Financial Reporting Frequency, the Confirmatory Role of Accounting, and the Cost of Bank Debt*

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ABSTRACT

We examine how financial reporting frequency (FRF) shapes loan contracting through the confirmatory role of accounting. In private debt markets, lenders already receive detailed proprietary information from borrowers, so more frequent public disclosures may add value primarily by validating and disciplining this private information, i.e., via the confirmatory role of accounting. Exploiting cross-country variation in EU interim reporting regimes and the staggered implementation of the Transparency Directive, we provide both difference-in-differences and cross-sectional evidence on the relation between reporting frequency and the cost of bank debt. We find that quarterly reporting is associated with significantly lower loan spreads, with effects concentrated among firms with Big 4 auditors, unqualified audit opinions, and speculative-grade bond ratings—settings where confirmatory benefits are likely most valuable. Beyond loan spreads, FRF is associated with more favorable non-price terms, including larger loan amounts and fewer covenants. Our results are consistent with reporting frequency enhancing the confirmatory role of accounting in private debt markets. To our knowledge, this is the first study to examine the theorized relation between FRF and the confirmatory role of accounting in any capital market setting, and the first to explore the confirmatory role of accounting in private debt contracting.

Keywords: financial reporting frequency; quarterly reporting; debt contracting; private information; information asymmetry; confirmatory role of financial reporting; credible commitment

JEL classification: G18; G32; M41; M48; D8

1. Introduction

Prior theoretical research suggests that reporting frequency influences the extent to which accounting information helps users confirm or revise prior expectations – i.e., accounting's confirmatory role (Gigler and Hemmer 1998, FASB 2021) – but this has not been explored empirically. Existing empirical research on the confirmatory role of accounting has also primarily focused on settings outside of debt markets. We address these gaps by examining how financial reporting frequency (FRF) shapes the confirmatory role of accounting in private debt markets.[1] In addition to providing a new market setting for exploring accounting's confirmatory role, the private debt market offers unique and useful research design benefits. Lenders contractually receive frequent, material non-public information about borrowers (e.g., Ball et al. 2008, Bharath et al. 2008, Carrizosa and Ryan 2017), which they use to set loan terms (e.g., initial spread) and monitor borrowers. Importantly, subsequent public disclosures do not fully subsume or augment earlier private disclosures, which generally include detailed information such as projected financial statements for future periods and frequent (often monthly) financial statements for prior periods. Utilizing this setting, we examine whether the frequency of public disclosure of accounting information plays a confirmatory role for borrowers' private disclosure in private debt markets.

The relationship between FRF and the confirmatory role of accounting remains theoretically and empirically ambiguous. While Gigler and Hemmer (1998) argue that increasing the frequency of mandatory reports may reduce their confirmatory value (by making them the primary information source and thus decreasing informational efficiency), more frequent reporting could alternatively increase confirmatory value by providing additional opportunities for verification and scrutiny. Alternatively, FRF may have no impact at all: Kajüter et al. (2019) (p.255) contend that, given the existence of a private reporting channel, "it is questionable as to whether an increase in financial reporting frequency affects debt contracting at all."

[1] Financial reporting frequency refers to the periodicity (e.g., quarterly, semi-annual, or annual) with which a listed firm files its financial statements with the securities regulator(s). Hereafter, we use the terms 'financial reporting frequency' ('FRF'), and 'reporting frequency' interchangeably. Since the debate over reporting frequency is typically focused on semi-annual versus quarterly reporting (Tan 2016), we simplify the exposition by defining an increase (decrease) in FRF as a shift from semi-annual to quarterly (quarterly to semi-annual) reporting.

If increased reporting frequency enhances the confirmatory value of accounting information, this should lower information asymmetry and monitoring costs for lenders, leading to more favorable capital market outcomes (e.g., Ball et al. 2008, Bharath et al. 2008, Wittenberg-Moerman 2008), such as reduced initial loan spreads.[2] Leveraging cross-sectional and time-series variation in FRF across EU-15 countries – arising from regulatory differences at the country and stock-exchange levels (Downar et al. 2018) – we find a statistically significant negative association between FRF and bank loan spreads. This negative association is consistent with quarterly reporters obtaining *lower* initial loan spreads compared to semi-annual reporters. The effect is also economically significant, with the quarterly reporters paying loan spreads that are, on average, 18 basis points (about 10% of the sample mean) lower than those paid by semi-annual reporters.

To mitigate concerns regarding the endogenous selection of financial reporting frequency, we exploit the staggered implementation of the European Union's Transparency Directive (European Parliament and Council, 2004), which mandated quarterly reporting for exchange-listed firms across member states. This policy intervention serves as a plausibly exogenous shock to reporting frequency and enables a quasi-natural experiment research design, building on recent literature that exploits this regulatory setting (e.g., Ernstberger et al. 2017, Balakrishnan and Ertan 2018, Downar et al. 2018, Nallareddy et al. 2021).[3] The setting provides both cross-sectional (pre-directive) and time-series (staggered adoption) variation in reporting frequency. Consistent with the baseline association, we continue to find a statistically and

[2] This prediction is analogous to theoretical arguments regarding accounting conservatism, which posit that timelier recognition of losses enhances debt contracting efficiency by increasing the frequency of unfavorable accounting signals and, in turn, the likelihood of timely transfer of decision rights to lenders (Ball and Shivakumar 2005, Gigler et al. 2009). Likewise, more frequent reporting increases the number of opportunities for covenant assessment, thereby raising the probability of detecting covenant violations and enabling lender intervention when warranted (Christensen and Nikolaev 2012).

[3] Before the Transparency Directive (TD), countries such as Finland, Greece, Portugal, and Sweden required mandatory quarterly reporting; whereas countries such as the United Kingdom, Netherlands, Luxembourg, Denmark, France, etc. required semi-annual reporting, thus making quarterly reporting voluntary. Within EU-15, Germany and Austria provide an interesting sub-setting as, before TD, the mandated FRF varied at the stock-exchange segment level within these countries. Specifically, firms listed on the prime segment (non-prime) of a stock exchange were required to report quarterly (semi-annually).

economically significant negative association between FRF and the cost of debt after controlling for known determinants of the cost of debt.

We next conduct a series of cross-sectional tests to probe for settings where the confirmatory value of frequent public reporting is likely to be most pronounced. Specifically, we examine heterogeneity in the association between FRF and the cost of debt along two dimensions: (1) perceived reliability of public disclosures, and (2) the borrower's credit quality.

First, we examine whether increased public reporting frequency facilitates the confirmatory role of accounting when lenders perceive financial statements as reliable. The conceptual premise is that the incremental value of interim public reports is greatest when those reports are credible and thus can effectively corroborate – or contradict – the borrower's private disclosures (Ball et al. 2008, Christensen and Nikolaev 2012). To capture the perceived reliability of financial statements, we use two common proxies: the presence of a Big 4 auditor and the existence of an unqualified audit opinion (DeFond and Zhang 2014). Consistent with the hypothesized mechanism, we find that the negative association between quarterly reporting and the cost of debt is concentrated among borrowers with Big 4 auditors and those with unqualified opinions. This pattern supports the interpretation that FRF reduces borrowing costs by enhancing the confirmatory role of accounting.

Second, we investigate whether the confirmatory role of public reporting frequency varies with borrower credit quality. Credit risk heightens lenders' need for credible confirmation of management's private disclosures, as weaker borrowers face stronger incentives to present overly optimistic projections and are more likely to engage in strategic reporting to the lender. In such cases, timely, audited (or reviewed) public statements can play a disproportionately important role in verifying the accuracy of private reports and disciplining borrower behavior. Consistent with this prediction, we find that the negative association between quarterly reporting and loan spreads is stronger among borrowers with higher ex ante credit risk, as indicated by being unrated or rated below investment grade. These results support the interpretation that frequent public reporting is particularly valuable when borrower risk increases the importance of third-party verification.

Across both cross-sectional tests, the negative association between FRF and the cost of debt is most pronounced when the confirmatory value of public reporting is likely to be greatest—specifically, when disclosures are perceived as credible, and when borrowers have lower credit quality.

Finally, to further strengthen the validity and generalizability of our findings, we conduct two additional analyses. First, we examine the impact of reporting frequency on a range of non-price loan terms—including loan size, maturity, collateral requirements, and the number of financial covenants—to ensure that the observed reduction in loan spreads for quarterly reporters is not offset by more stringent non-price contract features. We find that quarterly reporters not only secure lower loan spreads but also benefit from larger loan amounts, fewer financial covenants, and broader lender participation, suggesting that more frequent reporting confers an overall improvement in debt contract terms. Second, we replicate our main analyses in an independent setting—Singapore—which also implemented regulatory changes to financial reporting frequency. While this setting comes with the caveat of a much smaller sample size, we find qualitatively similar results to those in the EU setting: increases in reporting frequency in Singapore are associated with more favorable loan pricing terms for borrowers.[4] Collectively, these additional analyses reinforce the robustness and external validity of our main inferences regarding the confirmatory role of financial reporting frequency in debt markets.

Our paper makes several contributions to the literature. First, while the relation between reporting frequency and accounting's confirmatory role has been theorized (Gigler and Hemmer 1998), we are unaware of an empirical examination of this relation. We provide the first large-sample empirical evidence on how financial reporting frequency shapes the confirmatory role of accounting. While Gigler and Hemmer (1998) predict that the confirmatory value of mandatory public reporting is declining in reporting frequency, our empirical evidence suggests that more frequent public reporting is associated with significantly lower loan spreads, establishing a clear link between reporting frequency and the cost of debt,

[4] The results of this untabulated analysis are available upon request.

with this effect being strongest in precisely those settings where the confirmatory role of accounting is expected to be most pronounced.

Second, existing empirical research has primarily documented the confirmatory effects of accounting outside of debt market settings and in the context of public disclosure of management's private information – most commonly management forecasts (e.g., Ball et al. 2012). We extend this literature by demonstrating that the frequency of public financial reporting plays a distinct confirmatory role in private debt markets—a setting where sophisticated lenders receive extensive private disclosures and have contractual access to borrower information (e.g., Ball et al. 2008, Carrizosa and Ryan 2017). Our results provide the first large-sample evidence that greater reporting frequency lowers the cost of debt even when private channels are robust, highlighting an incremental informational role for public disclosure that existing theory leaves ambiguous (Kajüter et al. 2019).

Lastly, our findings have implications for ongoing regulatory debates on the costs and benefits of more frequent financial reporting (e.g., SEC 2018, CFA Institute 2019). In the broader capital market context, our evidence suggests that increasing reporting frequency can enhance the confirmatory role of accounting even when sophisticated investors already have access to extensive private information. This finding informs policymakers' assessments of whether the benefits of more timely public disclosure – such as improved monitoring, reduced information asymmetry, and lower cost of capital – extend beyond public equity markets. More specifically, our results show that in the private debt market, where lenders maintain robust contractual access to borrower information (Ball et al. 2008, Bharath et al. 2008), more frequent public reporting can still reduce borrowing costs, particularly when borrower credibility is uncertain. These results highlight that public reporting plays a complementary role to private information channels, implying that regulatory changes to reporting frequency – such as those introduced under the EU Transparency directive – can have material effects on debt contracting outcomes and, by extension, on firms' financing costs.

The remainder of the study is organized as follows. Section 2 discusses the related literature and motivates our hypotheses. Section 3 describes the data sources, sample selection procedures, and

descriptive statistics. Section 4 discusses the research design and presents the findings from our empirical analyses, and Section 5 concludes.

2. Related Literature and Hypothesis Development

2.1 Borrower accounting information and debt contracting

A large body of research establishes that debtholders utilize borrower accounting information and shape borrowers' financial reporting practices (see Armstrong et al. 2010, Shivakumar 2013, Taylor 2013). Ex-ante, lenders use accounting information to evaluate borrower creditworthiness and to structure loan contracts. For example, accounting quality influences firms' access to public versus private debt markets (Bharath et al. 2008), and accounting changes – both voluntary and mandatory – can affect loan pricing (Beatty et al. 2002). Fundamental accounting attributes, such as conservatism (e.g., Zhang 2008, Nikolaev 2010) and contractibility (e.g., Ball et al. 2008, 2015), shape key loan terms, including interest rate, maturity, amount, the likelihood of collateral, and covenants.

A defining feature of the private debt market is that, both prior to loan initiation and throughout the life of the loan, lenders receive extensive proprietary information about borrowers through contractual channels (Ball et al. 2008, Bharath et al. 2008, Bushman et al. 2010, Carrizosa and Ryan 2017).[5] For example, S&P Global Market Intelligence (2019) notes that "[b]eyond the credit agreement, there is a raft of ongoing correspondence between issuers and lenders that is made under confidentiality agreements, including quarterly or monthly financial disclosures, covenant compliance information, amendment and waiver requests, and financial projections, as well as plans for acquisitions or dispositions." Carrizosa and Ryan (2017) provide descriptive evidence that lenders include "private information covenants" to obtain borrower disclosures. They identify two primary types of private information obtained through such

[5] Accounting information plays a central role in ex post monitoring via covenants tied to financial ratios, which act as early warnings for credit risk deterioration and trigger lender intervention (Smith and Warner 1979, Dichev and Skinner 2002, Christensen, Nikolaev, et al. 2016). Covenant violations often prompt governance changes, such as CEO turnover or payout restrictions (Nini et al. 2012). To support this oversight, debt contracts typically require borrowers to provide periodic financial statements to lenders, despite lenders already having access to detailed private information (Shivakumar 2013, Bellucci and McCluskey 2016).

covenants: (1) projected financial statements for future periods and (2) non-public monthly historical financial statements.[6] Consistent with the principles of safe and sound banking, 'disclosure' covenants in credit agreements usually require the borrowers to furnish annual audited and quarterly unaudited financial statements, as well as 'catch-all' provisions requiring the borrower to supply any additional information requested by the lenders (Bellucci and McCluskey 2016).[7] Minnis and Sutherland (2017) find evidence consistent with lenders' requests for (and use of) alternative sources of information, such as firms' business tax returns and other financial information on receivables aging, equipment listings, etc.

2.2 Financial reporting frequency and the confirmatory role of accounting

A growing literature investigates the economic consequences of changes in financial reporting frequency (FRF). Intuition suggests that an increase in reporting frequency has informational benefits that reduce information asymmetry and enhance price efficiency. Consistent with this intuition, Fu et al. (2012) show that mandated quarterly reporting in the U.S. lowered information asymmetry and the cost of equity capital. Similarly, Arif and De George (2020) document that investors cannot fully substitute away from quarterly earnings news, indicating that FRF remains a critical source of firm-specific information. Other studies highlight the potential downside of increased FRF, namely, managerial short-termism. Gigler et al. (2014) predict that frequent reporting can induce myopic behavior, but empirical evidence on this prediction is mixed. Consistent with the theoretical prediction, several studies document real effects of increased reporting frequency, including reductions in fixed asset investments (Kraft et al. 2018) and innovation (Fu et al. 2020), as well as increases in real activities manipulation (Ernstberger et al. 2017). Other studies, however, fail to find evidence of such myopic behavior. For example, Kajüter et al. (2019), Nallareddy et al. (2021), and D'Adduzio et al. (2024) report no evidence of myopic behavior, and in some cases find contrasting effects, such as reductions in firm value or increases in stock price informativeness.

[6] The financial statement information could be used for periodic testing of financial covenants. Furthermore, these financial covenants, upon violations, induce an even more extensive information transfer to lenders (Bushman et al. 2010, Peek et al. 2010).

[7] Based on conversations with several bank loan officers and CFOs of mid-sized companies, it is not uncommon for the lender to call up the borrower and ask for ad hoc updates on projections, estimates, etc.

While this literature has generated substantial insights about the effects of reporting frequency on equity market behavior, it has not examined the role of FRF in private debt markets.[8] This gap is particularly notable given the institutional differences between equity and debt holders in terms of their access to firm information, contractual rights, and monitoring mechanisms. At the same time, these institutional features render the private debt market an especially well-suited setting for investigating how FRF shapes the confirmatory role of accounting. Specifically, because the subsequent public disclosures do not fully subsume or augment earlier private disclosures, they are unlikely to be a primary source of information. However, these disclosures may serve a critical *validating* function by enhancing the credibility, verifiability, and contractibility of the private information lenders receive. This confirmatory role of accounting, while conceptually recognized in theoretical work (e.g., Gigler and Hemmer 1998), has not been empirically explored.

2.3 Hypothesis development and setting

Public financial reporting serves not only to inform but also to validate other forms of information (Gigler and Hemmer 1998, FASB 2021). This "confirmatory role" is particularly salient in private debt markets, where lenders already obtain detailed borrower-specific information through covenants and ongoing private communications (Bellucci and McCluskey 2016, Carrizosa and Ryan 2017). In this setting, more frequent public reporting may not provide new information to lenders per se, but instead may serve to corroborate internal reports, enhance lender confidence in borrower disclosures, and facilitate more timely or credible covenant enforcement.

Private lending markets offer a particularly suitable institutional environment to examine the confirmatory role of accounting for three reasons. First, unlike public equity markets, lenders in private

[8] Outside an equity market context, Balakrishnan and Ertan (2018) find evidence that deposit interest rates and credit default swap spreads are lower for financial firms (banks) that report more frequently, which they attribute to improved asset quality. The focus of their study is explicitly on regulated financial firms, where disclosure incentives and supervisory structures differ markedly from those of non-financial firms operating in private debt markets. More broadly, existing studies have not examined whether, and how, financial reporting frequency affects the structure and pricing of private loan contracts.

debt settings already receive rich and timely proprietary data, allowing researchers to isolate confirmatory effects rather than primary information provision. Second, debt contracts frequently reference accounting numbers for covenant testing, and covenant enforcement may be more effective under regimes where standardized and verified reporting is more frequent (even if lenders already have the information through private disclosures from borrowers). Third, the bilateral nature of private debt contracts enables sharper inferences about how borrowers' reporting behavior interacts with monitoring and contracting.[9]

We develop a hypothesis grounded in the confirmatory perspective. If more frequent public financial reporting reinforces the credibility of borrower disclosures and improves lender monitoring or contractual enforcement, we would expect it to result in more favorable loan terms. However, if private reporting already fully satisfies lender information needs, increased FRF may have little incremental effect. Accordingly, our first hypothesis, stated in the null form, is:

> *H1: Borrowers that report more frequently (i.e., quarterly) do not have lower costs of debt relative to borrowers that report less frequently (i.e., semi-annually).*

2.4 Research setting

An ideal setting for testing this hypothesis requires plausibly exogenous variation in financial reporting frequency (FRF) as well as an appropriate control group. The European Union provides such a setting, offering both institutional diversity and regulatory shocks that generate credible quasi-experimental variation.

First, prior to 2007, EU member states differed in their interim reporting requirement despite operating under harmonized disclosure directives. Some countries, including Italy, Spain, Finland, and Greece, mandated quarterly reporting. Others – such as the U.K., France, Netherlands, Luxembourg, and Ireland – required only semi-annual reporting, although firms could voluntarily report quarterly. Germany and Austria adopted a hybrid model: firms listed on the 'prime' exchange segments (Prime Standard in Germany

[9] Unlike equity markets, where disclosures are directed at diffuse investors and shaped by many external forces, private debt contracts provide a bilateral setting in which reporting is directly tied to loan terms. This tighter link between disclosure and contracting allows cleaner inference about how financial reporting frequency affects spreads, maturities, collateral, or covenant strictness, making private debt an especially direct test of accounting's confirmatory role.

and Prime Market in Austria) were required to report quarterly, while those on non-prime segments reported semi-annually. This pre-directive variation provides natural treatment and control groups and helps alleviate concerns that FRF choices are driven solely by endogenous firm characteristics.

Second, the EU Transparency Directive of 2004 (European Parliament and Council (EU) 2004) introduced a regulatory regime change by requiring member countries to implement interim reporting mandates if they had not already done so. Between 2007 and 2009, countries transposed the directive into national law, effectively imposing staggered shocks to reporting frequency. These shocks were largely exogenous from the perspective of individual firms, creating quasi-experimental conditions that allow researchers to examine the causal effects of FRF on contracting outcomes (Downar et al. 2018).

The EU setting is particularly well-suited for testing our hypotheses for three reasons. First, the combination of pre-existing cross-sectional variation and subsequent staggered regulatory implementation generates both cross-sectional and time-series variation in FRF, which strengthens identification. Second, the EU setting provides a natural experiment for assessing confirmatory effects of accounting, since the changes in public reporting frequency do not involve increases in disclosure scope that exceed what lenders had through rich and detailed private reporting. This allows us to disentangle incremental confirmatory effects from primary information provision. Third, prior research has established the validity of the EU setting for studying FRF by documenting its effects on investment, asset quality, and equity market outcomes (e.g., Ernstberger et al. 2017, Balakrishnan and Ertan 2018, Downar et al. 2018). Our study extends this literature by examining how financial reporting frequency influences the confirmatory role of accounting – a role emphasized in theory but not previously tested empirically – in the context of debt contracting, where FRF itself has received little attention.

3. Data, Sample, and Summary Statistics

3.1 Data and sample selection

Our sample comprises private loan contracts of listed non-financial firms in the EU-15 countries (i.e., Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, the

Netherlands, Portugal, Spain, Sweden, and the United Kingdom). Table 1 summarizes our sample selection procedure. We use Thomson Reuters' Worldscope and DealScan databases as our primary sources to obtain firms' financial and loan data, respectively. We start with all firm-year observations for firms listed in EU-15 countries that have coverage in both databases. We merge the fundamental and loan datasets using several borrower identifiers (CUSIP, ISIN, and SEDOL) as well as company names and headquarters information.[10] We then exclude all observations for financial firms (SIC 6) (Ernstberger et al. 2017, Downar et al. 2018). This exclusion is consistent with the sample selection of Ball et al. (2015), who note that non-financial and financial firms face different regulatory, financial reporting, and debt contracting issues. Next, we exclude observations that have missing data on reporting frequency (Worldscope item 'WC05200') – our primary variable of interest – or any other firm-specific fundamental data (e.g., total assets, market capitalization, and leverage) required to compute our control variables.[11] Following the prior literature, we remove firms with fiscal years shorter than 365 days or cross-listed in countries outside the EU-15 (Downar et al. 2018). We also exclude observations with erroneous reporting frequency information.[12] Finally, we remove borrowers with missing information on the main loan contract characteristics - loan amount, spread, maturity, type, and purpose. We supplement DealScan with loan data from the Securities Data Company (SDC) Thomson One database wherever possible. The above sample selection process yields a primary sample of 5,708 loans[13] from 981 unique firms for the period 2001 through 2018.[14]

[10] Unlike the Compustat-DealScan linking table by Chava et al. (2008), to our knowledge, there is no single unique identifier to match the loan data with the fundamental data for non-US firms.

[11] It is noteworthy that we augment the reporting frequency data from FactSet (item 'ff_freq_code') whenever the reporting frequency information cannot be obtained from Worldscope.

[12] Specifically, we remove observations with the Worldscope item 'WC05200', which captures the frequency of earnings announcements, equal to 0 or 3. A value of '0' indicates fundamental data for one or more quarters is missing, e.g., a firm reports earnings data for Q2, Q3, and Q4 but not Q1. A value of '3' indicates that a firm reports fundamental data for three interims. We confirmed these data oddities with a Worldscope data representative, who suggested that we ignore these observations as they represent noise in the data. Our results are not sensitive to the inclusion of these observations.

[13] The unit of observation for our analyses is a loan facility/tranche because loan characteristics such as loan spread, maturity, amount, etc. vary at this level (e.g., Costello and Wittenberg-Moerman 2011, Ball et al. 2015).

[14] We start our sample period in 2001 to have a few years of data before the European Commission's adoption of the Transparency Directive (TD) that mandated quarterly reporting in 2004 (European Parliament and Council (EU) 2004). Please see the next section (in particular, sub-sections 4.1 and 4.4) for more institutional details on the directive.

3.2 Summary statistics

Table 2 reports the sample distribution across countries. The Column 'Representation (%)' shows the proportion of sample observations contributed by each country. The countries with the highest number of observations are the U.K., France, Germany, Spain, the Netherlands, and Italy. The next three columns, under the header 'Quarterly Reporters (%),' show the percentage of quarterly reporters in each country. The Column 'Overall' shows this percentage for each country for the entire sample period, i.e., 2001 through 2018. For example, the majority (about 93%) of the observations from the U.K. are non-quarterly reporters, which seems reasonable as the U.K. has historically required listed firms to report on a semi-annual basis. Italy and Spain, on the other hand, have a high proportion of quarterly reporters, as these countries had mandated quarterly reporting for most of the sample period. Countries such as the Netherlands, Belgium, and Luxembourg have an almost equal split between quarterly and semi-annual reporters. The Column 'Before TD' shows the average percentage of quarterly reporters over the period 2001 through the year of implementation of the Transparency Directive (TD), which mandated quarterly reporting (European Parliament and Council (EU) 2004). TD was implemented in 2008 by Belgium and Luxembourg, in 2009 by the Netherlands and Italy, and in 2007 by all remaining countries (Christensen, Hail, et al. 2016). Finally, the Column 'After TD' shows the average percentage of quarterly reporters over the period from the year of TD implementation through 2018. For most countries, there is a considerable increase in the average percentage of quarterly reporting in the post-TD regime. However, a few countries (such as the U.K.) are exceptions as they abolished the mandate to report quarterly following the EU's amendment to the Transparency Directive (TDA) in 2013 (European Commission 2013).

Table 3 reports the descriptive statistics for all the variables used in the main tests of the association between reporting frequency and the cost of debt. All continuous variables are winsorized at the 1st and 99th percentiles. QTR, the main independent variable of interest, has a mean of 0.44, implying that about 44% of the firm-years have quarterly reporting. The average firm in the sample has a leverage ratio of about

In untabulated analyses, we find that our main findings are robust to limiting our sample to years after the directive (e.g., starting our sample period in 2005 or 2006).

0.29, a return on assets ratio of 12% (median of 11%), and about 17 USD Bn (median of 3.5 USD Bn) in total assets. In line with prior studies, our sample is more likely to include firms that are larger, more leveraged, and more profitable than the general Worldscope universe (e.g., Dichev and Skinner 2002, Florou and Kosi 2015). In terms of loan characteristics, the average loan spread is 177 basis points (median of 140 basis points) above the benchmark interest rate, which is usually LIBOR or EURIBOR. The average (median) loan size is a little more than 1 USD Bn (350 USD Mn) with an average maturity of almost five years. In addition, 22% of loan facilities in our sample are backed by collateral, and most of our sample loans are arranged by syndication, with the average syndicate consisting of 11 lenders. For detailed variable definitions, please see Appendix A.

4. Research Design and Empirical Findings

4.1 Financial Reporting in Europe

We choose the EU setting to answer our research questions because it offers two advantages. First, despite having harmonized disclosure requirements, the EU member countries exhibited, before 2007, both cross-sectional and time-series variation in their reporting frequency requirements. For instance, countries such as Italy, Spain, Finland, and Greece mandated quarterly reporting for listed firms. Other countries, such as the U.K., France, the Netherlands, Luxembourg, and Ireland, had mandated semi-annual reporting; however, some firms reported quarterly on a *voluntary* basis. Germany and Austria followed yet a different model – a hybrid model where the reporting requirements varied within these countries based on the stock exchange on which a firm is listed. Firms listed on the 'prime' segment (Prime Standard in Germany and Prime Market in Austria) were required to report quarterly, while those listed on the non-prime segment were required to report on a semi-annual basis. Second, the EU implemented a regime change in 2004 by issuing the Transparency Directive (TD), requiring member countries to enact national laws for interim reporting if they had not already required quarterly reporting (European Parliament and Council (EU) 2004, Downar et al. 2018). These national laws, enacted on a staggered basis from 2007 through 2009, provide a rich quasi-exogenous shock to the reporting frequency and allow researchers to examine potentially causal

outcomes of changes in reporting frequency. Given these advantages of rich variations in reporting frequency, the EU setting has been commonly used in research examining the economic consequences of reporting frequency (e.g., Ernstberger et al. 2017, Balakrishnan and Ertan 2018, Downar et al. 2018).

4.2 Measuring financial reporting frequency

We obtain data on our primary variable of interest - financial reporting frequency - from Worldscope (item *WC05200*). This item represents the number of times a firm reports earnings in a given year. We supplement the Worldscope data with reporting frequency information from FactSet (item *ff_freq_code*). The item *ff_freq_code* closely parallels the Worldscope data item WC05200 in terms of definition and collection procedure. As Balakrishnan and Ertan (2018) document, the above readily available data items from Worldscope and FactSet are, at least for European firms, based on quantitative reports rather than qualitative disclosures.[15] To further augment our sample, for firm-years with missing information on reporting frequency, we count the number of distinct interim filings in a fiscal year in which a firm reports the periodic earnings. The above procedure gives us confidence that our measure of FRF accurately captures the periodicity with which a firm reports earnings and other quantitative measures of firm performance and position.

4.3 Baseline OLS analysis

To test the effect of a change in the financial reporting frequency on the cost of debt (H1), we compare bank loan spreads for quarterly and non-quarterly reporters (i.e., borrowers reporting at a semi-annual or annual frequency) using the following regression specification:[16]

[15] Because the Transparency Directive does not require the quarterly/interim reports to contain a full set of financial statements, it is possible that an interim report contains primarily *qualitative* disclosures Ernstberger et al. (2017). However, using the abovementioned data items from Worldscope and FactSet alleviates the concern that we inadvertently classify as quarterly reporters firms that merely provide interim qualitative disclosures. In addition to the assertion by Balakrishnan and Ertan (2018), we independently and directly confirmed the scope of these data items from the two data vendors – Worldscope and FactSet. Furthermore, to the extent we misclassify firms producing qualitative interim disclosures as quarterly reporters, this misclassification introduces noise in our measure of reporting frequency.

[16] Our results are robust to restricting the sample to quarterly and semi-annual reporters only.

$$LN(SPREAD)_{l,i,t} = \alpha + \beta * QTR_{i,t-1} + \sum Borrower\ Controls_{i,t-1} + \sum Loan\ Controls_{l,i,t} + Industry\ FE + Year\ FE + \epsilon \quad (1)$$

In Equation (1), *i* indexes firm, *t* indexes year, and *l* indexes loan facility/tranche (for loan control variables); *QTR*, the main independent variable of interest, equals one if borrower *i* reports quarterly in a given year and zero otherwise; *LN(SPREAD)*, the outcome variable, is the natural log of the basis point spread that a borrower pays over the benchmark rate such as LIBOR or EURIBOR on the drawn portion of the loan facility.

We control for known determinants of the cost of debt at the borrower- and loan- levels. Following prior research, borrower characteristics include borrower firm size (*SIZE*), leverage (*LEVERAGE*), market-to-book ratio (*MTB*), profitability (*ROA*), asset tangibility (*TANGIBILITY*), and operating cash flows (*CFO*). These borrower characteristics and reporting frequency are measured at time t-1, i.e., the year preceding the year of loan initiation. In addition, loan characteristics include the amount (*AMOUNT*), maturity in months (*MATURITY*), an indicator for being secured by collateral (*SECURED*), and an indicator for being arranged by syndication (*SYNDICATED*). We also include fixed effects for loan-type (i.e., "revolver," "term-loan," and "other" dummies) and loan-purpose (i.e., "takeover," "general corporate," "financing," "capital expenditure/investing," "working capital," and "other" dummies). Following prior literature, we control for unobserved time-invariant industry-level factors common to all firms within an industry by including 4-digit SIC industry fixed effects and year-level factors, such as macroeconomic shocks, by including year fixed effects (e.g., Houston et al. 2014, Li et al. 2020, Saffar et al. 2024, Chy et al. 2025).[17] We estimate standard errors after adjusting for clustering at the firm level (Amiram, Kalay, et al. 2017).[18] All variables are defined in detail in Appendix A.

Table 4 presents the results from testing H1, i.e., the effects of reporting frequency on the cost of debt. In Column (1), we start by examining the effect of *QTR* on loan spread while controlling for prior-known

[17] Our primary inferences are unchanged if we replace industry fixed effects with firm fixed effects.

[18] For robustness, we examine the sensitivity of our analyses to alternative fixed effects, including firm fixed effects (as noted above), and clustering choices and find qualitatively similar results.

borrower characteristics, industry, and year fixed effects. Next, we augment this specification by including the loan-level controls in Column (2). Then, in Column (3), we test the full specification after also including loan-type and loan-purpose fixed effects. The coefficient on *QTR*, which captures the effect of a change in FRF on the cost of debt, is negative and statistically significant across Columns (1) through (3). This magnitude is economically significant as well: based on Column (3), quarterly reporters pay a loan spread that is about 18 basis points *lower*, on average, than the spread paid by semi-annual reporters.[19] This reduction in spread is similar to that experienced by firms that voluntarily adopted IFRS, as reported by Kim et al. (2011).[20] Finally, in Column (4), we replace industry fixed effects with firm fixed effects to account for potential time-invariant firm characteristics that could drive the association between reporting frequency and the cost of debt. The results in Column (4) are consistent with those in Column (3). Control variables, in general, have signs consistent with theory and prior research. In particular, firms that are larger, are more profitable, have lower leverage, or have higher operating cash flows, obtain a lower cost of debt (e.g., Florou and Kosi 2015). As for the loan characteristics, we find that loans that are smaller in size, are secured, or have a higher maturity have higher spreads on average (e.g., Berg et al. 2017).

4.4 Difference-in-differences analyses around the Transparency Directive

Despite the use of a two-way fixed effects design with multiple controls, it is possible that there is an endogenous association between FRF and the cost of debt. That is, quarterly and semi-annual reporters differ in ways other than their reporting frequencies, and these unobserved/unmeasured differences are associated with their costs of debt. To further mitigate such endogeneity concerns, we take advantage of the staggered introduction of interim reporting in the EU. As noted in Section 2.4 above, the EU initiated a regime change when it issued the Transparency Directive (TD) in December 2004. As is typically the case, the directive required each EU member state/country to implement this directive into national law,

[19] Change in loan spread is computed as: 176.62 * ($e^{-0.109}$ - 1) basis points.

[20] Specifically, using a sample of non-US firms from 40 countries, Kim et al. (2011) document that "IFRS adopters, on average, pay lower loan rates than non-adopters by about 20 (31) basis points for all loans (LIBOR-based loans)."

mandating interim reporting by January 2007.[21,22] However, this deadline was later extended as several member states faced delays in the issuance of the regulatory details and technical standards following similar delays at the EU level (Link 2012, Christensen, Hail, et al. 2016).[23] The directive, implemented on a staggered basis over the period January 2007 through April 2009 in the EU-15 countries (Ernstberger et al. 2017), provides a plausibly exogenous shock to the reporting frequency, thereby allowing examination of potentially causal outcomes of changes in reporting frequency. Thus, following Downar et al. (2018), we use a generalized difference-in-differences (DiD) design exploiting this staggered implementation of the TD. Specifically, we compare the cost of debt for the firms that were mandated to switch from semi-annual to quarterly reporting frequency (treatment group) with firms that were already mandated to report at a quarterly frequency (control group). We exclude firms already reporting at a quarterly level *voluntarily* to avoid a potential bias due to self-selection. Specifically, we estimate the following difference-in-differences specification:

$$LN(SPREAD)_{l,i,t} = \alpha + \beta_0 * POST_{i,t} + \beta_1 * TREAT \times POST_{i,t} + \sum Borrower\ Controls_{i,t-1} + \sum Loan\ Controls_{l,i,t} + Country\ FE + Industry\ FE + Year\ FE + \epsilon \quad (2)$$

In Equation (2), *TREAT* equals one for firms treated in year *t*, i.e., mandated to report on a semi-annual basis prior to year *t*, and zero for firms mandated to report quarterly throughout. *POST* equals one for the

[21] These national laws required all listed firms to publish Interim Management Statements (or IMS) for the first and third quarters, thereby increasing the reporting frequency to quarterly. While an IMS is not necessarily as detailed as a full-fledged semi-annual or annual report, the TD requires firms to provide, at the minimum, "an explanation of material events and transactions that have taken place during the relevant period and their impact on the financial position of the issuer and its controlled undertakings, and a general description of the financial position and performance of the issuer and its controlled undertakings during the relevant period." Thus, arguably, these statements provide material and relevant information to financial statement users. However, some critics complain that these IMSs provide limited new or substantive information to the market, if any. It is noteworthy that this criticism and apparent weakness in IMSs is actually a strength of our setting as it allows greater support to our assumption that the IMSs are primarily useful to the lenders because of their confirmatory role in validating the borrower information privately shared with the lenders. In Appendix B, we provide an illustrative IMS issued in 2007 by Vallourec S.A., a company headquartered and listed in France, which adopted TD in 2007.

[22] The national legislative process typically entails drafting the national law, consultation periods, multiple readings, signing by the head of state, and public notification.

[23] As Christensen, Hail, et al. (2016) note, "a small delay is common practice in the European Union" and in the case of TD, the delay was for "reasons unrelated to the directive itself."

years after the TD adoption and zero otherwise.[24] The coefficient of interest is the coefficient on the interaction term, *TREAT* × *POST*. In addition to the set of control variables used in the baseline OLS analyses, to control for the strength of *time-varying* country-level regulatory quality and enforcement, we include measures capturing these dimensions obtained from the Worldwide Governance Indicators database developed by Kaufmann et al. (2009). Specifically, following Christensen et al. (2013), we define regulatory quality (*REG_QUALITY*) as the *regulatory quality index* from Kaufmann et al. (2009), which captures a country's overall ability to develop and implement regulation and government policies. Similarly, following Ernstberger et al. (2017), we define regulatory enforcement (*REG_ENFORCE*) as the mean of the "rule of law" and "control for corruption" scores from Kaufmann et al. (2009).[25] The inclusion of these measures alleviates the concern that institutional differences in country-level regulatory enforcement mechanisms confound the association between reporting frequency and the cost of debt.[26] We also control for the GDP per capita (*GDP_PER_CAP*), obtained from the World Bank, to capture country-specific macroeconomic conditions. Finally, we use country fixed effects to capture other unobserved country-specific heterogeneity.

For this analysis, we limit our sample period to 2004 - 2015. We begin in 2004 to have several years of data before 2007, the first year of TD adoption. We end in 2015 because of the EU's abolishment of mandatory quarterly reporting through an amendment to the TD (Transparency Directive Amended Directive) issued in November 2013 that required the member states to remove the quarterly reporting requirements by November 2015 (European Commission 2013). The United Kingdom, the first country to remove the quarterly reporting requirement, did so in November 2014 (Pozen et al. 2017).[27] Next, for a

[24] As noted earlier, TD was adopted in 2008 by Belgium and Luxembourg, in 2009 by the Netherlands and Italy, and in 2007 by all other countries (Christensen, Hail, et al. 2016).

[25] The data accompanied by methodology description and detailed documentation are publicly available on http://info.worldbank.org/governance/wgi/.

[26] We also assess the sensitivity of our findings to enforcement changes concurrent with the TD by excluding countries that implemented substantive changes in enforcement around TD implementation - Sweden and Ireland (Christensen et al. 2013, Christensen, Hail, et al. 2016). In untabulated analyses, we find virtually unchanged results.

[27] In untabulated analysis, we find that our results are robust to starting the sample in 2001 or ending in 2014.

cleaner identification of treatment and control firms, we require firms in our sample to be listed and domiciled in the same EU-15 country and remove cross-listed firms.[28] Finally, we estimate standard errors adjusted for clustering at the two-digit SIC level. Conceptually, it is more appropriate to cluster at the country level as the treatment varies at this level. However, given that we have 15 countries in our sample and prior research shows that standard errors based on a few clusters are likely to suffer from small-sample bias (e.g., Petersen 2009, Cameron and Miller 2015), we do not use country-level clustering in our main DiD specification. However, as reported later, clustering at the country-level yields similar inferences.[29]

Table 5 presents the results from the DiD analyses, which are consistent with those from the OLS fixed effects panel regression approach reported in Table 4. In Column 'Baseline,' which includes the full sample as described above, the coefficient on *TREAT* × *POST* is negative and statistically significant. This finding is consistent with an increase in reporting frequency leading to a decline in the cost of debt. In Column 'Non-crisis,' we remove the observations from the financial crisis years (i.e., 2007 through 2009). In Column 'Constant Sample,' we focus on a constant sample of firms, i.e., firms that obtained at least one loan in both the pre-TD and post-TD periods. Next, in Column 'Post-IFRS,' we restrict our sample to firm-years after mandatory adoption of the International Financial Reporting Standards (IFRS), i.e., years 2005 and after. We continue to find a statistically significant negative association between FRF and the cost of debt in all these Columns. Finally, in Column 'Country Clustering,' we examine the sensitivity of our main results ('Baseline') to clustering at the country level, i.e., at the level of the treatment assignment.

A key assumption underlying the above DiD identification strategy is that quarterly reporters and semi-annual reports would have had parallel trends in loan spreads in the absence of the TD. Although we cannot observe (and hence, test) what the trends in the dependent variables would have been without the TD regulation, we test for parallel trends across groups in the pre-treatment periods. Specifically, we transform

[28] We require sample firms to be listed on only one exchange as reporting requirements vary at the exchange level.

[29] Our choice of clustering at the two-digit SIC level is consistent with that of Ball et al. (2015), who examine the effects of IFRS adoption on debt contracting using a DiD specification. Ball et al. (2015) note the "tradeoff between clustering at the most aggregate level possible versus having sufficient clusters to consistently estimate the within cluster variance-covariance matrix."

the above baseline specification in equation (2) by replacing the POST variable with dummy variables for different time periods defined relative to the TD year and interacting them with the indicator variable *TREAT*. We replace POST with indicator variables *TD-1*, *TD0*, and *TD1+*, which take the value one in the year before, the same year as, and one or more years after, respectively, the year of TD adoption, and zero otherwise. The interaction term, *TREAT* × *TD-1*, allows us to assess whether there was any differential pre-treatment trend in the loan spreads.

Table 6 presents the results from the above pre-treatment trend analyses. Column 'Baseline' presents the 'Baseline' specification from Table 5 for reference. In Column 'Pre-Trends,' the coefficient for the interaction term *TREAT* × *TD-1* is statistically insignificant, suggesting that the pre-treatment loan spreads between treatment and control firms are indistinguishable. On the other hand, the interaction term *TREAT* # *TD1+* is negative and statistically significant, consistent with the divergence in loan spreads occurring only in the periods *after* TD. These results provide support for the parallel trend assumption inherent in DiD designs (Angrist and Pischke 2008).

Recent advances in econometric theory highlight potential biases in the estimated treatment effect when using a staggered DiD design due to the possibility of already-treated units serving as effective comparison units (e.g., Barrios 2021, Baker et al. 2022). We argue that our inferences from the DiD analyses exploiting the TD are unlikely to be contaminated by such biases. First, our results are robust (untabulated) to focusing only on the first set of treatment event(s), i.e., limiting the sample to only the countries that adopted the TD in 2007. By excluding the subsequent treatment events of 2008 and 2009 (TD adoption in Belgium, Luxembourg, the Netherlands, and Italy), we eliminate the likelihood of units treated in 2007 being used as control units for any subsequent treatment event (in 2008 or 2009). Second, about 84.5% of the observations in our DiD sample constitute the never-treated group and thus, provide comfort against the biases associated with the standard two-way fixed effects (TWFE) staggered DiD regressions (Baker et al. 2022). Barrios (2021) notes that in settings with a large pool of never-treated firms, "the TWFE estimator would put less weight on the problematic 2×2 DiD comparisons that use already-treated firms/units as controls."

4.5 Cross-sectional tests

The baseline and quasi-experimental analyses provide consistent evidence that more frequent financial reporting lowers the cost of debt. To reinforce this interpretation and shed light on underlying mechanisms, we next examine whether the effect is stronger in settings where the confirmatory role of accounting should be most valuable to lenders. Specifically, we test for cross-sectional variation in the relation between FRF and loan spreads across borrower characteristics that influence the credibility of private information and the extent to which public disclosures can enhance verification.[30]

4.5.1 Cross-sectional Tests: Audit Verification Quality

A defining feature of the confirmatory role of accounting is that it depends on the credibility of the reports being used to corroborate private disclosures. Interim public reports cannot enhance contracting if lenders view them as unreliable or easily manipulated. Instead, their value arises when they provide a trustworthy benchmark against which lenders can validate—or, if necessary, challenge—the information supplied privately by the borrower (Ball et al. 2008, Christensen and Nikolaev 2012). This logic implies that the incremental value of financial reporting frequency should be greater when the credibility of public reports is higher.

Audits are central to establishing such credibility. High-quality auditors invest heavily in industry specialization and reputational capital, which strengthens confidence in the integrity of their clients' reports. Similarly, an unqualified audit opinion signals that the auditor has found no material misstatements, further reinforcing the reliability of disclosed information. Thus, if the confirmatory role underpins our main findings, we expect the spread-reducing effect of quarterly reporting to be most pronounced among borrowers audited by Big-4 firms and those receiving unqualified audit opinions (DeFond and Zhang 2014).

[30] We conduct all cross-sectional analyses using our primary OLS specification to increase statistical power and generalizability. The DiD sample, which includes only firms affected by the Transparency Directive, is substantially smaller and comprises approximately 14% of the main sample. In untabulated analyses, we find similar inferences when applying a DiD specification analogous to that reported in Table 5 to the cross-sectional tests.

Table 7 presents the results. Consistent with our prediction, the coefficient on the interaction between quarterly reporting (*QTR*) and Big 4 auditor (*BIG4*) is negative and statistically significant. This indicates that the reduction in loan spreads associated with quarterly reporting is substantially larger when the borrower engages a Big 4 auditor. Likewise, the coefficient on *QTR* × *UNQUALIFIED* is negative and significant, showing that quarterly reporting reduces spreads more strongly for firms with clean audit opinions.

Taken together, these results support the confirmatory role interpretation: frequent public reports reduce the cost of debt most effectively when they are backed by more credible audit assurance.

4.5.2 Cross-sectional Tests: Borrower Credit Risk

Our second set of cross-sectional analyses focuses on borrower credit quality. Credit risk directly shapes lenders' demand for credible confirmation of private disclosures. Borrowers facing a higher risk of default have stronger incentives to present optimistic projections or withhold unfavorable information, increasing lenders' need for externally validated benchmarks (e.g., Zhang 2008, Franz et al. 2014, Demerjian et al. 2020). In such cases, interim public financial statements – prepared under standardized accounting rules and subject to audit (or at least review) – provide an important check on the reliability of the private information borrowers furnish through contractual channels. By contrast, when borrowers are financially strong and external monitors (such as rating agencies) already certify credit quality, the incremental confirmatory value of more frequent reporting should be weaker.

We examine two proxies for borrower credit risk: whether the firm is unrated, and whether it is rated below investment grade. Each captures a different dimension of borrower opacity. Unrated firms lack external validation from credit rating agencies, depriving lenders of a widely recognized third-party assessment of creditworthiness. Speculative-grade borrowers are riskier by definition and thus more likely to have incentives to manage or bias their private disclosures. In each of these settings, the confirmatory role of public reporting should be particularly valuable.

Table 8 reports the results. Consistent with our prediction, the spread-reducing effect of quarterly reporting is significantly stronger among firms with weaker credit signals – the coefficients on the

interaction terms *QTR* × *UNRATED* and *QTR* × *SPECGRADE* are negative and significant. Overall, the credit risk cross-sectional analysis reinforces the interpretation that financial reporting frequency matters most when borrower credit risk heightens the importance of credible verification. Frequent, standardized public reports allow lenders to more effectively corroborate or challenge the private disclosures they receive, thereby reducing financing costs for riskier borrowers.

Taken together, the audit- and credit-risk cross-sectional analyses provide strong support for our central interpretation: the effect of financial reporting frequency on loan contracting operates through accounting's confirmatory role. The audit tests show that quarterly reporting reduces loan spreads most when borrowers' financial statements are backed by credible external assurance – Big 4 auditors and unqualified opinions – indicating that lenders place greater weight on interim reports when they can trust their reliability. The credit-risk tests demonstrate that confirmatory benefits are also greatest when borrower incentives to misreport are strongest, as reflected in being unrated or speculative-grade. In these settings, more frequent public reports provide lenders with credible third-party benchmarks to validate or challenge borrower-supplied information. Given that FRF does not add information to what lenders already receive privately, these results reinforce that the economic value of FRF lies in enhancing the credibility of the private information, especially when credibility and verification are most consequential.

4.6 Robustness: FRF and non-price loan contract terms

Our main analyses in Sections 4.2 and 4.3 show that more frequent financial reporting is associated with lower loan spreads. An important question, however, is whether these spread reductions are offset by more stringent non-price terms. The final loan contract terms are often an outcome of negotiations between the borrower and lender(s) and are determined simultaneously. Thus, examining the impact of reporting frequency on loan spread in isolation might not provide a complete picture. For instance, it is possible that borrowers who report more frequently obtain a lower initial loan spread but also receive a lower loan amount or shorter maturity. In such a scenario, the *net* impact of more frequent reporting on loan contract terms is ambiguous (Amiram, Beaver, et al. 2017). To provide a more comprehensive view of how FRF

affects debt contracting, we therefore examine non-price loan terms. This analysis serves as a robustness check on our main results, allowing us to assess whether the benefits of more frequent reporting are limited to spreads or extend to the overall structure of lending arrangements. Accordingly, we separately examine the impact of FRF on several non-price loan contract terms while controlling for the loan spread and other non-price loan contract terms. Specifically, we estimate the following variant of Equation (1):

$$LoanTerm_{l,i,t} = \alpha + \beta * QTR_{i,t-1} + \sum Borrower\ Controls_{i,t-1} + \sum Loan\ Controls_{l,i,t} + Industry\ FE + Year\ FE + \epsilon \quad (3)$$

In Equation (3), *l* indexes loan facility/tranche, *i* indexes firm, and *t* indexes year. *QTR*, the primary independent variable of interest, equals one if borrower *i* reports quarterly in year *t* and zero otherwise. The outcome variable, *LoanTerm*, is one of *LN(AMOUNT)* (the natural log of the amount of the loan in USD Mn), *LN(MATURITY)* (the natural log of the loan duration in months), *SECURED* (an indicator for whether the loan is secured by collateral), *NUM_LENDERS* (the number of lenders in the lending syndicate) or *NCOV* (the total number of financial covenants in the loan). For detailed variable definitions, please see Appendix A.

Table 9 presents the results from estimating Equation (3). In Column (1), with *LN (AMOUNT)* as the dependent variable, the coefficient on *QTR* is positive and statistically significant, which implies that borrowers who report quarterly receive a loan amount that is *higher* than that received by borrowers who report on a semi-annual basis. This effect is also economically significant and translates to an increase of about 77 USD Mn for the median loan in our sample.[31] The coefficient on *QTR* is also positive in Column (4), with *NUM_LENDERS* as dependent variable, which is consistent with *more lenders* willing to participate in syndicates lending to borrowers reporting quarterly, implying greater demand for such borrowers (e.g., Kim and Song 2011, Chin et al. 2014). Next, in Column (5), with *NCOV* as dependent variable, we also find some evidence that quarterly reporters are likely to get *fewer* financial covenants, a

[31] 355.20 * ($e^{0.197}$ - 1) USD Mn.

proxy for loan contract strictness.[32] The sample size in the analysis with NCOV as a dependent variable is notably small, as the data on financial covenants on DealScan, our main data source for loans, is missing for a considerable proportion of loan observations.[33] Notwithstanding the small sample size, the effect of *QTR* on *NCOV* seems economically important. We find that borrowers who report quarterly have one financial covenant less in their loan contract compared to borrowers who report semi-annually. For the average loan in our sample, this translates to a reduction of 50%. We do not find evidence that the loan maturity and collateral requirement likelihood differ between quarterly and semi-annual reporters.

Overall, the results in Table 9 are consistent with borrowers reporting at a quarterly frequency receiving better (or no worse) loan terms than borrowers reporting on a semi-annual basis, which is consistent with the reporting frequency-induced lower loan spreads not being substituted by worse non-price loan terms.

4.7 Additional analysis: mandatory quarterly reporting in Singapore

To enhance the generalizability of our inferences based on plausibly exogenous variation introduced by the Transparency Directive in EU15 countries, we examine a distinct regulatory setting in Singapore that involved a mandated increase in reporting frequency (Balakrishnan and Ertan 2018, Kajüter et al. 2019). In March 2003, Singapore mandated quarterly reporting for listed firms with a market capitalization greater than S$75 million (which was approximately USD 42million at the time). We conduct a DiD analysis by classifying firms affected by this reporting regime change as the treated group and all other listed firms as the control group. We use the same regression specification with all control variables and fixed effects as in the DiD analysis reported in Table 5. In untabulated analysis, we find that firms required to switch to quarterly reporting experience a significant reduction in loan spread after the directive relative

[32] Admittedly, the number of financial covenants is a crude measure of covenant strictness as it does not account for the initial covenant slack (Murfin 2012). However, as Demerjian and Owens (2016) argue, a more comprehensive measure imposes significant data requirements and our current sample size (N=341) precludes the use of such a measure.

[33] Prior literature has noted this lack of covenant data on the DealScan database, particularly for non-U.S. loans. For instance, Ball et al. (2015), who study the impact of IFRS adoption on loan contracting using a global sample including European firms, report a missing rate of 90%. The missing rate of covenant data in our sample of EU-15 loans is in the same ballpark: 93.6%. Furthermore, this missing rate is actually better than that for the entire population of loans originating in Europe or EU-15 countries (97% each).

to firms in the control group. While based on a small sample (N = 62), these results reinforce the external validity of our findings and strengthen the interpretation that the observed decline in loan spreads reflects a response to increased reporting frequency.

5. Conclusion

This paper provides the first large-sample empirical evidence on how financial reporting frequency shapes the confirmatory role of accounting. Although prior theory emphasizes that accounting's confirmatory value should decline with reporting frequency (Gigler and Hemmer 1998), our results suggest otherwise. We find that quarterly reporting is associated with significantly lower loan spreads, and that this effect is concentrated in the very settings where confirmation is most valuable—when borrower credibility is uncertain or when audit assurance is especially strong. These findings establish a clear link between reporting frequency and the cost of debt, highlighting the confirmatory role of accounting as an economically meaningful channel.

We also extend the confirmatory role literature into a new institutional setting. Prior empirical studies have primarily examined how accounting corroborates managers' public disclosures, such as earnings forecasts (e.g., Ball et al. 2012). By contrast, we study private debt markets, where sophisticated lenders already enjoy robust contractual access to borrower information. Our evidence demonstrates that, even in this information-rich environment, more frequent public reporting provides incremental confirmation that lowers borrowing costs. This result underscores that public reporting complements rather than substitutes for private disclosure.

Finally, our findings carry implications for regulatory debates on the costs and benefits of frequent reporting. While critics argue that quarterly reporting fosters short-termism, our evidence suggests that it also strengthens the confirmatory role of accounting, reducing borrowing costs and improving debt contract terms. This perspective broadens the scope of policy discussions beyond equity markets, showing that decisions about reporting frequency also affect firms' access to debt capital—the dominant source of external financing for most corporations. More broadly, our results highlight that regulatory initiatives like

the EU Transparency Directive can materially shape financing outcomes by enhancing the credibility and contractibility of financial information.

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Appendix A: Variable definitions

Variable	Definition
*Borrower Characteristics**	
QTR	An indicator that equals one for borrowers reporting on a quarterly basis and zero otherwise (i.e., semi-annual or annual).
SIZE	Total assets in USD Mn.
LEVERAGE	The ratio of total debt to total assets.
MTB	The ratio of the market value of total assets to the book value of total assets.
ROA	The ratio of EBITDA to total assets.
TANGIBILITY	The ratio of net property, plant & equipment to total assets
CFO	The ratio of cash flow from operations to total assets.
BIG4	An indicator that equals one if the borrower was audited by a Big 4 firm for the fiscal year immediately preceding the year of loan initiation and zero otherwise.
UNQUALIFIED	An indicator that equals one if the borrower received an unqualified audit opinion for the fiscal year immediately preceding the year of loan initiation and zero otherwise.
UNRATED	An indicator that equals one if, at the time of loan initiation, the borrower does not have an outstanding long-term issuer credit rating from S&P and zero otherwise.
SPECGRADE	An indicator that equals one if, at the time of loan initiation, the borrower's long-term issuer rating assigned by S&P was lower than BBB- and zero otherwise.
Loan Characteristics	
SPREAD	The spread of the loan facility measured as the basis points charged over the reference/benchmark rate such as LIBOR or EURIBOR.
LN(SPREAD)	Natural log of the variable, SPREAD.
MATURITY	The maturity/term of the loan facility measured in months.
AMOUNT	The amount of the loan facility measured in USD Mn.
LN(AMOUNT)	Natural log of the variable, AMOUNT.
SECURED	An indicator that takes the value one for loan facilities secured by collateral and zero otherwise.
SYNDICATED	An indicator that takes the value one for loan facilities that are arranged by syndication and zero otherwise (i.e., for single-lender loans).
NUM_LENDERS	The number of lenders in the lending syndicate; equals one for single-lender loans.
NCOV	The total number of financial covenants in the loan contract.
Other Controls	
REG_QUALITY	The regulatory quality index taken from the Worldwide Governance Indicators (WGI) database. The index captures a government's ability to develop and implement sound policies and regulations to promote private sector development. A higher value indicates better regulatory quality.
REG_ENFORCE	Following Ernstberger et al. (2017), the regulatory enforcement index is defined as the mean of the "rule of law" and "control for corruption" scores obtained from the WGI database.

GDP_PER_CAP	Gross domestic product divided by the midyear population sourced from the World Bank's World Development Indicators. Data are in constant 2015 U.S. dollars.

*All borrower firm characteristics are measured before debt issuances unless stated otherwise: if the loan facility is issued in year t, then reporting frequency and other control variables are measured at year t-1.

Appendix B: Illustrative IMS

COMMUNIQUÉ DE PRESSE

VALLOUREC

2007 FIRST QUARTER RESULTS

Vallourec benefits from the good overall performance of its markets

- **Record quarterly sales of € 1,453.9 million (up 10.3%)**
- **EBITDA/sales ratio maintained at a high level of 29.2%**
- **Net income, Group share increases to € 237.7 million (up 11.6%)**
- **Outlook confirmed**

Boulogne-Billancourt, 3 May 2007 - Vallourec, world leader in the production of seamless steel tubes and tubular products for specific industrial applications, today announced its results for the first quarter of 2007. The consolidated financial statements were presented today by Vallourec's Management Board to its Supervisory Board, chaired by Jean-Paul Parayre.

Consolidated sales in the first quarter of 2007 increased by 10.3% to reach a record € 1,453.9 million. EBITDA rose by 10.2% to € 424.6 million, giving an EBITDA/sales ratio of 29.2%, the same as in the first quarter of 2006. Total net income increased from € 233.6 million to € 249.3 million while net income, Group share increased by 11.6% to € 237.7 million.

Unaudited data

Income statement *(in € million)*	**Q1 2006**	*as a % of sales*	**Q1 2007**	*as a % of sales*	**Change Q1 2007 / Q1 2006**
Sales	1,318.6		**1,453.9**		+10.3%
EBITDA	385.3	*29.2%*	**424.6**	***29.2%***	+10.2%
Operating income	359.0	*27.2%*	**395.9**	***27.2%***	+10.3%
Total net income	233.6	*17.7%*	**249.3**	***17.1%***	+6.7%
Net income, Group share	212.9	*n/a*	**237.7**	***n/a***	+11.6%

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When commenting on these results, Pierre Verluca, Chairman of the Management Board, stated:

"As expected, further growth was recorded in the early part of the year and our level of operating profitability remains very high. The situation we are witnessing across all our various markets means we are able to confirm our projections. The first quarter of 2007 will be remembered for the major decision taken for Vallourec's future to construct a new tube mill in Brazil in partnership with Sumitomo. This decision, which is fully in keeping with our selective growth strategy, will strengthen our competitiveness over the long term."

ACTIVITY

Demand remained strong, other than in the North American market, throughout the first quarter of 2007. Under these favourable conditions, the 10.3% sales growth consisted of a consolidation scope effect of -0.2%[1], a volume effect of +1.2% and a mix/price/currency effect of +9.2%.

Vallourec's plants, which were already operating at very close to full capacity in 2006, generally continued to operate at a similar level.

At the same time, prices stabilized overall compared with the end of the previous year. Nevertheless, in comparison with the first quarter of 2006, the Group benefited from the full effect of the price increases implemented in 2006 for certain high value-added products. Lastly, the Group further enhanced its product mix.

Unaudited data

Sales by market

	Q1 2007 sales (in € million)	Contribution to total sales for Q1 2007	*Reminder: contribution to total sales for 2006*
Oil and gas	682	46.9%	*48.4%*
Power generation	249	17.2%	*16.3%*
Total Energy	**931**	**64.1%**	***64.7%***
Petrochemicals	146	10.0%	*11.4%*
Mechanical engineering	180	12.4%	*10.7%*
Automotive	123	8.5%	*8.4%*
Other	73	5.0%	*4.8%*
Total Non-Energy	**522**	**35.9%**	***35.3%***
Total	**1,454**	**100%**	***100%***

[1] The consolidation scope effect mainly concerns the acquisition of SMFI, consolidated with effect from 1 April 2006, and the disposal of Spécitubes and Cerec, deconsolidated with effect from 1 April and 1 December 2006 respectively.

In the oil and gas sector, oil companies' exploration and production activities remained buoyant.

In North America, the inventory reductions observed at distributors at the end of 2006 continued in the first quarter. This phenomenon explains the bulk of the decline in quantities of OCTG tubes delivered by Vallourec in this region. In this market, Vallourec's selling prices in dollars remained at the high levels of 2006. Still in the United States, the market for premium joints continued to perform very well, with sales volumes and prices remaining at excellent levels.

Outside the North American market, sales of OCTG tubes and premium joints stabilized at satisfactory levels in terms of both prices and volumes.

Lastly, with regard to other oil activities, sales of drill pipes continued to increase. Sales of special line pipes also posted good performances. By way of illustration, Vallourec signed a contract with Petrobras in March worth $ 135 million over three years. This contract concerns the Hibrido project and covers the delivery of thick, heat-treated line pipes that will equip and link several deepwater oilfields.

In power generation, Vallourec continued to benefit from strong demand from China, although it was the increase in the number of new and complex projects in Europe and the United States – supercritical and ultra-supercritical coal-fired power plants – that supported the growth in activity.

Compared with the start of 2006, which was boosted by the reconstruction of certain refineries destroyed by the hurricanes that hit the United States in 2005, the petrochemical activity marked time to a certain extent in the first quarter.

By contrast, sales by the mechanical engineering activity increased sharply in an environment still characterized by strong orders in Germany, a market which is fuelled by exports.

Sales of products for the automotive industry stabilized but remained penalized in Europe by the decline in activity at the two main French car manufacturers.

RESULTS

EBITDA increased at the same rate as sales, up 10.2% to € 424.6 million compared with € 385.3 million in the first quarter of 2006. As a result, the EBITDA/sales ratio came to 29.2%, the same level as in the corresponding period of the previous year.

The effective tax rate was 35.7% compared with 33.5% in the first quarter of 2006.

Total net income increased by 6.7% to € 249.3 million, representing 17.1% of sales. Net income, Group share increased by 11.6% to € 237.7 million.

Although capital expenditure remained brisk (€ 71.0 million during the period) and despite a deterioration in working capital requirements, notably due to higher inventories and work-in-progress linked to increased recourse to subcontracting, the Group generated cash flow that enabled it to improve its cash position by € 73.8 million in the first quarter of 2007. Net cash thus stood at € 115.2 million at 31 March 2007 compared with € 41.4 million at 31 December 2006.

Unaudited data

Cash flow statement *(in € million)*	Q1 2006	Q1 2007
Gross cash flow from operations	296.2	**334.5**
Change in gross working capital requirement	-67.2	**-183.5**
Gross capital expenditure	-44.3	**-71.0**
Financial investments	-28.9	**0.0**
Asset disposals	+1.1	**+4.5**
Share management programme	0.0	**-2.5**
Dividends paid	-5.8	**-10.5**
Other	-8.7	**+2.3**
(Increase)/decrease in net debt	142.4	**73.8**

Unaudited data

Balance sheet items *(in € million)*	31/12/2006	**31/03/2007**
Shareholders' equity (Group share)	2,130.4	**2,371.9**
Shareholders' equity (including minority interests)	2,223.2	**2,465.5**
Net debt	-41.4	**-115.2**
Gearing ratio	-1.9%	**-4.7%**

OUTLOOK

In the oil and gas sector, demand remains sustained, except for a slowdown in sales of OCTG tubes in the United States. Other than in the North American market, oil and gas order books remain long (eight to nine months). Activity also remains very buoyant for premium joints and high value-added products such as drill pipes and accessories. The power generation market is very robust, with order books again standing at eight to nine months.

As demonstrated by the first-quarter sales, the mechanical engineering market is also extremely healthy and offers bright prospects. The petrochemicals activity is also holding up well, even though, compared with 2006, sales are likely to be affected by a demanding base effect and a consolidation scope effect linked to the sale of Cerec. The automotive activity is relatively stable (excluding the consolidation scope impact of the planned sale of the precision tubes activity).

Vallourec thus confirms that most of the Group's plants should continue to operate at very close to maximum operating capacity and that the gradual enhancement of its product mix will continue, while selling prices are expected to remain stable overall.

Vallourec thus reiterates that, barring any exceptional events and despite the dollar's current weakness, the Group should record sales growth of around 7% to 10% in 2007 (excluding the impact of the planned sale of its precision tubes activity).

Vallourec also confirms that, in the first half of 2007, its EBITDA/sales ratio will remain very high, although just below 30% as a result notably of higher energy and transportation costs and of costs relating to the intensive utilization of production capacity.

Summary consolidated income statement

(under IFRS – in € million)

Unaudited data

VALLOUREC GROUP	Q1 2006		Q1 2007		Change Q1 2007 / Q1 2006
		as a % of sales		*as a % of sales*	
Sales	1,318.6		1,453.9		+10.3%
Production taken into inventory	60.0	*4.6%*	29.8	*2.0%*	-50.3%
Other operating revenues	6.7	*0.5%*	6.6	*0.5%*	-1.5%
Purchases consumed	-498.1	*37.8%*	-506.6	*34.8%*	+1.7%
Taxes and duties	-14.7	*1.1%*	-14.3	*1.0%*	-2.7%
Payroll costs	-202.0	*15.3%*	-215.8	*14.8%*	+6.8%
Other operating costs	-285.5	*21.7%*	-333.5	*22.9%*	+16.8%
Provisions net of reversals	0.3	*0.0%*	4.5	*-0.3%*	
EBITDA	**385.3**	***29.2%***	**424.6**	***29.2%***	**+10.2%**
Depreciation & amortization	-26.9	*2.0%*	-30.0	*2.1%*	+11.5%
Impairment of assets and goodwill			-1.0		
Asset disposals and restructuring costs	0.6		2.3		
OPERATING INCOME	**359.0**	***27.2%***	**395.9**	***27.2%***	**+10.3%**
FINANCIAL INCOME	-4.1		-14.7		+258.5%
INCOME BEFORE TAX	354.9	*26.9%*	381.2	*26.2%*	+7.4%
Income tax	-119.0		-135.9		+14.2%
Share in net income of equity affiliates	-2.3		4.0		
TOTAL CONSOLIDATED NET INCOME	**233.6**	***17.7%***	**249.3**	***17.1%***	**+6.7%**
NET INCOME, GROUP SHARE	**212.9**		**237.7**		**+11.6%**

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APPENDICES

Documents accompanying this release:

- Summary consolidated income statement
- Summary consolidated balance sheet

Calendar

- The General Meeting will be held on 6 June 2007.
- Investor Day: 14 June 2007.
- Results for the first half of 2007 will be released on 31 July 2007.

About Vallourec

Vallourec is a world leader in the production of seamless steel tubes and tubular products for specific industrial applications (oil and gas, power generation, chemicals and petrochemicals, automotive and mechanical engineering industries).

Vallourec is listed on the Euronext Paris Eurolist (ISIN code: FR0000120354), is eligible for the deferred settlement system and is included in the following indices: MSCI World Index, Euronext 100, CAC 40 and SBF 120. FTSE classification: engineering and machinery.

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VALLOUREC New Head office address from the 21st may 2007

27, avenue du Général Leclerc 92660 Boulogne Billancourt Cedex France.

No changes to the existing telephone numbers

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Summary consolidated balance sheet

(under IFRS – in € million)

Unaudited data

VALLOUREC GROUP					
	31/12/06	31/03/07		31/12/06	31/03/07
Intangible fixed assets	20.5	17.9	Shareholders' equity [1]	2,130.4	2,371.9
Goodwill	87.3	86.5			
Property, plant and equipment	996.7	1,040.7	Minority interests	92.8	93.6
Investments in equity affiliates	55.0	58.9	**Total equity**	**2,223.2**	**2,465.5**
Other non-current assets	39.5	40.6			
Deferred tax assets	19.3	25.2	Bank loans and other borrowings	467.4	468.4
Total non-current assets	**1,218.3**	**1,269.8**	Employee benefits	195.2	195.1
			Deferred tax liabilities	75.1	66.2
Inventories and work-in-progress	1,039.3	1,126.5	Other provisions and liabilities	3.6	4.0
			Total non-current liabilities	**741.3**	**733.7**
Trade receivables	1,002.7	1,119.0	Provisions	77.5	76.4
Derivatives - assets	91.0	93.1	Overdrafts and other short-term bank borrowings	380.5	376.5
Other current assets	111.9	121.6	Trade payables	602.4	626.3
			Derivatives-liabilities	26.1	30.0
Cash and cash equivalents	889.3	960.1	Other current liabilities	399.2	489.8
Total current assets	**3,134.2**	**3,420.3**	**Total current liabilities**	**1,485.7**	**1,599.0**
Assets due to be sold	**175.6**	**194.0**	**Liabilities due to be sold**	**77.9**	**85.9**
TOTAL ASSETS	**4,528.1**	**4,884.1**	**TOTAL LIABILITIES AND SHAREHOLDERS' EQUITY**	**4,528.1**	**4,884.1**

Net debt	- 41.4	- 115.2	[1] Net income, Group share	917.0	237,7

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Table 1 – Sample Selection

	No. of Observations	
Details	**Firms**	**Firm-Years**
All firms listed on an exchange in the EU-15 countries with coverage in Worldscope and DealScan or SDC databases over the period 2001 - 2018	2,377	21,193
Less: Observations from the financial industries (SIC starting with 6)	(451)	(3,112)
Less: Observations with missing data on reporting frequency (FRF) or other financial characteristics	(339)	(4,932)
Less: Observations missing data to compute loan and lender characteristics	(606)	(7,441)
Sample used for main analyses	**981**	**5,708**

Table 1 provides sample selection criteria for all EU-15 listed firms on Worldscope that had new loan issuances as covered by the Thomson Reuters LPC's DealScan or Securities Data Company (SDC) Thomson One databases over the period 2001 - 2018. The sample is reduced for missing reporting frequency, and other control variable data. Financial firms are excluded.

Table 2 – Distribution of reporting frequency across countries

Country	Representation (%)	Quarterly Reporters (%)		
		Overall	Before TD	TD and beyond
Austria	0.50	86.21	88.89	85.00
Belgium	2.12	55.74	50.00	60.00
Denmark	0.99	92.98	89.47	100.00
Finland	1.51	100.00	100.00	100.00
France	19.95	12.55	7.41	19.55
Germany	13.03	86.65	81.53	90.34
Greece	1.44	86.75	80.39	96.88
Ireland	1.00	44.83	36.67	53.57
Italy	5.98	90.99	88.99	94.44
Luxembourg	0.33	57.89	27.27	100.00
Netherlands	6.61	54.21	58.58	46.81
Portugal	0.78	86.67	66.67	100.00
Spain	10.00	86.43	91.36	83.38
Sweden	3.20	96.74	95.08	100.00
United Kingdom	31.81	6.94	7.87	6.26

Table 2 depicts the distribution of quarterly reporting across countries. Representation (%) measures the percentage of total sample firm-year observations coming from a particular country. The next three columns depict the percentage of firm-years reporting on a quarterly basis within a country: Column 'Overall' shows the percentage of quarterly reporters for the full sample period 2001 through 2018; column 'Before-TD' shows the percentage of quarterly reporters for the period from 2001 up to the implementation of the Transparency Directive (TD) in that country (TD was implemented in 2008 by Belgium and Luxembourg, in 2009 by the Netherlands and Italy, and in 2007 by all other countries); column 'TD and beyond' shows the percentage of quarterly reporters for the period starting with the TD implementation and extending up to 2018.

Table 3 – Descriptive Statistics

Variable	N	SD	P25	Mean	Median	P75
Borrower Characteristics						
QTR	5,708	0.50	0.00	0.44	0.00	1.00
LEVERAGE	5,708	0.15	0.18	0.29	0.29	0.40
SIZE	5,708	34,949.94	909.15	17,189.72	3,528.62	15,441.37
ROA	5,708	0.08	0.08	0.12	0.11	0.15
MTB	5,708	0.67	1.10	1.52	1.33	1.70
TANGIBILITY	5,708	0.22	0.11	0.30	0.26	0.44
CFO	5,708	0.07	0.05	0.09	0.08	0.11
Loan Characteristics						
SPREAD	5,708	156.52	55.00	176.62	140.00	250.00
LN(SPREAD)	5,708	0.95	4.03	4.78	4.95	5.53
AMOUNT	5,708	1,739.40	116.15	1,033.25	355.20	1,061.03
LN(AMOUNT)	5,708	1.58	4.76	5.86	5.88	6.97
MATURITY	5,708	25.83	36.00	56.52	60.00	72.00
SECURED	5,708	0.41	0.00	0.22	0.00	0.00
SYNDICATED	5,708	0.41	1.00	0.79	1.00	1.00
NUM_LENDERS	5,708	9.63	4.00	11.56	9.00	17.00

Table 3 provides the summary statistics for all the variables used in the main tests of reporting frequency on the cost of debt. All the continuous variables are winsorized at the 1st and 99th percentiles. *QTR*, the primary independent variable of interest, is an indicator variable that equals one for firms reporting on a quarterly basis and zero otherwise. *LEVERAGE* is the ratio of total debt to total assets. *SIZE* is the total assets as measured in USD Mn. *ROA* is the ratio of EBITDA to total assets. *MTB* is the ratio of the market value of equity to the book value of equity. *TANGIBILITY* is the ratio of property, plant, and equipment, net to total assets. CFO is the ratio of operating cash flows to total assets. *SPREAD* is the initial loan spread expressed in basis points over LIBOR/EURIBOR. *LN(SPREAD)* is the natural log of *SPREAD*. *AMOUNT* is the amount of the loan facility in USD Mn. *LN(AMOUNT)* is the natural log of *AMOUNT*. *MATURITY* is the loan maturity/term measured in months. *SECURED* is an indicator variable that equals one for facilities backed by collateral and zero otherwise. *SYNDICATED* is an indicator variable that equals one for syndicated loans and zero otherwise. *NUM_LENDERS* is the number of lenders in the lending syndicate; equals one for single-lender loans.

Table 4 – Financial reporting frequency (FRF) and the cost of bank debt

	LN(LOAN SPREAD)			
	(1)	(2)	(3)	(4)
QTR	-0.138**	-0.123***	-0.109***	-0.239***
	(0.011)	*(0.008)*	*(0.009)*	*(0.002)*
Borrower Characteristics				
LEVERAGE	0.513***	0.433***	0.529***	0.199
	(0.005)	*(0.004)*	*(0.000)*	*(0.356)*
SIZE	-0.000***	-0.000***	-0.000***	0.000
	(0.000)	*(0.000)*	*(0.000)*	*(0.456)*
ROA	-1.060***	-1.063***	-1.285***	-1.332***
	(0.002)	*(0.000)*	*(0.000)*	*(0.000)*
MTB	-0.046	-0.040	-0.040	0.013
	(0.246)	*(0.225)*	*(0.175)*	*(0.773)*
TANGIBILITY	-0.111	-0.125	-0.094	-0.332
	(0.457)	*(0.307)*	*(0.391)*	*(0.165)*
CFO	-0.477	-0.679*	-0.604*	-0.589*
	(0.270)	*(0.069)*	*(0.073)*	*(0.072)*
Loan Characteristics				
AMOUNT		-0.000***	-0.000***	-0.000***
		(0.000)	*(0.000)*	*(0.001)*
MATURITY		0.006***	0.006***	0.005***
		(0.000)	*(0.000)*	*(0.000)*
SECURED		0.506***	0.384***	0.231***
		(0.000)	*(0.000)*	*(0.000)*
SYNDICATED		0.074**	0.068*	0.020
		(0.048)	*(0.056)*	*(0.592)*
Observations	5,708	5,708	5,708	5,573
Adj. R2(within)	0.125	0.265	0.370	0.201

Table 4 reports the results from estimating equation (1), i.e., examining the impact of reporting frequency on bank loan spread. The dependent variable is the natural log of the loan spread measured as the basis points charged over the reference rate (LIBOR, EURIBOR, etc.). *QTR*, the primary independent variable of interest, equals one for borrowers reporting on a quarterly basis and zero otherwise. *QTR* and all other firm characteristics are measured in the year preceding the year of loan origination. Column (1) estimates the effect of *QTR* on *LN(SPREAD)* while controlling for prior-known borrower-level determinants of the loan spread. Year and 4-digit SIC fixed effects are included. Column (2) additionally includes loan-level determinants. Column (3) builds on Column (2) by also including dummies for loan-type (i.e., 'revolver,' 'term-loan,' and 'other') and loan-purpose (i.e., 'takeover,' 'general corporate,' 'financing,' 'capital expenditure/investing,' 'working capital,' and 'other'). Finally, Column (4) estimates the full specification in Column (3) by replacing industry fixed effects with firm fixed effects. Control variables are defined in Appendix A. Standard errors are adjusted for clustering at the firm level. Two-tailed p-values are reported in parentheses beneath coefficient estimates. *, **, *** indicate significance at the 0.10, 0.05, and 0.01 levels, respectively.

Table 5 – Plausibly exogenous variation in FRF and the cost of bank debt

	LN(LOAN SPREAD)				
	Baseline	**Non-Crisis**	**Constant Sample**	**Post-IFRS**	**Country Clustering**
POST	-0.267	0.237	-0.180	-0.393	-0.267*
	(0.432)	*(0.362)*	*(0.521)*	*(0.222)*	*(0.070)*
TREAT × POST	-0.757***	-0.797***	-0.516**	-0.750***	-0.757***
	(0.002)	*(0.001)*	*(0.031)*	*(0.009)*	*(0.004)*
Borrower Characteristics					
LEVERAGE	0.743**	1.114**	0.207	0.495	0.743*
	(0.044)	*(0.019)*	*(0.665)*	*(0.159)*	*(0.057)*
SIZE	-0.000***	-0.000	-0.000***	-0.000**	-0.000***
	(0.007)	*(0.173)*	*(0.001)*	*(0.020)*	*(0.004)*
ROA	0.211	-0.480	-0.003	0.602	0.211
	(0.713)	*(0.496)*	*(0.997)*	*(0.381)*	*(0.662)*
MTB	0.101*	0.061	0.184	0.086	0.101
	(0.095)	*(0.406)*	*(0.343)*	*(0.180)*	*(0.141)*
TANGIBILITY	-0.010	-0.153	0.072	-0.031	-0.010
	(0.972)	*(0.649)*	*(0.796)*	*(0.915)*	*(0.976)*
CFO	-1.514*	-0.827	-1.863	-1.271	-1.514
	(0.082)	*(0.412)*	*(0.112)*	*(0.164)*	*(0.229)*
Loan Characteristics					
AMOUNT	0.000	0.000	0.000**	0.000	0.000
	(0.742)	*(0.713)*	*(0.026)*	*(0.539)*	*(0.790)*
MATURITY	0.007***	0.008***	0.003*	0.007***	0.007***
	(0.000)	*(0.000)*	*(0.083)*	*(0.000)*	*(0.000)*
SECURED	0.313**	0.313**	0.382*	0.249	0.313***
	(0.032)	*(0.025)*	*(0.059)*	*(0.105)*	*(0.009)*
SYNDICATED	0.281***	0.295***	0.217***	0.257***	0.281***
	(0.000)	*(0.000)*	*(0.005)*	*(0.001)*	*(0.007)*
Other Controls					
REG_QUALITY	0.407	0.310	-0.792	0.739	0.407
	(0.394)	*(0.524)*	*(0.147)*	*(0.216)*	*(0.485)*
REG_ENFORCE	0.549	0.381	0.860	0.324	0.549
	(0.413)	*(0.583)*	*(0.405)*	*(0.700)*	*(0.559)*
GDP_PER_CAP	-0.000***	-0.000	-0.000***	-0.000***	-0.000
	(0.004)	*(0.103)*	*(0.008)*	*(0.006)*	*(0.112)*
Observations	772	705	361	698	772
Adj. R2(within)	0.277	0.280	0.296	0.267	0.277

Table 5 reports the results from estimating equation (2), i.e., diff-in-diff analyses using the Transparency Directive (TD). The dependent variable is the natural log of the loan spread measured as the basis points charged over the reference rate (LIBOR/EURIBOR). *TREAT* equals one for borrowers that were reporting semi-annually before the adoption of the TD and zero for borrowers that were mandatorily reporting quarterly before the adoption of TD. *POST* equals one for years after the adoption of TD in each EU-15 country, and zero otherwise. *TREAT × POST* is the primary variable of interest. All the specifications contain fixed effects at the country, industry (4-digit SIC), year, loan-type, and loan-purpose levels. The standard errors are adjusted for clustering at the industry (2-digit SIC) level. Column 'Baseline' reports the results from the baseline model, i.e., years 2004 - 2015. Column 'Non-Crisis' reports the results from the baseline model after excluding the financial crisis period (2007-09). Column 'Constant Sample' reports the results from a constant sample, i.e., firms present in both the pre- and post- periods. Column 'Post-IFRS' reports the results from limiting the sample to the post-IFRS period, i.e., 2005 onward. Finally, Column 'Country Clustering' reports the results from adjusting the standard errors for clustering at the country level in place of the 2-digit SIC industry level. Control variables are defined in Appendix A. Two-tailed p-values are reported in parentheses beneath coefficient estimates. *, **, *** indicate significance at the 0.10, 0.05, and 0.01 levels, respectively.

Table 6 – Plausibly exogenous variation in financial reporting frequency and the cost of bank debt: examining the parallel trends assumption

	LN(LOAN SPREAD)	
	Baseline	**Pre-trends**
TREAT × *POST*	-0.757***	
	(0.002)	
POST	-0.267	
	(0.432)	
TREAT × *TD-1*		0.042
		(0.923)
TREAT × *TD0*		-0.677
		(0.154)
TREAT × *TD1+*		-0.785***
		(0.004)
Observations	772	772
Adj. R2(within)	0.277	0.294

Table 6 reports the results from estimating modified equation (2), i.e., tests of the parallel trends assumption. The dependent variable is the natural log of the loan spread measured as the basis points charged over the reference rate (LIBOR/EURIBOR). *TREAT* equals one for borrowers that were reporting semi-annually before the adoption of the TD and zero for borrowers that were mandatorily reporting quarterly before the adoption of TD. *POST* equals one for years after the adoption of TD in each EU-15 country, and zero otherwise. *TREAT × POST* is the primary variable of interest. Column 'Baseline' reproduces the results from the 'Baseline' Column of Table 5, for reference. In Column 'Pre-Trends,' *POST* is replaced by three indicator variables *TD-1*; *TD0*; and *TD1+*; which indicate, respectively, one year before; the year of; and one or more years after the Transparency Directive introduction. All the specifications contain fixed effects at the country, industry (4-digit SIC), and year levels. The standard errors are adjusted for clustering at the industry (2-digit SIC) level. Control variables are the same as those in Table 5. For brevity, we do not report the coefficients on control variables. Control variables are defined in Appendix A. Two-tailed p-values are reported in parentheses beneath coefficient estimates. *, **, *** indicate significance at the 0.10, 0.05, and 0.01 levels, respectively.

Table 7 – FRF and the cost of bank debt: cross-sectional heterogeneity in audit verification quality

	LN(SPREAD)	
	(1)	**(2)**
QTR (A)	0.275***	0.132
	(0.005)	*(0.142)*
QTR × BIG4 (B)	-0.401***	
	(0.000)	
QTR × UNQUALIFIED (B)		-0.323***
		(0.001)
BIG4	-0.346	
	(0.174)	
UNQUALIFIED		0.209
		(0.449)
Borrower Controls		
SIZE	-0.000	-0.000*
	(0.531)	*(0.085)*
LEVERAGE	0.744**	0.169
	(0.023)	*(0.577)*
MTB	-0.027	-0.066
	(0.698)	*(0.441)*
ROA	-1.271	-3.811***
	(0.182)	*(0.000)*
TANGIBILITY	-0.051	-0.165
	(0.820)	*(0.443)*
CFO	-0.636	1.535
	(0.500)	*(0.150)*
Loan Controls		
MATURITY	0.002	0.004**
	(0.168)	*(0.014)*
AMOUNT	-0.000*	-0.000***
	(0.071)	*(0.000)*
SECURED	0.626***	0.634***
	(0.000)	*(0.000)*
SYNDICATED	-0.262***	-0.196**
	(0.008)	*(0.011)*
BIG4 × SIZE	-0.000**	
	(0.026)	
Observations	4,942	4,968
Adj. R2	0.613	0.598
Audit Verification Quality * Controls	Included	Included
p-val of (A) + (B)	[0.003]	[0]

Table 7 reports the results from estimating the effect of quarterly reporting (*QTR*) on the cost of debt (*LN(LOAN SPREAD)*) as moderated by reliability of financial reports. In Column (1), we interact *QTR* with *BIG4*, a dummy variable that equals one if the borrower has a Big 4 auditor and zero otherwise. In Column (2), we interact *QTR* with *UNQUALIFIED*, a dummy variable that equals one for borrowers with an unqualified audit opinion and zero otherwise. As before, the dependent variable is the natural log of the loan spread measured as the basis points charged over the reference rate (LIBOR, EURIBOR, etc.). *QTR*, the primary independent variable of interest, equals one for borrowers reporting on a quarterly basis and zero otherwise. *QTR* and all other firm characteristics, including the financial statement reliability variables, are measured in the year preceding the year of loan origination. Control variables are defined in Appendix A. All the specifications contain fixed effects at the industry (4-digit SIC), year, loan-type, and loan-purpose levels. Standard errors are adjusted for clustering at the firm level. Two-tailed p-values are reported in parentheses beneath coefficient estimates. *, **, *** indicate significance at the 0.10, 0.05, and 0.01 levels, respectively. *, **, *** indicate significance at the 0.10, 0.05, and 0.01 levels, respectively.

Table 8 – FRF and the cost of bank debt: cross-sectional heterogeneity in credit risk

	LN(SPREAD)	
	(1)	**(2)**
QTR (A)	0.154**	0.107
	(0.046)	*(0.165)*
QTR × UNRATED (B)	-0.270***	
	(0.002)	
QTR × SPECGRADE (B)		-0.316**
		(0.012)
UNRATED	0.177	
	(0.554)	
SPECGRADE		0.374
		(0.317)
Borrower Controls		
SIZE	-0.000**	0.000
	(0.031)	*(0.672)*
LEVERAGE	1.493***	1.337***
	(0.000)	*(0.000)*
MTB	-0.207**	-0.178*
	(0.032)	*(0.051)*
ROA	-3.146***	-2.255***
	(0.000)	*(0.002)*
TANGIBILITY	-0.723***	-0.461**
	(0.001)	*(0.040)*
CFO	0.145	0.529
	(0.850)	*(0.518)*
Loan Controls		
MATURITY	0.002	0.001
	(0.211)	*(0.679)*
AMOUNT	-0.000***	-0.000***
	(0.000)	*(0.000)*
SECURED	0.720***	0.690***
	(0.000)	*(0.000)*
SYNDICATED	-0.077	-0.100
	(0.269)	*(0.158)*
Observations	5,708	1,892
Adj. R2	0.601	0.611
Credit Risk * Controls	Included	Included
p-val of (A) + (B)	[0.006]	[0.349]

Table 8 reports the results from estimating the effect of quarterly reporting (*QTR*) on the cost of debt (*LN(LOAN SPREAD)*) as moderated by borrower's credit risk. In Column (1), we interact *QTR* with *UNRATED*, a dummy variable that equals one if the borrower does not have an outstanding long-term issuer credit rating from S&P at the time of the loan, and zero otherwise. In Column (2), we interact *QTR* with an indicator variable that equals one if the borrower has an outstanding long-term issuer credit rating from S&P of BBB- or lower at the time of the loan, and zero otherwise. As before, the dependent variable is the natural log of the loan spread measured as the basis points charged over the reference rate (LIBOR, EURIBOR, etc.). *QTR*, the primary independent variable of interest, equals one for borrowers reporting on a quarterly basis and zero otherwise. *QTR* and all other firm characteristics, including the financial statement reliability variables, are measured in the year preceding the year of loan origination. Control variables are defined in Appendix A. All the specifications contain fixed effects at the industry (4-digit SIC), year, loan-type, and loan-purpose levels. Standard errors are adjusted for clustering at the firm level. Two-tailed p-values are reported in parentheses beneath coefficient estimates. *, **, *** indicate significance at the 0.10, 0.05, and 0.01 levels, respectively. *, **, *** indicate significance at the 0.10, 0.05, and 0.01 levels, respectively.

Table 9: Financial reporting frequency and the non-price loan contractual terms

	LN(AMOUNT)	*LN(MATURITY)*	*SECURED*	*NUM_LENDERS*	*NCOV*
QTR	0.197***	-0.011	0.028	1.790***	-0.917***
	(0.006)	*(0.694)*	*(0.178)*	*(0.000)*	*(0.002)*
Borrower Characteristics					
LEVERAGE	0.944***	-0.193**	0.134*	8.842***	0.550
	(0.000)	*(0.037)*	*(0.064)*	*(0.000)*	*(0.440)*
SIZE	0.000***	-0.000	-0.000	0.000***	-0.000
	(0.000)	*(0.960)*	*(0.935)*	*(0.000)*	*(0.198)*
ROA	0.465	0.518**	0.023	5.621	1.462
	(0.295)	*(0.011)*	*(0.884)*	*(0.117)*	*(0.322)*
MTB	0.062	0.023	0.002	-0.204	-0.128
	(0.246)	*(0.279)*	*(0.910)*	*(0.579)*	*(0.436)*
TANGIBILITY	0.030	0.124	-0.030	-1.199	-0.545
	(0.875)	*(0.117)*	*(0.644)*	*(0.399)*	*(0.571)*
CFO	-0.602	-0.088	0.485***	-1.145	-1.774
	(0.274)	*(0.718)*	*(0.008)*	*(0.805)*	*(0.415)*
Loan Characteristics					
LN(SPREAD)	-0.504***	0.152***	0.124***	-1.035***	0.128
	(0.000)	*(0.000)*	*(0.000)*	*(0.001)*	*(0.439)*
AMOUNT		-0.000***	0.000	0.001***	0.000
		(0.000)	*(0.704)*	*(0.000)*	*(0.794)*
MATURITY	-0.001		0.002***	-0.000	-0.002
	(0.219)		*(0.000)*	*(0.960)*	*(0.663)*
SECURED	-0.058	0.124***		-1.340**	0.436
	(0.426)	*(0.000)*		*(0.012)*	*(0.108)*
SYNDICATED	0.463***	0.095***	0.035*		0.119
	(0.000)	*(0.001)*	*(0.072)*		*(0.473)*
Observations	5,708	5,708	5,708	5,708	341
Adj. R2(within)	0.320	0.101	0.162	0.209	0.175

Table 9 reports the results from estimating equation (3), i.e., examining the impact of reporting frequency on the non-price loan contract terms. *QTR*, the primary independent variable of interest, equals one for borrowers reporting on a quarterly basis and zero otherwise. The dependent variable in Column 'LN(AMOUNT)' is the natural log of the amount of the loan facility in USD Mn; in Column 'MATURITY' is the loan maturity/term measured in months; in Column 'SECURED' is an indicator variable that equals one for loan facilities backed by a collateral and zero otherwise; and in Column 'NCOV' is the number of financial covenants in the credit agreement. All the specifications control for *LN(SPREAD)* - the natural log of the loan spread. *QTR* and all other firm characteristics are measured in the year preceding the year of loan origination. Control variables are defined in Appendix A. All the specifications contain fixed effects at the industry (4-digit SIC), year, loan-type, and loan-purpose levels. Standard errors are adjusted for clustering at the firm level. Two-tailed p-values are reported in parentheses beneath coefficient estimates. *, **, *** indicate significance at the 0.10, 0.05, and 0.01 levels, respectively.