent influences remains an empirical question.

4 Research design and sample

4.1 Baseline research design: CSPP and disclosure

I analyze the impact of private-sector QE policies on the voluntary disclosure of targeted firms employing the following baseline difference-in-differences specification:

$$Disclosure_{it} = \alpha + \beta_1 \times Post\ CSPP_t \times Purchased_i + \sum \partial \times Controls_{it} + \gamma_i + \gamma_t + \varepsilon_{it}, \quad (1)$$

in which i identifies a firm and t represents a year-quarter. I include firm (γ_i) and year-quarter (γ_t) fixed effects to account for time-invariant differences between treated and control firms and aggregate time-series variations in voluntary disclosure choices. The independent variable of interest is the interaction *Purchased* × *Post CSPP*. *Post CSPP* is an indicator variable that takes the value of one after the implementation of the CSPP. In particular, *Post CSPP* equals one starting from the second calendar quarter of 2016 onward.[7] *Purchased* is the indicator variable capturing targeted firms, that is, those firms with bonds purchased by the central bank through the CSPP. *Post* and *Purchased* are subsumed by the firm and year-quarter fixed effects and thus excluded from the regression. I estimate Eq. 1 on a baseline sample of eurozone-incorporated bond issuers from 2013–2018. The control sample comprises firms whose bonds were not acquired by the ECB. By including eurozone-incorporated firms in the treatment and control samples, I account for the potential influence of institutions and regulations on disclosure choices, which could otherwise introduce bias into my analysis.

4.2 Central bank clientele and cost of credit

I refine the baseline design and explore four alternative approaches to disentangle the central bank-clientele and cost-of-credit effects. Table 1 and Fig. 1 jointly provide an overview of the various samples and methodologies employed in this section of the analysis.

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[7] The CSPP was announced in March 2016 and implemented from June 2016. Therefore disclosures occurring from the second quarter of 2016 are assigned to the *Post* period.

To isolate the central-bank-clientele effect, I reestimate Eq. 1 focusing on treatment and control observations that experienced reduced funding costs after the implementation of the QE policy but differed in terms of direct interventions by the central bank in their debt capital. This approach enables me to factor in the influence of the cost-of-credit effect on disclosure, thereby enhancing the identification of the central bank-clientele effect. As a result of institutional investors' portfolio rebalancing, yield spreads of CSPP-eligible bonds not purchased by the ECB dropped simultaneously with those of purchased securities. Furthermore, the spreads of eurozone ineligible issuers' bonds tightened approximately four quarters after the CSPP's implementation (Zaghini 2019; Zaghini 2020). Building on this evidence, I adopt two distinct research designs. In the first (Approach A), I compare firms whose securities were purchased by the ECB with firms whose bonds were eligible for CSPP purchases but were never acquired by the central bank. In the second (Approach B), I compare the baseline treated observations with the complete set of eurozone-incorporated control firms whose bonds were not acquired by the central bank but still benefited from a reduced cost of debt after the CSPP. This latter comparison excludes observations from the four calendar quarters immediately following the CSPP implementation, allowing for a focused analysis of the period during which both CSPP-eligible and ineligible eurozone issuers experienced such reduced credit costs.[8] Overall these research designs aim to understand how the central bank-clientele effect impacts disclosure decisions by comparing various groups of firms with different exposure to the CSPP's purchases but similar exposure to the CSPP's cost of credit effect.

To investigate the cost-of-credit effect, I estimate the following regression:

$$\begin{aligned} Disclosure_{it} = &\alpha + \beta_1 \times Post\ CSPP_t \times Not\ Purchased\ Credit\ Affected_i \\ &+ \sum \partial \times Controls_{it} + \gamma_i + \gamma_t + \varepsilon_{it,} \end{aligned} \quad (2)$$

in which, as in Eq. 1, i identifies a firm, t represents a year-quarter, and γ_i and γ_t respectively capture firm and time year-quarter effects. The treatment variable refers to observations in the *Not Purchased Credit Affected* samples. As mentioned, these categories include nonpurchased Eurozone CSPP-eligible firms that experienced an immediate reduction in their cost of debt following the implementation of the QE policy (Approach C) as well as the entire set of nonpurchased CSPP-eligible and ineligible eurozone-incorporated firms, beginning four quarters after the implementation of the QE policy (Approach D). In Eq. 2, I compare these groups of firms to a propensity-score-matched control sample comprising observations that were neither targeted by ECB purchases nor experienced lower borrowing costs due to the CSPP. To identify this control sample, I focus on U.S.-incorporated bond issuers, whose bonds were ineligible for CSPP purchases. By estimating Eq. 2 on treated and control firms not targeted by the central bank, I mitigate the potential influence of

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[8] The four calendar quarters immediately following the implementation of the CSPP are the second, third, and fourth quarters of 2016 and the first quarter of 2017.

Table 1. Baseline and Additional Research Design

Target	Equation	Table	Approach	Treated Sample	Notes	Control Sample	Notes
Baseline analysis: the effects of QE on disclosure	Eq. 1	Table 6 and from Table 8 onward		ECB purchased bond issuers		Eurozone nonpurchased bond issuers (CSPP eligible and ineligible)	Subject to eurozone institutional and regulatory factors like treated observations
Exploring the central bank-clientele channel (i.e., the reduced information demand of the central bank)	Eq. 1	Table 7, Panel A, Columns 1 and 2	A	ECB purchased bond issuers		Eurozone nonpurchased CSPP-eligible bond issuers	*Not Purchased Credit Affected:* Eurozone bond issuers that did not have their bonds purchased by the central bank but experienced a reduction in their cost of debt due to the spillover effects of the CSPP
	Eq. 1	Table 7, Panel A, Columns 3 and 4	B	ECB purchased bond issuers, excluding the four quarters after the CSPP implementation		Eurozone nonpurchased bond issuers (CSPP eligible and ineligible), excluding the four quarters after the CSPP implementation	
Exploring the cost-of-credit channel (i.e., the facilitated access to credit and reduced cost of funding)	Eq. 2	Table 7, Panel B, Columns 1 and 2	C	Eurozone nonpurchased CSPP-eligible bond issuers	*Not Purchased Credit Affected:* Eurozone bond issuers that did not have their bonds purchased by the central bank but experienced a reduction in their cost of debt due to the spillover effects of the CSPP	Matched U.S. bond issuers	Bond issuers neither purchased by the central bank nor experiencing a decrease in their cost of debt due to the spillover effects of the CSPP
	Eq. 2	Table 7, Panel B, Columns 3 and 4	D	Eurozone nonpurchased bond issuers (CSPP eligible and ineligible), excluding the four quarters after the CSPP implementation		Matched U.S. bond issuers, excluding the four quarters after the CSPP implementation	

This table summarizes the research designs employed in the study to address the primary research question and investigate explanations for the results. For a visual representation of the various samples examined throughout the analysis, please refer to Figure 1
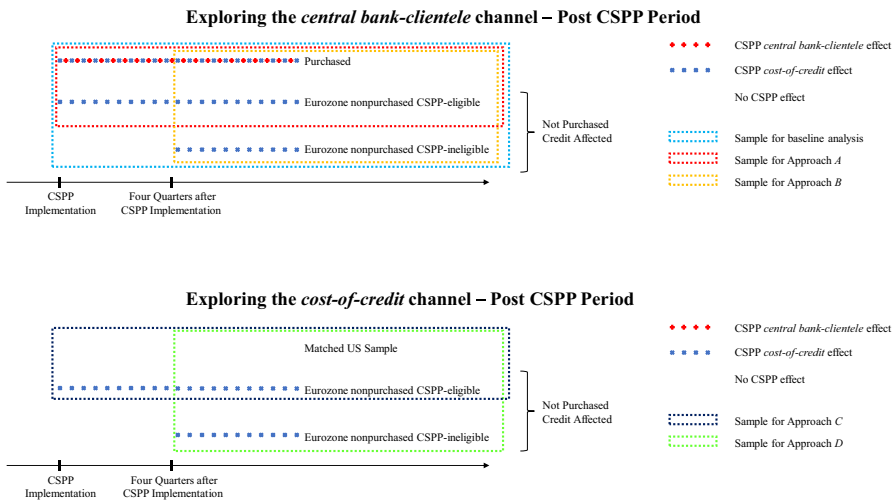

Fig. 1 This figure depicts the diverse effects of the CSPP on various groups of bond issuers in the period following the CSPP implementation. The symbol indicates that a group underwent the central bank-clientele effect of the CSPP, denoting reduced information demand from the central bank. The symbol indicates that a group experienced the cost-of-credit effect of the CSPP, signifying a reduction in the cost of credit. The dotted squares highlight the different samples considered for developing the baseline analysis and the additional approaches designed to disentangle the central bank-clientele (approaches A and B) and the cost-of-credit (approaches C and D) effects. For descriptions of the various samples examined throughout the analysis, please refer to Sects. 4.1 and 4.2 as well as Table 1

the central bank-clientele effect and isolate the specific impact of the cost-of-credit effect of QE on disclosure.[9]

4.3 Variable definitions

I employ various empirical proxies for voluntary disclosure based on management guidance obtained from the Thomson ONE Guidance Reports. These reports compile voluntarily disclosed forecasts shared by managers in conference calls and press releases, offering information on (i) the specific financial item for which guidance is provided, (ii) the numerical forecast (when available), (iii) the date of guidance issuance and its target horizon, and (iv) textual excerpts extracted from associated conference calls and press releases. Thomson ONE Guidance Reports have been used in recent studies (Sethuraman 2019; Mayew et al. 2020) and have been shown to provide better coverage of management guidance than other commonly used databases, such as I/B/E/S (Mayew et al. 2023).

In defining my outcome variables, I draw upon research highlighting the importance of detailed management forecasts beyond bottom-line guidance (Merkley et al. 2013). Given the central bank's intervention in the credit market and its impact on bondholders and the cost of credit, my focus is on management forecasts that exhibit enhanced credit-relevant content. I define credit-relevant voluntary disclosure as information related to expected cash flows and liabilities, as supported by prior studies (DeFond and Hung 2003; Merkley et al. 2013; Gurun et al. 2016; Hugon et al. 2016). Thus my primary disclosure variables include *EPS Guidance Count*, capturing the frequency of EPS forecasts, and *Cash Flows and Liabilities Guidance Count*, measuring the frequency of cash flows and liabilities forecasts. I further break down the latter variable by categorizing line-item forecasts into the following groups: (i) *Cash Flows from Operations* (*CFO*), (ii) *Cash Flows from Investments* (*CFI*), and (iii) *Cash Flows from Financing and Liabilities* (*CFF&L*). The appendix provides an overview of the different financial line-item forecasts that I assign to each guidance category and a description of alternative outcome variables that I consider throughout the analysis.

In each model, I control for time-varying factors that may be associated with the propensity to provide voluntary disclosure. To this end, *ROA*, *HH Industry Concentration*, *Size*, *Number Financial Analysts*, *Negative Net Income Dummy*, and *Price to Book* are measured following related research (e.g., Balakrishnan et al. 2014). *Change in Operating Cash Flows* is computed as the quarter-over-quarter change in

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[9] Given the pivotal role of the findings from related literature in this phase of the analysis, I adopt the methodology outlined by Zaghini (2019) to investigate whether the implications of CSPP on the cost of debt align with the anticipated direction when focusing on the specific subsample of firms and bonds within my sample. In the appendix, the following findings are presented: (i) both purchased and non-purchased CSPP-eligible bonds experience a comparable decline in bond spreads following the implementation of CSPP; (ii) eurozone nonpurchased CSPP-ineligible bonds exhibit a delayed decline in bond spreads, commencing in 2017. Furthermore, the analysis reveals that *Not Purchased Credit Affected* bonds, after the CSPP, demonstrate a lower cost of debt compared to bonds issued by U.S. firms matched using propensity scores. Notably, these results are directionally consistent with those of Zaghini (2019).

a firm's operating cash flows, scaled by its total assets. I also include three control variables reflecting borrowers' debt structure characteristics and credit risk. *Bond Leverage* reflects the relative importance of bonds in a firm's debt structure. *Average Bond Spread* measures the average difference in yields between a firm's issued bonds and benchmark securities. *Median Adjusted Leverage* represents the difference between a firm's book leverage and the median book leverage of issuers in the firm's credit rating class (investment-grade and non-investment grade). To account for media attention that could influence a firm's disclosures, I consider the number of *News* articles covering the firm in a given quarter. Additionally, given that my sample consists of firms based in countries with different markets and institutions, I control for *Country Bond to GDP*, which measures the ratio of corporate bonds issued by nonfinancial firms in a country to the country's total GDP. This variable reflects the development of a country's public credit market.

4.4 Sample construction

My baseline sample combines data from various sources. Bond characteristics are obtained from Bloomberg, while the list of bonds purchased by the central bank is accessed through the websites of the ECB and the central banks responsible for making the purchases on behalf of the Eurosystem.[10] Firm financials are sourced from FactSet, and forward-looking management guidance is extracted from Thomson ONE Guidance Reports.

I collect data from Bloomberg on 4,275 euro-denominated bonds issued by nonfinancial firms incorporated in the Eurozone, with maturities between six months and 31 years and outstanding at any quarter-end between January 2013 and December 2018. To ensure a homogeneous sample and mitigate potential biases stemming from variations in firm characteristics, I apply several restrictions. First, I only include bonds issued by firms with at least one outstanding bond before and after CSPP. This ensures consistency in the sample composition over time. Second, I require firms to have provided at least one management forecast during my sample period. This ensures that I capture firms that engage in voluntary disclosure. Lastly, I exclude issuers whose CSPP eligibility status changes during the sample period, as their inclusion could confound my analysis.[11] As shown in Table 2, my baseline sample comprises 164 Eurozone-incorporated bond issuers, corresponding to a total of 3,896 firm-quarters with relevant control variables available from 2013 to 2018. Within this sample, I observe 99 firms that meet the CSPP eligibility criteria,

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[10] The Eurosystem comprises the ECB and the national central banks of those countries that have adopted the euro. The Bundesbank, Banque de France, Banca D'Italia, Banco de Espana, Suomen Pankki, and Banque Nationale de Belgique implemented CSPP-purchases on behalf of the Eurosystem.

[11] While I acknowledge that the final sample comprises fewer observations due to my specific sample requirements, studies analyzing the effects of policy changes or regulations can benefit from a narrow-sample approach. Such an approach allows for the identification of a setting and observations characterized by clear and homogenous institutional features, leading to more neatly defined identification assumptions (Christensen 2020). In Table 8 Panel B, I show that results endure when using a sample that does not consider these requirements.

meaning their bonds have an investment-grade credit rating, and 88 firms whose bonds have been directly purchased by the central bank.[12]

5 Empirical results

5.1 Descriptive statistics

Table 3 presents summary statistics for the bonds and firms included in the baseline sample of eurozone-incorporated bond issuers from 2013–2018. In Panel A, I observe that bonds of purchased issuers have a larger notional amount and longer maturity than those issued by nonpurchased issuers. In Panels B and C, I report summary statistics on the main dependent and independent firm-level variables for both purchased and nonpurchased samples before and after CSPP. A univariate analysis reveals significantly different patterns among firms whose bonds were purchased by the central bank. On average, they tend to be larger and more profitable and have more of their debt in the form of bonds. Additionally, they have lower bond spreads than nonpurchased issuers, both before and after the implementation of the CSPP (Column 18 for the comparison in the pre-CSPP period and Column 20 for the comparison in the post-period).[13]

No significant differences emerge in the frequency of EPS forecasts between the treated and control subsamples. However, prior to the implementation of the CSPP, issuers that were part of the program more frequently provided forecasts for cash flows and liabilities. Following the ECB's purchases, these issuers became significantly less inclined to provide such forecasts compared to the nonpurchased sample. Specifically, the difference in the quarterly average guidance frequency between the treatment and control groups declines from 0.073 in the pre-CSPP period to -0.149 in the post-period. While descriptive, this evidence is consistent with a shift in the behavior of purchased issuers regarding the disclosure of credit relevant information after the CSPP.

5.2 Validation of the disclosure variables and the research design

5.2.1 Validation of the disclosure variables

As a first step, I assess the suitability of my primary outcome variables as proxies for disclosure. Specifically, I focus on the information conveyed to stakeholders through the disclosure of management guidance pertaining to specific line items.

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[12] Given that the ECB determined CSPP eligibility at the security level, I categorize an issuer as eligible when at least 50 percent of its outstanding euro-denominated bonds met the eligibility criteria as of a specific quarter-end. My inferences endure when using alternative eligibility thresholds, requiring 75 percent and 90 percent of a firm's euro-denominated bonds to be CSPP eligible. Instances of different eligibility status for bonds of the same issuer during the same period are rare and mainly pertain to the unrated bonds of issuers with eligible outstanding securities.

[13] Like related studies analyzing the effects of the CSPP (e.g., Grosse-Rueschkamp et al. 2019; Zaghini 2019), I observe significant differences in fundamental firm variables between the treatment and control groups. To address potential confounding factors, I employ a comprehensive set of controls and fixed effects. Additionally, I conduct various robustness tests to evaluate the validity of my findings.

Table 2 Sample Construction

Sample Selection

Step	Criteria	Bond Level N. of Bonds	
		Bond Level *N. of Bonds*	
1	Bonds of nonfinancial firms incorporated in the Eurozone, with maturities between six months and 31 years and outstanding at any quarter-end between 2013 and 2018	4,275	
2	Bonds issued by firms that have at least one bond outstanding both before and after CSPP	2,865	
		Firm Level	
		N. of Firms	*N. of Firm-Quarters*
3	At least one management forecast in Thomson ONE	186	4,464
4	Not changing CSPP-eligibility status	164	3,936
5	Company financials and bond spread data available	164	3,896

This table presents the key steps involved in the sample selection process. The upper section of the table focuses on the selection of individual bonds, while the lower section focuses on the selection of issuers based on the availability of disclosure and financial data. Each row in the table presents the number of bonds, firms, and firm-quarters that satisfy the specific sample selection criteria

Given the ECB's role in the credit market and its influence on the cost of credit, along with the crowding out of institutional credit investors, I anticipate that the disclosure of credit-relevant information may exhibit distinct patterns following QE interventions. To validate the use of management forecasts of cash flows and liabilities as indicators of credit-relevant information, I examine the frequency of management guidance disclosure during significant corporate events, such as seasoned equity offerings and bond issuances. The literature suggests that shareholders (Shroff et al. 2013; Clinton et al. 2014) demand more information surrounding seasoned equity offerings, while bondholders (Houweling et al. 2005; Pasquariello and Vega 2009) demand more around bond issuances. Consequently, I investigate the disclosure patterns of EPS forecasts as well as cash flow and liability forecasts during the periods coinciding with these events.

Table 4 presents the findings from my univariate analysis of management forecast frequency during quarters when firms issue equity or bonds, compared to other quarters.[14] My results align with those of previous studies (Li and Zhuang 2012) and indicate that firms provide more guidance, including both EPS forecasts and cash flow and liability forecasts, during SEO periods. In contrast, when firms issue bonds, I observe an increase in the disclosure of guidance related to expected cash

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[14] My validation analysis focuses on the sample of firm-quarter observations taken from the period preceding the implementation of the CSPP. To minimize potential distortions resulting from the central bank's purchases, I deliberately exclude the post-CSPP period from this analysis.

Table 3 Descriptive Statistics

Panel A Bond Level		
Bond Characteristics		
Financial Charac-teristics	**Treated: ECB Purchased**	**Control: ECB Nonpurchased**
Average Amount (€M)	676.6	380.0
Average Maturity (Years)	8.7	7.1
Average Rating[a]	4.5	3.1
Industry of the Issuer	**Treated: ECB Purchased**	**Control: ECB Nonpurchased**
	Electric, Gas, and Sanitary Services (22%)	Communications (11%)
	Transportation Equipment (19%)	Real Estate (8%)
	Chemical and Allied Products (10%)	General Building Contractors (7%)
	Oil and Gas Extraction (9%)	Paper & Allied Products (7%)
	Communications (8%)	Transportation Equipment (7%)

Table 3 (continued)

Panel B Firm Level Dependent Variables

Dependent Variables

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)
	Treated: CSPP Purchased Sample (N = 2,108)								Control: CSPP Nonpurchased Sample (N = 1,788)								Pre-CSPP: Treated vs. Control Columns (1)-(9) Diff. in Means	(p value)	Post-CSPP: Treated vs. Control Columns (4)-(12) Diff. in Means	(p value)
	Pre-CSPP (N=1,140)			Post-CSPP (N=968)			Diff.in Means Post-Pre	(p value)	Pre-CSPP (N=960)			Post-CSPP (N=828)			Diff. in Means Post-Pre	(p value)				
	Mean	SD	Median	Mean	SD	Median			Mean	SD	Median	Mean	SD	Median						
Main Guidance Variables																				
Cash Flows and Liabilities Guidance Count	0.753	1.226	0.000	0.574	0.963	0.000	-0.178	0.00	0.679	1.134	0.000	0.723	1.103	0.000	0.044	0.40	0.073	0.16	-0.149	0.00
Cash Flows and Liabilities Guidance Indicator	0.427	0.495	0.000	0.356	0.479	0.000	-0.071	0.00	0.384	0.487	0.000	0.407	0.492	0.000	0.023	0.33	0.043	0.05	-0.051	0.03
Other Guidance Variables																				
EPS Guidance Count	0.211	0.565	0.000	0.221	0.599	0.000	0.010	0.71	0.189	0.648	0.000	0.217	0.646	0.000	0.029	0.35	0.023	0.39	0.004	0.90
Revenues Guidance Count	0.546	1.247	0.000	0.532	1.155	0.000	-0.014	0.78	0.375	0.743	0.000	0.353	0.724	0.000	-0.022	0.52	0.171	0.00	0.179	0.00
COGS Guidance Count	0.006	0.078	0.000	0.008	0.091	0.000	0.002	0.56	0.002	0.000	0.000	0.001	0.000	0.000	-0.001	0.94	0.004	0.02	0.007	0.00
SGA Guidance Count	0.011	0.106	0.000	0.027	0.186	0.000	0.015	0.02	0.015	0.120	0.000	0.024	0.182	0.000	0.010	0.18	-0.003	0.52	0.003	0.75
CFO Guidance Count	0.174	0.487	0.000	0.150	0.408	0.000	-0.024	0.23	0.220	0.658	0.000	0.232	0.579	0.000	0.012	0.68	-0.046	0.07	-0.082	0.00
CFI Guidance Count	0.403	0.767	0.000	0.299	0.614	0.000	-0.104	0.00	0.348	0.657	0.000	0.344	0.611	0.000	-0.004	0.90	0.055	0.08	-0.046	0.11
CFF&L Guidance Count	0.176	0.516	0.000	0.126	0.427	0.000	-0.050	0.02	0.111	0.373	0.000	0.147	0.525	0.000	0.036	0.09	0.065	0.00	-0.021	0.34

Table 3 (continued)

Panel C Firm-Level Independent Variables

Independent Variables

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)
	Treated: CSPP Purchased Sample (N = 2,108)								Control: CSPP Nonpurchased Sample (N = 1,788)								Pre-CSPP: Treated vs. Control Columns (1)-(9)		Post-CSPP: Treated vs. Control Columns (4)-(12)	
	Pre-CSPP (N=1,140)			Post-CSPP (N=968)			Diff. in Means Post-Pre	(p value)	Pre-CSPP (N=960)			Post-CSPP (N=828)			Diff. in Means Post-Pre	(p value)	Diff. in Means	(p value)	Diff. in Means	(p value)
	Mean	SD	Median	Mean	SD	Median			Mean	SD	Median	Mean	SD	Median						
Bond Leverage	0.635	0.304	0.704	0.693	0.196	0.700	0.058	0.00	0.501	0.309	0.554	0.528	0.264	0.519	0.028	0.04	0.135	0.00	0.165	0.00
Bond Spread	125.2	203.4	101.8	89.2	85.7	91.4	-36.0	0.00	270.4	437.3	197.6	248.2	523.3	141.5	-22.2	0.33	-145.1	0.00	-159.0	0.00
Change in Operating Cash Flows	0.001	0.025	0.003	0.006	0.021	0.003	0.005	0.00	0.005	0.031	0.007	0.009	0.025	0.008	0.004	0.00	-0.004	0.00	-0.004	0.00
Country Bond to GDP	0.031	0.010	0.030	0.033	0.011	0.036	0.002	0.00	0.031	0.012	0.030	0.033	0.012	0.037	0.002	0.00	-0.001	0.07	0.000	0.63
HH Industry Concentration	0.034	0.033	0.020	0.038	0.032	0.027	0.004	0.00	0.057	0.052	0.040	0.061	0.053	0.042	0.004	0.08	-0.023	0.00	-0.024	0.00
Median Adjusted Leverage	0.007	0.136	-0.005	0.010	0.127	-0.004	0.002	0.67	0.032	0.129	0.007	0.028	0.135	0.016	-0.004	0.48	-0.025	0.00	-0.018	0.00
Negative Net Income Dummy	0.085	0.279	0.000	0.040	0.197	0.000	-0.045	0.00	0.246	0.431	0.000	0.121	0.326	0.000	-0.125	0.00	-0.161	0.00	-0.080	0.00
News	33.398	24.642	31.000	28.709	23.567	22.500	-4.690	0.00	25.980	30.361	19.000	23.405	24.465	18.000	-2.576	0.00	7.418	0.00	5.304	0.25
Number Financial Analysts	6.943	9.729	1.500	7.799	10.265	1.000	0.856	0.05	5.333	8.117	0.000	5.870	8.442	0.000	0.536	0.17	1.610	0.00	1.929	0.00
Price to Book	2.353	1.223	2.112	2.522	1.382	2.283	0.169	0.00	2.361	1.535	1.784	2.647	1.601	1.973	0.286	0.00	-0.008	0.88	-0.125	0.07

Table 3 (continued)

ROA	0.037	0.031	0.035	0.043	0.029	0.039	0.006	0.00	0.020	0.034	0.023	0.035	0.032	0.038	0.015	0.00	0.017	0.00	0.008	0.00
Size	10.465	1.131	10.513	10.515	1.088	10.581	0.050	0.30	9.025	1.039	8.761	9.060	1.020	8.864	0.034	0.48	1.439	0.00	1.455	0.00

This table presents summary statistics. Panel A refers to the bonds in the final sample. Industry groups are categorized based on two-digit SIC codes. Panels B and C provide an overview of the firms in the final sample, presenting summary statistics for the dependent and independent variables at the firm-quarter level. Each panel focuses on treated (columns 1 to 8) and control (columns 9 to 16) observations in both the pre-CSPP and post-CSPP periods. Additionally, columns 17 and 18 display the difference in the mean of each variable between the treated and control samples before the CSPP implementation, while columns 19 and 20 show the difference in the mean of each variable between the treated and control samples after the CSPP implementation. Continuous independent variables are winsorized at the 1% and 99% levels

flows and liabilities but not EPS forecasts. This pattern is consistent with previous research, which suggests that the information demands of bond investors and the sensitivity of bond prices to financial information rise around bond issuances. The observed increase in guidance related to cash flows and liabilities, without a similar rise in EPS forecasts, also suggests that firms target their voluntary disclosures to the needs of creditors. This evidence supports the validity of my cash flows and liabilities metric as a proxy for credit-relevant financial disclosure.

5.2.2 Validation of the research design

My research design, especially the section dedicated to disentangling the central bank-clientele and cost-of-credit effects, is driven by related findings indicating that the CSPP had varying impacts on the cost of debt for different categories of issuers, including eligible purchased, eligible nonpurchased, eurozone ineligible issuers, and US ineligible issuers. Given the pivotal role of this inference, I conduct tests to confirm whether the cost of debt indeed changed in the expected direction for the firms included in my sample.

First, the literature reveals that CSPP-eligible nonpurchased issuers witnessed a decrease in yield spreads concurrent with those of purchased securities, while CSPP-ineligible eurozone issuers experienced a decline in yield spreads approximately four quarters after the CSPP implementation (Zaghini 2019). To validate these findings, I replicate Zaghini's analysis on the securities issued by eurozone firms within my sample, employing a regression model that includes time dummies and dummies identifying the nature of the security around the introduction of the CSPP. The results, presented in Table 5 Panel A, align directionally with prior evidence, indicating that (i) CSPP-eligible bonds, whether purchased or not, experience a reduction in yield spreads immediately following CSPP implementation and (ii) spreads on eurozone ineligible bonds decrease with a delay. This implies that eurozone nonpurchased issuers can serve as a suitable control group for investigating the central bank-clientele effect of QE on disclosure.

Building upon Zaghini's empirical framework, I extend my validation analysis to compare yield spreads on Eurozone bonds not purchased by the ECB (the *Not Purchased Credit Affected* sample) with a series of bonds issued by a matched set of U.S. firms during the period surrounding the introduction of the CSPP. As reported in Table 5 Panel B, regression results support the notion that the yield spreads of eurozone nonpurchased bonds exhibited a relative decline, also when compared to U.S. securities, following the implementation of the CSPP. This indicates that U.S. bond issuers are a viable choice as a control group for examining the cost-of-credit effect of QE on disclosure.

5.3 Baseline results: CSPP and disclosure

Table 6 Panel A presents the main findings regarding the impact of large-scale outright central bank purchases on firms' disclosure practices. After the implementation of the CSPP, I find no statistically significant variation between treated and control

Table 4 Validation of the Disclosure Variables

	No Bond Issuance			Bond Issuance			
Guidance Type	N	Avg Frequency	N	Avg Frequency	Diff in Means	*(pvalue)*	
Overall Guidance	1,653	2.587	447	2.579	-0.007	*0.88*	
Cash Flows and Liabilities Guidance	1,653	0.670	447	0.899	0.229	*0.00*	
EPS Guidance	1,653	0.207	447	0.179	-0.028	*0.21*	
	No SEO		SEO				
Guidance Type	N	Avg Frequency	N	Avg Frequency	Diff in Means	*(pvalue)*	
Overall Guidance	1,962	2.534	138	3.319	0.785	*0.007*	
Cash Flows and Liabilities Guidance	1,962	0.700	138	0.993	0.293	*0.005*	
EPS Guidance	1,962	0.194	138	0.297	0.103	*0.053*	

This table displays the average number of management forecasts issued by firms in the period preceding the implementation of the CSPP. The data is reported at the firm-quarter level and is categorized based on whether the firm issued bonds (bond issuance versus no bond issuance) and whether the firm conducted a secondary equity offering (SEO versus no SEO) during the respective quarters. *Overall Guidance* is the total number of management forecasts issued by a firm in a quarter. *Cash Flows and Liabilities Guidance* is the number of cash flows and liabilities management forecasts issued by a firm in a quarter. *EPS Guidance* is the number of EPS management forecasts issued by a firm in a quarter

firms in terms of their issuance of EPS guidance. However, I do observe a noteworthy change in cash flow and liability forecasts. The negative coefficient on the interaction *Purchased Issuer × Post CSPP* (-0.224, Column 3) suggests that treated firms reduce their disclosure of credit-relevant forecasts by approximately 30 percent compared to control observations based on the sample mean (0.753). Notably, targeted firms not only issue fewer cash flow and liability forecasts after the CSPP implementation, but they are also less likely to disclose any such information. The analysis in Column 4 demonstrates that the probability of a treated issuer providing at least one credit-relevant forecast per quarter decreases by 9.5 percent following the ECB's intervention. As a benchmark, the probability of providing credit-relevant guidance stands at 43 percent for the average treated firm in the pre-CSPP period.

The asymmetric behavior documented above may not capture the propensity of firms to curtail disclosure with specific credit relevance. Instead firms may maintain EPS guidance while discontinuing other more detailed forecasts (Glaeser 2018). To address this concern, I estimate Eq. 1 using alternative outcome variables, including granular accrual and cash flow metrics. Table 6 Panel B presents the results of this analysis. I do not detect any significant decrease in the frequency of *Revenue*, *COGS*, and *SGA* forecast disclosures among firms targeted by the central bank, compared to other eurozone-incorporated bond issuers.[15] When I focus on detailed credit-relevant management forecasts, I observe a concentrated decrease in disclosures related

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[15] On the contrary, my analysis reveals a slight increase in the frequency of SGA forecast disclosures among the treated firms.

to cash flows from investment (*CFI*) and cash flows from financing and liabilities (*CFF&L*). The number of *CFI* forecasts decreases by approximately 27 percent (0.112/0.403), while the number of *CFF&L* forecasts falls by approximately 48 percent (0.085/0.176). Although to a lesser extent, this decrease also applies to cash flows from operations, with *CFO* forecasts occurring approximately 16 percent less frequently (0.028/0.174). These findings indicate that, following the implementation of the CSPP, treated issuers primarily withhold information regarding projected investment and financing, which are critical factors for bond investors when evaluating an issuer's credit risk.[16]

5.4 Central bank-clientele and cost-of-credit channels

5.4.1 Central bank-clientele channel

To illuminate how private-sector QE interventions impact credit-relevant voluntary disclosure, I first focus on the central bank-clientele channel.[17] My approach involves comparing firms whose bonds were purchased by the central bank with two control groups of eurozone-incorporated bond issuers. These control groups comprise firms that, like the purchased ones, experienced a reduction in their cost of credit due to spillovers from QE (*Not Purchased Credit Affected* samples). By comparing firms with varying exposure to CSPP purchases but comparable exposure to the CSPP's cost-of-credit effects, I mitigate the influence of the cost-of-credit effect on disclosure while pinpointing the central bank-clientele effect.

First, the cost of credit of CSPP-eligible issuers not purchased by the ECB dropped along with that of purchased firms (Zaghini 2019; ECB 2020). Thus I estimate Eq. 1 on purchased and nonpurchased CSPP-eligible issuers only, excluding eurozone CSPP-ineligible issuers from my baseline sample (Approach A). The findings, presented in Columns 1 and 2 of Table 7 Panel A, suggest a decreased likelihood among firms whose bonds were purchased by the central bank to provide forecasts of cash flows and liabilities, in contrast to firms whose bonds were not purchased.

Second, I refine my baseline sample by excluding observations in the four quarters following the implementation of the CSPP (Approach B). The cost of credit for eurozone-incorporated ineligible issuers tightened approximately four quarters after the CSPP implementation due to spillovers from QE. Therefore I evaluate the extent of the disclosure differences in the post-CSPP period beyond the first quarter of

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[16] In an unreported analysis, I define a scaled proxy of firms' credit-relevant disclosure that I measure as the ratio of *CF and Liabilities Guidance Count* to *Total Guidance Count*. When I estimate Eq. 1 using this outcome variable, I consistently find a negative and significant coefficient on the interaction *Purchased Issuer × Post CSPP*. This finding suggests that, even after accounting for firms' overall disclosure propensity, targeted firms decrease their provision of credit-relevant information compared to control firms following the implementation of the CSPP.

[17] Given that the baseline results suggest that the effects of the CSPP on credit-relevant information are significantly more important than the effects on other types of performance guidance, my investigation, from this point forward, will focus on cash flow and liability forecasts.

2017, when both the treated and control firms in my baseline sample benefitted from QE in terms of a lower cost of debt. Columns 3 and 4 of Table 7 present results for Eq. 1 on this adjusted sample. The negative and statistically significant coefficients on the interaction term *Purchased Issuer × Post CSPP* support the notion that issuers with direct investments from the central bank reduced credit-relevant guidance, even after accounting for the effects of QE on the cost of credit.

Taken together, these findings lend support to the central bank-clientele channel, whereby the central bank acts as a significant investor with reduced information requirements. Consequently, firms face less pressure to disclose and reduce their voluntary disclosure of credit-relevant information.

5.4.2 Cost-of-credit channel

To investigate the impact of QE on disclosure through the cost-of-credit channel, I estimate Eq. 2. My analysis focuses on eurozone-incorporated bond issuers that, despite not being purchased by the central bank, experienced a decrease in their cost of debt due to CSPP spillovers. In line with my prior tests, I delineate two distinct samples of firms that were not purchased by the central bank but were affected by changes in credit conditions (*Not Purchased Credit Affected* firms). First, I investigate firms eligible for CSPP whose bonds were not purchased by the ECB (Approach C). Second, I consider Eurozone-incorporated bond issuers whose bonds the central bank did not purchase, regardless of CSPP-eligibility status, excluding observations between the CSPP implementation and the first quarter of 2017 (Approach D). I compare these samples with a control set of U.S. bond issuers, whose cost of credit was unaffected by the CSPP. To form this control group, I employ a one-to-one nearest neighbor approach using propensity-score matching without replacement. The matching is conducted based on observable firm characteristics, including size, book leverage, and bond leverage, and is performed at the time of CSPP implementation.

Table 7 Panel B presents the results of Eq. 2. Across all specifications comparing *Not Purchased Credit Affected* firms and U.S. control issuers, I do not find significant and consistent variation in credit-relevant disclosure patterns. Consequently, these findings fail to support a relationship between large-scale QE purchases and disclosure driven by the cost-of-credit channel.

5.5 Robustness tests

5.5.1 Alternative approaches to identify treated observations

To further examine the relationship between QE and disclosure, I conduct additional robustness tests. I consider two variants of my research design. First, I leverage variation in the timing of the first ECB purchases at the company level. Instead of relying on the generic timing of the CSPP implementation, I introduce a binary treatment variable (*Post Firm Purchased*) that identifies the post-CSPP period based on

Table 5 Validation of the Research Design

Panel A Eurozone Securities

	(1) Yield Spread
Bond Maturity	0.012***
	(15.568)
Bond Value	3.004
	(0.934)
Investment Grade	-70.411***
	(-11.272)
Bond in Euro	-7.675
	(-1.403)
Issuer Size	-44.612***
	(-11.871)
First Timer	29.042**
	(2.304)
REER	2.559
	(1.106)
Systematic Stress	241.596*
	(1.934)
Market Volatility	1.052
	(1.083)
Business Cycle	-64.443***
	(-2.775)
Uncertainty	0.095
	(0.787)
Corporate Credit Risk	-21.104
	(-1.118)
Q2016Q1	63.460
	(1.182)
Q2016Q2	29.726
	(0.552)
Q2016Q3	35.655
	(0.633)
Q2016Q4	34.257
	(0.589)
Q2017Q1	**-14.489**
	(-0.244)
Q2017Q2	**-5.340**
	(-0.096)
Q2016Q3 × CSPP Eligible Purchased	**-37.834****
	(-2.127)
Q2016Q4 × CSPP Eligible Purchased	**-29.530**
	(-1.514)

Table 5 (continued)

Q2017Q1×CSPP Eligible Purchased	4.911
	(0.407)
Q2017Q2×CSPP Eligible Purchased	-9.396
	(-0.518)
Q2016Q3 × CSPP Eligible Non-Purchased	**-45.928*****
	(-2.648)
Q2016Q4 × CSPP Eligible Non-Purchased	**-27.415**
	(-0.938)
Q2017Q1×CSPP Eligible Non-Purchased	15.726
	(1.138)
Q2017Q2×CSPP Eligible Non-Purchased	8.189
	(0.835)
Observations	2,972
Adjusted R-squared	0.547

Panel B – Not Purchased Credit Affected and US Securities

	(1)
	Yield Spread
Bond Maturity	0.009***
	(14.906)
Bond Value	1.815
	(0.556)
Investment Grade	-106.753***
	(-22.138)
Bond in Euro	-19.332***
	(-3.811)
Issuer Size	-56.554***
	(-25.874)
First Timer	40.988***
	(4.371)
REER	1.769
	(0.947)
Systematic Stress	222.669**
	(2.266)
Market Volatility	0.934
	(1.269)
Business Cycle	-59.094***
	(-3.142)
Uncertainty	0.222*
	(1.949)
Corporate Credit Risk	-0.478
	(-0.031)
Q2016Q1	82.047*
	(1.700)

Table 5 (continued)

Q2016Q2	52.513
	(1.091)
Q2016Q3	50.247
	(0.986)
Q2016Q4	74.232
	(1.441)
Q2017Q1	37.722
	(0.706)
Q2017Q2	65.788
	(1.316)
Q2016Q3 × Not Purchased Credit Affected	**-6.992**
	(-0.302)
Q2016Q4 × Not Purchased Credit Affected	**-25.820**
	(-1.048)
Q2017Q1 × Not Purchased Credit Affected	**-45.268****
	(-2.042)
Q2017Q2 × Not Purchased Credit Affected	**-39.265***
	(-1.654)
Observations	4,093
Adjusted R-squared	0.560

This table presents a validation analysis for the research design employed in this study. The dependent variable captures corporate bond *Yield Spreads* relative to the benchmark security at the time of issuance. In Panel A, the results compare yield spreads of CSPP-eligible purchased and CSPP-eligible nonpurchased securities to eurozone CSPP-ineligible securities. The empirical framework used replicates that of Zaghini (2019). In Panel B, the results compare yield spreads of eurozone bonds not purchased by the ECB (as identified by the *Not Purchased Credit Affected* variable) with a series of bonds issued by a matched set of U.S. firms. All other variables used in the regressions are defined as by Zaghini (2019). Standard errors are clustered by issuer, and the t-statistics are presented in parentheses below the coefficients. Observations enter the regressions at the security level. Statistical significance levels are denoted by ***, **, and *, indicating significance at the 1%, 5%, and 10% levels, respectively

the first firm-specific ECB purchase of eligible securities.[18] Second, to capture the variation in the intensity and timing of ECB purchases at the company level, I introduce a continuous-treatment variable (*Percentage Firm Purchased*). This variable quantifies the proportion of CSPP-eligible bonds issued by a firm that the central bank purchases at any quarter-end throughout the sample period.[19]

I estimate Eq. 1 using my baseline sample with these alternative treatment designs and present the regression results in Table 8 Panel A. The coefficient for

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[18] Thirty-eight percent of the initial ECB's purchases of a firm's corporate bonds take place in the second quarter of 2016, when the CSPP was first implemented. The remaining initial ECB purchases are distributed as follows: 45 percent in the third quarter of 2016, 7 percent in the fourth quarter of 2016, 2 percent in the first quarter of 2017, 1 percent in the third quarter of 2017, 4 percent in the fourth quarter of 2017, 1 percent in the first quarter of 2018, and 1 percent in the second quarter of 2018.

[19] The proportion of CSPP-eligible bonds purchased by the ECB gradually increases over time. In the second quarter of 2016, around 35 percent of eligible securities are purchased by the ECB, and this proportion steadily rises to approximately 91 percent by the fourth quarter of 2018.

Table 6 Baseline Results: CSPP and Disclosure

Panel A EPS and Cash Flows and Liabilities Guidance

	(1)	(2)	(3)	(4)
	EPS		*Cash Flows and Liabilities*	
	Count	*Indicator*	*Count*	*Indicator*
Purchased Issuer × Post CSPP	**–0.022**	**–0.016**	**–0.224*****	**–0.095*****
	(–0.896)	**(–1.128)**	**(–3.880)**	**(–3.756)**
Bond Leverage	0.001	0.012	0.075	0.084**
	(0.028)	(0.587)	(0.908)	(2.349)
Median Adjusted Leverage	0.137	0.145*	0.072	0.057
	(0.950)	(1.753)	(0.215)	(0.393)
Average Bond Spread	–0.002	–0.000	–0.014**	–0.006**
	(–0.794)	(–0.188)	(–2.172)	(–2.149)
Change in Operating Cash Flows	0.044	–0.212	2.743***	0.814***
	(0.152)	(–1.255)	(4.031)	(2.739)
ROA	0.405	0.322	–2.308**	–0.570
	(0.831)	(1.147)	(–2.033)	(–1.150)
Country Bond to GDP	–0.244	–0.303	2.214	2.845**
	(–0.215)	(–0.463)	(0.839)	(2.469)
HH Industry Concentration	–1.330***	–0.721**	–3.742***	–0.558
	(–2.711)	(–2.550)	(–3.276)	(–1.119)
Size	0.058	–0.016	0.090	0.103*
	(1.121)	(–0.546)	(0.749)	(1.954)
News	–0.035	–0.008	0.427***	0.124***
	(–0.823)	(–0.328)	(4.338)	(2.880)
Number Financial Analysts	0.004**	0.001	0.008*	0.001
	(2.353)	(1.165)	(1.844)	(0.454)
Negative Net Income Dummy	0.035	0.011	0.022	0.014
	(1.024)	(0.568)	(0.272)	(0.393)
Price to Book	0.030**	0.002	0.020	–0.001
	(2.510)	(0.320)	(0.714)	(–0.051)
Constant	–0.397	0.312	–0.209	–0.717
	(–0.762)	(1.040)	(–0.172)	(–1.355)
Firm and Quarter FE	YES	YES	YES	YES
Observations	3,896	3,896	3,896	3,896
Adjusted R-squared	0.620	0.601	0.383	0.385

Table 6 (continued)

Panel B Alternative Guidance

	(1) Revenues	(2) COGS	(3) SG&A	(4) CFO	(5) CFI	(6) CFF&L
Purchased Issuer × Post CSPP	**0.039**	**0.002**	**0.013***	**–0.028***	**–0.112***	**–0.085***
	(0.837)	**(0.885)**	**(1.658)**	**(–1.724)**	**(–3.167)**	**(–3.313)**
Bond Leverage	0.146**	0.005	0.029***	0.022	0.039	0.013
	(2.215)	(1.462)	(2.671)	(0.597)	(0.774)	(0.365)
Median Adjusted Leverage	–0.649**	–0.008	0.027	–0.138	0.122	0.088
	(–2.416)	(–0.569)	(0.612)	(–0.906)	(0.593)	(0.593)
Average Bond Spread	–0.006	0.000	0.000	–0.009***	–0.005	0.000
	(–1.086)	(0.484)	(0.496)	(–3.183)	(–1.289)	(0.150)
Change in Operating Cash Flows	0.709	0.003	0.098	0.755**	1.624***	0.365
	(1.300)	(0.100)	(1.074)	(2.437)	(3.893)	(1.205)
ROA	–1.092	–0.105**	–0.198	–0.376	–1.838***	–0.095
	(–1.200)	(–2.098)	(–1.304)	(–0.727)	(–2.641)	(–0.188)
Country Bond to GDP	–0.656	–0.023	1.435***	–4.494***	4.797***	1.912
	(–0.310)	(–0.195)	(4.069)	(–3.740)	(2.965)	(1.629)
HH Industry Concentration	–0.118	–0.014	–0.092	–1.823***	0.117	–2.036***
	(–0.129)	(–0.284)	(–0.600)	(–3.506)	(0.167)	(–4.007)
Size	0.240**	0.005	0.030*	0.142***	0.040	–0.092*
	(2.491)	(0.970)	(1.844)	(2.590)	(0.543)	(–1.714)
News	0.157**	0.005	0.013	0.115**	0.167***	0.145***
	(1.992)	(1.106)	(0.980)	(2.566)	(2.774)	(3.305)
Number Financial Analysts	–0.005	–0.000	–0.000	0.003	0.004	0.001
	(–1.531)	(–1.093)	(–0.377)	(1.494)	(1.536)	(0.502)
Negative Net Income Dummy	–0.067	–0.004	–0.020*	0.026	–0.024	0.020
	(–1.055)	(–1.269)	(–1.898)	(0.721)	(–0.500)	(0.562)
Price to Book	0.033	0.002*	0.007*	0.040***	–0.013	-0.007
	(1.495)	(1.888)	(1.917)	(3.125)	(–0.749)	(–0.562)
Constant	–1.993**	–0.051	–0.347**	–1.101**	–0.169	1.061**
	(–2.052)	(–0.946)	(–2.141)	(–1.995)	(–0.227)	(1.969)
Firm and Quarter FE	YES	YES	YES	YES	YES	YES
Observations	3,896	3,896	3,896	3,896	3,896	3,896
Adjusted R-squared	0.524	0.607	0.388	0.448	0.360	0.296

This table presents an analysis of the impact of the CSPP on firms' disclosure. In panel A, the dependent variables in Columns 1 and 2 represent the number of EPS forecasts issued by a firm and an indicator variable taking a value of one if a firm discloses at least one EPS forecast in a given quarter. The dependent variables in Columns 3 and 4 represent the number of *CF&L* (*Cash Flows and Liabilities*) forecasts issued by a firm and an indicator variable taking a value of one if a firm discloses at least one *CF&L* forecast in a given quarter. In panel B, the dependent variables in Columns 1, 2, and 3 represent the number of forecasts issued by a firm in a quarter for *Revenues*, *COGS*, and *SG&A*, respectively. The dependent variables in Columns 4, 5, and 6 represent the number of forecasts issued by a firm in a quarter for *Cash Flows from Operations*, *Cash Flows from Investments*, and *Cash Flows from Financing and Liabilities Levels*, respectively. *Purchased Issuers* is an indicator variable that identifies firms whose bonds are acquired by the ECB during the CSPP. *Post* is an indicator variable taking a value of one from the second quarter of 2016 onward. All other variables used in the regressions are defined in the appendix. Standard errors are clustered by issuer, and the t-statistics are presented in parentheses below the coefficients. Observations enter the regressions at the firm-quarter level. Statistical significance levels are denoted by ***, **, and *, representing significance at the 1%, 5%, and 10% levels, respectively

Table 7 Underlying Channels

Panel A – Central Bank-Clientele Channel

	(1)	(2)	(3)	(4)
	Approach A CSPP-Eligible		Approach B Baseline Sample Excluding Quarters (2016 Q2-2017 Q1) after the CSPP Implementation	
	Cash Flows and Liabilities		Cash Flows and Liabilities	
	Count	Indicator	Count	Indicator
Purchased Issuer × Post CSPP	**-0.231****	**-0.174*****	**-0.212*****	**-0.080*****
	(-1.994)	**(-3.380)**	**(-3.143)**	**(-2.740)**
Bond Leverage	0.093	0.095**	0.072	0.074*
	(0.875)	(2.019)	(0.810)	(1.932)
Median Adjusted Leverage	-0.773	-0.801***	0.227	0.139
	(-1.261)	(-2.946)	(0.618)	(0.871)
Average Bond Spread	0.005	0.002	-0.014**	-0.006*
	(0.396)	(0.357)	(-1.969)	(-1.913)
Change in Operating Cash Flows	3.868***	1.095**	3.131***	0.856**
	(3.971)	(2.535)	(4.060)	(2.553)
ROA	-4.090**	-1.099	-2.903**	-0.903*
	(-2.443)	(-1.480)	(-2.343)	(-1.675)
Country Bond to GDP	0.148	1.756	1.645	2.261*
	(0.047)	(1.245)	(0.580)	(1.832)
HH Industry Concentration	-1.849	0.199	-4.698***	-0.823
	(-1.179)	(0.287)	(-3.802)	(-1.531)
Size	-0.228	-0.078	0.041	0.085
	(-1.274)	(-0.977)	(0.312)	(1.494)

Table 7 (continued)

News	0.295**	0.105**	0.447***	0.149***
	(2.504)	(2.009)	(4.008)	(3.080)
Number Financial Analysts	-0.004	-0.004**	0.009**	0.001
	(-0.873)	(-1.983)	(1.993)	(0.567)
Negative Net Income Dummy	0.149	0.077	0.037	0.004
	(1.287)	(1.498)	(0.418)	(0.095)
Price to Book	-0.014	-0.009	0.026	-0.000
	(-0.329)	(-0.491)	(0.865)	(-0.001)
Constant	3.296*	1.227	0.323	-0.507
	(1.727)	(1.450)	(0.245)	(-0.886)
Firm and Quarter FE	YES	YES	YES	YES
Observations	2,372	2,372	3,241	3,241
Adjusted R-squared	0.364	0.367	0.368	0.370

Table 7 (continued)

Panel B – Cost-of-Credit Channel

	(1)	(2)	(3)	(4)
	Approach C		Approach D	
	Non-Purchased Eligible and Matched US Issuers		Non-Purchased Eurozone and Matched US Issuers Excluding Quarters (2016 Q2–2017 Q1) after the CSPP Announcement	
	Cash Flows and Liabilities		Cash Flows and Liabilities	
	Count	Indicator	Count	Indicator
Not Purchased Credit Affected × Post CSPP	**0.134**	**0.050**	**-0.057**	**-0.025**
	(0.733)	**(0.815)**	**(-0.735)**	**(-0.907)**
Bond Leverage	0.081	-0.056	0.123	0.053
	(0.294)	(-0.610)	(1.102)	(1.316)
Median Adjusted Leverage	1.454	0.207	0.522*	0.155
	(1.235)	(0.528)	(1.848)	(1.511)
Change in Operating Cash Flows	6.119***	0.973	-1.070*	-0.313
	(3.192)	(1.522)	(-1.766)	(-1.424)
ROA	-9.465***	-0.587	1.461*	0.104
	(-2.638)	(-0.490)	(1.854)	(0.366)
Country Bond to GDP	12.314	3.808	10.466**	6.537***
	(1.279)	(1.186)	(2.296)	(3.959)
HH Industry Concentration	1.229	1.316*	1.138	0.069
	(0.521)	(1.672)	(1.244)	(0.207)
Size	-0.372	-0.027	-0.307***	-0.047**
	(-1.379)	(-0.303)	(-5.099)	(-2.164)
News	0.181	0.046	0.609***	0.203***
	(1.164)	(0.893)	(5.082)	(4.684)

Table 7 (continued)

Number Financial Analysts	0.017	0.006	0.025***	0.013***
	(1.264)	(1.209)	(4.132)	(5.729)
Negative Net Income Dummy	-0.212	0.077	-0.029	-0.018
	(-0.707)	(0.773)	(-0.335)	(-0.570)
Price to Book	-0.097*	-0.061***	-0.073***	-0.026***
	(-1.770)	(-3.321)	(-3.376)	(-3.339)
Constant	3.739	0.443	2.722***	0.393*
	(1.417)	(0.504)	(4.724)	(1.883)
Firm and Quarter FE				
Observations	528	528	3,040	3,040
Adjusted R-squared	0.446	0.537	0.479	0.463

This table provides an analysis of the channels through which the CSPP influences firms' disclosure. The analysis in panel A focuses on the central bank-clientele channel. The analysis in panel B focuses on the cost-of-credit channel. Columns 1 and 3 represent the number of *CF&L (Cash Flows and Liabilities)* forecasts issued by a firm in a quarter. Columns 2 and 4 represent binary indicators, taking a value of one if a firm discloses at least one *CF&L* forecast in a quarter. *Purchased Issuers* is an indicator variable that identifies firms whose bonds are acquired by the ECB during the CSPP. *Not Purchased Credit Affected* serves as an indicator to identify eurozone firms whose bonds are not acquired by the ECB during the CSPP. *Post* is an indicator variable taking a value of one from the second quarter of 2016 onward. All other variables used in the regressions are defined in the appendix. Standard errors are clustered by issuer, and the t-statistics are presented in parentheses below the coefficients. Observations enter the regressions at the firm-quarter level. Statistical significance levels are denoted by ***, **, and *, representing significance at the 1%, 5%, and 10% levels, respectively

the *Post Firm Purchased* variable is estimated to be -0.193, while the coefficient for the *Percentage Firm Purchased* variable is estimated to be -0.234. Both coefficients are statistically significant at the 1 percent level. These alternative treatment designs contribute to a better understanding of the relationship between QE private-sector investments and changes in targeted firms' disclosure.

5.5.2 Propensity-score matching and generalizability of QE impact on disclosure

To address the possibility that differences in the firm characteristics of purchased and nonpurchased bond issuers confound my baseline findings, I employ propensity-score matching. My use of propensity-score matching is justified based on two key considerations, as highlighted by Shipman et al. (2017). First, a clearly defined cutoff exists for assigning observations to the treatment and control groups. Second, specific characteristics that determine the treatment status may also be associated with the disclosure choices made by the firms. To conduct the matching, I employ the one-to-one nearest neighbor approach with common support and without replacement. I match treated and control observations from my baseline sample at the time of the CSPP implementation based on size, book leverage, and bond leverage. In Table 8 Panel B Column 1, I present the results of Eq. 1 estimated on this sample. The negative coefficient observed on the *Purchased Issuer × Post CSPP* interaction aligns with previous findings, indicating that firms whose bonds are purchased by the central bank tend to reduce their credit-relevant guidance.

Another concern relates to the generalizability of my results. To construct my baseline sample, I apply specific criteria. In particular, I only include firms with outstanding bonds before and after the CSPP and that did not experience any changes in their CSPP eligibility. Additionally, I focus on firms that issued at least one management forecast during the sample period. By employing this approach, I can focus on more homogeneous observations and account for variations in fundamental firm characteristics that may impact disclosure choices. However, the smaller sample size raises concerns about the broader applicability of my findings. To address these concerns, I expand my analysis to encompass a larger sample that comprises more eurozone-incorporated bond issuers. In this sample, I remove the aforementioned restrictions to encompass a broader range of 413 firms. Remarkably, even with this larger sample, the coefficient on the interaction term between *Purchased Issuer* and *Post CSPP* remains negative (-0.093; Table 8 Panel B Column 2) and statistically significant.[20] This indicates that my findings regarding the relationship between QE and disclosure persist when considering a broader range of bond issuers.

5.5.3 Parallel trends assumption

I proceed to examine the dynamic treatment effects of the CSPP on disclosure and evaluate the validity of the parallel trends assumption. My identification strategy

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[20] In the unconstrained sample, the average count of *Cash Flows and Liabilities Guidance* is 0.372, which is lower than in the baseline sample. This difference arises because the unconstrained sample includes firms that did not issue any management forecasts during the sample period. Thus a coefficient of -0.093 indicates a decrease in the frequency of disclosure by approximately 25 percent.

assumes that treatment and control firms would have exhibited similar trends in their disclosure choices regarding cash flows and liabilities in the absence of central bank purchases. To evaluate this assumption, I adopt a methodology employed in prior studies (Christensen et al. 2017) and analyze the dynamics of treatment effects over time.

Figure 2 illustrates my findings. Instead of using the *Purchased Issuer × Post CSPP* interaction, I replace it with separate interactions for each quarter within my sample period, enabling observation of the treatment effect in event time. The figure supports the parallel trends assumption. During the pre-period, the coefficients pertaining to variations in credit-relevant disclosure are small and statistically insignificant and show no discernible trends. However, a significant and robust effect emerges in the year following the implementation of the CSPP. This effect partially reverses in the subsequent two quarters (the second and third quarters of 2017). In the longer term, the treatment effects stabilize at negative and statistically significant values, indicating that the impact of outright investments through QE on disclosure persists.

5.6 Cross-sectional analysis

To enhance the strength of my identification and provide a better understanding of the impact of QE on disclosure, I leverage variations in market pressure and information asymmetry across firms. My premise posits that issuers facing heightened information demands from bond investors prior to the implementation of the CSPP, due to rigorous screening and monitoring requirements, along with elevated disclosure costs, are more likely to adapt their disclosure practices following the central bank's intervention.

5.6.1 Primary bond market pressure

In my initial set of cross-sectional tests, I investigate the extent to which firms' financing needs, particularly related to bond issuances, may influence disclosure practices. Studies (e.g., Pasquariello and Vega 2009; Houweling et al. 2005) have highlighted that recently issued bonds tend to be more sensitive to information than seasoned ones. As a result, firms that have recently accessed or are anticipated to access the bond market in the near future face heightened information demand from bond investors. If the central bank's reduced need for information drives the impact of QE on disclosure, I anticipate that this effect will be more pronounced under these circumstances.

To test this conjecture, I create multiple partitions of my baseline sample. First, I examine whether the recent issuance of securities in the primary bond market moderates the significance of my findings. To achieve this, I divide my baseline sample based on the median quarter-over-quarter change in firm bond leverage. Second, I employ a proxy to gauge a firm's likelihood of issuing bonds in the immediate future. I calculate this by evaluating a firm's anticipated short-term financing needs, using the ratio of its short-term obligations to its overall long-term debt. I then use the median value of this variable to create a partition in my baseline sample.

Table 9 Panel A presents the findings of Eq. 1 estimated on these partitions. The regression coefficients associated with the interaction variable reveal notable patterns regarding cash flow and liability forecasts. Specifically, I observe a more significant decrease in these disclosures among firms that have experienced a larger increase in bond leverage (-0.352), compared to those with a smaller increase (-0.164). Similarly, companies with greater short-term financing needs reduce disclosures more (-0.356) than do those with lower needs (-0.065). The chi-squared test confirms the significance of these differences in coefficients, indicating that the effects of QE on the disclosure are more pronounced during periods when bond issuers are likely to face greater attention and information demands from the primary bond market.

5.6.2 Cost of disclosure

Firms tend to withhold information when disclosure costs are high. If firms have an incentive to limit the disclosure of credit-relevant information due to reduced information requirements from the central bank, I anticipate this effect to be more pronounced when disclosure is costly.

To test this prediction, I use two conventional proxies for disclosure costs. First, I assess a firm's proprietary costs and exposure to competition by examining the average R&D intensity within its industry. Second, I leverage the cross-country nature of the firms in my sample and employ a country-level index that measures the extent of legal liabilities faced by firms for providing misleading disclosures (La Porta et al. 2006).[21] To conduct the cross-sectional tests, I divide the sample based on the medians of these variables. The results, presented in Table 9 Panel B columns 1–4, support my hypothesis. Consistent with my conjecture, I observe that the coefficients on the interaction term *Purchased Issuer × Post CSPP* are significantly more negative for sample partitions consisting of firms operating in industries with high R&D (-0.371 versus -0.106) and in countries with high legal liability risk (-0.381 versus -0.112).

Managers also face increased incentives to hide negative news (Kothari et al. 2009). Consequently, I anticipate that the impact of QE on disclosure will be more pronounced when firms' performance declines on a relative basis. To examine this hypothesis, I divide the sample into two groups based on the quarter-over-quarter change in the firm's operating cash flows. The results, presented in Columns 5 and 6 of Table 9 Panel B, support my prediction. Specifically, the coefficients on the interaction variable (-0.388 versus -0.190; difference approaching significance at the 10 percent level) indicate that targeted issuers more significantly curtail the disclosure of credit-relevant forecasts when they experience an adverse change in their cash generation capabilities.

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[21] I drop 24 observations from these analysis since La Porta et al. (2006) do not report the liability standard index for Luxembourg.

Table 8 Robustness Analysis

Panel A – Alternative Approaches to Identify Treated Observations

	(1) Firm-Level First ECB Purchase	(2) Continuous Treatment
	Cash Flows and Liabilities Count	
Post Firm Purchased	-0.193***	
	(-3.394)	
Percentage Firm Purchased		-0.234***
		(-3.683)
Bond Leverage	0.077	0.074
	(0.932)	(0.897)
Median Adjusted Leverage	0.028	0.027
	(0.084)	(0.080)
Average Bond Spread	-0.013**	-0.014**
	(-2.069)	(-2.133)
Change in Operating Cash Flows	2.755***	2.766***
	(4.042)	(4.060)
ROA	-2.213*	-2.280**
	(-1.950)	(-2.008)
Country Bond to GDP	1.951	2.131
	(0.739)	(0.807)
HH Industry Concentration	-3.754***	-3.697***
	(-3.284)	(-3.237)
Size	0.101	0.072
	(0.840)	(0.598)
News	0.442***	0.455***
	(4.498)	(4.639)
Number Financial Analysts	0.008*	0.008*
	(1.843)	(1.912)
Negative Net Income Dummy	0.020	0.021
	(0.255)	(0.266)
Price to Book	0.022	0.026
	(0.802)	(0.938)
Constant	-0.336	-0.071
	(-0.277)	(-0.058)
Firm and Quarter FE	YES	YES
Observations	3,896	3,896
Adjusted R-squared	0.382	0.382

Table 8 (continued)

Panel B – Propensity-Score Matching and Generalizability of QE Impact on Disclosure

	(1)	(2)
	Matched Sample	Unconstrained Sample
	Cash Flows and Liabilities Count	
Purchased Issuer × Post CSPP	**-0.220*****	**-0.093*****
	(-3.547)	**(-3.020)**
Bond Leverage	0.030	0.045
	(0.329)	(1.170)
Median Adjusted Leverage	-0.176	0.020
	(-0.506)	(0.179)
Average Bond Spread	-0.014**	-0.000
	(-1.995)	(-0.557)
Change in Operating Cash Flows	2.088***	0.159
	(2.759)	(0.858)
ROA	-1.346	0.033
	(-1.083)	(0.136)
Country Bond to GDP	5.487*	0.896*
	(1.823)	(1.767)
HH Industry Concentration	-4.028***	-1.232***
	(-3.420)	(-2.985)
Size	0.164	0.057**
	(1.281)	(1.996)
News	0.481***	0.403***
	(4.125)	(5.699)
Number Financial Analysts	0.009*	0.003*
	(1.854)	(1.700)
Negative Net Income Dummy	0.040	0.039
	(0.456)	(1.266)
Price to Book	0.013	0.001
	(0.454)	(0.119)
Constant	-1.017	-0.202
	(-0.798)	(-0.779)
Firm and Quarter FE	YES	YES
Observations	3,092	9,912
Adjusted R-squared	0.371	0.453

This table provides an analysis to evaluate the robustness of the results presented in Table 6. The dependent variable indicates the number of *CF&L* (*Cash Flows and Liabilities*) forecasts issued by a firm in a quarter. The analysis in panel A employs alternative treatment designs considering alternative identification of treated observations. *Post Firm Purchased* is an indicator variable that takes a value of one for a firm after the ECB's initial purchase of the firm's bonds and zero otherwise. The *Percentage Firm Purchased* variable quantifies the proportion of a firm's CSPP-eligible bonds that are purchased by the central bank at any quarter-end throughout the sample period. The analysis in panel B employs alternative samples. *Purchased Issuers* is an indicator variable that identifies firms whose bonds are acquired by the ECB during the CSPP. *Post* is an indicator variable taking a value of one from the second quarter of 2016 onward. All other variables used in the regressions are defined in the appendix. Standard errors are clustered by issuer, and the t-statistics are presented in parentheses below the coefficients. Observations enter the regressions at the firm-quarter level. Statistical significance levels are denoted by ***, **, and *, representing significance at the 1%, 5%, and 10% levels, respectively
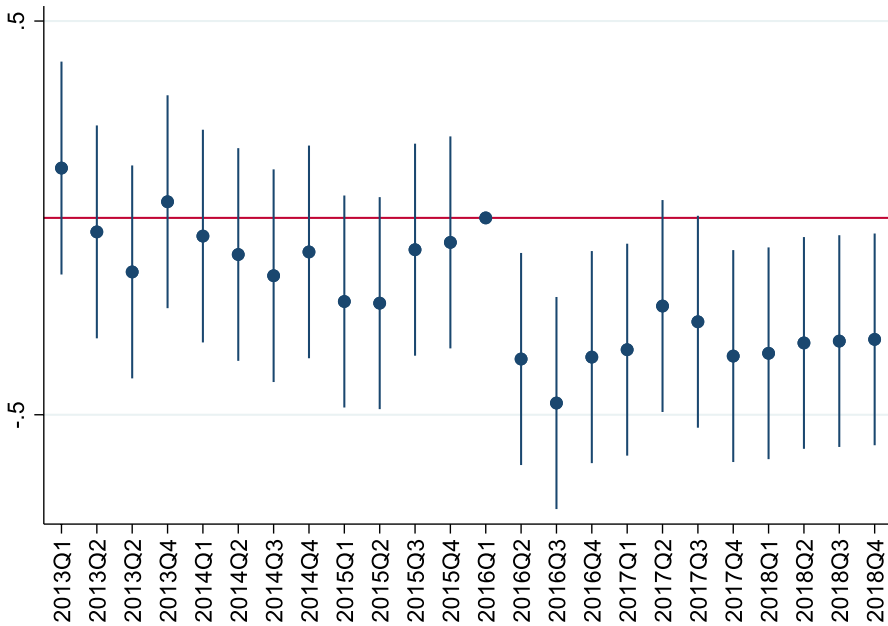
Fig. 2 This figure plots estimated treatment effects (with 95% confidence intervals) on the *Purchased Issuer × Quarter* interactions for each quarter in the period of the first quarter of 2013 through the fourth quarter of 2018. Coefficients are estimated by augmenting my baseline OLS regression (Eq. 1) with quarterly treatment effects relative to the benchmark quarter, the first quarter of 2016. The dependent variable in the figure refers to the number of cash flows and liabilities forecasts issued by a firm in a quarter (*Cash Flows and Liabilities Guidance Count*)

In summary, the cross-sectional results support the notion that companies that face less scrutiny from the central bank are inclined to disclose less when confronted with elevated costs linked to information sharing.[22]

5.7 Additional disclosure attributes

To better understand the effects of central bank purchases of private-sector securities on disclosure, I extend my analysis to encompass additional attributes of credit-relevant information. My baseline examination has focused on the likelihood of a firm issuing management forecasts and the number of forecasts issued within a given quarter. Building upon relevant research (Rickmann 2022), I introduce two additional measures. Specifically, I define *Disclosure Dates* as a count variable that

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[22] In an untabulated cross-sectional analysis, I further divide the sample into two groups based on whether firms experience positive or negative changes in average equity institutional ownership before and after the CSPP implementation. This approach helps investigate whether fluctuations in institutional shareholding affect the link between the CSPP and voluntary disclosure of credit-relevant information. My analysis does not uncover any significant cross-sectional association, indicating that my results are unlikely to be influenced by changes in equity investors' composition and the associated information demand.

captures the number of distinct dates during a quarter when firms release cash flow and liability forecasts. Additionally, I introduce *Disclosure Horizons*, which counts the number of distinct guidance horizons to which credit-relevant forecasts within a quarter apply. These variables, although displaying correlations with the outcome variables used in my baseline analysis, offer more granular insights into the effects of QE on disclosures.

I also leverage distinct characteristics of the guidance data used in my study (Sethuraman 2019; Mayew et al. 2020, 2023). Specifically, Thomson ONE Guidance Reports offer several noteworthy features. First, they provide segment-level guidance, enabling the identification of guidance specific to individual segments. Second, they include textual excerpts from conference calls and press releases associated with any guidance. Last, they encompass nonnumeric guidance, which consists of forward-looking textual information related to financial statement line items where managers do not provide precise point or range estimates. Exploiting these distinctive aspects of the data, I define the following variables. *% Segments* captures the proportion of management forecasts of cash flows and liabilities that refer to specific segments. *% Non-Numeric* is constructed by combining the samples of numeric and nonnumeric guidance, and it quantifies the proportion of credit-relevant forecasts associated with general forward-looking textual disclosure rather than specific numeric estimates. *Credit Risk Related Words* measures the proportion of credit-risk-related words in the text surrounding each management forecast. To develop this measure, I follow the literature (Campbell et al. 2014; Sethuraman 2019) and define a dictionary of credit-risk related terms, reported in the appendix. These variables collectively offer additional insights into the level of uncertainty, level of detail, and the credit orientation of firm guidance.

I estimate Eq. 1 with these outcome variables and present results in Table 10. Notably, firms whose bonds the central bank buys adjust their voluntary disclosures when considering these alternative attributes. First, these firms issue management guidance on cash flows and liabilities on fewer dates and across fewer horizons. Second, credit-relevant forecasts specific to particular segments become less frequent. Third, credit-relevant guidance is less likely to be accompanied by point or range numeric estimates and instead consists more frequently of textual discussions.[23] Moreover, references to words associated with credit risk occur less regularly in conference calls and press releases around the issuance of management guidance. Collectively, these results indicate that credit-relevant information voluntarily disclosed by firms undergoing central bank purchases becomes less common and less detailed.

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[23] In an untabulated analysis, I estimate Eq. 1 on a sample that includes both numeric and nonnumeric forecasts. As in my previous findings, I observe a decrease in the frequency of cash flow and liability forecasts issued by firms targeted by CSPP purchases. This finding, coupled with the result reported in Column 4 of Table 10, indicates that, although the proportion of nonnumeric management forecasts increases following central bank purchases, this increase does not compensate for the overall decrease in the likelihood of firms voluntarily disclosing credit-relevant information.

Table 9 Cross-Sectional Analysis

Panel A Primary Bond Market Pressure

	(1)	(2)		(3)	(4)
	Cash Flows and Liabilities Guidance Count				
	By Change in Bond Leverage			*By Short-Term Financing Needs*	
	High	*Low*		*High*	*Low*
Purchased Issuer × Post CSPP	**–0.352***	**–0.164**		**–0.356***	**–0.065**
	(–3.611)	**(–1.985)**		**(–3.176)**	**(–0.749)**
Chi-Squared	2.97			3.54	
P-value	0.064			0.041	
Other Controls	YES	YES		YES	YES
Firm and Quarter FE	YES	YES		YES	YES
Observations	1,944	1,952		1,932	1,964
Adjusted R-squared	0.408	0.392		0.378	0.434

Panel B Cost of Disclosure

	(1)	(2)	(3)	(4)	(5)	(6)
	Cash Flows and Liabilities Guidance Count					
	By R&D Intensity		*By Country Level Liability Standards*		*By Change in Operating Cash Flows*	
	High	*Low*	*High*	*Low*	*Negative*	*Positive*
Purchased Issuer × Post CSPP	**–0.371***	**–0.106**	**–0.381***	**–0.112**	**–0.388***	**–0.190***
	(–3.919)	**(–1.269)**	**(–3.925)**	**(–1.571)**	**(–2.890)**	**(–2.653)**
Chi-Squared	5.31		6.98		2.61	
P-value	0.031		0.018		0.105	
Other Controls	YES	YES	YES	YES	YES	YES
Firm and Quarter FE	YES	YES	YES	YES	YES	YES
Observations	1,940	1,956	1,748	2,124	1,300	2,596
Adjusted R-squared	0.343	0.434	0.379	0.376	0.395	0.409

This table analyzes cross-sectional variation in the analysis in Table 6. The dependent variable indicates the number of *CF&L* (*Cash Flows and Liabilities*) forecasts issued by a firm in a quarter. The analysis in panel A exploits varying exposure to the primary bond market of sample firms. In Columns 1 and 2, the sample is partitioned based on the sample median of *Change in Bond Leverage*. In Columns 3 and 4, the sample is partitioned based on the sample median of *Short-Term Financing Needs*. The analysis in panel B exploits variation in disclosure costs of sample firms. In Columns 1 and 2, the sample is partitioned based on the sample median of *R&D Intensity*. In Columns 3 and 4, the sample is partitioned based on the sample median of *Liability Standards*. In Columns 5 and 6, the sample is partitioned based on the direction of the quarterly *Change in Operating Cash Flows*. *Purchased Issuers* is an indicator variable that identifies firms whose bonds are acquired by the ECB during the CSPP. *Post* is an indicator variable taking a value of one from the second quarter of 2016 onward. All other variables used in the regressions are defined in the appendix. Observations enter the regressions at the firm-quarter level. Standard errors are clustered by issuer, and the t-statistics are presented in parentheses below the coefficients. Statistical significance levels are denoted by ***, **, and *, representing significance at the 1%, 5%, and 10% levels, respectively

Table 10 Additional Disclosure Attributes

	(1)	(2)	(3)	(4)	(5)
	Cash Flows and Liabilities Guidance Count				
	Disclosure Dates	Disclosure Horizons	% Segments	% Non-Numeric	Credit Risk Related Words
Purchased Issuer × Post CSPP	**-0.127***	**-0.106***	**-0.034***	**0.054**	**-0.146***
	(-3.494)	**(-3.482)**	**(-2.586)**	**(2.325)**	**(-1.694)**
Bond Leverage	0.027	0.075*	-0.062***	0.023	0.085
	(0.514)	(1.719)	(-3.316)	(0.657)	(0.695)
Median Adjusted Leverage	0.247	-0.211	0.083	0.099	0.808
	(1.171)	(-1.192)	(0.948)	(0.662)	(1.529)
Average Bond Spread	-0.008**	-0.006	0.003	0.003	-0.008
	(-2.008)	(-1.615)	(1.151)	(1.117)	(-0.716)
Change in Operating Cash Flows	1.542***	1.280***	-0.547***	-0.451	1.458
	(3.605)	(3.554)	(-3.544)	(-1.604)	(1.356)
ROA	-1.179*	-1.104*	0.313	-0.119	1.224
	(-1.653)	(-1.837)	(1.149)	(-0.242)	(0.712)
Country Bond to GDP	4.104**	2.145	-0.989*	-0.612	-7.108**
	(2.474)	(1.535)	(-1.878)	(-0.609)	(-1.988)
HH Industry Concentration	-1.621**	-1.160*	-0.177	-0.235	0.824
	(-2.258)	(-1.918)	(-0.668)	(-0.452)	(0.478)
Size	0.102	0.164**	0.043	-0.026	-0.508***
	(1.354)	(2.568)	(1.417)	(-0.511)	(-2.605)
News	0.233***	0.128**	-0.034*	-0.029	0.161
	(3.769)	(2.451)	(-1.774)	(-0.797)	(1.341)

Table 10 (continued)

	(1)	(2)	(3)	(4)	(5)
Number Financial Analysts	0.005*	0.003	-0.002	0.001	0.000
	(1.837)	(1.395)	(-1.573)	(0.451)	(0.042)
Negative Net Income Dummy	0.020	0.000	0.013	-0.027	0.146
	(0.398)	(0.009)	(0.775)	(-0.843)	(1.196)
Price to Book	-0.005	0.018	0.005	-0.012	-0.029
	(-0.305)	(1.227)	(0.660)	(-0.979)	(-0.782)
Constant	-0.605	-1.254*	-0.316	1.007*	6.542***
	(-0.794)	(-1.954)	(-1.016)	(1.918)	(3.273)
Firm and Quarter FE	YES	YES	YES	YES	YES
Observations	3,896	3,896	1,526	2,687	9,731
Adjusted R-squared	0.346	0.381	0.511	0.294	0.152

This table provides an analysis to evaluate the CSPP's influence on additional management guidance attributes. *Purchased Issuers* is an indicator variable that identifies firms whose bonds are acquired by the ECB during the CSPP. *Post* is an indicator variable taking a value of one from the second quarter of 2016 onward. All other variables used in the regressions are defined in the appendix. In Column 1, the dependent variable represents the count of unique dates within a quarter on which an issuer releases cash flows and liabilities forecasts. In Column 2, the dependent variable indicates the count of distinct target months for which an issuer provides cash flows and liabilities forecasts within a quarter. In Column 3, the dependent variable reflects the proportion of cash flows and liabilities forecasts released by an issuer that pertain to the issuer's subsegments. In Column 4, the dependent variable captures the proportion of nonnumeric cash flows and liabilities forecasts issued by a firm in a quarter. In Column 5, the dependent variable indicates the proportion of credit risk-related words in the text surrounding all management forecasts issued by a firm in a quarter. Observations enter the regressions at the firm-quarter level in Columns 1 to 4 and at the management forecast level in Column 5. Standard errors are clustered by issuer, and the t-statistics are presented in parentheses below the coefficients. Statistical significance levels are denoted by ****, ***, **, and *, representing significance at the 1%, 5%, and 10% levels, respectively

6 Conclusion

I investigate the influence of private-sector QE on firms' voluntary disclosures. While research has mainly examined the direct effects of QE, its potential spillovers on disclosure practices have been overlooked. Leveraging novel data on voluntary disclosures related to multiple financial line items and the implementation of the CSPP by the ECB in 2016, my findings indicate that targeted firms reduce both the extent and specificity of their voluntary disclosures of credit-relevant information. However, I do not observe significant changes in other more generic forms of voluntary disclosure. I identify the central bank-clientele channel as a plausible explanation for these effects, highlighting the role of direct central bank purchases and the reduced demand for firm-specific information from the central bank.

This study contributes to the literature in several ways. First, it enhances understanding of how monetary policy, specifically private-sector QE purchases, influences firms' voluntary disclosures. Although these results may not directly extend to the influence of other conventional monetary policy tools, understanding the impact of QE on the information environment of firms is important, given its widespread implementation in recent years. Second, I contribute to the literature on investor clientele by examining the impact of central banks as novel and influential investors in the private sector. This study also expands knowledge of management guidance practices, particularly in the context of information tailored to creditors with limited access to private information. Overall my study provides insights into the relationship between firms, their disclosure practices, and the evolving landscape of investor clientele. By illuminating the impacts of private-sector QE on voluntary disclosure, my study offers valuable considerations for policymakers and researchers seeking to understand the implications of central bank interventions on firm behavior and transparency.

Appendix 1-*Variable Definitions*

This appendix reports the definition and the data sources of the main variables used in my analysis.

| Variable	Definition	Source
Main Dependent Variables		
Cash Flows and Liabilities Guidance Count	Number of cash flows and liabilities forecasts (*CFO*, *CFI*, and *CFF&L*) disclosed by an issuer in a quarter	Thomson One
Cash Flows and Liabilities Guidance Indicator	Indicator taking the value of one if an issuer discloses at least one cash flows and liabilities forecast in a quarter	Thomson One

Variable	Definition	Source
Other Dependent Variables		
EPS Guidance Count	Number of EPS and net income forecasts disclosed by an issuer in a quarter	Thomson One
Revenues Guidance Count	Number of revenue forecasts disclosed by an issuer in a quarter	Thomson One
COGS Guidance Count	Number of COGS forecasts disclosed by an issuer in a quarter	Thomson One
SG&A Guidance Count	Number of SG&A forecasts disclosed by an issuer in a quarter	Thomson One
Disclosure Dates	The count of unique dates within a quarter on which an issuer releases cash flows and liabilities forecasts	Thomson One
Disclosure Horizons	The count of distinct target months for which an issuer provides cash flows and liabilities forecasts	Thomson One
% Segments	Percentage of cash flows and liabilities forecasts that refer to a specific segment of the firm (rather than to the consolidated entity)	Thomson One
% Non-Numeric	Percentage of cash flows and liabilities forecasts that are not associated with a numerical value	Thomson One
Credit Risk Related Words	Percentage of credit-risk-related words in the text surrounding management forecasts	Thomson One
Main Independent Variables and Partitioning Variables		
Average Bond Spread	The average difference in yields between a firm's issued bonds and benchmark securities in a given quarter	FactSet
Bond Leverage	The ratio of the amount of outstanding bonds divided by the amount of total debt	Bloomberg, FactSet
Change in Operating Cash Flows	Period-over-period change in the amount of operating cash flows, scaled by the firm's total assets	FactSet
Country Bond to GDP	The ratio of the total amount of the bonds issued by the nonfinancial firms based in a country to the country's GDP	World Bank
Country Level Liability Standard	A country-level index that measures the extent of legal liabilities faced by firms for providing misleading disclosures. Higher index values indicate institutional contexts where firms face a greater risk of investor lawsuits	La Porta et al. 2006
Eligible Issuer	An issuer having at least 50 percent of its euro-denominated bonds (by outstanding amount) classified as CSPP-eligible at the end of a quarter	Bloomberg
HH Industry Concentration	Revenues based Hirschman-Herfindahl measure of concentration in a firm's two-digit SIC industry	FactSet

Variable	Definition	Source
Median Adjusted Leverage	Difference between an issuer's book leverage and the median book leverage of the other firms in the same credit rating category of the issuer (investment grade versus non-investment grade)	FactSet
Negative Net Income Dummy	Indicator taking the value of one if an issuer's net income is negative	FactSet
News	Number of news articles relating to a firm in one quarter	RavenPack
Not Purchased Credit Affected	A eurozone issuer whose bonds were not acquired by the ECB during the CSPP	Bloomberg, Central Banks websites
Number Financial Analysts	Number of equity analysts covering a firm	IBES
Post CSPP	Indicator taking the value of one from the second calendar quarter of 2016 onward	
Price to Book	Price-to-book ratio	FactSet
Purchased Issuer	An issuer whose bonds are acquired by the ECB under the scope of the CSPP	Bloomberg, Central Banks websites
R&D Intensity	Industry (two-digit SIC) level average ratio of R&D expenses to total revenues	FactSet
ROA	The ratio of net income to total assets	FactSet
Size	Natural logarithm of an issuer's total assets	FactSet
ST Financing Needs	The ratio of the short-term portion of long-term debt to long-term debt	FactSet

Appendix 2 *CSPP-Eligible Universe and ECB's Purchases*

These figures illustrate the distribution by country and credit ratings for bonds included in two categories: the CSPP-eligible bond universe (representing all securities meeting the CSPP eligibility criteria, shown in the left bar) and the ECB portfolio (representing securities purchased by the ECB, shown in the right bar). The distributions are based on bond outstanding amounts and CSPP holding amounts as of the end of the first quarter of 2019, respectively. Source: Beuve et al. (2019).

Credit Rating Distribution of the CSPP-Eligible Bond Universe and ECB Holdings
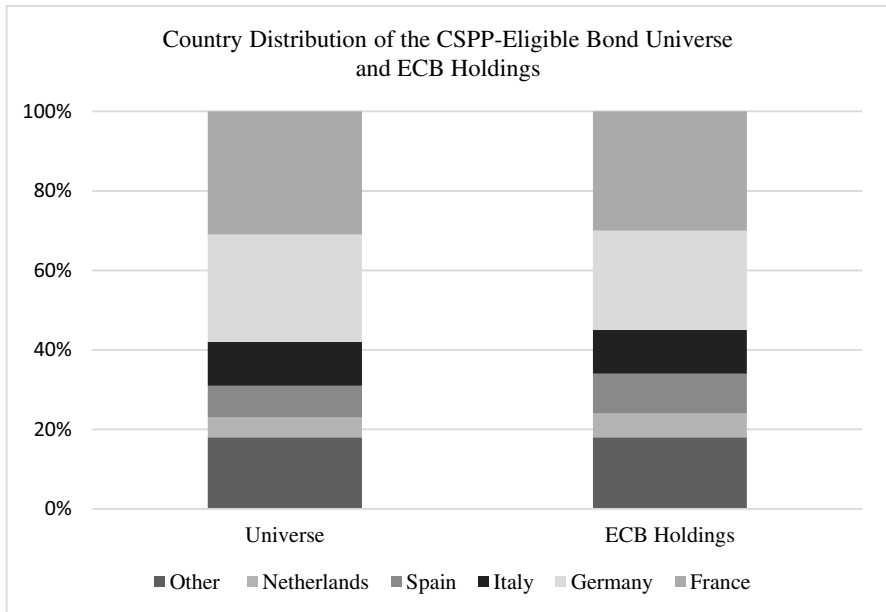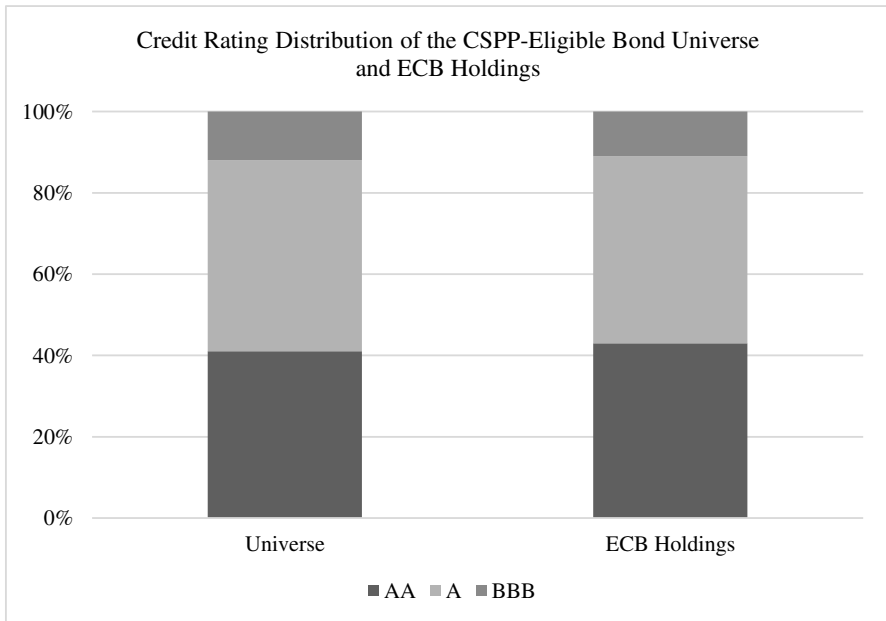
Appendix 3 *Thomson ONE Guidance Reports*

This appendix reports details of the management guidance items retrieved from the Thomson ONE Guidance Reports.

I rely on data from the Thomson ONE Guidance Reports (rather than on data from alternative databases, such as I/B/E/S First Call, S&P's Capital IQ, and FactSet) since Thomson ONE provides more granular coverage of the management forecasts issued by European firms. Thomson ONE Guidance Reports are widely used by finance professionals and have been employed in related research (e.g., Sethuraman 2019).

As in prior research, my sample comprises exclusively forecasts that provide numerical estimates (except for the analysis presented in Table 10 Column 4, which specifically focuses on the propensity to issue numerical versus nonnumerical forecasts). I also eliminate duplicate observations, such as forecasts reported in both conference calls and press releases on the same date by the same firm. Specifically, I retain only one observation when the same issuer provides multiple forecasts for the same financial item within the same three-day window and with the same forecast horizon.

My final sample includes 9,731 management forecasts, of which 2,635 are coded as credit-relevant. I classify a management forecast as credit-relevant if it falls within one of the following categories:

- Cash Flows from operations (726 forecasts): i) cash flows from continuing operations; ii) changes in working capital

- Cash flows from investments (1,367 forecasts): i) capital expenditures; ii) sales of properties, plants, and equipment (including gain loss) on sale of asset)
- Cash flows from financing activities and liabilities levels (542 forecasts): i) dividends paid (including common stock dividends and preferred stock dividends); ii) common shares issued and bought back; iii) interest expenses; iv) long-term debt; v) long-term debt repaid

Appendix 4 *Credit Risk Related Words*

This appendix presents a list of credit risk-related words and terms used to calculate the *Credit Risk Related Words* variable. The list is adapted from Campbell et al. (2014) and Sethuraman (2019) and includes terms that are more applicable in an international context. Terms such as "Chapter 7," "Chapter 11," and "penny stock" are excluded as they are less relevant in this setting.

Credit-Risk-Related Words			
anti-takeover provision	credit risk	insider sales	notes
anti-takeover provisions	debt	Interest	obligations
balance sheet	debt issue	investment in equipment	operating losses
bank debt	debt issues	investment in plant	payable
bond	debt burden	Lease	payables
bondholder	debts	lease commitment	postretirement
bondholders	decline in stock price	lease commitments	rating
bonds	default	Leases	refinance
capital expenditure	defaults	Leasing	refinancing
capital expenditures	defined benefit	Leverage	reinsurance
capital lease	dilution	leveraged lease	renegotiation
capital leases	distressed	leveraged leases	reorganization
cash	dividends	Liabilities	reserves
cashflow	downgrade	Liability	revolver
collateral	family	limited trading	sale of productive assets
concentrated ownership	financial condition	Liquid	solvency
coupon payment	financing	Liquidity	solvent
coupon payments	financing costs	loan	stock market listing
covenant	fixed income	loans	stock price drop
covenants	funded status	locked-in lease	stock price volatility
coverage	funding	locked-in leases	stressed
credit	illiquid market	mandatory contribution	underfunded pensions
credit facilities	improvements	maturity	underwriting
credit facility	income	negative operating cash flows	volatility of operating results
credit rating	indebtedness	new financing	volatility of revenues
			volatility of sales
			working capital

Data availability All data are publicly available from the sources indicated.

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