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ORIGINAL RESEARCH

Conditional conservatism and the yield spread of corporate bond issues

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Abstract Building upon recent research which indicates that debt markets rather than equity markets shape financial reporting, this study examines how conditionally conservative financial reporting relates to the yield spread of corporate bond issues. Our findings suggest that the debt contract efficiency/information costs view of conditional conservatism, documented in private debt contracts, does not generalize to public debt contracts. Instead, a debt contract renegotiation costs perspective seems to better capture the dynamics of the public debt markets, with conditionally conservative reporting being associated with higher yield spread of corporate bond issues. Additional subsample test results indicate that the association between conditional conservatism and bond yield spreads is more pronounced in non-investment grade bonds, for bond issuers with more financial distress, and for bonds that are issued before the passage of the Sarbanes–Oxley Act. This study fills a gap in the conservatism literature, which focuses primarily on equity or private bank loan markets with traditional debt contract efficiency/information costs view.

Keywords Conditional conservatism · Yield spread · Debt contract efficiency · Information costs · Debt contract renegotiation costs

JEL Classification M41 · G12

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1 Introduction

There is ongoing debate as to the relative role of equity and debt markets in shaping financial reporting. Consistent with Lev's (1989) view that accounting earnings lack usefulness to equity markets, Ball and Shivakumar (2008) and Ball et al. (2008b) argue that debt markets rather than equity markets actually drive corporate financial reporting. Debt contracts include accounting numbers that are used by creditors to predict future cash flows, assess the default risk of debt issuers, and monitor the behavior of management. Moreover, debt financing represents the predominant source of external funding for US corporations (Denis and Mihov 2003). In fact, the total value of US corporate debt issuances (including private and public debt) between 1990 and 2009 amounts to about $23 trillion, while the total value of equity issuances (including common and preferred stock) for the same period is about $3.2 trillion.[1] Considering creditors' asymmetric payoff function and fixed claims on corporate assets, it is argued that they have stronger incentives than equity investors to demand conservative financial reporting (Ball et al. 2008a).[2]

In this study, we build upon the idea that there is an interface between a firm's financial reporting attribute, measured by conditional conservatism, and the price terms demanded by public debt markets, as reflected in the yield spread of corporate bond issues. We investigate the impact of conditionally conservative reporting on the yield spreads. Beaver and Ryan (2005, p. 269) define conditional conservatism as when "book values are written down under sufficiently adverse circumstances but not written up under favorable circumstances". This definition is consistent with Basu's (1997) notion of conservatism—timely loss recognition. Beaver and Ryan (2005, p. 269) also define unconditional conservatism as when "the book value of net assets is understated due to predetermined aspects of the accounting process". However, contracting theory predicts that contracting parties can adjust for unconditional conservatism ex ante and it is "inefficient or at best neutral in contracting" (Ball and Shivakumar 2005, p. 91). Accordingly, this study focuses on conditional conservatism only.

The paper puts forward two alternative views with respect to the association between conditional conservatism and the costs of debt. On one hand, the debt contract efficiency/information costs view holds that conditionally conservative reporting decreases the cost of capital as it provides debtholders with levers to act on the basis of contractual clauses (Ball and Shivakumar 2005). Prior empirical evidence, which is mostly derived from private debt contracts, is consistent with conditional conservatism being associated with a lower cost of debt (Wittenberg-Moerman 2008; Zhang 2008). On the other hand, relying on the contract renegotiation costs perspective developed by Li (2013), we put forward alternative hypotheses that conditional conservatism induces a higher yield spread in corporate bond issues. Such differential predictions are due to institutional differences between private and public debt contracting, especially in the potential magnitude of debt contract renegotiation costs. In his seminal paper on the determinants of debt borrowing, Myers (1977) does explicitly discuss the tension between monitoring and contract renegotiation costs and how it may affect the terms of debt contracts. Subsequent theoretical and empirical work documents that almost all debt contract renegotiations following covenant violations occur in private debt contracts, most likely as a result of higher renegotiation costs for public debt

[1] Data source: Securities Industry and Financial Markets Association (http://www.sifma.org). A similar trend is also prevalent in other developed countries, such as the United Kingdom.

[2] Ball et al. (2008b) provide empirical evidence that accounting conservatism is shaped by debt markets but not by equity markets.

issues (Garleanu and Zwiebel 2009; Piskorski et al. 2010). Such higher expected renegotiation costs derive from the difficulty that public debtholders face in coordinating and organizing a coherent and effective response to contract failures by the debtor (Smith and Warner 1979; Leftwich 1981). Through a theoretical model, Li (2013) argues that, for public debtholders, more conditionally conservative reporting actually reduces the efficiency of debt contracts. This is largely due to the high renegotiation costs for public debt settings.

Our sample comprises 4,600 new corporate bond issues in the US market in the period 1990–2009. Our empirical results are consistent with the debt contract renegotiation costs hypotheses, with conditional conservatism being associated with a higher yield spread of new public debt issues. In addition, subsample test results indicate that the association between conditional conservatism and bond yield spreads is more pronounced in non-investment grade bonds, for less financially healthier bond issuers, and for bonds that are issued before the passage of the Sarbanes–Oxley Act (SOX). The findings are robust to alternative methods. For example, using instrumental variable two-stage least-squares (2SLS) regression; using hierarchical linear modeling (HLM) regression or keeping only one bond issue for each fiscal year to control for multi-level observation issue; using alternative measures for conditional conservatism, and excluding bonds with convertible features.

The literature documents the effect of conditional conservatism on the cost of equity capital (Francis et al. 2004; Garcia Lara et al. 2011). However, shareholders and debtholders have different claims on a firm's net assets and thus tend to have conflicting interests (Ahmed et al. 2002). Shareholders have residual claims on firm net assets and thus the upside potential of their equity investments is unlimited, while debtholders' return is fixed and they have no right to claim extra payoffs. In addition, our study is related to but distinct from research on the association between conditional conservatism and the cost of private debt (Wittenberg-Moerman 2008; Zhang 2008). However, private and public debt financing differ substantially in terms of monitoring efficiency, private information availability, seniority in liquidation and renegotiation flexibility (Fama 1985; Diamond 1991; Welch 1997; Bharath et al. 2008). Hence, private and public debtholders could have different needs and expectations regarding what they consider to be useful financial reporting. Therefore, the valuation of conditional conservative reporting by public bondholders is still an empirical question.

Our study is related to Nikolaev (2010), who finds that public issuers with more covenant restrictions exhibit higher levels of conditional conservatism. However, our study differs from Nikolaev (2010) on the following aspects. First, Nikolaev (2010) uses a non-price term, reliance on covenants, as proxy for the cost of public debt. However, Bharath et al. (2008) find that, due to re-contracting inflexibility for public debt, financial reporting quality affects only the price terms of the dispersed public bond issues. Our study focuses on a more relevant price term, bond yield spreads, to investigate the association between conditional conservatism and the cost of public debt. Second, a corporate bond contract involves both price and non-price terms. Accordingly, corporate bond yield, maturity, and covenants could be simultaneously determined. We use an instrumental variable 2SLS regression approach to address this simultaneity issue, which is not studied by Nikolaev (2010). Third, we perform additional tests to illustrate the variations of our primary finding across different subsamples (investment-grade vs. non-investment-grade bonds; issuers with high financial distress vs. low financial distress, bonds that are issued before vs. after the passage of SOX).

Overall, this paper contributes to the existing literature in the following ways. Firstly, by integrating the theoretical arguments and empirical evidence from the accounting and finance literatures, this study provides evidence about the role of accounting in a significant economic phenomenon (corporate bond issues). We rely on conditional conservatism to explain the yield spread of corporate bond issues. This study provides theoretical arguments and empirical evidence that are contrary to the debt contract efficiency/information costs view of conditional conservatism, which holds that conditionally conservative reporting reduces the cost of debt (Ball and Shivakumar 2005; Zhang 2008). The contract renegotiation costs perspective that we put forward with respect to the cost of public debt is grounded in the theoretical work performed by Li (2013) but is also consistent with prior theoretical (Garleanu and Zwiebel 2009) and empirical work (Chan et al. 2009; Piskorski et al. 2010).

Secondly, as Holthausn and Watts (2001) note, "It is not apparent that the relevance of a given number would be the same for equity investors and lenders, and what is relevant for one user or user group, may not be relevant for another". Therefore, conclusions drawn from research on equity markets and on private debt markets may not be reliable indications of how public debt markets interact with financial reporting. The relevance of financial reporting numbers varies among users (shareholders and creditors). However, prior research largely focuses on equity markets and private debt markets, and provides limited empirical evidence about the effect of conservative financial reporting on public debt markets (Nikolaev 2010). Moreover, to explain the price terms of public bond financing, prior studies use financial reporting attributes (audit quality, analyst forecast, CEO incentives, and operating accruals) that do not directly relate to the debt contracting (Mansi et al. 2004; Crabtree and Maher 2005; Bharath et al. 2008; Mansi et al. 2011; Shaw 2012). This study complements the corporate bond financing literature by using a financial reporting attribute (conditional conservatism) that is closely related to the debt contracting to explain the price terms of corporate bond financing patterns (Watts 2003).

Thirdly, this study complements the credit rating and SOX-related corporate governance literature by documenting that the association between conditional conservatism and bond yield spreads is more pronounced for bonds with high credit risk (non-investment grade bonds), and when bond issuers face less corporate oversight and scrutiny of accounting practices (bonds that are issued before the passage of the SOX).

The rest of this study is organized as follows: Sect. 2 reviews the related literature and presents our hypotheses. Section 3 describes the sample and methodology. Section 4 presents the main results and subsample test results. Section 5 summarizes the results of robustness checks. Section 6 presents the conclusions and discussions.

2 Literature and hypotheses

2.1 Bond markets and financial reporting

Baker et al. (2003) point out that, "Relative to the literature on equity financing patterns, and relative to the actual importance of debt finance in the US economy, the literature on debt financing patterns is surprisingly underdeveloped". A focus on public debt markets is relevant because, in terms of providing capital to corporations, public debt markets are as important as private debt markets. According to statistics from the Securities Industry and Financial Markets Association, the total value of new US corporate public debt issues during 1990–2009 is about $11.5 trillion, representing half of all US corporate debt

financing during this period. However, current research on debt markets focuses largely on the effect of financial reporting quality on private debt contracting (Ball et al. 2008a; Graham et al. 2008; Wittenberg-Moerman 2008; Zhang 2008; Costello and Wittenberg-Moerman 2011).[3] Overall, these studies document a link between financial reporting quality and the cost of private debt. However, the literature provides limited empirical evidence about the effect of financial reporting quality on public bond financing. Prior studies use only indirect measures (audit quality, analyst forecast, and CEO incentives) or accrual-based measures (abnormal operating accruals) to explain the price terms of public bond financing (Mansi et al. 2004; Crabtree and Maher 2005; Bharath et al. 2008; Mansi et al. 2011; Shaw 2012). Mansi et al. (2004) examine the relationship between analyst forecast characteristics and the yield spread of corporate bond issues. They find that issuers with informative analyst activity can issue bonds at lower yield spreads, with greater uncertainty about issuer value increasing analyst activity. Similarly, Crabtree and Maher (2005) use analyst forecast characteristics as proxies for earnings predictability and document that earnings predictability negatively associates with the yield spread of new bond issues. Bharath et al. (2008) focus on comparing the effect of accounting quality (proxied by abnormal operating accruals) on private debt and public debt contracting. The authors find that, for public debt, abnormal operating accruals explain the variation in the interest spreads. Mansi et al. (2011) investigate whether auditor characteristics influence the yield spread of corporate bond issues. They document that issuers with higher-quality auditors and longer relationships with their auditors can issue bonds at lower yield spreads. This effect is more pronounced when a bond is categorized as non-investment grade. Shaw (2012) examines the association between CEOs' stock incentives and the yield spread of new bond issues. The empirical findings suggest that firms whose CEOs hold more shares and stock options will issue bond at higher yield spreads.

Moreover, most of prior studies in public debt settings ignore an important financial reporting attribute—conservatism. According to Watts (2003), debt contract demand is one of the key drivers of conservative financial reporting. Nikolaev (2010) documents that non-price terms of public bond issues, as proxied by issuers' reliance on covenants, are positively correlated with conditionally conservative reporting. In contrast, Bharath et al. (2008) find that, due to re-contracting inflexibility for public debt, financial reporting quality affects only the price terms of the dispersed public bond issues. Li (2013) suggests that, due to the high renegotiation cost for public bondholders, bondholders require higher risk premiums for issuers with more conditionally conservative reporting. Accordingly our study focuses on the price terms of public debt contracts.

2.2 Conditional conservatism and cost of corporate bond

2.2.1 Debt contract efficiency and information cost perspective

Among the four widely recognized explanations for conservative financial reporting (contracting, litigation, regulation, and taxation, as per Watts 2003), contracting, especially debt contracting, is the most influential and most extensively studied. Agency cost and debt

[3] Ball et al. (2008a) document that the debt-contracting value of accounting information affects the structure of loan syndicates. Graham et al. (2008) examine the negative effect of financial restatements on bank loan contracting. Wittenberg-Moerman (2008) finds that timely loss recognition reduces the bid–ask spread in private debt secondary trading. Zhang (2008) finds that more conservative borrowers can issue loans at lower interest rates and are more likely to violate debt covenants. Costello and Wittenberg-Moerman (2011) provide empirical evidence that internal control weaknesses negatively affect bank loan contracting.

contract efficiency arguments are the two major explanations for conditional conservatism in the debt context. Jensen and Meckling (1976, p. 310) suggest that "Contractual relations are the essence of the firm". One can regard a firm as a group of people with contracts. Due to information asymmetry between agents and principals, and the limited liability and tenure of agents, agents (e.g., managers of the firm) have strong incentives to engage in opportunistic behaviors to maximize their own benefits at the expense of other contracting parties (e.g., creditors). Conditional conservatism mitigates information asymmetries among contracting parties, and thus reduces adverse selection and moral hazard problems, as indicated by Jensen and Meckling (1976). According to Ball and Shivakumar (2005), contracting theory predicts that conditional conservatism provides new information to creditors and thus enhances contracting efficiency. Timely loss recognition improves ex-post monitoring and increases the likelihood of a debt covenant violation. In the case of a covenant violation, the decision rights transfer from equity holders to debtholders. Thus, conditionally conservative reporting serves as a platform for efficient contracting (Watts 2003), especially when managers have strong incentives to overstate accounting numbers through their discretionary choices. Similarly, the information cost view suggests that firms can enjoy lower cost of capital by timely loss recognitions and full disclosure of information (Guay and Verrecchia 2007). As an extension of this information cost view, Armstrong et al. (2010) interpret conditional conservatism as a set of accounting practices that facilitate more complete and timely corporate disclosure by committing managers to report bad news earlier, and argue that conditionally conservative reporting will decrease the cost of debt. Overall, both the debt contract efficiency and information cost views indicate that conditional conservatism relates to lower cost of debt capital through timely loss recognition.

Prior studies focus on private debt markets when testing these debt contract efficiency and information cost arguments (Wittenberg-Moerman 2008; Zhang 2008). Wittenberg-Moerman (2008) documents that conditionally conservative reporting reduces the bid–ask spread in the secondary loan trade. Using four conditional conservatism measures, Zhang (2008) finds that the spread of the initial loan interest rate over the London Interbank Offered Rate is negatively related to borrowers' conservatism. Consistent with agency theory and the debt contract efficiency view of conditional conservatism, and based on prior empirical evidence in the private bank loan context, we make the following prediction:

Hypothesis 1a Ceteris paribus, a firm's conditionally conservative reporting results in a lower yield spread for corporate bond issues (Contract Efficiency/Information Cost Argument).

2.2.2 Debt contract renegotiation costs perspective

The relatively scant evidence concerning the relationship between financial reporting and corporate debt financing, as well as prior research focused on private debt financing, raises several questions. For instance, Merton's (1974) theoretical bond pricing model suggests that equity holders and bondholders value a firm's operating volatility in different ways. More specifically, Bessembinder and Maxwell (2008) point out bonds are issued by a corporation at different points in time, and traded separately, with distinct contracts that differ in terms of bond features. From this perspective, corporate bonds differ substantially from common equities. Prior research documents that public and private debt financings differ substantially in terms of monitoring efficiency (Diamond 1984, 1991; Rajan 1992);

private information availability (Fama 1985; Bhattacharya and Chiesa 1995); seniority in liquidation (Welch 1997); and renegotiation flexibility (Bharath et al. 2008).[4] We argue that due to these monitoring, information, liquidation, and renegotiation disadvantages over private debtholders, public bondholders are more likely to resort to price terms rather than non-price terms to mitigate information asymmetries between management and bondholders.[5] This argument is corroborated by Bharath et al.'s (2008) findings that accounting quality only affects the price terms of the dispersed public bond issues. Similarly, Basu et al. (2010) argue that the differences in monitoring functions and covenant features between private and public debt contracting result in differing enforceability of conditionally conservative reporting. Their empirical evidence indicates that bondholders fail to enforce conditionally conservative reporting after seasoned bond offerings. Since public bondholders focus less on non-price terms (e.g., monitoring and covenant) and have weak ex-post enforceability of conditional conservatism, we argue that public bondholders will not value conditional conservatism as an efficient contracting mechanism as private debtholders do.

We further argue that the public bond market values conditional conservatism negatively. Li (2013) develops a theoretical model indicating that the demand for conditional conservatism depends on contract renegotiation occurrence and cost. She further concludes that when a debt contract is not renegotiable or renegotiation costs are high, more conditional conservatism reduces debt contract efficiency. Public bond debt contracts focus less on non-price terms, such as covenants, because renegotiation costs for debt involving dispersed bondholders are very high. Following this contract renegotiation cost argument, we predict that public bondholders will assign a negative value to conditionally conservative reporting. In addition, the finance literature documents that financial covenants in public debt are set looser, while covenants in private debt are set tighter (Dichev and Skinner 2002; Begley and Freedman 2004).[6] As a result, conditionally conservative reporting can accelerate covenant violations for private debt relative to public debt. In case of a violation, it is costly for management to involve the private lender in reviewing and negotiating new covenant terms (Dichev and Skinner 2002).[7] Moreover, the renegotiation of the debt contract may result in favorable contracting terms from the lenders' perspective (e.g., it may increase the interest rate and impose additional constraints), which has a negative impact on borrowers' future cash flows and operating flexibility (Dichev and Skinner 2002). Thus, private bankers are in favor of conditional conservatism, while public bondholders negatively value conditional conservatism, which may benefit private bankers

[4] More specifically, Diamond (1991) predicts that direct public borrowing implies less efficient monitoring of a borrower's behavior than does private borrowing. Private lenders devote more effort to direct monitoring, thus alleviating the moral hazard problem in a more efficient way. Fama (1985) argues that private debt lenders are more efficient and effective in obtaining private information about borrowers than are public bondholders. Thus, private debt financing mitigates the information asymmetry between borrowers and lenders. Welch (1997) argues that private bank lenders are better negotiators, lobbyists, and litigants than are public bondholders. Borrowers have incentives to give private lenders senior creditor status to avoid confrontation with them in times of financial distress. Due to the weak flexibility in terms of renegotiation, dispersed public bondholders focus more on the price terms of the debt contract (Bharath et al. 2008).

[5] The commonly used non-price terms in private bank loan contracting are "covenant" and "collateral" (Costello and Wittenberg-Moerman 2011).

[6] Dichev and Skinner (2002) indicate that private lenders would set financial constraints close to the actual current value, which increases the likelihood of covenant violation.

[7] In the case of a covenant violation, borrowers must prepare updated and detailed financial reports for the lenders, and management must spend time explaining and justifying the financial situation of the issuer to lenders.

at the expense of all stakeholders. In fact, dispersed public debtholders face sharply higher contract renegotiation costs in the case of covenant violation as it is much more difficult to coordinate their response than for private debtholders (Garleanu and Zwiebel 2009). Empirical evidence is consistent with private debt contracts being more likely to be renegotiated successfully after a covenant violation than public debt contracts (Piskorski et al. 2010).

In summary, public bondholders' information disadvantages restrict their monitoring role, and their weak ex-post enforceability mitigates their ex-ante demand for conditional conservatism. In addition, conditionally conservative reporting could accelerate costly debt covenant violation, which entails potentially high contract negotiation costs for public bondholders. Consequently, as an alternative to the debt contract efficiency/information costs perspective, we predict that mostly due to contract renegotiation costs, public bondholders respond negatively to conditional conservatism. Hence, the following hypothesis:

Hypothesis 1b Ceteris paribus, a firm's conditionally conservative reporting results in a higher yield spread for corporate bond issues (Contract Renegotiation Cost Argument).

3 Research design

3.1 Sample selection

The sample for this study comes from the following databases: (1) the Mergent Fixed Income Securities Database for bond-specific information; (2) the COMPUSTAT for bond issuers' financial information; and (3) the Center for Research in Security Prices (CRSP) for bond issuers' equity information. After merging the samples from the three databases and eliminating the observations with missing variables, we obtain 4,600 observations (distinct bond issues) from 2,601 firms during the 1990–2009 period.[8] According to Bessembinder et al. (2009), variable coupon, zero coupon and perpetual bonds tend to be unique, and tend to behave more like equities. Thus, we eliminate these bonds from our sample. Bonds issued by public financial firms are excluded (Khurana and Raman 2003; Mansi et al. 2011).[9]

3.2 Empirical model

Based on prior research (Sengupta 1998; Khurana and Raman 2003; Shi 2003; Jiang 2008; Ge and Liu 2014), we use the following empirical model to test the effect of conservative reporting on the yield spread of corporate bond issues:

[8] Small sample size is common in studies pertaining to bond markets (Shi 2003; Liu and Magnan 2014). One possible explanation is that a large portion of bond issuers are non-public firms and that there is no equity return information available for these non-public bond issuers. In addition, the requirement to calculate conditional conservatism further reduced our sample size (refer to footnote #11 for details).

[9] According to Jiang (2008), financial firms operate under different accounting regulations than industrial firms do. Accordingly, accounting numbers that are reported by financial firms are not comparable to these reported by industrial firms. This study focuses on one of financial reporting attribute-conditional conservatism. To make the cross-section comparison of the degree of conditional conservatism meaningful, we exclude bonds that are issued by financial firms.

$$\begin{aligned} YieldSpread_{ijt} = {} & \alpha_1 + \beta_1 Conservatism_{it} + \beta_2 IssuerSize_{it} + \beta_3 ROA_{it} \\ & + \beta_4 Leverage_{it} + \beta_5 Big4_{ijt} + \beta_6 \ln Maturity_{ijt} \\ & + \beta_7 IssueSize_{ijt} + \beta_8 \ln Rating_{ijt} + \beta_9 \mathrm{Re}deemD_{ijt} \\ & + \beta_{10} PutD_{ijt} + \beta_{11} ConvertD_{ijt} + \beta_{12} Rule415D_{ijt} \\ & + \beta_{13} Rule144aD_{ijt} + \beta_{14} Busicycle_{ijt} \\ & + Industry\&Year\ Indicators + \varepsilon_{ijt} \end{aligned} \quad (1)$$

3.2.1 Dependent and test variables

The subscript *ijt* indicates bond j for firm i in year t. Dependent variable, YieldSpread, is measured as the difference between a coupon rate of corporate bond and a coupon rate of Treasury bond with comparable maturity at the same issuance date (Shi 2003; Jiang 2008; Ge and Liu 2014).[10] YieldSpread captures the risk premiums that bond issuers pay to bond investors to raise funds from the corporate bond market. Treasury bonds are issued by national governments. Because government bonds are backed by the high-quality credit and taxing power of a nation, they have very little credit risk. Thus, *YieldSpread* is a direct and accurate measure of issuers' incremental cost of a bond over a comparable risk-free treasury bond.

We use a firm-year conditional conservatism measure that is introduced by Khan and Watts (2009) as the test variable (*Conservatism*).[11] Refer to Sect. 3.3 for the detailed calculations. The contract efficiency hypothesis (H1a) predicts that the coefficient of *Conservatism* is negative, while the contract renegotiation cost hypothesis (H1b) implies that the coefficient of *Conservatism* is positive.

3.2.2 Firm- and bond-level control variables

IssuerSize This is the natural logarithm of an issuer's assets at the fiscal year-end immediately prior to the corporate bond issuance date. Issuers with larger assets are perceived to be less risky (lower default risk) than those with smaller assets. Hence, we expect *IssuerSize* to be negatively related to the risk premium.

ROA This is an issuer's return on assets, defined as net income divided by total assets at the fiscal year-end immediately prior to the corporate bond issuance date. A higher return on assets generally implies greater profitability. Thus, we expect *ROA* to be negatively related to the risk premium.

Leverage This is long-term debt divided by total assets at the fiscal year-end immediately prior to the corporate bond issuance date. We predict that *Leverage* will be positively related to the risk premium.

Big4 This is an indicator variable for auditor type. It takes the value of one for Big Four auditors and zero otherwise. The variable *Big4* is a common proxy for audit quality or earnings quality; thus we expect its coefficient to be negative.

[10] We do not use Mergent FISD's estimation of yield spread of bonds at issuance for following reasons: missing value for quite some bonds, the estimates are very noisy (e. g, many bonds have zero yield spread at issuance).

[11] This study investigates the economic consequence of conditionally conservative reporting. However, Basu (1997) measure is more relevant to studies that focus on the determinants of conditional conservatism. Accordingly, we use Khan and Watts (2009) firm-year conditional conservatism measure in our primary analysis. As a robustness test, we use Basu's (1997) relative timeliness of bad news to timeliness of good news as an alternative proxy for conditionally conservative reporting. The overall results are consistent.

lnMaturity This is the natural logarithm of the number of years to bond maturity. Usually, bond issues with longer maturities are riskier than issues with shorter maturities (Khurana and Raman 2003; Shi 2003). Thus, we expect the variable *lnMaturity* to be positively related to the risk premium.

IssueSize This is the natural logarithm of the par value of an initially issued bond, in millions of dollars. A larger issue size can enjoy a lower risk premium due to economies of scale in underwriting (Sengupta 1998). However, Khurana and Raman (2003) point out that a large issue size also increases underwriters' difficulty in placing the issue with investors. Thus, we do not make predictions for the sign of *IssueSize*.

lnRating This is the natural logarithm of Standard & Poor's bond ratings. We convert Standard and Poor's bond ratings sequentially to numbers, with one for AAA through 27 for no rating. For issues without Standard and Poor's ratings, we use Moody's or Fitch ratings instead. A bond rating indicates an issue's creditworthiness; so we expect it to be positively related to the risk premium (Jiang 2008; Loffler 2013).

RedeemD This is an indicator variable for a bond's call feature. It equals one for bonds that have a call option and zero otherwise. A redeemable bond offers issuers the option to repurchase the bond before maturity. It increases the potential interest risk for bondholders, so we expect the variable *RedeemD* to be positively related to the risk premium.

PutD This is an indicator variable for a bond's put feature. It equals one for bonds with a put option and zero otherwise. Putable bonds offer bondholders the option to retire the bond before maturity and thus we expect this variable to be negatively related to the risk premium.

ConvertD This is an indicator variable for a bond's convertible feature. It equals one for convertible bonds and zero otherwise. Mayers (1998) suggests that reducing the interest rate is an incentive for firms to issue convertible bonds. We expect this variable to be negatively related to the risk premium.

Rule415D This is an indicator variable for US Securities and Exchange Commission (SEC) Rule 415 shelf registration bonds. We assign the value of one for bonds issued under a shelf registration and zero otherwise. According to Rule 415, issuers are allowed to pre-register a certain securities (e.g., equities and bonds). In the case of bonds, issuers have the option to take bonds "off the shelf" and offer them to the public at a favorable time up to 2 years into the future. Therefore, we expect the coefficient of this variable to be negative.

Rule144aD This is an indicator variable for US SEC Rule 144a private placement bonds. It equals one for bonds issued through private placements that are exempt from registration and zero otherwise. Rule 144a issues are generally offered to a limited number of institutional investors, known as qualified institutional buyers. Since institutional investors have stronger negotiation power than public investors regarding the coupon rate, we expect this variable to be positively related to the risk premium. On the other hand, Arena (2011) suggests that poor credit quality firms preferentially issue 144a debt; therefore, this variable can be negatively associated with the risk premium. We do not make a prediction for this variable.

BusiCycle This variable is measured as the difference between the average yield of Moody's Aaa bonds and the average yield of 10-year US Treasury bonds for the month of issue. This variable controls for the time-series variation of risk premiums over the business cycle. Prior studies predict that the variable *BusiCycle* will be positively related to the risk premium (Shi 2003; Jiang 2008).

3.3 Measurement of conditional conservatism

We use Khan and Watts's (2009) firm-year measure of conservatism as the proxy for conditional conservatism.[12] Firms with more conditionally conservative reporting have a higher C_Score. According to Khan and Watts (2009), C_Score captures variation in conservatism and predicts asymmetric earnings timeliness at horizons of up to 3 years into the future. This measure follows Basu's (1997) notion of timely loss recognition; however, it overcomes Basu's (1997) limitation of single-period, cross-sectional regression or single-firm time series regression as indicated by Givoly et al. (2007). To allow coefficients to vary across firms and time, Khan and Watts (2009) modify the original Basu (1997) regression as follows:

$$X_{it} = \beta_{1t} + \beta_{2t}D_{it} + \beta_{3it}R_{it} + \beta_{4it}D_{it}R_{it} + \varepsilon_{it} \tag{2}$$

Where X_{it} is earnings for firm i in year t, R_{it} is returns for firm i in year t, and D_{it} is a dummy variable equal to 1 if $R_{it} < 0$, and 0 otherwise. β_{3it} is a firm-year good news timeliness measure and β_{4it} is the incremental firm-year timeliness for bad news over good news.

Khan and Watts (2009) assume that both the timeliness of good news and the incremental timeliness of bad news are linear functions of time-varying, firm-specific characteristics:

$$\text{G\_Score} \equiv \beta_{3it} = \mu_{1t} + \mu_{2t}\text{Size}_{it} + \mu_{3t}\text{M/B}_{it} + \mu_{4t}\text{Lev}_{it} \tag{3}$$

$$\text{C\_Score} \equiv \beta_{4it} = \lambda_{1t} + \lambda_{2t}\text{Size}_{it} + \lambda_{3t}\text{M/B}_{it} + \lambda_{4t}\text{Lev}_{it} \tag{4}$$

where μ_i and λ_i, $i = 1$ to 4, are constant across firms but vary across time. Size_{it} is the natural log of market value of equity for firm i in year t; M/B_{it} is the ratio of market value of equity to book value of equity for firm i in year t; and Lev_{it} is leverage, defined as long-term debt plus short-term debt deflated by the market value of equity for firm i in year t. G_Score is the firm-year measure of good news timeliness, while C_Score is the firm-year measure of conservatism. G_Score and C_Score vary across firms through cross-sectional variation in the firm-year characteristics, e.g., Size, M/B, and Lev. Equations (3) and (4) are substituted into regression Eq. (2) to yield the following Eq. (5):

$$\begin{aligned} X_{it} = {} & \beta_1 + \beta_2 D_{it} + R_{it}(\mu_{1t} + \mu_{2t}\text{Size}_{it} + \mu_{3t}\text{M/B}_{it} + \mu_{4t}\text{Lev}_{it}) \\ & + D_{it}R_{it}(\lambda_{1t} + \lambda_{2t}\text{Size}_{it} + \lambda_{3t}\text{M/B}_{it} + \lambda_{4t}\text{Lev}_{it}) \\ & + (\alpha_{1t}\text{Size}_{it} + \alpha_{2t}\text{M/B}_{it} + \alpha_{3t}\text{Lev}_{it} + \alpha_{4t}D_{it}\text{Size}_{it} \\ & + \alpha_{5t}D_{it}\text{M/B}_{it} + \alpha_{6t}D_{it}\text{Lev}_{it}) + \varepsilon_{it} \end{aligned} \tag{5}$$

Equation (5) is estimated using annual cross-sectional regressions. C_Score is then calculated using Eq. (4), to serve as a proxy for our measure of conditional conservatism (*Conservatism*).

4 Empirical results

4.1 Univariate analysis

Table 1 provides descriptive statistics of the observations by year. The sample period is from 1990 to 2009. Table 2 summarizes the descriptive statistics by variable. In total, there

[12] Following Khan and Watts (2009), we delete firm years with market price per share less than \$1, netative total assets or book value of equity, and firms in the top and bottom 1 % of earnings, returns, size, market-to-book ratio, leverage and depreciation each year.

Table 1 Descriptive statistics by year

Year	Frequency	Percent
1990	25	0.54
1991	222	4.83
1992	197	4.28
1993	239	5.20
1994	179	3.89
1995	133	2.89
1996	66	1.43
1997	430	9.35
1998	499	10.85
1999	385	8.37
2000	315	6.85
2001	98	2.13
2002	297	6.46
2003	413	8.98
2004	280	6.08
2005	212	4.61
2006	62	1.35
2007	56	1.22
2008	166	3.61
2009	326	7.09
Total	4,600	100

This table reports the descriptive statistics of the sample observations by year. Specifically, for each year, we report the frequency of the observations and the percentage of the observations relative to the total observations

are 4,600 observations (4,600 distinct bond issues from 2,601 firms). Since our sample has both firm- and bond-level variables, the number of observations used to calculate the descriptive statistics differs between the two types of variables. The average yield spread is 153.28 basis points, which is approximately 1.53 %. The average degree of conditional conservatism is 0.05, with a standard deviation of 0.11. The average *ROA* and *Leverage* of the bond issuer are 3 and 27 %, respectively. Approximately 98 % of the firms choose to have their financial statements audited by big 4 auditors. The average maturity is 11.1 years and average offering amount is $227.93 million. The median credit rating (*rating*) is 11, which means that more than half of bond issues are non-investment grade, as rated by Standard and Poor's. Respectively, 64, 6, and 15 % of bond issues have redeem, put, and convert options. About 66 % of bonds are issued under SEC Rule 415 through shelf registration and 26 % of bonds are issued under SEC Rule 144a through private placement.

Table 3 presents Pearson correlation matrices of the firm- and bond-level variables. Our dependent variable, *YieldSpread*, is positively correlated with conditional conservatism measure (*Conservatism*), which is consistent with our prediction in Hypothesis 1b. Also, *YieldSpread* is negatively related to bond rating (*lnRating*), suggesting that issuers with better bond ratings could issue bond at lower yield spreads. The correlations between *YieldSpread* and control variables are very informative. More specifically, *YieldSpread* correlates negatively with *ROA*, ln*Maturity*, *PutD, ConvertD and Rule415D*; and positively with *IssuerSize, Leverage, IssueSize, RedeemD and Rule144aD*.

Table 2 Descriptive statistics by variable

Variable	N	Mean	Median	SD	25th ‰	75th ‰
Bond-level variables						
Yield Spread	4,600	153.28	129.10	199.97	67.70	237.00
Maturity in years	4,600	11.10	10.00	7.84	5	11
lnMaturity	4,600	2.20	2.30	0.66	1.61	2.40
Offering amount	4,600	227.93	175.00	247.31	57.50	300
Issue size	4,600	11.34	12.07	2.02	10.96	12.61
Rating	4,600	13.46	11	7.71	8	15
lnRating	4,600	3.14	3.00	1.50	2	4
RedeemD	4,600	0.64	1	0.48	0	1
PutD	4,600	0.06	0	0.23	0	0
ConvertD	4,600	0.15	0	0.32	0	0
Rule415D	4,600	0.66	1	0.48	0	1
Rule144aD	4,600	0.26	0	0.44	0	1
Firm-level variables						
Conservatism	2,601	0.05	0.03	0.11	−0.02	0.11
IssuerSize	2,601	7.79	7.85	1.44	6.77	8.92
ROA	2,601	0.03	0.04	0.07	0.01	0.07
Leverage	2,601	0.27	0.27	0.15	0.16	0.37
Big4	2,601	0.98	1	0.15	1.00	1.00

This table reports the descriptive statistics of key variables used in our primary tests. Bond-level variables: *YieldSpread*: the difference between a coupon rate of corporate bond and a coupon rate of Treasury bond with comparable maturity at the same issuance date. *Maturity in years*: the number of years until the bond matures. *lnMaturity*: the natural logarithm of the *maturity in years*. *Offering amount*: the par value of the bond initially issued, in millions of dollars. *IssueSize*: the natural logarithm of the *offering amount*. *Rating*: bond rating by Standard and Poor's, sequentially converted to numbers, with one for AAA through 27 for no rating. For issues without a Standard and Poor's rating, Moody's and Fitch ratings are used instead. *lnrating*: the natural logarithm of *rating*. *RedeemD*: an indicator variable for the call feature of a bond. It equals one for bonds that have an embedded call option and zero otherwise. *PutD*: an indicator variable for the put feature of a bond. It equals one for bonds that have an embedded put option and zero otherwise. *ConvertD*: an indicator variable for the convertible feature of a bond. It equals one for bonds that have an embedded convertible option and zero otherwise. *Rule415D*: an indicator variable for the SEC Rule 415 shelf registration feature of a bond. It equals one for bonds issued under a shelf registration and zero otherwise. *Rule144aD*: an indicator variable for the SEC Rule 144a private placement feature of a bond. It equals one for bonds issued through private placement exempt from registration and zero otherwise. Firm-level variables: *Conservatism*: a firm-year conditional conservatism measure introduced by Khan and Watts (2009). *IssuerSize*: the natural logarithm of the issuer's assets at the fiscal year-end immediately prior to the corporate bond issuance date. *ROA*: return on assets of the issuer, defined as net income divided by total assets at the fiscal year-end immediately prior to the corporate bond issuance date. *Leverage*: long-term debt divided by total assets of the issuer at the fiscal year-end immediately prior to the corporate bond issuance date. *Big4*: an indicator variable that equals one if a firm is audited by a Big Four auditor and zero otherwise

4.2 Primary multivariate analysis

In Eq. (1), we use bond yield spread as a proxy for the cost of public debt and credit rating as control variable. In Table 3, the correlation matrix indicates that bond rating is significantly correlated with most of firm- and bond-level control variables. The credit rating literature explains this phenomenon with the fact that credit rating agencies take into consideration the issuer's financial information and bond features during the rating process

Table 3 Correlation matrix

	Conservatism	*IssuerSize*	*ROA*	*Leverage*	*Big4*	*lnMaturity*	*IssueSize*	*lnRating*	*RedeemD*	*PutD*	*ConvertD*	*Rule415D*	*Rule144aD*
IssuerSize	**−0.2473**												
ROA	**−0.2198**	**0.1508**											
Leverage	**0.1608**	**0.1467**	**−0.1723**										
Big4	−0.0153	**0.0977**	0.0087	−0.0072									
lnMaturity	−0.0206	**−0.0848**	**0.0728**	**−0.1488**	**0.0541**								
IssueSize	**0.1242**	**−0.0381**	0.0294	**−0.2298**	0.0287	**0.2582**							
lnRating	**−0.2226**	**0.3766**	**0.2852**	**−0.0883**	**0.0698**	**0.0604**	**0.1097**						
RedeemD	**0.2563**	**−0.0844**	−0.0222	**0.0827**	0.0230	**0.1837**	**0.2625**	−0.0337					
PutD	**0.1552**	**−0.1768**	**−0.0721**	**−0.1024**	−0.0326	**0.3143**	**0.0877**	**−0.1647**	**0.1252**				
ConvertD	**0.2052**	**−0.4073**	**−0.2715**	**−0.1634**	**−0.0655**	0.0432	**0.1331**	**−0.4096**	**0.0655**	**0.4599**			
Rule415D	**−0.2951**	**0.4503**	**0.1567**	0.0146	0.0358	−0.0282	**−0.3078**	**−0.2837**	**−0.2242**	**−0.1524**	**−0.3729**		
Rule144aD	**0.3378**	**−0.3758**	**−0.1699**	0.0068	−0.0349	0.0286	**0.2707**	**0.2184**	**0.2121**	**0.1736**	**0.2962**	**−0.8052**	
YieldSpread	**0.1364**	**0.0476**	**−0.0468**	**0.2487**	−0.0149	**−0.1167**	**0.0944**	**−0.0005**	**0.2336**	**−0.3680**	**−0.4305**	**−0.0805**	**0.1146**

This table reports the correlation matrix of key variables used in our primary tests. *Conservatism*: a firm-year conditional conservatism measure introduced by Khan and Watts (2009). *IssuerSize*: the natural logarithm of the issuer's assets at the fiscal year-end immediately prior to the corporate bond issuance date. *ROA*: return on assets of the issuer, defined as net income divided by total assets at the fiscal year-end immediately prior to the corporate bond issuance date. *Leverage*: long-term debt divided by total assets of the issuer at the fiscal year-end immediately prior to the corporate bond issuance date. *Big4*: an indicator variable that equals one if a firm is audited by a Big Four auditor and zero otherwise. *YieldSpread*: the difference between a coupon rate of corporate bond and a coupon rate of Treasury bond with comparable maturity at the same issuance date. *lnMaturity*: the natural logarithm of the number of years until the bond matures. *IssueSize*: the natural logarithm of the par value of the bond initially issued, in millions of dollars. *lnrating*: the natural logarithm of bond rating by Standard and Poor's, sequentially converted to numbers, with one for AAA through 27 for no rating. For issues without a Standard and Poor's rating, Moody's and Fitch ratings are used instead. *RedeemD*: an indicator variable for the call feature of a bond. It equals one for bonds that have an embedded call option and zero otherwise. *PutD*: an indicator variable for the put feature of a bond. It equals one for bonds that have an embedded put option and zero otherwise. *ConvertD*: an indicator variable for the convertible feature of a bond. It equals one for bonds that have an embedded convertible option and zero otherwise. *Rule415D*: an indicator variable for the SEC Rule 415 shelf registration feature of a bond. It equals one for bonds issued under a shelf registration and zero otherwise. *Rule144aD*: an indicator variable for the SEC Rule 144a private placement feature of a bond. It equals one for bonds issued through private placement exempt from registration and zero otherwise. Correlations that are significant at the 1 % level or less are in bold-face

(Beaver et al. 2006). Theoretically, cost of debt is a function of default risk. However, a firm's credit rating also captures its default risk and is therefore used in prior studies as a proxy for the *ex ante* cost of debt (Ahmed et al. 2002; Jiang 2008). If credit ratings fully reflect all available and relevant information (including a firm's conditional conservatism) pertaining to a bond issue's default risk, then conditionally conservative reporting should have no incremental explanatory power after credit ratings are controlled for. To investigate this issue, we carry out tests in the following steps. First, we examine the effect of conditionally conservative reporting on bond ratings; second, we estimate Eq. (1) without controlling for bond ratings; and, third, we re-estimate Eq. (1) with bond ratings included.

According to Petersen (2009), the standard errors calculated by the ordinary least squares (OLS) regression for panel data may be biased due to residual correlations. Thus, regression results reported in our tables are corrected the standard errors of the OLS regression coefficients for firm-level clustering, as well as for heteroskedasticity. Table 4 reports the results of testing the association between conditional conservatism and the cost of corporate bonds. Column (1) reports the results when bond rating (*lnRating*) is the dependent variable. The coefficient of conditional conservatism measure (*Conservatism*) is positive (0.25) and significant ($p < 0.05$), suggesting that bond ratings incorporate information about a firm's conditionally conservative reporting and that issuers report less conditional conservatively will be rated higher by credit rating agencies. Column (2) reports the results of testing the effect of conditional conservatism on bond yield spreads, without controlling for bond ratings. The coefficient of *Conservatism* is positive (209.24; $p < 0.01$). Column (3) summarizes the results of testing our hypotheses as specified in model (1). The coefficient for *Conservatism* is positive (197.43; $p < 0.01$), but its magnitude becomes smaller (197.43) than 209.24 as reported in Column (2). The difference is statistically significant at the 1 % level (Chi square = 8.63). Results also indicate that a firm's conditionally conservative reporting is valued by bondholders, but some effect of conditional conservatism on yield spreads is absorbed by bond ratings. The result that public debt market participants negatively value issuers' conditionally conservative reporting is inconsistent with the debt contract efficiency/information costs argument in Hypothesis 1a. But this finding supports the contract renegotiation cost perspective as predicted in Hypothesis 1b. Also, this result corroborates Chan et al.'s (2009) empirical evidence that firms with more conditional conservative reporting exhibit lower cost of equity.[13] Our result is economically significant as well. Since the standard deviation of the conditional conservatism measure is 0.11, we interpret this coefficient as follows: on average, a one-standard-deviation decrease in *Conservatism* will result in a decrease of 21.7 (197.43 × 0.11) basis points (0.217 %) in bond yield spreads. In addition, Table 2 shows that mean offering amount is $227.93 million and average maturity is about 11.1 years. Thus, the above discussed 21.7 basis points decrease in yield spreads can save a firm a total interest cost of $5.49 million per bond issue until its maturity [227.93 × (21.7 ÷ 10,000) × 11.1 = 5.49].

Most of the firm- and bond-level control variables have the expected signs for their coefficients in Table 4. For brevity, our discussion focuses on the coefficients in Column (3) of Table 4. Specifically, the coefficients of issuer size (*IssueSize)* (−21.07) and of *ROA* (−341.65) are negative and significant at the 1 % level. This means that larger issuers can issue bonds at a lower cost. It corroborates the argument that issuer size can be a good proxy for equity risk and that larger issuers benefit from the lower cost of borrowing

[13] Chan et al. (2009) argue that opportunistic managerial discretion on the timing and amount of asset write-down or restructuring charges decreases the persistence and predictability of current and future earnings.

Table 4 Association between conservatism and the cost of corporate bonds

Variable	(1) DV: *lnRating*		(2) DV: *YieldSpread*		(3) DV: *YieldSpread*	
	Coefficient	t-value	Coefficient	t-value	Coefficient	t-value
Conservatism	0.25	2.11**	209.24	4.72***	197.43	4.49***
IssuerSize	−0.07	−5.56***	−24.61	−7.79***	−21.07	−6.84***
ROA	−1.20	−8.69***	−399.05	−7.35***	−341.65	−6.29***
Leverage	0.25	3.23***	165.13	6.46***	153.20	6.10***
Big4	−0.07	−1.25	−31.60	−1.38	−28.10	−1.28
lnMaturity	−0.09	−4.83***	−3.91	−0.80	0.23	0.05
IssueSize	−0.04	−3.66***	2.73	1.51	4.68	2.60***
lnRating	–	–	–	–	47.93	5.89***
RedeemD	0.09	3.93***	45.62	7.57***	41.26	6.98***
PutD	0.09	2.38**	−139.44	−9.09***	−143.99	−9.38***
ConvertD	0.40	13.35***	−293.38	−22.57***	−312.49	−23.32***
Rule415D	−0.13	−3.51***	−47.29	−3.81***	−41.10	−3.32***
Rule144aD	0.05	1.42	30.76	2.37**	28.33	2.19**
Busicycle	−0.00	−0.65	1.41	10.27***	1.43	10.85***
Year indicators	Yes		Yes		Yes	
Industry indicators	Yes		Yes		Yes	
# Observation	4,600		4,600		4,600	
Model fit (F-value)	56.31***		76.12***		76.15***	
Adjusted R^2	47.72 %		56.10 %		57.04 %	
Coefficients of *Conservatism*					(2) versus (3) Chi-squire: 8.63***	

This table reports the OLS regression results of the association between conditional conservatism and the cost of corporate bonds. *YieldSpread*: the difference between a coupon rate of corporate bond and a coupon rate of Treasury bond with comparable maturity at the same issuance date. *Conservatism*: a firm-year conditional conservatism measure introduced by Khan and Watts (2009). *IssuerSize*: the natural logarithm of the issuer's assets at the fiscal year-end immediately prior to the corporate bond issuance date. *ROA*: return on assets of the issuer, defined as net income divided by total assets at the fiscal year-end immediately prior to the corporate bond issuance date. *Leverage*: long-term debt divided by total assets of the issuer at the fiscal year-end immediately prior to the corporate bond issuance date. *Big4*: an indicator variable that equals one if a firm is audited by a Big Four auditor and zero otherwise. *lnMaturity*: the natural logarithm of the number of years until the bond matures. *IssueSize*: the natural logarithm of the par value of the bond initially issued, in millions of dollars. *lnrating*: the natural logarithm of bond rating by Standard and Poor's, sequentially converted to numbers, with one for AAA through 27 for no rating. For issues without a Standard and Poor's rating, Moody's and Fitch ratings are used instead. *RedeemD*: an indicator variable for the call feature of a bond. It equals one for bonds that have an embedded call option and zero otherwise. *PutD*: an indicator variable for the put feature of a bond. It equals one for bonds that have an embedded put option and zero otherwise. *ConvertD*: an indicator variable for the convertible feature of a bond. It equals one for bonds that have an embedded convertible option and zero otherwise. *Rule415D*: an indicator variable for the SEC Rule 415 shelf registration feature of a bond. It equals one for bonds issued under a shelf registration and zero otherwise. *Rule144aD*: an indicator variable for the SEC Rule 144a private placement feature of a bond. It equals one for bonds issued through private placement exempt from registration and zero otherwise. *Busicycle*: difference between the average yield of Moody's Aaa bonds and the average yield of 10-year US Treasury bonds for the month of issue. The standard errors of the estimated coefficients are corrected for firm-level clustering and heteroskedasticity. The superscripts *, **, and *** denote significance at the 10, 5, and 1 % levels, respectively

(Khurana and Raman 2003). In addition, the coefficient of *Leverage* is positive (153.2) and significant at 1 % level. Overall, these results corroborate the argument that ROA and leverage can be good proxies for default risk. Lower ROA and higher leverage result in a higher cost of borrowing (Khurana and Raman 2003; Jiang 2008).

With respect to bond-level control variables, the coefficient of issue size (*IssueSize)* is positive (4.68; $p < 0.01$), which means issuers will pay higher risk premiums for larger size issues. The coefficient of bond rating (*lnRating)* is positive (47.93; $p < 0.01$) indicating that issuers with better bond rating can issue bond at lower yield spreads. This finding reinforces Jiang's (2008) argument that credit rating captures the creditworthiness of the issue. As predicted, the coefficients of the redeemable dummy (*RedeemD*) (41.26; $p < 0.01$) and Rule 144a dummy (*Rule144aD*) (28.33; $p < 0.05$) are positive, while the coefficients of the putable dummy (*PutD*) (−143.99; $p < 0.01$), convertible dummy (*ConvertD*) (−312.49; $p < 0.01$) and Rule 415 dummy (*Rule415D*) (−41.10; $p < 0.01$) are negative. These results suggest that bond issuers will pay lower risk premiums for bonds that have putable and convertible features and that are issued under Rule 415 through shelf registration. However, issuers will pay higher risk premiums for bonds that have redeemable feature and that are issued under Rule 144a through private placement. Consistent with prior studies (Sengupta 1998; Jiang 2008), the coefficient of the business cycle (*Busicycle*) is positive (1.43; $p < 0.01$). This means that issuers will pay higher-risk premiums for bond issues during the period when there is a larger difference between Moody's Aaa bond yields and the 10-year US Treasury bond yields. Overall, the independent variables as reported in Column (3) of Table 4 explain about 57 % of the variance of the dependent variable (*YieldSpread*), and our model is significant at the 1 % level.

4.3 Additional subsample analysis

The existing literature documents an associations between bond rating and conservatism (Ahmed et al. 2002) and financial distress and conservatism (Hsu et al. 2011). We argue that bond issuers with non-investment-grade bond issues and high financial distress have relatively poor financial performance and more negative news, and thus these issuers are more likely to report conditional conservatively. To restore the confidence of market participants and maintain the stability of US capital markets, the US Congress passed the SOX in January 23, 2002.[14] We expect bond issuers that issued bonds during the post-SOX period to have a higher degree of conditional conservatism. This is largely due to the enhanced corporate oversight and scrutiny of accounting practices after the passage of SOX (Cohen et al. 2008). As a result, the documented association between conditional conservatism and yield spread of new bond issues could vary by different subgroups. To investigate further, we conduct univariate tests comparing mean and median values of *conservatism* by subsamples. As reported in Table 5, non-investment-grade, high financial distress, and post-SOX period subsamples have higher mean and median values *conservatism* than investment-grade, low financial distress, and pre-SOX period subsamples respectively. In addition, *t* tests (Wilcoxon tests) indicate that the mean (median) differences of *conservatism* for the three pair of subsamples are all significant at 0.0001 level. Next, we perform additional analyses to provide corroborative evidence regarding the

[14] Starting from Enron in 2001, a series of corporate financial scandals exposed serious deficiencies in corporate internal control systems and the lack of adequate corporate governance mechanisms. President Bush described the SOX as the "most far-reaching reforms of American business practices" since the Great Depression (Hitt 2002).

Table 5 Mean and median differences by conservatism: subsample analyses

Variable: *Conservatism*	Bond rating		Financial distress		SOX	
	Non-investment-grade	Investment-grade	High financial distress	Low financial distress	Pre-SOX period	Post-SOX period
N	2,500	2,100	2,170	2,176	3,085	1,515
Mean	0.0507	0.0020	0.0471	0.0073	−0.0055	0.0976
T test	T-value = 15.85; $p < .0001$		T-value = 12.63; $p < .0001$		T-value = −34.63; $p < .0001$	
Median	0.0435	−0.0074	0.0380	0.0030	−0.0029	0.0998
Wilcoxon-test	Z-value = −16.37; $p < .0001$		Z-value = 10.70; $p < .0001$		Z-value = 28.43; $p < .0001$	

This table reports mean and median comparisons by *conservatism* for the following three subgroups: investment-grade bonds (BBB or higher) versus non–investment-grade bonds (BB or lower); issuers with a high and a low financial distress; and bonds that are issued before and after the passage of SOX. Bond issuers with high (low) financial distress are those whose *Z-score* is below (above) the median (Altman 1968). *Z-score* is calculated as follows: 1.2 × (working capital/total assets) + 1.4 × (retained earnings/total assets) + 3.3 × (earnings before interest and taxes/total assets) + 0.6 × (market value of equity/total liabilities) + 1.0 × (sales/total assets). Sample size for financial distress subsample analysis reduced to 4,346 (2,170 + 2,176) due to the additional data requirements to calculate the proxy for financial distress-*Z-score*. *Conservatism*: a firm-year conditional conservatism measure introduced by Khan and Watts (2009). T-test row reports comparisons between means and Wilcoxon-test row summarizes comparisons between medians

cross-sectional variation of the association between a firm's conditionally conservative reporting and bond yield spreads.

First, we investigate whether the association between conditional conservatism and bond yield spreads is more pronounced in investment-grade bonds (BBB or higher) or non-investment-grade bonds (BB or lower).[15] Specifically, we estimate Eq. (1) for investment-grade bonds and non-investment-grade bonds subsamples, respectively. As shown in Columns (1) and (2) of Table 6, the coefficient of *Conservatism* is positive (199.59; $p < 0.01$) for non-investment-grade bonds, while the coefficient of *Conservatism* is positive (61.52) but not significant for investment-grade bonds. As reported, the difference in the coefficients of *Conservatism* between the two subsamples is significant (Chi square = 5.48; $p < 0.05$). These findings indicate that the association between conditional conservatism and bond yield spreads is mainly driven by non-investment-grade bonds. It implies that bondholders would consider issuers' conditionally conservative reporting for valuation purposes especially for low-rated bonds. Our explanation is that non-investment-grade bonds have higher default risk and conditional conservatism is more likely to trigger default through timely loss recognition for non-investment-grade bonds. Thus, low-rated bonds investors are more likely to negatively value issuers' conditionally conservative reporting practices.

Second, we separate bond issuers based on their level of financial distress as proxied by Altman's (1968) Z-score and estimate Eq. (1) for subsamples with *Z-score* below the median value versus subsamples with *Z-score* above the median value, respectively.[16] Z-score captures a firm's level of financial distress. A firm with high Z-score is financially healthier than those with low Z-score. As summarized in Columns (3) and (4) of Table 6, the coefficient of *Conservatism* is positive (287.41; $p < 0.01$) for firms with high financial distress (low *Z-score* subsample), while the coefficient of *Conservatism* is positive (91.12) but not significant for the subsample with financially healthy firms. In addition, the difference in the coefficients of *Conservatism* between the two subsamples is significant (Chi square = 6.09; $p < 0.01$). We argue that firms exhibiting high financial distress face more financial constraints, with timely loss recognition being more likely to trigger costly debt contract renegotiation for these firms. Accordingly, bond investors in these firms are more likely to value issuers' conditional conservatism negatively. The result that bondholders pay more attention to conditionally conservative reporting by less financially healthier issuers is consistent with the above argument.

Third, we examine whether the association between conditional conservatism and bond yield spreads is more pronounced prior to the enactment of the SOX or afterward. SOX comprises various provisions targeting corporate accounting oversight, audit independence, corporate responsibility, and enhanced financial disclosures and so on. It is argued that firms have been subject to higher regulations and enhanced corporate oversight and scrutiny of accounting practices after the passage of SOX (Cohen et al. 2008). In addition, Chang et al. (2012) document that CEO pay-performance sensitivity decrease substantially after SOX. Thus management is more likely to practice conditional conservatism opportunistically before the passage of SOX and, accordingly, bondholders will negatively value conditional conservatism especially during the period before the passage of SOX. We

[15] Yoo, Lee and Chang (2014) argue that investment-grade and non-investment-grade firms could have different degree of earnings management and conservatism.

[16] Altman's *Z-score* is calculated as follows: 1.2 × (working capital/total assets) + 1.4 × (retained earnings/total assets) + 3.3 × (earnings before interest and taxes/total assets) + 0.6 × (market value of equity/total liabilities) + 1.0 × (sales/total assets).

Table 6 Association between conservatism and bond yield spreads: subsample analyses

Variable	Bond rating		Financial distress		SOX	
	(1) Non-investment -grade	(2) Investment -grade	(3) High financial distress	(4) Low financial distress	(5) Pre-SOX period	(6) Post-SOX period
Conservatism	199.59***	61.52	287.41***	91.12	120.42***	−64.89
IssuerSize	−24.60***	−7.91***	−24.11***	−27.55***	−18.12***	−18.65***
ROA	−325.72***	−213.80**	−143.11	−248.85***	−397.85***	−153.33**
Leverage	106.51***	−58.04*	79.03**	101.57***	201.68***	143.25***
Big4	−37.53*	2.03	−0.81	−62.21**	−2.90	−62.25**
lnMaturity	−14.59	20.98***	−22.27***	13.30**	9.69*	−51.37***
IssueSize	11.85***	7.54***	5.52**	4.65	3.12	−1.27
lnRating	−71.70***	109.48***	69.61***	33.35***	32.24***	83.61***
RedeemD	53.19***	−9.01	52.24***	41.97***	41.98***	71.78***
PutD	−129.99***	−163.41***	−161.17***	−121.98***	−93.58***	−163.96***
ConvertD	−336.99***	−119.04***	−281.75***	−333.07***	−283.59***	−323.35***
Rule415D	−58.11***	10.86	−52.98***	−18.41	−46.41***	−23.59
Rule144aD	7.05	2.84	19.41	52.45***	47.39***	25.28
Busicycle	1.73***	1.42***	1.49***	1.28***	1.05***	2.19***
Year indicators	Yes	Yes	Yes	Yes	Yes	Yes
Industry indicators	Yes	Yes	Yes	Yes	Yes	Yes
# Observation	2,500	2,100	2,170	2,176	3,085	1,515
Model fit (F-value)	173.34***	38.53***	42.75***	46.35***	50.17***	80.07***
Adjusted R^2	66.14 %	54.67 %	55.83 %	59.92 %	44.79 %	63.90 %

Table 6 continued

Variable	Bond rating		Financial distress		SOX	
	(1) Non-investment -grade	(2) Investment -grade	(3) High financial distress	(4) Low financial distress	(5) Pre-SOX period	(6) Post-SOX period
Coefficients of *Conservatism*	(1) versus (2)		(3) versus (4)		(5) versus (6)	
	Chi-squire: 5.48**		Chi-squire: 6.09***		Chi-squire: 12.72***	

This table reports the results of the association between conservatism and bond yield spreads for the following three subgroups: investment-grade bonds (BBB or higher) versus non–investment-grade bonds (BB or lower); issuers with a high and a low financial distress; and bonds that are issued before and after the passage of SOX. Bond issuers with high (low) financial distress are those whose *Z-score* is below (above) the median (Altman 1968). *Z-score* is calculated as follows: 1.2 × (working capital/total assets) + 1.4 × (retained earnings/total assets) + 3.3 × (earnings before interest and taxes/total assets) + 0.6 × (market value of equity/total liabilities) + 1.0 × (sales/total assets). Sample size for financial distress subsample analysis reduced to 4,346 (2,170 + 2,176) due to the additional data requirements to calculate the proxy for financial distress-*Z-score*. *YieldSpread*: the difference between a coupon rate of corporate bond and a coupon rate of Treasury bond with comparable maturity at the same issuance date. *Conservatism*: a firm-year conditional conservatism measure introduced by Khan and Watts (2009). *IssuerSize*: the natural logarithm of the issuer's assets at the fiscal year-end immediately prior to the corporate bond issuance date. *ROA*: return on assets of the issuer, defined as net income divided by total assets at the fiscal year-end immediately prior to the corporate bond issuance date. *Leverage*: long-term debt divided by total assets of the issuer at the fiscal year-end immediately prior to the corporate bond issuance date. *Big4*: an indicator variable that equals one if a firm is audited by a Big Four auditor and zero otherwise. *lnMaturity*: the natural logarithm of the number of years until the bond matures. *IssueSize*: the natural logarithm of the par value of the bond initially issued, in millions of dollars. *lnrating*: the natural logarithm of bond rating by Standard and Poor's, sequentially converted to numbers, with one for AAA through 27 for no rating. For issues without a Standard and Poor's rating, Moody's and Fitch ratings are used instead. *RedeemD*: an indicator variable for the call feature of a bond. It equals one for bonds that have an embedded call option and zero otherwise. *PutD*: an indicator variable for the put feature of a bond. It equals one for bonds that have an embedded put option and zero otherwise. *ConvertD*: an indicator variable for the convertible feature of a bond. It equals one for bonds that have an embedded convertible option and zero otherwise. *Rule415D*: an indicator variable for the SEC Rule 415 shelf registration feature of a bond. It equals one for bonds issued under a shelf registration and zero otherwise. *Rule144aD*: an indicator variable for the SEC Rule 144a private placement feature of a bond. It equals one for bonds issued through private placement exempt from registration and zero otherwise. *Busicycle*: difference between the average yield of Moody's Aaa bonds and the average yield of 10-year US Treasury bonds for the month of issue. The standard errors of the estimated coefficients are corrected for firm-level clustering and heteroskedasticity. The superscripts *, **, and *** denote significance at the 10, 5, and 1 % levels, respectively

estimate Eq. (1) for pre- and post-SOX subsamples, respectively. As shown in Columns (5) and (6) of Table 6, the coefficient of *Conservatism* is positive (120.42; $p < 0.01$) for the pre-SOX subsample, while the coefficient of *Conservatism* is negative (−64.89) but not significant for the post-SOX subsample. The difference of the coefficients of *Conservatism* between the two subsamples is significant (Chi square = 12.72; $p < 0.01$). Overall, the result confirms our prediction that the association between conditional conservatism and bond yield spreads is more pronounced for bonds that are issued before the passage of SOX.

5 Robustness checks

5.1 Instrumental variable approach

It is argued that the relation between conditional conservatism and yield spread could be driven by omitted variables. Another concern in our empirical model is that corporate bond contracts involve both price and non-price terms. Corporate bond yield, maturity, and covenants could be simultaneously determined. As a robustness check, we use an instrumental variable 2SLS regression approach to address these concerns.

Khan and Watts (2009) document that longer investment cycle and younger firm age are associated with more conditional conservatism. Following DeFond et al. (2012), we use bond issuers' investment cycle (*cycle*) and firm age (*age*) as two instrumental variables for conditional conservatism. We follow Bharath et al. (2011) to select instrumental variables for bond yield spread. Specifically, we choose the contemporaneous default spreads (*DefaultSpread*) and the average yield spread of bonds issued over the previous 6 months (*AvgYieldSpread*) as two instrumental variables for bond yield spreads. Consistent with prior literature, we select asset maturity (*AssetMaturity*) and term spreads (*TermSpread*) as two instrumental variables for bond maturity (Brick and Ravid 1991; Barclay and Smith 1995). We use the average number of covenants of bonds issued over the previous 6 months scaled by the maximum number of covenants (*AvgCovenant*) as an instrumental variable for bond covenants (*Covenant*). The definitions of all instrumental variables are provided in the Appendix.

We follow Dennis et al. (2000) and Bharath et al. (2011)'s assumption that there is a unidirectional relationship between the price term (yield spread) and non-price terms (covenants and maturity) of debt contract to develop our models.[17] In other words, non-price terms, covenants and maturity, affect each other (bidirectional relationship), while yield spread is only affected by covenants and maturity (unidirectional relationship). In the first stage, we separately regress conditional conservatism (*conservatism*), bond maturity (*lnMaturity*) and covenants (*Covenant*) on their instrumental variables and other independent variables. Results are reported in Specifications (1)–(3) of Table 7. The coefficient of *Conservatism* is only significant for regression with *Covenant* as dependent variable in specification (3), suggesting that issuers relying more on conditional conservatism issue bonds with more covenant restrictions. In the second stage, we regress bond yield spread on the predicted value of conservatism, bond maturity and covenants from the first stage regressions, the instrumental variables for yield spreads and other independent variables as

[17] According to the Standard and Poor's Guide to Loan Markets (2006), loan syndication starts by borrower appointing the lead bank, which conducts due diligence and hammers out the non-price terms with the borrower and leaves the final price term to be determined.

Table 7 Association between conservatism and bond yield spreads: instrumental variable 2SLS regressions

Variable	First Stage						Second Stage	
	(1) DV: *Conservatism*		(2) DV: *InMaturity*		(3) DV: *Covenant*		(4) DV: *YieldSpread*	
	Coefficient	t-value	Coefficient	t-value	Coefficient	t-value	Coefficient	t-value
Conservatism	–	–	0.252	1.35	0.095	1.80*	3,682.20	7.19***
InMaturity	0.003	1.30	–	–	−0.005	−1.08	−688.79	−5.13***
Covenant	0.032	1.87*	−0.126	−1.09	–	–	3,009.20	5.33***
Cycle	−0.086	−1.71*						
Age	0.000	1.99**						
AssetMaturity	–	–	0.001	0.80	–	–	–	–
TermSpread	–	–	0.001	1.11	–	–	–	–
AvgCovenant	–	–	–	–	0.004	0.44	–	–
AvgYieldSpread	–	–	–	–	–	–	0.49	2.20**
DefaultSpread	–	–	–	–	–	–	0.94	7.18***
IssuerSize	−0.018	−8.44***	0.031	1.50	−0.020	−9.65***	201.66	6.72***
ROA	−0.069	−1.79*	−0.050	−0.22	−0.173	−2.74***	432.46	3.13***
Leverage	0.084	5.04***	0.048	0.35	0.192	6.52***	−700.42	−5.76***
Big4	0.010	0.80	0.226	2.47**	−0.011	−0.33	60.13	1.30
IssueSize	−0.009	−2.78***	−0.014	−0.38	0.041	5.96***	−101.29	−3.93***
InRating	0.009	2.10**	−0.178	−4.83***	0.023	3.17***	−194.10	−5.68***
RedeemD	−0.005	−1.35	0.431	9.67***	0.037	4.82***	239.32	4.67***
PutD	−0.016	−1.86*	0.953	20.98***	−0.023	−1.67*	661.16	4.83***
ConvertD	0.002	0.22	−0.099	−2.01**	−0.195	−14.83***	305.42	2.80***
415RegD	−0.009	−1.75*	0.224	4.77***	−0.045	−3.31***	303.11	5.96***
144aRegD	0.012	1.25	0.154	2.66***	−0.110	−4.99***	417.25	5.42***
Busicycle	0.000	1.71*	−0.002	−3.51***	0.000	2.52**	−2.29	−5.02***
Year indicators	Yes		Yes		Yes		Yes	
Industry indicators	Yes		Yes		Yes		Yes	

Table 7 continued

Variable	First Stage						Second Stage	
	(1) DV: *Conservatism*		(2) DV: *InMaturity*		(3) DV: *Covenant*		(4) DV: *YieldSpread*	
	Coefficient	t-value	Coefficient	t-value	Coefficient	t-value	Coefficient	t-value
# Observation	2,196		2,196		2,196		2,196	
Model fit (F-value)	53.22***		23.59***		18.43***		40.98***	
Adjusted R^2	60.01 %		24.47 %		36.19 %		59.30 %	

This table reports the instrumental variable 2SLS regressions results of the association between conservatism and three measures of cost of bond (maturity, covenant, and yield spread). Sample size reduced to 2,196 for 2SLS regressions analysis, due to the fact that there are some new bond issues without bondholder protective covenant and we have to exclude these bond issues. In addition, we lost some observations with missing data for calculating following instrumental variables. Instrumental variables: *Cycle*: a decreasing measure of the length of the investment cycle, defined as depreciation expense divided by total assets. *Age*: the age of the firm in a given year, measured as the number of years with return history on CRSP. *AssetMaturity:* an instrumental variable for *lnMaturity*. It is measured as the weighted average of maturity of current assets (CA) and net property, plant, and equipment (PPE). Specifically, *AssetMaturity* = [CA/(CA + PPE)]*(CA/Cost of Goods Sold) + [PPE/(CA + PPE)*(PPE/Depreciation). *TermSpread*: an instrumental variable for *lnMaturity*. It is the difference between the yields on 10- and 1-year US Treasury bonds measured in the month corporate bonds are issued. *Covenant*: the total number of bondholder protective covenants in a bond issue divided by the maximum number of bondholder protective covenants in our sample. *AvgCovenant*: an instrumental variable for *Covenant.* It is the average number of covenants of bonds issued over the previous 6 months divided by the maximum number of bondholder protective covenants for our sample. *AvgYieldSpread*: an instrumental variable for *YieldSpread.* It is the average yield spread on bond issues completed over 6 months before corporate bonds are issued. *DefaultSpread*: an instrumental variable for *YieldSpread*. It is the difference between the yields on Moody's seasoned Baa-rated corporate bonds and 10-year US government bonds in the month corporate bonds are issued. Other variables: *YieldSpread*: the difference between a coupon rate of corporate bond and a coupon rate of Treasury bond with comparable maturity at the same issuance date. *Conservatism*: a firm-year conditional conservatism measure introduced by Khan and Watts (2009). *IssuerSize*: the natural logarithm of the issuer's assets at the fiscal year-end immediately prior to the corporate bond issuance date. *ROA*: return on assets of the issuer, defined as net income divided by total assets at the fiscal year-end immediately prior to the corporate bond issuance date. *Leverage*: long-term debt divided by total assets of the issuer at the fiscal year-end immediately prior to the corporate bond issuance date. *Big4*: an indicator variable that equals one if a firm is audited by a Big Four auditor and zero otherwise. *lnMaturity*: the natural logarithm of the number of years until the bond matures. *IssueSize*: the natural logarithm of the par value of the bond initially issued, in millions of dollars. *lnrating*: the natural logarithm of bond rating by Standard and Poor's, sequentially converted to numbers, with one for AAA through 27 for no rating. For issues without a Standard and Poor's rating, Moody's and Fitch ratings are used instead. *RedeemD*: an indicator variable for the call feature of a bond. It equals one for bonds that have an embedded call option and zero otherwise. *PutD*: an indicator variable for the put feature of a bond. It equals one for bonds that have an embedded put option and zero otherwise. *ConvertD*: an indicator variable for the convertible feature of a bond. It equals one for bonds that have an embedded convertible option and zero otherwise. *Rule415D*: an indicator variable for the SEC Rule 415 shelf registration feature of a bond. It equals one for bonds issued under a shelf registration and zero otherwise. *Rule144aD*: an indicator variable for the SEC Rule 144a private placement feature of a bond. It equals one for bonds issued through private placement exempt from registration and zero otherwise. *Busicycle*: difference between the average yield of Moody's Aaa bonds and the average yield of 10-year US Treasury bonds for the month of issue. The standard errors of the estimated coefficients are corrected for firm-level clustering, and heteroskedasticity. *, **, *** denote significance at the 10, 5, and 1 % levels, respectively

Table 8 Association between conservatism and bond yield spreads: robustness tests

Variable	(1) HLM Regression		(2) One bond per year		(3) Alternative measure for conservatism		(4) Exclude convertible bonds	
	Coefficient	t-value	Coefficient	t-value	Coefficient	t-value	Coefficient	t-value
Conservatism	104.18	3.96***	236.75	4.94***	1.63	2.71***	145.60	3.34***
IssuerSize	−24.99	−8.65***	−19.40	−5.27***	−26.45	−9.21***	−26.29	−9.12***
ROA	−396.20	−10.07***	−333.50	−6.56***	−320.31	−6.07***	−536.71	−7.29***
Leverage	155.55	8.18***	159.88	6.51***	174.53	7.16***	118.57	4.73***
Big4	−13.04	−0.79	−20.27	−0.82	−15.53	−0.57	−26.94	−1.06
lnMaturity	6.19	1.98**	−12.35	−1.97**	6.48	3.30***	11.79	2.97***
IssueSize	5.75	2.93***	5.62	1.07	−1.10	−0.24	2.30	1.48
lnRating	28.64	5.92***	46.70	5.49***	47.23	6.03***	54.39	6.65***
RedeemD	24.55	5.29***	51.96	6.49***	40.93	6.32***	44.39	7.68***
PutD	−146.85	−14.80***	−137.46	−8.66***	−146.89	−9.45***	−149.42	−5.25***
ConvertD	−278.81	−36.53***	−321.18	−22.71***	−316.33	−22.61***	–	–
Rule415D	−40.52	−5.53***	−41.17	−3.15***	−48.49	−3.69***	97.20	7.27***
Rule144aD	1.25	0.16	32.77	2.38**	23.02	1.66*	1.38	11.41***
Busicycle	1.61	19.99***	1.57	9.20***	1.37	10.02***	−2.33	−4.57***
Year indicators	Yes		Yes		Yes		Yes	
Industry indicators	Yes		Yes		Yes		Yes	
# Observation	4,600		2,601		4,005		3,933	
Model fit	Deviance: 3,397.4***		F-value: 93.00***		F-value: 78.75***		F-value: 73.27***	

Table 8 continued

Variable	(1) HLM Regression		(2) One bond per year		(3) Alternative measure for conservatism		(4) Exclude convertible bonds	
	Coefficient	t-value	Coefficient	t-value	Coefficient	t-value	Coefficient	t-value
Adjusted R^2	48.30 %		59.84 %		56.06 %		56.52 %	

This table reports the results of the robustness tests for the association between conservatism and bond yield spreads. Following Basu (1997), we use relative timeliness of bad news to timeliness of good news as an alternative proxy for conditional conservatism. For model specifications (2)-(4), we keep only one bond issue per year for a given issuer, use alternative measure for conditional conservatism, and exclude new bond issues with convertible feature, as a result, sample size for these models reduced from 4,600 to 2,601, 4,005, and 3,933 respectively. *YieldSpread*: the difference between a coupon rate of corporate bond and a coupon rate of Treasury bond with comparable maturity at the same issuance date. *Conservatism*: a firm-year conditional conservatism measure introduced by Khan and Watts (2009). *IssuerSize*: the natural logarithm of the issuer's assets at the fiscal year-end immediately prior to the corporate bond issuance date. *ROA*: return on assets of the issuer, defined as net income divided by total assets at the fiscal year-end immediately prior to the corporate bond issuance date. *Leverage*: long-term debt divided by total assets of the issuer at the fiscal year-end immediately prior to the corporate bond issuance date. *Big4*: an indicator variable that equals one if a firm is audited by a Big Four auditor and zero otherwise. *lnMaturity*: the natural logarithm of the number of years until the bond matures. *IssueSize*: the natural logarithm of the par value of the bond initially issued, in millions of dollars. *lnrating*: the natural logarithm of bond rating by Standard and Poor's, sequentially converted to numbers, with one for AAA through 27 for no rating. For issues without a Standard and Poor's rating, Moody's and Fitch ratings are used instead. *RedeemD*: an indicator variable for the call feature of a bond. It equals one for bonds that have an embedded call option and zero otherwise. *PutD*: an indicator variable for the put feature of a bond. It equals one for bonds that have an embedded put option and zero otherwise. *ConvertD*: an indicator variable for the convertible feature of a bond. It equals one for bonds that have an embedded convertible option and zero otherwise. *Rule415D*: an indicator variable for the SEC Rule 415 shelf registration feature of a bond. It equals one for bonds issued under a shelf registration and zero otherwise. *Rule144aD*: an indicator variable for the SEC Rule 144a private placement feature of a bond. It equals one for bonds issued through private placement exempt from registration and zero otherwise. *Busicycle*: difference between the average yield of Moody's Aaa bonds and the average yield of 10-year US Treasury bonds for the month of issue. The standard errors of the estimated coefficients are corrected for firm-level clustering and heteroskedasticity. The superscripts *, **, and *** denote significance at the 10, 5, and 1 % levels, respectively

specified in Eq. (1). As summarized in Specification (4) of Table 7, the coefficient of *Conservatism* is positive (3,682.2; $p < 0.01$). Thus, the result from the instrumental variable 2SLS regressions is consistent with our primary findings as reported in Table 4.[18]

5.2 Control for multi-level observation issue

Our data sets contain multiple bond issues for a single firm for the same fiscal year. Since multi-level observations violate the assumption of residual independence at the lower bond level, the standard errors from the OLS regression may be biased. Accordingly, we use HLM regression to handle this multi-level observation problem. Unlike OLS, HLM uses the maximum likelihood method to estimate coefficients. In our case, HLM accounts for the within-firm correlation among bond issues by the same firm for the same year, and adjusts the estimated covariance matrix. HLM is widely used in social science research with multi-level observations (Ang et al. 2002; Seibert et al. 2004). As reported in Specification (1) of Table 8, yield spread is positively correlated with conditionally conservative reporting. Thus, the primary findings are robust with the HLM regression.

Alternatively, for firms with multiple bond issues during a fiscal year, we keep only the bond issue with the largest offering amount to control for multi-level observation issue. The regression results for this reduced sample are consistent with our primary test results and are summarized in Specification (2) of Table 8.

5.3 Alternative proxy for conditional conservatism

There is no perfect proxy for conditional conservatism. Khan and Watts (2009) measure generates firm-year conditional conservatism. But this measure could correlate with other firm attributes that relate to ROA, book-to-market ratio and leverage ratio. As a robustness check, we use Basu (1997) relative timeliness of bad news to timeliness of good news as an alternative measure for conditionally conservative reporting. The results reported in Specification (3) of Table 8 are unchanged compared to the results of the primary multivariate analysis.

5.4 Excluding convertible bonds

A small percentage of new corporate bond issues have convertible features. Convertible bonds differ from straight bonds and linear regression models may not be appropriate to explore the relation between yield spreads and convertible features (Khurana and Raman 2003). As another robustness check, we delete new bond issues with convertible features and estimate Eq. (1). The main findings still hold and the results are reported in Specification (4) of Table 8.

6 Conclusion and discussion

This study complements the existing bond financing literature by using a financial reporting attribute (conservatism) that is closely related to debt contracting to explain the price terms of corporate bond issues. In this paper, we contrast the contract efficiency/information costs view of conservatism in debt markets, which has been mostly tested in

[18] As a robustness test, we use instrumental variable generalized method of moments (GMM) estimators approach to examine the simultaneous determination among yield spread, covenants and maturity. The results are similar to these from instrumental variable 2SLS regressions (not tabulated for brevity).

private debt settings, with an alternative contract renegotiation costs perspective that is better aligned with the reality of public debt markets (dispersed ownership, difficulty to monitor and to effectively renegotiate in cases of contract violation or default). With these arguments, we investigate the association between conditional conservatism and the yield spread of corporate bond issues.

Our results indicate that conditional conservatism relates to a higher yield spread in corporate bond issues. This finding contrasts with the debt contract efficiency/information costs argument but is consistent with the contract renegotiation costs perspective, as put forward by Li (2013). Our findings also corroborate those reported by Chan et al. (2009), who show that conditionally conservative reporting increases the cost of equity. Additional subsample analyses indicate that the association between conditional conservatism and bond yield spreads is more pronounced in non-investment grade bonds, for bond issuers exhibiting more financial distress, and for bonds that are issued before the passage of the Sarbanes–Oxley Act. Overall, it means that bondholders are more likely to negatively value conditionally conservative reporting for bonds with high credit risk, for financially distressed bond issuers and during a period in which corporate governance-related policies and scrutiny are weak.

In addition to its contribution to the academic literature, this study has some practical implications. From standard-setting and regulatory perspectives, the finding that conditionally conservative reporting increases the cost of corporate bond provides further support for FASB's (2005) statement of neutral representation of accounting information. It also supports the recent trend toward fair value recognition in financial statements (Song et al. 2010). In addition, the result of this study corroborates the findings that management can abuse the timely loss recognition practices to reduce political cost through the understatement of profit (Mensah et al. 1994); to behave opportunistically by impairing the reliability of financial reporting (Chan et al. 2009); to reduce legal liability for fraud firms during SEC investigation period (Alam and Petruska 2012); and to generate "cookie-jar" reserves as income-smoothing device (DeAngelo et al. 1994; Francis et al. 1996); and to be overly conservative following management turnovers to allow enough space for future profitability (Murphy and Zimmerman 1993). These empirical results suggest adverse public policy implications of conditionally conservative reporting. However, regulators should also take into consideration the different effect of conditionally conservative reporting from our subsample analyses. Policy makers may consider different regulations for different subsamples (e.g., different scrutiny of accounting practices may be applied to investment-grade bonds versus non-investment-grade bonds firms). From the finding that bond markets value conditional conservatism differently than do equity and private debt markets, auditors and analysts may take capital structure into consideration when assessing a client's risk.

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Appendix

See Table 9.

Table 9 Variable definitions

Variable	Definition
YieldSpread	The difference between a coupon rate of corporate bond and a coupon rate of Treasury bond with comparable maturity at the same issuance date
Conservatism	A firm-year conditional conservatism measure introduced by Khan and Watts (2009)
IssuerSize	The natural logarithm of the issuer's assets at the fiscal year-end immediately prior to the corporate bond issuance date
ROA	Return on assets of the issuer, defined as net income divided by total assets at the fiscal year-end immediately prior to the corporate bond issuance date
Leverage	Long-term debt divided by total assets of the issuer at the fiscal year-end immediately prior to the corporate bond issuance date
Big4	An indicator variable that equals one if a firm is audited by a Big Four auditor and zero otherwise
lnMaturity	The natural logarithm of the number of years until the bond matures
IssueSize	The natural logarithm of the par value of the bond initially issued, in millions of dollars
Rating	Bond rating by Standard and Poor's, sequentially converted to numbers, with one for AAA through 27 for no rating. For issues without a Standard & Poor's rating, Moody's and Fitch ratings are used instead
lnRating	The natural logarithm of *Rating*
RedeemD	An indicator variable for the call feature of a bond. It equals one for bonds that have an embedded call option and zero otherwise
PutD	An indicator variable for the put feature of a bond. It equals one for bonds that have an embedded put option and zero otherwise
ConvertD	An indicator variable for the convertible feature of a bond. It equals one for bonds that have an embedded convertible option and zero otherwise
Rule415D	An indicator variable for the SEC Rule 415 shelf registration feature of a bond. It equals one for bonds issued under a shelf registration and zero otherwise
Rule144aD	An indicator variable for the SEC Rule 144a private placement feature of a bond. It equals one for bonds issued through private placement exempt from registration and zero otherwise
BusiCycle	Difference between the average yield of Moody's Aaa bonds and the average yield of 10-year US Treasury bonds for the month of issue
Z-score	Altman's Z-score is calculated as follows: 1.2 × (working capital/total assets) + 1.4 × (retained earnings/total assets) + 3.3 × (earnings before interest and taxes/total assets) + 0.6 × (market value of equity/total liabilities) + 1.0 × (sales/total assets)
Cycle	A decreasing measure of the length of the investment cycle, defined as depreciation expense divided by total assets
Age	The age of the firm in a given year, measured as the number of years with return history on CRSP
AvgYieldSpread	An instrumental variable for *YieldSpread*. It is the average yield spread on bond issues completed over 6 months before corporate bonds are issued
DefaultSpread	An instrumental variable for *YieldSpread*. It is the difference between the yields on Moody's seasoned Baa-rated corporate bonds and 10-year US government bonds in the month corporate bonds are issued
AssetMaturity	An instrumental variable for *lnMaturity*. It is measured as the weighted average of maturity of current assets (*CA*) and net property, plant, and equipment (*PPE*). Specifically, *AssetMaturity* = [CA/(CA + PPE)]*(CA/Cost of Goods Sold) + [PPE/(CA + PPE) *(PPE/Depreciation)

Table 9 continued

Variable	Definition
TermSpread	An instrumental variable for *lnMaturity*. It is the difference between the yields on 10- and one-year US Treasury bonds measured in the month corporate bonds are issued
Covenant	The total number of bondholder protective covenants in a bond issue divided by the maximum number of bondholder protective covenants in our sample
AvgCovenant	An instrumental variable for *Covenant*. It is the average number of covenants of bonds issued over the previous 6 months divided by the maximum number of bondholder protective covenants for our sample

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