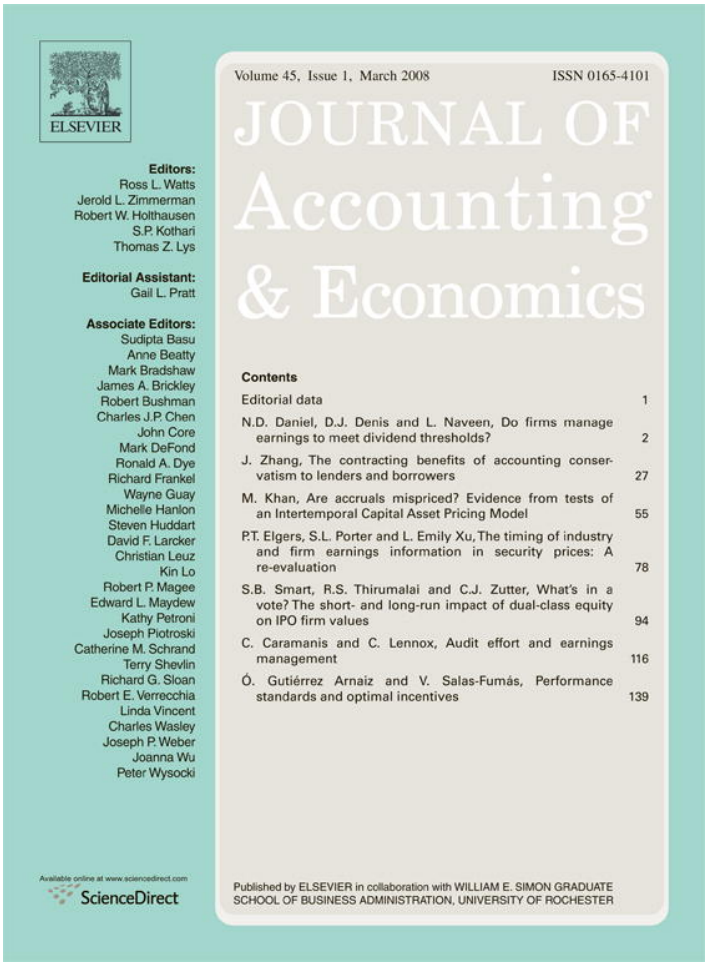

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The contracting benefits of accounting conservatism to lenders and borrowers ☆

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Abstract

This paper examines the *ex post* and *ex ante* benefits of accounting conservatism to lenders and borrowers in the debt contracting process. I expect conservatism to benefit lenders *ex post* through the timely signaling of default risk, as manifested by accelerated covenant violations, and to benefit borrowers *ex ante* through lower initial interest rates. Consistent with these predictions, I find that more conservative borrowers are more likely to violate debt covenants following a negative price shock, and that lenders offer lower interest rates to more conservative borrowers.

JEL classification: M41; G32

Keywords: Conservatism; Debt contracting; Covenant violation; Spread

1. Introduction

While positive accounting theory suggests that accounting conservatism enhances efficiency in the debt contracting process (Watts and Zimmerman, 1986; Watts, 2003a, b), there is little empirical evidence on the debt contracting benefits of conservatism. In this paper, I provide evidence on the *ex post* and *ex ante* benefits of conservatism to lenders and borrowers. Specifically, I document that conservatism benefits lenders *ex post* through the timely signaling of default risk, as manifested by accelerated covenant violations, and benefits borrowers *ex ante* through lower interest rates.

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In the debt contracting process, lenders bear downside risk but have no upside potential. Accordingly, lenders favor mechanisms that mitigate their downside risk. Watts and Zimmerman (1986) suggest that accounting conservatism is one such mechanism. An important implication of conservatism is that financial reports recognize bad news on a more timely basis than good news (Basu, 1997; Watts, 2003a, b), suggesting that conservative financial reports are more likely to trigger covenant violations. Accelerated covenant violations benefit lenders *ex post* by providing them an opportunity to reduce their downside risk by taking protective actions. Thus, I hypothesize that, *Ceteris paribus*, more conservative borrowers are more likely to violate debt covenants, and to violate them sooner.

Since conservatism is expected to benefit lenders at the expense of borrowers, I expect borrowers to share in the lenders' benefits. While there are many contracting variables over which lenders and borrowers can negotiate to share these benefits (e.g., lower interest rates, increased lending limits, and longer maturities), I examine the effects of conservatism on interest rates while controlling for other contracting variables. Thus, I also hypothesize is that, *Ceteris paribus*, more conservative borrowers obtain lower interest rates.

I test the above hypotheses on a sample of 327 firms that meet the following criteria. First, in order to identify a sample that is likely to include debt covenant violations, sample firms must have experienced at least one negative price shock in 1999 or 2000. Second, in order to control for debt contracting variables, sample firms' original contracts must be available. Finally, sample firms must have enough time-series data available to compute firm-specific measures of conservatism. Following the definition of conservatism proposed in Basu (1997), I capture conservatism using the following four measures: (1) the sensitivity of earnings to bad news relative to the sensitivity of earnings to good news, (2) the explanatory power of bad news for earnings relative to the explanatory power of good news for earnings, (3) the skewness of earnings, and (4) accumulated nonoperating accruals.[1]

To test the first hypothesis (that more conservative borrowers are more likely to violate debt covenants), I use a probit model that regresses a dummy variable capturing covenant violations on the four conservatism measures and several control variables. Consistent with the first hypothesis, I find that all four measures of conservatism are positively associated with covenant violations. To test the second hypothesis (that more conservative borrowers are more likely to violate debt covenants sooner), I use a hazard model that regresses the time to covenant violation on the four conservatism measures and several control variables. The analysis does not support the second hypothesis, as only one of the four conservatism measures is negatively associated with the time to covenant violation. Finally, to test the third hypothesis (that more conservative borrowers obtain lower interest rates), I use an ordinary least squares (OLS) model that regresses the interest rate on the four conservatism measures and several control variables. Consistent with the third hypothesis, I find that all four measures of conservatism are negatively associated with interest rates. In addition, I find that these results are robust to several sensitivity tests.

This paper's main contributions are twofold. First, this is the first paper in the literature to directly test the debt contracting benefits of conservatism to lenders. While positive accounting theory clearly predicts that conservatism plays an important role in efficient contracting, there is little empirical evidence to substantiate this claim. One notable exception is Ahmed et al. (2002), who document that conservatism enhances the debt ratings of borrowers and that firms facing more severe debtholder–shareholder conflict are more conservative. However, given I find an *ex ante* benefit of conservatism to borrowers (lower interest rates) and a direct *ex post* benefit of conservatism to lenders (more timely signals of default risk), this paper examines a broader set of benefits from conservatism in debt contracting compared to the prior literature.

Second, the evidence in this paper has implications for standard setters when they consider the tradeoff between relevance (which favors fair value) and reliability (which is often associated with conservatism in practice). Historically, the Financial Accounting Standards Board (FASB) tended to issue accounting standards consistent with the conservatism principle. Recently, however, FASB has shifted its focus toward supporting fair values, weakening the asymmetric treatment of bad and good news in financial statements (Watts 2003a, b). The results in this study indicate that both borrowers and lenders value conservatism, as conservatism provides lenders more timely signals of default risk and borrowers lower interest rates.

[1]See Section 4.1 for a thorough discussion of each of these four measures.

The rest of the paper proceeds as follows. Section 2 reviews the literature on the debt contracting role of conservatism. Section 3 develops the hypotheses. Section 4 introduces the sample and research design, and Section 5 presents empirical evidence and robustness checks. Finally, Section 6 summarizes and concludes.

2. Background literature

While prior research provides strong theoretical guidance on the contracting benefits of conservatism, the empirical evidence is limited. In this section, I briefly review the theoretical and empirical papers that are closely related to my study.

The role of accounting information in the debt contracting process is first characterized by Watts and Zimmerman (1986). The voluminous empirical literature building on Watts and Zimmerman (1986) focuses largely on the use of accounting choices to avoid covenant violations (Press and Weintrop, 1990; Duke and Hunt, 1990; DeAngelo et al., 1994; DeFond and Jiambalvo, 1994; Sweeney, 1994; Dichev and Skinner, 2002; Beatty and Weber, 2003). Recently, several papers examine the positive role that accounting information plays in debt contracting. For example, Beatty et al. (2007) show that debt contract modifications do not fully provide lenders with desired level of conservatism. Similar to Beatty et al. (2007), this paper also explores the positive role of accounting in debt contracting by providing evidence that accounting conservatism generates benefits that lenders and borrowers share.

Watts (2003a, b) summarizes the extant theory and evidence on accounting conservatism. He points out that because lenders are concerned with downside risk, they tend to concentrate on the lower ends of the earnings and net assets distributions. In addition, because net assets are more verifiable under conservative reporting than in its absence, conservative reporting allows lenders to make better lending decisions and more efficiently monitor a borrower's ability to pay. Watts (2003a) therefore argues that "The long survival of conservatism and its apparent resilience to criticism strongly suggests that conservatism's critics overlook its significant benefits." However, the literature provides only indirect evidence on the benefits of conservatism to lenders and limited evidence on the benefits of conservatism to borrowers (Ahmed et al., 2002).

In Ahmed et al. (2002), the authors document that conservatism reduces the cost of debt for borrowers (i.e., more conservative borrowers receive better debt ratings). This paper complements their study in several ways. First, I examine the extent to which conservatism benefits lenders. Second, while Ahmed et al. (2002) use debt ratings as their proxy for the cost of debt, I use interest rates. Unlike debt ratings, interest rates measure the actual cost of debt and are measured at the debt issuance level (as opposed to the firm level). Third, I employ a more comprehensive set of conservatism measures than those used in Ahmed et al. (2002). Specifically, I use two asymmetric timeliness measures from Basu (1997) and two earnings measures from Givoly and Hayn (2000), whereas Ahmed et al. (2002) use one measure derived from the market-to-book ratio and another measure based on total operating accruals.

In another related paper, Moerman (2006) finds that the bid-ask spread in the secondary loan market is lower for more conservative borrowers. While Moerman (2006) provides evidence that conservatism reduces the information asymmetry component of the cost of debt, it does not explore how conservatism reduces information asymmetry and whether lenders also benefit from such reduction.

In summary, the existing literature suggests that conservatism plays an efficiency-enhancing role in the debt contracting process (Watts and Zimmerman, 1986; Watts, 2003a, b). However, to date there is no direct evidence as to whether and how conservatism benefits lenders, and there is only limited evidence that conservatism benefits borrowers (Ahmed et al., 2002; Moerman, 2006). This study adds to the literature by investigating the extent to which conservatism benefits lenders, and in turn, the extent to which lenders share those benefits with borrowers.

3. Hypothesis development

Efficient debt contracting provides an important explanation for conservatism. In the debt contracting process, lenders have an informational disadvantage, bearing downside risk with no upside potential. Absent a mechanism to credibly mitigate their downside risk, lenders would either refuse to lend or require a high rate

of return. Accounting conservatism is one such mechanism that allows borrowers to mitigate the downside risk of lenders (Watts and Zimmerman, 1986).

3.1. Definition of conservatism

Following Basu (1997), I define conservatism as a higher degree of verification to recognize good news as gains than to recognize bad news as losses. An important implication of the asymmetric verification requirement is the understatement of net assets. Given lenders bear downside risk but no upside potential, lenders receive more downside risk protection from, and hence prefer, understated net assets on the balance sheet and a timely report of bad news on the income statement. Note that this definition of asymmetric verification is consistent with FASB's Statement of Concepts No. 2, which states that "if two estimates of amounts to be received or paid in the future are about equally likely, conservatism dictates using the less optimistic estimate." By requiring a higher degree of verification to recognize good news than bad news, conservative accounting reports are less optimistic.

3.2. The covenant violation hypothesis: The ex post benefits of conservatism to lenders

Positive accounting theory predicts that conservatism reduces the moral hazard and adverse selection components of the cost of debt, thereby providing borrowers an incentive to report conservatively in order to reduce the cost of debt. To understand how conservatism reduces the cost of debt, it is important to examine how conservatism benefits lenders.

After a debt facility is in place, lenders are concerned about unexpected increases in default risk that result from either exogenous business shocks or borrowers' opportunistic behaviors. Given their information disadvantage, lenders may not detect increases in default risk in time and thereby bear uncompensated risk. Debt covenants are designed to provide lenders with updated information on default risk. Specifically, covenant violations signal an increase in default risk.

However, a significant number of covenants are written in terms of financial numbers (hereafter, "financial covenants") that are under the discretion of borrowers. To further ensure lenders of timely signals of default risk, borrowers offer conservative reporting, i.e., reporting a verifiable lower bound estimate of net assets through timely loss recognition and delay in gain recognition. Holding the debt covenant threshold constant, timely loss recognition makes financial covenants more binding by capitalizing bad news. For example, suppose a firm has a covenant that Debt to EBITDA ratio cannot exceed three. Upon a negative shock, if the firm chooses to capitalize the shock, then earnings would drop and Debt/EBITDA ratio would go up, making the covenant more binding. Binding covenants provide lenders a more timely warning of increased default risk, triggering covenant violations when the risk exceeds the threshold set by lenders. In the event of a covenant violation, lenders can take protective actions to reduce their downside risk. For example, lenders can adjust the interest rate to compensate for the increased risk. Lenders can also accelerate the debt maturity, reduce the borrowing base, and/or enhance the security to reduce the potential loss of principal. Appendix A offers two examples of lenders' protective actions, one written in a debt contract and the other taken in practice.

In sum, conservative reporting benefits lenders through the acceleration of covenant violations, with the resulting transfer of control rights from borrowers to lenders enabling lenders to reduce their risk. Accordingly, I operationalize the benefits of conservatism to lenders as accelerated covenant violations. To increase the power of the test, I require that the sample firms experience at least one negative stock price shock so that the sample is likely to include covenant violations. This leads to the following two hypotheses:

Hypothesis 1a (H1a). *Ceteris paribus*, more conservative borrowers are more likely to violate debt covenants than less conservative borrowers.

Hypothesis 1b (H1b). . *Ceteris paribus*, more conservative borrowers are more likely to violate debt covenants sooner than less conservative borrowers.

Since covenants are endogenous, lenders may make covenant thresholds relatively tighter for less conservative firms. If so, this is likely to bias against the two hypotheses above because it suggests that there is

a negative relation between conservatism and debt covenant violations. Besides, Beatty et al. (2007) suggest that lenders cannot fully achieve desired level of conservatism by modifying GAAP in debt contracts. Nevertheless, since covenant tightness is expected to be associated with the probability of covenant violation, I include covenant tightness as a control in testing H1a and H1b.

Note that the timely signal associated with accelerated covenant violation is only one possible benefit of conservative reporting. By understating net assets, conservative reporting also gives lenders a measure of the lower bound of the collateral's value and understated collateral might be associated with a higher recovery rate in default.

3.3. The cost of debt hypothesis: The ex ante sharing of the benefits from lenders

An underlying assumption in this analysis is that lenders are concerned with default risk, i.e., the higher the default risk, the higher the expected return, or in the context of a loan, the higher the interest rate. Thus, if conservative reporting provides lenders more timely signals of default risk, thereby mitigating their default risk, lenders are likely to reduce the interest rates charged to more conservative borrowers in exchange. Moreover, the more conservative the borrower, the greater the benefits to the lender. Thus, I expect interest rates to be negatively related to conservatism.[2] This leads to the following hypothesis:

Hypothesis 2 (H2). . *Ceteris paribus*, interest rates are lower for more conservative borrowers.

Note, however, that the following four assumptions must be true for H2 to hold: (i) lenders do not share the benefits from conservatism with borrowers exclusively through other channels such as relaxed covenants; (ii) lenders prefer an earlier default to a later one; (iii) borrowers can make credible commitments as to their level of conservatism, and they do not deviate from their commitments subsequently; and (iv) there is variation in the level of conservatism among borrowers.

With respect to the first assumption, in practice lenders are likely to reward conservatism in a number of ways, for instance, by loosening covenants, increasing lending amounts, lowering collateral, etc. Which channels lenders use or whether they use one channel exclusively is an empirical question. However, if I find that the interest rate is lower for more conservative borrowers, the possibility of other types of rewards for conservatism implies that the extent to which the benefits of conservatism are actually shared might be even larger.

With respect to the second assumption, I argue that lenders are likely to prefer an early default to a later one. A timely default warns a lender about increased default risk, protecting the lender from downside risk; however, excessively frequent defaults may give lenders false alarms that unnecessarily increase monitoring and renegotiation costs. Therefore, there exists an optimal frequency of default that minimizes the sum of default, monitoring, and renegotiation costs. If conservative reporting drives the actual default rate toward this optimal point then lenders value conservatism (consistent with the hypotheses). On the other hand, if conservative reporting drives the actual default rate away from this optimal point, then I do not expect to find support for H2.

With respect to the third assumption, I argue that a borrower has incentives to commit to and maintain a given level of conservatism. Borrowing is a repeated game: If borrowers deviate from a commitment, there will be negative reputational consequences. Moreover, borrowers have mechanisms that allow them to credibly commit to a certain level of conservatism, for example, through the use of fixed GAAP in covenants (Mohrman, 1996; Beatty et al., 2002).[3] Thus, both the reputation cost and contracting mechanisms help keep borrowers at a committed level of conservatism.[4]

[2]Note that to be consistent with the first hypothesis, the second hypothesis is also tested conditional on the negative shock. In the robustness check, I release this constraint and test the second hypothesis on a broader sample.

[3]Fixed GAAP refers to provisions that ensure that the terms of the contract will be unaffected by future mandatory and/or voluntary accounting method changes (Mohrman, 1996).

[4]In addition, while prior literature shows that managers manipulate accounting numbers to avoid covenant violations (DeFond and Jiambalvo, 1994; Sweeney, 1994), rational lenders should reflect the cost of expected manipulation into interest rates, which works against H2.

With respect to the fourth assumption, there is likely to be variation in the degree of conservatism across firms because conservatism is costly. First, conservative firms are more likely to violate their covenants, and the costs associated with covenant violations are economically significant (Beneish and Press, 1993). Second, conservatism imposes explicit costs on managers if their compensation contracts are invariant to accounting choices. Third, conservatism imposes implicit costs on managers if managers believe there might be adverse consequences to their choices in the labor market. Thus, I expect to observe a wide range of conservatism.

4. Data and research design

4.1. Measures of conservatism

Following Basu's (1997) empirical definition of conservatism, i.e., asymmetric verification requirement, I employ the following four measures of conservatism.

The first measure, *Consv_coeff*, is the sensitivity of earnings to bad news relative to the sensitivity of earnings to good news, i.e., $(\beta_{0i}+\beta_{1i})/\beta_{0i}$. This measure, which comes from Basu (1997), is given by the firm-specific regression $E_{it}/P_{it-1}=\alpha_{0i}+\alpha_{1i}DR_{it}+\beta_{0i}R_{it}+\beta_{1i}R_{it}{*}DR_{it}+\varepsilon_{it}$, where E_{it} is the earnings per share (Compustat # 58) of firm i in fiscal year t, P_{it-1} is the price per share of firm i at the beginning of fiscal year t, R_{it} is the 12-month return of firm i ending 3 months after the end of fiscal year t, and DR_{it} is a dummy variable equal to one if $R_{it}<0$ and zero otherwise. In this regression, the sensitivity of earnings to good news is captured by β_{0i} and the sensitivity of earnings to bad news is captured by $\beta_{0i}+\beta_{1i}$, thus the sensitivity of earnings to bad news relative to the sensitivity of earnings to good news is given by $(\beta_{0i}+\beta_{1i})/\beta_{0i}$. The higher this measure, the more conservative the firm.

The second measure, *Consv_*R^2, is the explanatory power of bad news to earnings relative to the explanatory power of good news to earnings. This measure, also from Basu (1997), is given by R^2 (bad news)/R^2 (good news) of the same regression above applied to the corresponding bad news or good news sub-sample. I include this measure to address the difference in the variance of negative versus positive returns. In an earnings–returns regression, $R^2=\mathrm{cov}(E_{it},R_{it})/\mathrm{var}(E_{it})\mathrm{var}(R_{it})$. The difference in the variance of negative versus positive returns is controlled for by the $\mathrm{var}(R_{it})$ term in the denominator of the R^2.

The above two measures capture the essence of the asymmetric verification requirement, which is what reduces lenders' default risk: A high verification standard for gains ensures that the gains are more reliable (less prone to manipulation) than losses, whereas a low verification standard for losses gives lenders a timely signal of default risk and a lower bound for the value of collateral. However, these measures have at least two limitations. First, estimated using single-period earnings and returns, these measures assess the average asymmetric timeliness of earnings for each single-period and do not pick up aggregate conservatism, i.e., cumulative effect of asymmetric timeliness across all previous periods (Roychowdhury and Watts, 2007).[5] Second, when applied to individual firms, the measures are potentially subject to considerable measurement error or a downward bias (Givoly et al., 2007; Roychowdhury and Watts, 2007). Therefore, I use two additional earnings-based measures, both from Givoly and Hayn (2000), to supplement the analysis.

The third measure, *Consv_negskew*, is the time-series skewness of earnings, deflated by the skewness of cash flows, in order to control for the variation in firm performance.[6] When bad news requires a lower verification standard, it is usually capitalized into earnings, generating a large reduction in earnings and thus a negatively skewed earnings series. Appendix B quantifies this intuition through a simple simulation. The simulation shows that if a firm's earnings incorporate bad news immediately but good news gradually, then its earnings are negatively skewed. To make the direction of this measure consistent with the first two measures, I multiply skewness by negative one, so that the higher the *Consv_negskew*, the more conservative the firm.

[5] Roychowdhury and Watts (2007) show that extending the estimation period mitigates the single-period problem. However, extending the estimation period dramatically reduces the number of observations available for Basu's times-series regression. In an unreported sensitivity test, I estimate Basu's measures using 3-year accumulated earnings and returns computed on a rolling basis. The results are similar.

[6] Cash flow is measured as Compustat #308 when available. If Compustat #308 is not available, then cash flows equal Funds from operations (Compustat #110)−Δcurrent assets (Compustat #4)−Δdebt (Compustat #34)+Δcurrent liabilities (Compustat #5)+Δcash (Compustat #1).

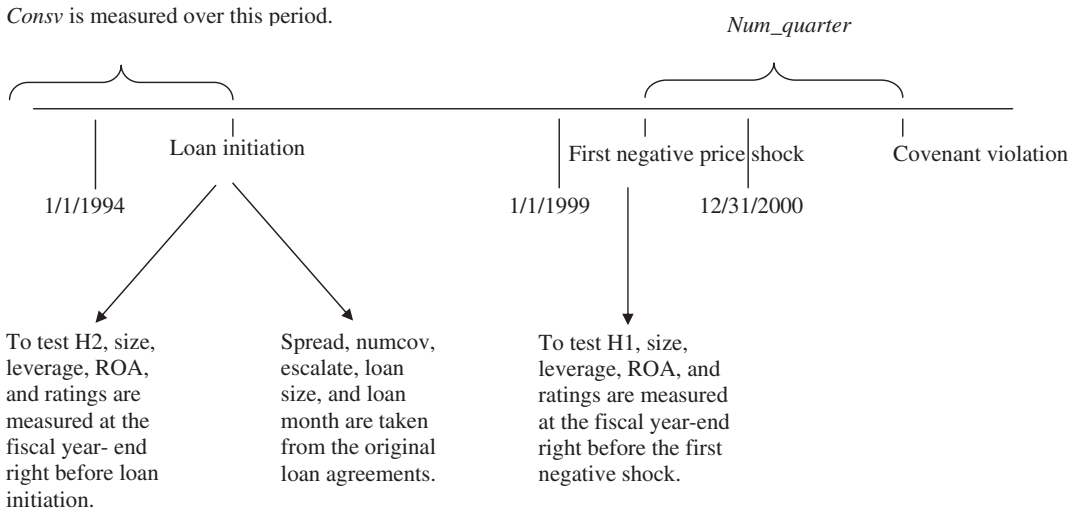

Fig. 1. Timeline of the measurement period for the variables in the negative shock sample.

The fourth measure, *Consv_accrual*, is the accumulated nonoperating accruals deflated by accumulated total assets.[7] The accumulation of nonoperating accruals summarizes the actual recording of bad news. Examples include restructuring charges and asset write-downs. Again, to make the direction of this measure consistent with the first three, I multiply accumulated nonoperating accruals by negative one so that the higher the *Consv_accrual*, the more conservatism the firm.

The above two earnings-based measures from Givoly and Hayn (2000) also capture the asymmetric verification requirement as reflected in earnings, but they do not rely on whether stock returns are a good proxy for economic gains or losses. However, one limitation with these two measures is that negatively skewed earnings or negative nonoperating accruals are also consistent with ''big baths'' that result from earnings manipulation rather than accounting conservatism. Another limitation of the *Consv_accrual* is that operating cash flows may also contain investment accruals if an asset purchased in cash is written off as an operating expense rather than capitalized.

Appendix C demonstrates the relation between Basu's measures of conservatism and the two earnings-based measures of conservatism. In particular, Appendix C shows that firms with negatively skewed earnings incorporate bad news in earnings in a more timely fashion than firms with positively skewed earnings. Appendix C also shows that firms with negative nonoperating accruals incorporate bad news in earnings in a more timely fashion than firms with positive nonoperating accruals. Thus, the evidence in Appendix C provides some assurance that the four measures are evaluating a similar underlying construct.

Fig. 1 provides a timeline of the measures of conservatism as well as the other main variables. As shown in Fig. 1, I measure conservatism over the period prior to the loan initiation: When lenders and borrowers negotiate the loan, they can only contract on the historical level of conservatism. I assume that borrowers can commit to a certain level of conservatism and that they do not deviate subsequently due to either a lack of accounting slack or reputation concerns. I also assume that lenders may employ fixed GAAP in debt contracts to reduce accounting slack. Under these two assumptions, if a borrower has been conservative before the loan initiation the borrower is likely to continue to be conservative after the loan initiation, providing the lender a timely signal about changes in default risk.

[7]Nonoperating accruals are defined as operating accruals−Δaccounts receivable (Compustat #2)−Δinventories (Compustat #3)−Δprepaid expenses (Compustat #160)+Δaccounts payable (Compustat #70)+Δtaxes payable (Compustat #71), where operating accruals = net income (Compustat #172)+depreciation (Compustat #14))−cash flow from operations (Compustat #308), or operating accruals = net income (Compustat #172)+depreciation (Compustat #14))−funds from operations (Compustat #110)+Δcurrent assets (Compustat #4)+Δdebt (Compustat #34)−Δcurrent liabilities (Compustat #5)−Δcash (Compustat #1). In this paper, I use ''nonoperating accruals'' to be consistent with Givoly and Hayn (2000), who define nonoperating accruals as operating accruals excluding working capital accruals, not the sum of financing and investing accruals as the name might suggest.

Table 1
Sample selection of the negative shock sample

Selection criteria	Number of firms left in the sample
CRSP firms with at least one monthly return less than −30% during year 1999 or 2000	4,339
Less: firms with long-term debt less than 10% of total assets	−2,553
Less: firms without seven years of earnings and return data to calculate the measures of conservatism	−1,271
Less: firms without original debt contracts	−188
Sample to test H1a *and* H1b	327[a]
Less: firms without interest rates to test H2	−13
Sample to test H2	314[b]

[a]Among the 327 firms in the negative shock sample, 98 firms disclose the violation of covenants in their 10K, 10Q, or 8K filings. The test of H1a is based on these 327 firms for *Consv_coeff*, *Consv_negskew*, and *Consv_accrual*. The test of H1a for *Consv_*R^2 is based on 309 (of the 327) firms with at least three positive annual returns and at least three negative annual returns. The test of H1b for *Consv_coeff*, *Consv_negskew*, and *Consv_accrual* is based on the 279 firms whose covenant violation dates can be identified, and the test of H1b for *Consv_*R^2 is based on the 266 firms with at least three positive annual returns and at least three negative annual returns.

[b]The test of H2 is based on these 314 firms for for *Consv_coeff*, *Consv_negskew*, and *Consv_accrual*. The test of H2 for *Consv_*R^2 is based on 297 (of the 314) firms with at least three positive annual returns and at least three negative annual returns.

4.2. Sample selection and descriptive statistics

Table 1 summarizes the sample selection process. I begin with the CRSP universe of firms in years 1999 and 2000. The choice of 1999 and 2000 yields both a bounded 5-year window (1999–2003) over which to search for covenant violations, and sufficient time (1994–1999) over which to search for the original debt contract.[8] As mentioned before, I require that the sample firms experience at least one negative stock price shock to increase the power of the test. Specifically, I extract from CRSP the 4,339 firms with at least one monthly return less than −30% during 1999 and 2000. The choice of −30% as the cutoff point identifies those firms with one or more monthly returns that are approximately two standard deviations lower than the mean.[9]

To avoid including firms with no debt or immaterial debt, I exclude firms with long-term debt of less than 10% of total assets, yielding a sample of 1,786 firms.[10] The sample is further reduced to 515 firms after I require at least 7 years of earnings and returns data prior to the price shock to calculate firm-specific measures of conservatism.

I obtain loan information, including covenants, from Securities Database Corporation (hereafter referred to as "SDC"), Lexis-Nexis, and 10K Wizard.[11] In identifying the original debt contract, I require that all contracts start before the price shock and span the covenant violations for violators. This requirement yields the final sample of 327 firms. I manually collect from firms' 10K, 10Q, and 8K filings in Lexis-Nexis information regarding violations of financial covenants after a negative price shock.[12] Of the 327 firms, 98 disclose violations of financial covenants subsequent to a price shock. I use the full set of 327 sample firms to test H1a. The test of H1b is based on the subsample of firms that report covenant violation dates and that do

[8]Debt contracts prior to 1994 are not available on Lexis-Nexis, 10K Wizard, or Securities Database Corporation.

[9]The mean and standard deviation of all available monthly returns on CRSP are 0.7% and 15%, respectively.

[10]I impose this requirement on the debt-to-asset ratio as a first-pass selection criterion. This reduces the effort involved in hand-collecting the actual debt contracts.

[11]Regulation S-K 601(b) (4) (ii) requires the disclosure of all instruments defining the rights of holders of long-term debt of the registrant and its consolidated subsidiaries with the exception of long-term debt less than 10% of total assets. To find the covenants, I first conduct a search using keywords such as "covenant," "financial covenant," "negative covenant," "affirmative covenant," "credit agreement," etc. For each firm whose covenant(s) I cannot locate by keyword search, I go to the Exhibit index contained in their 10K around year 1999 to look for a reference to the existence of any significant debt contract and then go to the referred report to find the contract.

[12]I use search criteria such as "covenant** w/5 violat***," "technical default," "default w/5 covenant*," "not comply w/5 covenant*," and "compl***** w/5 fail w/5 covenant*."

not report a covenant violation (279 firms). The test of H2 is based on the subsample of firms for which the initial interest rate spread is available (314 firms).[13]

4.3. Research design

4.3.1. Test of H1a

H1a hypothesizes that more conservative firms are more likely to violate their financial covenants. I test this hypothesis by estimating the following probit model:

$$\begin{aligned} Violate_i = {} & \alpha_0 + \alpha_1 Consv_i + \alpha_2 Cumret_i + \alpha_3 Log(Size_i) + \alpha_4 Leverage_i + \alpha_5 ROA_i \\ & + \alpha_6 Rating_i + \alpha_7 \Delta NW_i + \alpha_8 Numcov_i + \alpha_9 Escalate_i + \alpha_{10} Otherdebt_i \\ & + \alpha_{11} Loansize_i + \alpha_{12} Month\_to\_maturity_i + \varepsilon_i. \end{aligned} \tag{1a}$$

The dependent variable *Violate* equals one if the firm discloses a violation of financial covenants after a negative price shock, and zero otherwise. The treatment variable, i.e., level of conservatism, is measured as the rank of each measure discussed in Section 4.1. I use the rank instead of the magnitude to avoid spurious inference. To further mitigate measurement error or noise in each individual conservatism measure, I also combine these four measures into an aggregate summary measure that equals the average rank of the four individual measures.[14] The individual measures and the summary measure are all constructed so that a higher rank corresponds to a higher level of conservatism. H1a predicts that $\alpha_1 > 0$.

The control variables are defined as follows:

Cumret: The size of the negative price shock(s) that a firm experienced during 1999 and 2000. If a firm observes multiple price shocks, *cumret* is the buy-and-hold return of all the price shocks. The larger the negative price shock, the more likely a firm will violate its covenants.

Log(*Size*): The natural log of the total assets of the borrower at the fiscal year-end before the price shock (or prior to the first price shock if there are multiple shocks). A larger firm is usually stronger, better able to negotiate looser terms in covenants, and better able to build more accounting slack. Therefore, a larger firm is less likely to violate its covenants.

Leverage: Long-term debt/total assets of the borrower at the fiscal-year end before the negative price shock (or prior to the first shock if there are multiple shocks). A highly levered firm might have more covenants and tighter covenants, and hence is more likely to violate its covenants. However, a highly levered firm also bears a higher cost of covenant violations and may be more careful either to not violate its covenant or to obtain a waiver more quickly (if a waiver is obtained within the quarter of a covenant violation, the firm has the choice not to disclose the covenant violation).

ROA: Net income/total assets of the borrower in the fiscal year prior to the price shock (or prior to the first shock if there are multiple shocks). A firm with a higher *ROA* is financially sound and less likely to violate its covenants.

ΔNW: The net worth of the borrower before the negative price shock minus the net worth before the loan initiation, deflated by the net worth before the loan initiation. I use this variable to capture the net worth covenant slack. A firm with a higher net worth relative to loan initiation is more distant to covenant violations than another firm with a lower net worth. I therefore predict a negative coefficient on this variable.

Rating: Actual S&P debt rating if available; imputed debt rating if the actual rating is not available. I calculate the imputed rating by estimating a regression of available S&P ratings on firm size, leverage, ROA, loan size, and loan maturity and then applying the estimated coefficients to the loans whose actual ratings are not available.The imputed rating is calculated as $19.33 + 0.23 * loansize + 0.0026 *$-

[13]The second measure of conservatism, $Consv\_R^2$, requires at least three positive or negative returns to run the regression separately for positive and negative return periods. To test H1a using $Consv\_R^2$, I exclude 18 firms with less than three positive or negative returns. Similarly, to test H1b and H2, I exclude 13 and 17 firms, respectively.

[14]Leuz et al. (2003) use the average rank of four individual earnings management measures to mitigate the noise or measurement error associated with the individual measures.

loanmonth−1.4**revolv*−7.26**roa*+2.57**lev*−1.283**size*. *Rating* is measured right before the loan initiation to reflect the perceived risk of the new loan. Larger values of *Rating* correspond to worse ratings, actual or imputed. The worse the rating, the more likely a firm will violate its covenants.

Numcov: Number of financial covenants contained in the original debt contract. The more financial covenants in the debt agreement, the more likely a firm will violate its covenants.[15]

Escalate: Dichotomous variable equal to one if any part of the covenant is escalating, and zero otherwise. An escalating covenant has a moving threshold over time, and usually becomes more binding over time.[16] A firm is more likely to violate an escalating covenant than a nonescalating one.

Otherdebt: Dichotomous variable equal to one if the same borrower has other loans outstanding covering approximately the period between1999 and 2003 in SDC, or if 10K, 10Q, or 8K filings from Lexis-Nexis mention other debt outstanding, and zero otherwise. If a firm has multiple loan facilities or other forms of debt financing, the firm potentially has other financial covenants and/or a cross-default clause. Also, a firm with other loans might have tighter covenants, and is therefore more likely to violate its covenants.

Loansize: Principal/total assets of the borrower.[17] Lenders might impose closer monitoring and tighter covenants to larger loans relative to the size of the borrower. At the same time, the cost of covenant violation is higher for the borrower, and the borrower tries not to violate the covenants for larger loans.

Month_to_maturity: The number of months between the negative price shock and the maturity of the loan. A firm is more likely to violate its covenants if it has a longer effective covenant period.

4.3.2. Test of H1b

H1b hypothesizes that more conservative firms violate their financial covenants sooner. I test this hypothesis by estimating the following hazard model:

$$\ln h_i(t) = \alpha(t) + \alpha_1 Consv_i + \alpha_2 Cumret_i + \alpha_3 Log(Size_i) + \alpha_4 Leverage_i + \alpha_5 ROA_i + \alpha_6 Rating_i + \alpha_7 \Delta NW_i + \alpha_8 Numcov_i + \alpha_9 Escalate_i + \alpha_{10} Otherdebt_i + \alpha_{11} Loansize_i + \alpha_{12} Month\_to\_maturity_i + \varepsilon_i. \quad (1b)$$

The term $h_i(t)$ represents the instantaneous risk of a covenant violation at time t for borrower i conditional on i surviving to time t, and $\alpha(t)$ is the baseline hazard. H1b predicts that $\alpha_1 > 0$, i.e., the hazard of covenant violations increases with the borrower's conservatism.

Since the variable of interest is the time to covenant violations, I use a hazard analysis that treats time explicitly.[18] Specifically, I estimate the widely used Cox proportional hazard model (Cox, 1972), where the hazard rate does not vary over time and the functional form of the baseline hazard is not required. Compared to the probit regression, the hazard model uses the information in the timing of the covenant violations rather than just the occurrence of the violations, providing more insight about the interaction between conservatism and covenant violations. Compared to a regular OLS regression with the time to violation as the dependent variable, the hazard model corrects for the right-censoring problem, yielding unbiased coefficient estimates of the covariates.[19]

[15]An ideal measure of the tightness of a covenant would be the distance between the actual financial number and the covenant threshold for the most binding covenant. However, due to the diversified nature of financial covenants and the customized definition of covenant items, such an ideal measure is difficult to calculate.

[16]For example, the loan agreement entered on September 11, 1998 between Metatec Corporation and Bank One requires that, on a consolidated basis, the company maintain at all times a ratio of funded debt to EBITDA minus CAPEX of not more than the following: September 11, 1998–June 30, 1999: 3.00–1.00; July 1, 1999–December 31, 1999: 2.00–1.00; January 1, 2000–Termination Date: 1.50–1.00.

[17]The principle for a revolving loan is the committed maximum credit line instead of the actual drawing from the credit line. There are two reasons for using the committed credit line. First, even though the interest rates only apply to the used fund, a commitment fee is applied on the unused portion. Second, covenants are written against the maximum commitment.

[18]Hazard analysis is also referred to as event history analysis, survival analysis, and duration time analysis. It originates is biostatistics and engineering, and concerns survival until a nonreversible event occurs. Examples include death from cancer or light bulb burnout. Explanatory variables for the event occurrence are often referred to as covariates in hazard analysis.

[19]Right censoring occurs when some firms may violate the covenant after the data collection period.

To test the hazard model above, I identify the date of the first covenant violation after a negative price shock. If the firm reports a covenant violation, then I define the dependent variable *Num_quarter* as the number of quarters within which the firm reports the covenant violation from the first price shock. If the firm does not report a covenant violation within the search period, I define *Num_quarter* as the number of quarters between the first price shock and the maturity date, or between the first negative price shock and the end of the sample period, i.e., May 31, 2003, whichever is shorter. The control variables are the same as in the probit regression in Section 4.3.1.

4.3.3. Test of H2

H23 hypothesizes that more conservative borrowers' interest rates are lower. I test this hypothesis by estimating the following OLS regression

$$Spread_i = \beta_0 + \beta_1 Consv_i + \beta_2 Log(Size_i) + \beta_3 Leverage_i + \beta_4 ROA_i + \beta_5 Rating_i + \beta_6 Numcov_i + \beta_7 Escalate_i + \beta_8 Otherdebt_i + \beta_9 Loansize_i + \beta_{10} Loanmonth_i + \beta_{11} Revolver_i + \beta_{12} PP_i + \beta_{13} PP_i * Consv_i + \varepsilon_i. \quad (2)$$

The dependent variable *Spread* is the initial interest rate, i.e., spread over LIBOR, of each loan and the treatment variable is again the level of conservatism. H2 predicts that $\beta_1 < 0$.

In determining the interest rate, lenders consider both firm-specific risk and loan-specific risk. I use *Size, Leverage, ROA,* and *Rating* to proxy for firm-specific risk; these variables are measured prior to loan initiation. I use *Numcov, Escalate, Otherdebt, Loansize, Loanmonth, Revolver,* and *PP* to proxy for loan-specific risk. *Loanmonth*, *Revolver*, and *PP* are controls that I obtain from either SDC or 10K, 10Q, or 8K filings that further describe the characteristics of the loan. More specifically,

Loanmonth: The length of the loan in months. There are two competing hypotheses on the effect of loan maturity on loan pricing. The tradeoff hypothesis argues that lenders are willing to offer long-term loans to risky borrowers at higher spreads. The credit quality hypothesis argues that less risky borrowers signal their credit quality by taking long-term loans. Due to the offsetting effect of these two hypotheses, the sign on this variable is ambiguous.

Revolver: A dichotomous variable equal to one for revolving loans and zero otherwise.

PP: A dichotomous variable equal to one for performance pricing loans and zero otherwise.

Performance pricing has become increasingly popular in corporate loan issuance since the 1990s (Asquith et al., 2005). Under performance pricing, interest rates are directly tied to a pre-specified measure of the borrower's credit risk, further reducing the lender's risk. It is still unknown whether performance pricing and debt covenants are substitutes or complements. I include the indicator variable *PP* to tease out the effect of performance pricing on interest rates. I also include the interaction term *PP*Consv* to provide additional evidence on how performance pricing affects the sensitivity of interest rates to conservatism.

5. Empirical results

This section is organized as follows. Section 5.1 provides descriptive statistics and cross-correlations among variables. Section 5.2 presents test results for the covenant violation hypothesis (H1a and H1b) and the cost of debt hypothesis (H2). Section 5.3 presents robustness checks.

5.1. Descriptive statistics and simple correlations

Panel A of Table 2 reports descriptive statistics for the negative shock sample of 327 firms. The first three rows of Panel A present the distribution of the dependent variables used to test hypotheses H1a, H1b, and H2. The mean value of *Violate* indicates that 30% of the sample firms violated their debt covenants. The mean value of *Num_quarter* reveals that on average, a covenant violator discloses the violation 5.5 quarters after the shock. The median spread of the sample loans is 150 basis points over LIBOR, 25 basis points higher than

Table 2
Descriptive statistics of the negative shock sample

Panel A. Descriptive statistics

Variables	*N*	Mean	*Q*1	Median	*Q*3	Std.
Dependent variables						
Violate	327	0.30	0	0	1	0.46
Num_quarter	71	5.48	3	5	7	4.8
Spread	314	172.2	95	150	250	107
Treatment variables						
Consv_Coeff	327	1.30	−1.52	0.62	3.24	13.68
Consv_R^2	309	8.01	0.21	0.92	4.56	22.9
Consv_negskew[a]	327	0.42	−0.5	−0.6	1.4	1.4
Consv_accrual	327	−0.002	−0.02	−0.01	0.00	0.06
Firm-specific control variables						
Cumret	327	−0.54	−0.71	−0.48	−0.36	0.21
Size	327	1,482	96	368	1,153	3,663
Log(Size)	327	5.82	4.47	5.85	6.95	1.75
Leverage	327	0.33	0.17	0.27	0.42	0.22
ROA	327	−0.04	−0.04	0.02	0.05	0.25
ΔNW	327	0.17	−0.08	0.00	0.40	2.72
Rating	327	12.73	10	12	14	4.03
Loan-specific control variables						
Numcov	327	2.83	2	3	3	1.15
Loan size	327	0.25	0.08	0.17	0.33	0.31
Loan month	327	48.2	36	48	60	20.9
Month_to_maturity	327	25.51	11	23	37	18.53

Panel B. Industry composition of the negative shock sample

Industry	Number of firms	Percentage
Mining	3	0.92
Food, beverage, tobacco	3	0.92
Textile, wood, furniture, paper, printing and publishing	25	7.65
Chemicals and allied products, plastic material	7	2.14
Medicinal chemicals, pharmaceutical preparations	16	4.89
Oil and gas extractions, petroleum refining and related	11	3.36
Plastic, leather, glass, concrete products, metal, fabricated metal products	97	29.66
Computers, electronics, computer services	52	15.90
Transportation, communication	8	2.45
Electric, gas and sanitary services	4	1.22
Wholesale and retail	60	18.35
Services	28	8.56
Banks, financial institutions, real estate	13	3.98
Total	327	100.00

Panel C. Correlation matrix of the key variables (correlation coefficients in bold are significant at the 5% level or higher)

	Violate	*Spread*	*Consv_coeff*	*Consv_R*^{2}	*Consv_negskew*	*Consv_accrual*	*Cum_ret*	*Log (Size)*	*Lev_rage*	*ROA*	*ΔNW*	*Rating*	*Num_cov*	*Esca_late*	*Other debt*	Loan size	Loan month
Consv_Coeff	0.08	−0.04															
Consv_R^2	0.04	**−0.15**	**0.22**														
Consv_negskew	**0.12**	**−0.23**	**0.11**	0.07													
Consv_accrual	**0.16**	−0.12	0.07	−0.03	**0.22**												
Cumret	−0.07	**−0.19**	−0.05	0.03	**−0.33**	**−0.18**											
Log(Size)	**−0.15**	**−0.33**	0.05	**0.24**	**−0.21**	**−0.15**	**0.10**										
Lev	0.04	**0.26**	0.03	0.03	**0.22**	**0.11**	**−0.25**	**−0.20**									

ROA	0.03	**−0.37**	0.02	0.08	**−0.18**	**−0.15**	**0.27**	**0.33**	**−0.6**									
ΔNW	0.04	N/A	−0.05	0.03	−0.04	0.02	−0.10	0.01	**−0.11**	0.02								
Rating	0.05	**0.57**	−0.09	**−0.12**	**0.25**	**0.14**	**−0.28**	**−0.68**	**0.67**	**−0.80**	**−0.80**							
Numcov	**0.11**	0.11	0.04	0.03	0.02	0.05	−0.02	−0.08	−0.02	0.00	0.05	0.04						
Escalate	0.02	**0.24**	−0.04	−0.05	**0.15**	0.02	−0.02	0.04	−0.02	0.05	−0.05	0.01	**0.32**					
Other debt	0.05	**−0.12**	0.03	0.04	−0.01	**−0.11**	0.04	**0.16**	−0.06	0.08	0.06	−0.09	0.07	**0.14**				
Loan size	−0.03	−0.08	0.04	**−0.10**	0.09	0.01	0.04	**−0.39**	**0.27**	**−0.25**	−0.08	**0.34**	0.08	−0.02	−0.01			
Loan month	0.01	**−0.16**	0.02	0.02	−0.04	−0.02	0.06	**0.12**	−0.01	−0.01	−0.02	−0.09	−0.05	−0.01	**0.12**	**0.17**		
Month_to_maturity	−0.03	N/A	−0.07	−0.10	0.06	0.09	−0.02	**−0.13**	**0.06**	**−0.14**	0.01	**0.15**	−0.04	**−0.13**	−0.07	−0.04	0.05	

Variable definitions.

Violate: Dichotomous variable equal to one if the sample firm violated its covenants after the negative price shock and zero otherwise.

Spread: The initial spread (basis points over LIBOR) charged for each loan.

Num_quarter: Number of quarters between the negative price shock and the first covenant violation if the firm violates its covenants; number of quarters between the negative price shock and May 31, 2003 or loan maturity, whichever is shorter, if the firm does not violate its covenants.

Consv_Coeff: $(\beta_{0i}+\beta_{1i})/\beta_{0i}$, from the firm-specific earnings-returns regression $E_{it}/P_{it-1} = \alpha_{0i} + \alpha_{1i}DR_{it} + \beta_{0i}R_{it} + \beta_{1i}R_{it}{*}DR_{it} + \varepsilon_{it}$ (Basu, 1997), where E_{it} is the earnings per share (Compustat #58) of firm i in fiscal year t, P_{it-1} is the price per share of firm i at the beginning of fiscal year t, R_{it} is the 12-month return of firm i ending three months after the end of fiscal year t, and DR_{it} is a dummy variable equal to one if $R_{it}<0$ and zero otherwise. It is measured using all available earnings and returns up until the loan initiation.

Consv_R^2: $R^2_{\text{bad}}/R^2_{\text{good}}$, where R^2_{bad} (R^2_{good}) comes from the same Basu regression above but is applied only to the negative (positive) return period. It is measured using all available earnings and returns up until the loan initiation.

Consv_negskew: −(skewness of earnings (Compustat #18)/skewness of cash flow from operations), where cash flow from operations is Compustat #308 if available, and is funds from operations (Compustat #110)−Δcurrent assets (Compustat #4)−Δdebt (Compustat #34)+Δcurrent liabilities (Compustat #5)+Δcash (Compustat #1) otherwise. It is measured using all available earnings and cash flows up until the loan initiation.

Consv_accrual: −(accumulated nonoperating accruals/accumulated total assets (Compustat #6)). Nonoperating accruals = operating accruals−Δaccounts receivable (Compustat #2)−Δinventories (Compustat #3)−Δprepaid expenses (Compustat #160)+Δaccounts payable (Compustat #70)+Δtaxes payable (Compustat #71), where operating accruals = net income (Compustat #172)+depreciation (Compustat #14))−cash flow from operations (Compustat #308), or net income (Compustat #172)+depreciation (Compustat #14))−funds from operations (Compustat #110)+Δcurrent assets (Compustat #4)+Δdebt (Compustat #34)−Δcurrent liabilities (Compustat #5)−Δcash (Compustat #1) if Compustat #308 is not available. It is measured using all available data up until the loan initiation.

Cumret: The size of the negative price shock(s) firms experienced during 1999 and 2000. If a firm has multiple monthly returns less than −30%, *Cumret* equals the buy-and-hold return for those months.

Size: The total assets of the borrower (Compustat #6) prior to the negative price shock.

Log(Size): The natural log of the total assets of the borrower (Compustat #6) prior to the negative price shock.

Leverage: Long-term debt/total assets (Compustat #9/Compustat #6) prior to the negative price shock.

ROA: Net income/total assets (Compustat #172/Compustat #6) prior to the negative price shock.

ΔNW: Change in net worth (Compustat #60) from loan initiation to the negative price shock, deflated by the net worth prior to loan initiation.

Rating: Actual S&P debt rating if available; imputed debt rating if the actual rating is not available. I calculate the imputed rating by estimating a regression of available S&P ratings on firm size, leverage, ROA, loan size, and loan maturity and then applying the estimated coefficients to the loans for which actual ratings are not available.The imputed rating is calculated as $19.33+0.23{*}loansize+0.0026{*}loanmonth-1.4{*}revolv-7.26{*}roa+2.57{*}lev-1.283{*}size$. *Rating* is measured right before the loan initiation to reflect the perceived risk of the new loan.

Numcov: Number of financial covenants contained in the debt contract.

Escalate: Dichotomous variable equal to one if any of the financial covenant is escalating and zero otherwise.

Other debt: Dichotomous variable equal to one if the same borrower has other loans and zero otherwise.

Loan size: Principal/total assets of the borrower.

Loan month: Length of the loan in months.

Month_to_maturity: Number of months from the negative price shock to the maturity of the loan.

[a] *Consv_coeff*, *Consv_R*^{2}, and *Consv_accrual* are truncated at the top and bottom one percentile to exclude extreme outliers. The statistics reported here are all magnitudes, while the actual testing uses the rank of each conservatism measure. The results are robust to including or excluding the outliers.

the median spread of the loans in SDC (the SDC sample is discussed in Section 5.3.1). The higher spread indicates that the sample loans might be riskier than the loans in SDC.

The next four rows of Panel A present the distribution of the four measures of conservatism. The statistics of the four measures are given in terms of their magnitudes. Recall, however, that the multivariate tests use ranked measures of these variables to avoid spurious inference. The mean values of *Consv_coeff* and *Consv_*R^2 are greater than one, indicating that on average, the sensitivity of the sample firms' earnings to bad news is higher than the sensitivity of their earnings to good news, and the explanatory power of bad news to earnings is higher than the explanatory power of good news to earnings. Further, on average the sample firms' earnings are negatively skewed, as indicated by the positive mean of *Consv_negskew*. Thus, these three measures of conservatism indicate that the sample firms are conservative prior to loan initiation. In contrast, the last measure, *Consv_accrual*, suggests that the sample firms accumulate positive nonoperating accruals prior to loan initiation.

The next seven rows give the distribution of firm-specific control variables. On average, the size of the shock is significant, amounting to a loss in market capitalization of approximately −54% . The median total asset of the sample firms is $368 million, higher than that of the median Compustat firm in fiscal year 1998 ($126.75 million). The average long-term debt ratio of the sample firms is 33%, also higher than that of the average Compustat firm (10.24%) by construction. The average ROA of the sample firms is 2%, which is more profitable than the average Compustat firm in the same period (1.1%).

Reconciling the fact that firms with an average loss in market capitalization of −54% appear more profitable than the average Compustat firm, I find evidence that accounting measures lag stock returns. In particular, the mean ROA of the sample firms drops to −2.4% 1 year after, −7.5% 2 years after, and −8.9% 3 years after a price shock. It therefore appears that ROA catches up with the price shock slowly, over several years.

The last four rows of Table 2, Panel A present the distribution of loan-specific control variables. By construction, all loans have at least one financial covenant, and most firms have three covenants (as indicated by the same median); the maximum number of covenants is nine (not reported). The average size of a sample loan is $50 million, about 17% of the average borrower's total assets. The large size of the loans highlights the economic significance of covenant violations as well as lower interest rates. Finally, the average and median maturity of the loans is 48 months, with a median *month_to_maturity* of 23 months, indicating that on average the negative price shock occurs in the middle of the loan's maturity.

Table 2, Panel B reports the distribution of the negative shock sample by industry. The sample firms are distributed evenly across all industries as defined by two-digit SIC code, with 29.7% in the Plastic, Glass, & Metal industry, 18.4% in the Wholesale & Retail industry, and 15.9% in the Computers & Electronics industry.

Table 2 Panel C presents the Pearson correlation matrix of the variables. The panel reveals positive correlations between each measure of conservatism and the likelihood of covenant violations, indicating that more conservative firms are more likely to violate their covenants. In addition, the likelihood of covenant violation is positively correlated with the size of the price shock and the number of covenants, and negatively correlated with the size of the borrower.

Table 2 Panel C also shows that the initial spread is negatively correlated with the four measures of conservatism. In terms of borrower characteristics, the initial spread decreases in firm size and ROA, and increases in leverage and debt rating. In terms of loan characteristics, the initial spread decreases in loan maturity and increases in number of covenants and escalating covenants.

In sum, the descriptive statistics provide preliminary evidence that more conservative firms are more likely to violate their covenants after a negative price shock, and further that more conservative firms enjoy a lower cost of debt. These findings are consistent with the predictions in H1 and H2.

5.2. Multivariate results

Table 3 presents the probit regression of the likelihood of covenant violations on the level of conservatism and other control variables (Eq. (1a)). The five columns differ only in the proxy for conservatism. For all four conservatism measures (*Consv_coeff,* *Consv_*R^2, *Consv_negskew*, *Consv_accrual*) as well as the summary

Table 3
Probit regression of the likelihood of covenant violations on the level of conservatism, with χ^2 statistics in parentheses

$$Violate_i = \alpha_0 + \alpha_1 Consv_i + \alpha_2 Cumret_i + \alpha_3 Log(Size_i) + \alpha_4 Leverage_i + \alpha_5 ROA_i + \alpha_6 Rating_i + \alpha_7 \Delta NW_i + \alpha_8 Numcov_i + \alpha_9 Escalate_i + \alpha_{10} Otherdebt_i + \alpha_{11} Loansize_i + \alpha_{12} Month\_to\_maturity_i + \varepsilon_i. \quad (1a)$$

Variables	Expected sign	*Consv_coeff*	*Consv_R²*	*Consv_negskew*	*Consv_accrual*	*Consv_avgrank*
Intercept		−0.33 (1.57)	−0.11 (1.93)	−0.37 (1.53)	0.23 (2.41)	−0.03 (0.00)
Consv	+	**0.001 (2.00)**	**0.002 (3.46)***	**0.002 (3.95)***	**0.003 (4.68)****	**0.004 (4.28)****
Firm-specific control variables						
Cumret	−	−0.001 (2.04)	−0.001 (2.08)	−0.001 (2.11)	−0.002 (5.04)**	−0.002 (4.97)**
Log(Size)	−	−0.17 (5.45)**	−0.22 (6.87)**	−0.17 (5.61)**	−0.20 (5.28)**	−0.19 (5.22)**
Leverage	?	−0.24 (1.19)	−0.26 (0.45)	−0.26 (1.35)	−0.33 (1.91)	−0.33 (1.73)
ROA	−	0.63 (1.06)	0.66 (0.91)	0.64 (1.04)	0.69 (0.94)	0.68 (0.90)
ΔNW	−	0.01 (0.08)	0.02 (0.15)	0.01 (0.07)	0.02 (0.19)	0.02 (0.18)
Rating	+	0.03 (0.31)	0.01 (0.07)	0.02 (0.19)	0.01 (0.04)	0.02 (0.16)
Loan-specific control variables						
Numcov	+	0.12 (2.66)*	0.12 (2.64)*	0.14 (3.62)*	0.08 (1.13)	0.08 (0.99)
Escalate	+	−0.10 (0.35)	−0.15 (0.69)	−0.17 (0.99)	−0.06 (0.10)	−0.05 (0.06)
Other debt	+	0.20 (1.67)	0.24 (1.96)	0.20 (1.57)	0.28 (2.39)	0.31 (2.79)*
Loan size	?	−0.14 (3.56)*	−0.16 (3.71)*	−0.14 (3.50)*	−0.14 (2.78)*	−0.17 (4.08)*
Month_to_maturity	+	−0.01 (0.11)	−0.01 (0.24)	−0.01 (0.31)	−0.01 (2.19)	−0.01 (1.92)
N		327	309	327	327	309
Pseudo-R^2 (%)		7.4	8.5	8.0	11.7	12.2
Percent correctly Predicted		67.7	68.4	68.3	71.3	72.8

Variable definitions:
Consv_avgrank = Average rank of the four measures of conservatism above.
See Table 2 for other variable definitions.
** and * represent significance at the 1% and 5% level, respectively, for one- or two-tailed tests as appropriate.
Pseudo-R^2 = [log likelihood (intercept only)−log likelihood (intercept and covariate)]/log likelihood (intercept and covariate).

measure (*Consv_avgrank*), the coefficients on conservatism are significantly positive, indicating that more conservative firms are more likely to violate their covenants after a price shock. With respect to the economic significance of this result, firms in the third quartile of *Consv_R²* are 9.89% more likely to violate covenants than firms in the first quartile.[20]

Note that this result holds after controlling for other factors that affect the likelihood of covenant violations. Table 3 shows that, not surprisingly, firms that experience a more negative shock are more likely to violate covenants. Also, firms that are subject to more covenants are more likely to violate covenants. Finally, smaller borrower size and smaller loan size are associated with a greater likelihood of covenant violation. The pseudo-R^2 of the probit regression is 12.2% when conservatism is measured as the average rank of the four measures.

In sum, the evidence in Table 3 suggests that conservatism benefits lenders by providing timely signals of increased default risk, namely, accelerated covenant violations. Such timely signals have value because they give lenders an opportunity to reduce their default risk or to require additional compensation for bearing increased risk.

Taking the prediction of H1a one step further, I test whether more conservative borrowers violate their financial covenants sooner (H1b). Since the variable of interest is the time to covenant violations, I use the hazard model approach. Table 4 reports the results from the hazard model estimation. The coefficient on

[20]Economic significance is evaluated by the marginal probability, calculated as the parameter estimate multiplied by the standardization factor $(1/\sqrt{2\pi})e^{-(\alpha+X\beta)/2}$, where $\alpha + X\beta$ is the predicted probability from the probit regression.

Table 4
Hazard model regression of the instantaneous risk of covenant violations on the level of conservatism and other covariates, with χ^2 statistics in parentheses

$$\ln h_i(t) = \alpha(t) + \alpha_1 Consv_i + \alpha_2 Cumret_i + \alpha_3 Log(Size_i) + \alpha_4 Leverage_i + \alpha_5 ROA_i + \alpha_6 Rating_i + \alpha_7 \Delta NW_i + \alpha_8 Numcov_i + \alpha_9 Escalate_i + \alpha_{10} Otherdebt_i + \alpha_{11} Loansize_i + \alpha_{12} Month\_to\_maturity_i + \varepsilon_i. \quad (1b)$$

Variable	Expected sign	*Consv_coeff*	*Consv_R²*	*Consv_negskew*	*Consv_accrual*	*Consv_avgrank*
Consv	+	0.001 (0.53)	0.001 (0.52)	0.002 (2.12)	**0.003 (2.56)***	0.004 (1.64)
Firm-specific control variables						
Cumret	−	−0.001 (0.18)	−0.001 (0.04)	−0.001 (0.13)	−0.002 (1.94)	−0.002 (1.78)
Log(Size)	−	−0.33 (5.18)**	−0.42 (6.14)**	−0.33 (5.14)**	−0.30 (3.70)*	−0.30 (3.60)*
Leverage	?	−0.22 (0.22)	−0.21 (0.18)	−0.22 (0.21)	−0.50 (0.86)	−0.57 (1.06)
ROA	−	0.65 (0.35)	0.72 (0.32)	0.72 (0.42)	1.09 (0.74)	0.85 (0.48)
ΔNW	−	0.01 (0.07)	0.03 (0.11)	0.01 (0.07)	0.03 (0.12)	0.03 (0.11)
Rating	+	0.002 (0.01)	0.05 (0.19)	−0.01 (0.01)	0.03 (0.05)	0.03 (0.07)
Loan-specific control variables						
Numcov	+	0.15 (1.50)	0.17 (1.89)	0.17 (1.95)	0.61 (0.20)	0.02 (0.02)
Esclate	+	0.02 (0.003)	0.09 (0.08)	−0.07 (0.05)	0.28 (0.65)	0.32 (0.81)
Other debt	+	0.23 (0.66)	0.29 (0.90)	0.23 (0.66)	0.20 (0.41)	0.27 (0.72)
Loan size	?	−0.13 (0.99)	−0.15 (1.20)	−0.12 (0.77)	−0.16 (1.22)	−0.18 (1.49)
Month_to_maturity	+	−0.01 (0.35)	−0.01 (0.33)	−0.01 (0.45)	−0.01 (1.00)	−0.01 (0.84)
N		279	266	279	279	266
Pseudo-R^2 (%)		3.0	3.7	3.3	4.7	4.7

Variable definitions: $h_i(t)$: The instantaneous risk of a covenant violation at time t for borrower i conditional on i surviving to time t
See Tables 2 and 3 for other variable definitions.
** and * represent significance at 1% and 5% level, respectively, for one- or two-tailed tests as appropriate.

Consv_accrual is significantly positive, which means that the hazard of a covenant violation increases with this measure of conservatism. The evidence does not support H1b in the sense that the three other measures of conservatism fail to yield significant results. One possible reason for the weak results in this test is that the relation between conservatism and time to covenant violations may be nonlinear. The significantly negative coefficient on *Size* suggests that larger borrowers have a smaller hazard of covenant violations.

Table 5 provides evidence on whether lenders lower interest rates to reward conservative borrowers (H2). In a regression of loan spreads on conservatism, I find that the coefficients are significantly negative for all four measures of conservatism, consistent with the prediction that more conservative firms receive lower interest rates For example, the coefficient on *Consv_R²* is −0.23, significant at the 5% level. Economically, this coefficient means that the loan spread is 38 basis points lower for firms in the first quartile of *R²_rank* than for firms in the third quartile.[21]

Notably, the initial spread for loans with performance pricing is lower than that for loans without performance pricing, because performance pricing reduces credit risk by linking the spread to a pre-specified credit risk measure. Further, the relation between the loan spread and the level of conservatism is marginally less negative for loans with performance pricing, as indicated by the positive coefficients on *PP*consv* for the three measures of conservatism (*Consv_coeff, Consv_negskew*, and *Consv_accrual*). Therefore, there may be some substitutability between performance pricing and debt covenants, in the sense that lenders do not lower the interest rate for more conservative firms as much if performance pricing is in the debt contract.

[21]Economic significance has to be interpreted with caution. The median spread of the negative shock sample is 150 basis points, 25 basis points higher than the median spread of loans on SDC.

Table 5
OLS regression of the loan spread on the level of conservatism of the firm

$$Spread_i = \beta_0 + \beta_1 Consv_i + \beta_2 Log(Size_i) + \beta_3 Leverage_i + \beta_4 ROA_i + \beta_5 Rating_i + \beta_6 Numcov_i + \beta_7 Escalate_i + \beta_8 Otherdebt_i + \beta_9 Loansize_i + \beta_{10} Loanmonth_i + \beta_{11} Revolver_i + \beta_{12} PP_i + \beta_{13} PP_i * Consv_i + \varepsilon_i \quad (2)$$

you need to add a period following the equation, for consistency with above

Variables	Expected sign	*Consv_coeff*	*Consv_R*^{2}	*Consv_negskew*	*Consv_accrual*	*Consv_avgrank*
Intercept		66.58 (0.84)	17.53 (0.16)	70.88 (0.92)	46.35 (0.55)	95.63 (1.08)
Consv	−	**−0.32 (−1.98)***	**−0.23 (−2.15)***	**−0.40 (−2.84)****	**−0.41 (−2.07)***	**−0.86 (−2.75)****
Firm-specific control variables						
Log(Size)	−	1.24 (0.22)	1.56 (0.25)	0.55 (0.10)	5.12 (0.83)	5.44 (0.88)
Leverage	+	34.57 (1.25)	41.35 (2.15)*	41.98 (1.53)	44.73 (1.50)	43.22 (1.45)
ROA	−	−20.39 (−0.35)	−13.72 (−0.22)	−35.15 (−0.61)	−29.50 (−0.47)	−23.73 (−0.36)
Rating	+	16.90 (4.27)**	17.25 (4.10)**	17.59 (4.52)**	17.70 (4.25)**	17.84 (4.27)**
Loan-specific control variables						
Numcov	?	2.17 (0.43)	−1.91 (−0.34)	2.40 (0.48)	−1.52 (−0.27)	−0.34 (−0.06)
Escalate	?	35.17 (2.97)**	38.20 (2.94)**	35.39 (3.00)**	32.08 (2.43)*	33.05 (2.45)**
Other debt	?	−11.33 (−0.98)	−4.99 (−0.90)	−13.13 (−1.14)	−4.71 (−0.37)	−3.07 (−0.24)
Loan size	?	−23.90 (−1.21)	−27.72 (−1.35)	−26.03 (−1.33)	−4.39 (−0.16)	−7.27 (−0.27)
Loan month	?	−0.25 (−0.82)	−0.33 (−0.99)	−0.32 (−1.04)	−0.36 (−1.09)	−0.43 (−1.27)
Revolver	−	−55.07 (−2.69)**	−42.19 (−2.28)**	−49.40 (−2.47)**	−53.10 (−2.53)**	−55.70 (−2.64)**
PP	−	−104.07 (−4.10)**	−56.40 (−2.20)*	−93.43 (−3.70)**	−108.24 (−3.92)**	−161.21 (−3.56)**
*PP*Consv*	?	0.40 (2.12)*	−0.03 (−0.06)	0.29 (1.67)	0.39 (1.67)	0.85 (2.22)*
N		314	297	314	314	297
Adj-R^2 (%)		43.3	41.6	44.4	43.0	43.2

Variable definitions:
Revolver: Dichotomous variable equal to one for revolving loans and zero otherwise.
PP: Dichotomous variable equal to one if the loan has performance pricing and zero otherwise.
*PP*Consv*: The interaction term calculated as PP multiplied by each of the four measures of conservatism.
See Tables 2 and 3 for other variable definitions.
** and * represent significance at 1% and 5% level for one- or two-tailed tests as appropriate.

Turning to the firm-specific control variables, the significantly positive coefficient on credit ratings indicates that borrowers with better ratings enjoy a lower spread. With respect to the loan-specific controls, escalating covenants usually accompany a higher spread and revolving loans are associated with a lower spread.

Collectively, the evidence from the negative shock sample demonstrates the efficiency-enhancing role that conservatism plays in the debt contracting process. In particular, I find that more conservative borrowers are more likely to violate their financial covenants, providing lenders a more timely signal of increased default risk; in return, lenders reward more conservative borrowers with lower interest rates up front.

5.3. Robustness checks

5.3.1. Out-of-sample evidence on whether conservatism reduces interest rates

One caveat with respect to the negative shock sample relates to the extent to which the inference can be generalized. To verify the robustness of the result from the negative shock sample, I use a larger sample to test whether conservatism reduces interest rates (H2).[22]

Table 6 provides the sample selection process. I start with all the syndicated loans on SDC from 1994 to 2003. I then exclude loans without any financial covenants. Of the 72,067 loan issues on SDC from 1994 to 2003, 8,055 have financial covenants. The sample size drops further to 6,279 issues after I also exclude issues

[22]I cannot replicate the covenant violation test on the SDC sample due to the lack of covenant violation data.

Table 6
Sample selection of the SDC large sample

Panel A. Sample selection process

Selection criteria	Total issues (number of borrowers)
Syndicated loans from SDC (1994–2003)	72,067 (28,446)
Issues with covenants	13,227 (5,066)
Issues with financial covenants	8,055 (4,798)
Issues with initial spread over LIBOR	6,279 (3,915)
Availability of Compustat data	3,992 (2,327)
Requirement of enough earnings and returns data to calculate measures of conservatism and other earnings attributes	1,974 (1,156)

Panel B. The frequency of issues of individual borrowers

Number of issues on SDC, 1994–2003	Number of borrowers correspondingly	Total issues
1	667	667
2	284	568
3	138	414
4	36	144
5	16	80
6	9	54
7	4	28
8	1	8
11	1	11
Total issues	1,156	1,974

without an initial spread over LIBOR. After imposing the data requirements on the earnings and returns series, I obtain a final SDC sample of 1,974 loans representing 1,156 borrowers.

Table 7 provides the descriptive statistics, industry distribution, and correlations that correspond to the SDC sample. Table 7, Panel A indicates that the median spread of the SDC sample is 125 basis points over LIBOR, lower than the median spread of the negative shock sample, which suggests that on average loan issues in the negative shock sample might be riskier than those in the SDC sample. Panel A also reveals that borrowers in the SDC sample are relatively larger and more profitable than those in the negative shock sample and that loans in the SDC sample have longer maturities than those in the negative shock sample.

Table 7 Panel B shows that the industry distribution of the SDC sample is similar to that of the negative shock sample, with 23.7% of the issues in the Plastic, Glass, & Metal industry, 15.6% in the Wholesale & Retail industry, and 10.4% in the Textile, Furniture, Printing, & Publishing industry. The two samples differ only in that the Computer & Electronics industry is more represented in the negative shock sample than in the SDC sample. Due to the economic downturn in the Computer & Electronics industry, it is not surprising that more firms in that industry incur a negative shock during 1999 and 2000. Since the Computer & Electronics industry does not dominate the negative shock sample, I do not expect any bias to be induced by this difference on the tests using the negative shock sample.

Table 7 Panel C, the correlation matrix, indicates that the initial spread is negatively correlated with all four measures of conservatism. Not surprisingly, the spread is lower for larger, less levered, more profitable, and better rated borrowers. The spread is also lower for revolving loans (as compared to term loans), loans with shorter maturity, and loans with performance pricing terms. Moreover, the spread is higher for loans with more financial covenants and for loans with escalating covenants. The spread and covenants therefore appear to be compliments rather than substitutes.

Table 7 Panel C exhibits several other noteworthy correlations. For example, the number of financial covenants is higher (and the covenants are more likely to be escalating) for smaller, more levered, and more poorly rated borrowers. Large loans, loans with longer maturity, and term loans (as opposed to revolving

Table 7
Descriptive statistics of the SDC sample

Panel A. Descriptive statistics

Variable	Mean	$Q1$	Median	$Q3$	Std.
Spread	143.10	60	125	200	102.83
Consv_coeff	1.20	−1.24	0.88	2.83	15.11
Consv_R²	8.92	0.38	1.33	5.54	23.02
Consv_negskew	1.41	−0.57	0.26	1.48	14.50
Consv_accrual	0.0004	0.001	0.008	0.02	0.14
Quality	1.23	0.95	1.05	1.27	0.68
Persistence	0.61	0.33	0.65	0.95	0.44
Predictability	−38.34	−39.23	−15.19	−6.44	58.01
Smoothness	−0.14	−0.06	−0.03	−0.01	1.92
Timeliness	0.38	0.16	0.32	0.57	0.27
Relevance[a]	0.33	0.12	0.27	0.48	0.25
Log(Size)	6.87	5.78	6.78	7.84	1.53
Leverage	0.26	0.12	0.25	0.38	0.19
ROA	0.03	0.01	0.04	0.07	0.10
Rating	10.26	9	10	12	2.57
Numcov	2.81	2	3	4	1.20
Escalate	0.46	0	0	1	0.50
Otherdebt	0.78	1	1	1	0.41
Loan size	0.26	0.11	0.20	0.35	0.20
Loan month	41.23	24	37	60	21.63
Revolver	0.86	1	1	1	0.35
PP	0.79	1	1	1	0.41

Panel B. Industry composition

Industry	Number of firms	Percentage (%)
Agriculture, forestry and fishing	4	0.20
Mining, oil & gas	60	3.04

Table 7 (*continued*)

Panel B. Industry composition

Industry	Number of firms	Percentage (%)
Food, beverage, tobacco	44	2.23
Textile, wood, furniture, paper, printing and publishing	206	10.44
Chemicals and allied products, plastic material	56	2.84
Medicinal chemicals, pharmaceutical preparations	19	0.96
Oil and gas extractions, petroleum refining and related	118	5.98
Plastic, leather, glass, concrete products, metal, fabricated metal products	467	23.66
Computers, electronics, computer services	136	6.89
Transportation, communication	88	4.46
Electric, gas and sanitary services	99	5.02
Wholesale and retail	307	15.55
Services	186	9.42
Banks, financial institutions, real estate	184	9.32
Total	1,974	100

Panel C. Correlation table of SDC sample (correlation coefficients in bold are significant at the 5% level or higher)

	Spread	*Consv_coeff*	*Consv_R^2*	*Consv_negskew*	*Consv_accrual*	*Log (Size)*	*Lev*	*ROA*	*Rating*	*Num cov*	*Esca _late*	*Other Debt*	*Loan size*	*Loan month*	*Revol _ver*
Cosv_coeff	**−0.05**														
Consv_R^2	**−0.07**	**0.15**													
Consv_negskew	**−0.09**	0.01	−0.02												
Consv_accrual	**−0.06**	**−0.08**	−0.03	**0.11**											
Log(Size)	**−0.33**	0.00	**0.12**	−0.03	0.04										
Lev	**0.28**	0.02	−0.002	0.001	**0.06**	**0.11**									
ROA	**−0.26**	−0.02	0.003	**−0.13**	−0.03	0.00	**−0.19**								
Rating	**0.60**	0.03	−0.04	**0.11**	−0.03	**−0.54**	**0.33**	**−0.34**							
Num cov	**0.35**	−0.02	0.00	**0.05**	−0.04	**−0.43**	**0.10**	−0.02	**0.41**						
Escalate	**0.45**	0.02	−0.03	**0.13**	−0.01	**−0.22**	**0.24**	**−0.16**	**0.40**	**0.31**					
Other debt	0.02	0.03	0.03	0.01	0.06	**0.10**	**0.14**	−0.00	**0.01**	**0.06**	0.04				
Loan size	**0.09**	0.02	**−0.07**	−0.01	**0.06**	**−0.43**	0.04	**0.06**	**0.26**	**0.17**	**0.15**	0.00			
Loan month	**0.10**	0.03	−0.005	0.01	**0.05**	**−0.18**	**0.12**	0.05	**0.23**	**0.12**	**0.25**	**−0.07**	**0.24**		
Revol_ver	**−0.39**	−0.03	−0.03	−0.06	0.03	**0.11**	**−0.12**	0.03	**−0.30**	**−0.14**	**−0.23**	0.02	**−0.07**	**−0.30**	
PP	**−0.17**	0.01	**0.06**	**0.01**	0.03	**0.12**	0.02	**0.06**	**−0.13**	−0.03	0.04	**0.09**	**0.05**	**0.11**	**0.15**

Variable definitions:

Spread: The initial spread (basis points over LIBOR) charged for each loan.

Consv_coeff: $(\beta_{0i}+\beta_{1i})/\beta_{0i}$, from firm-specific earnings-returns regression $E_{it}/P_{it-1} = \alpha_{0i} + \alpha_{1i}DR_{it} + \beta_{0i}R_{it} + \beta_{1i}R_{it} * DR_{it} + \varepsilon_{it}$ (Basu, 1997), where E_{it} is the earnings per share (Compustat #58) of firm i in fiscal year t, P_{it-1} is the price per share of firm i at the beginning of fiscal year t, $R_{it}$is the 12-month return of firm i ending 3 months after the end of fiscal year t, and DR_{it} is a dummy variable equal to one if $R_{it}<0$ and zero otherwise. It is measured using all available earnings and returns up until the loan initiation.

Consv_R^2: R^2_{bad}/R^2_{good}, where R^2_{bad} (R^2_{good}) comes from the same Basu regression above but is applied only to the negative (positive) return period. It is measured using all available earnings and returns up until the loan initiation.

Table 7 (*footnote continued*)

Consv_negskew: −(skewness of earnings (Compustat #18)/skewness of cash flow from operations), where cash flow from operations is Compustat # 308 if available, and funds from operations (Compustat #110)–Δcurrent assets (Compustat #4)–Δdebt (Compustat #34)+Δcurrent liabilities (Compustat #5)+Δcash (Compustat #1) otherwise. It is measured using all available earnings and cash flows up until the loan initiation.

Consv_accrual: −(accumulated nonoperating accruals/accumulated total assets (Compustat #6)). Nonoperating accruals = operating accruals–Δaccounts receivable (Compustat #2)–Δinventories (Compustat #3)–Δprepaid expenses (Compustat #160)+Δaccounts payable (Compustat #70)+Δtaxes payable (Compustat #71), where operating accruals = net income (Compustat #172)+depreciation (Compustat #14))–cash flow from operations (Compustat #308), or net income (Compustat #172)+depreciation (Compustat #14))–funds from operations (Compustat #110)+Δcurrent assets (Compustat #4)+Δdebt (Compustat #34)–Δcurrent liabilities (Compustat #5)–Δcash (Compustat #1) if Compustat #308 is not available. It is measured using all available data up until the loan initiation.

Quality: $-\sigma(\hat{v}_{jt})$ from the regression $\frac{TCA_{jt}}{Assets_{jt}} = \alpha_{0,j} + \alpha_{1,j}\frac{CFO_{j,t-1}}{Assets_{j,t}} + \alpha_{2,j}\frac{CFO_{j,t}}{Assets_{j,t}} + \alpha_{3,j}\frac{CFO_{j,t+1}}{Assets_{j,t}} + v_{j,t}$, where TCA_{jt} is firm j's total current accrual, computed as $\Delta CA_{j,t} - \Delta CL_{j,t} - \Delta Cash_{jt} + \Delta STDEBT_{j,t}$, $Assets_{jt}$ is firm j's average total assets in year t and $t-1$, $CFO_{j,t}$ is firm j's cash flow from operations in year t, computed as $NI_{j,t} - CFO_{j,t}$, $NI_{j,t}$ is firm j's net income before extraordinary items (Compustat #18), $CFO_{j,t} = \Delta CA_{j,t} + \Delta CL_{j,t} + \Delta Cash_{j,t} - \Delta STDEBT_{j,t} + Depre_{j,t}$, $\Delta CA_{j,t}$ is firm j's change in current assets (Compustat #4), $\Delta CL_{j,t}$ is firm j's change in current liabilities (Compustat #5), $\Delta Cash_{j,t}$ is firm j's change in cash (Compustat #1), $\Delta STDEBT_{j,t}$ is firm j's change in current liabilities (Compustat #34), and $Depre_{j,t}$is firm j's depreciation and amortization expeenses (Compustat #14). This regression is estimated using all available data prior to loan initiation.

Persistence: The slope coefficient $\hat{\phi}_{1,j}$ from the regression $E_{j,t} = \phi_{0,j} + \phi_{1,j}E_{j,t-1} + v_{j,t}$, where $E_{j,t}$ is firm j's earnings per share excluding extraordinary items (Compustat #58). This regression is estimated using all available data prior to loan initiation.

Predictability: $-\sigma(\hat{v}_{jt})$ from the regression $E_{j,t} = \phi_{0,j} + \phi_{1,j}E_{j,t-1} + v_{j,t}$. This regression is estimated using all available data prior to loan initiation.

Smoothness: $-\sigma(NI_{j,t})/\sigma(CFO_{j,t})$, where $NI_{j,t}$ and $CFO_{j,t}$ are defined the same as for *Quality*. This regression is estimated using all available data prior to loan initiation.

Timeliness: R_j^2 from the regression $E_{it}/P_{it-1} = \alpha_{0i} + \alpha_{1i}DR_{it} + \beta_{0i}R_{it} + \beta_{1i}R_{it}*DR_{it} + \varepsilon_{it}$, where E_{it} is the earnings per share (Compustat #58) of firm i in fiscal year t, P_{it-1} is the price per share of firm i at the beginning of fiscal year t, R_{it} is the 12-month return of firm i ending three months after the end of fiscal year t, and DR_{it} is a dummy variable equal to one if $R_{it} < 0$ and zero otherwise. This regression is estimated using all available data prior to loan initiation.

Relevance: R_j^2 from the regression $R_{j,t} = \lambda_{0,j} + \lambda_{1,j}NI_{j,t} + \lambda_{2,j}\Delta NI_{j,t} + \varepsilon_{j,t}$, where $R_{j,t}$ is firm j's 12-month return ending three months after the fiscal year-end, $NI_{j,t}$ is firm j's net income before extraordinary items (Compustat #18) deflated by the market value at the end of year $t-1$, and $\Delta NI_{j,t}$ is change in $NI_{j,t}$ from year $t-1$ to t. This regression is estimated using all available data prior to loan initiation.

Size: The natural log of the total assets of the borrower (Compustat #6) prior to loan initiation.

Leverage: Long-term debt/total assets (Compustat #9/Compustat #6) prior to loan initiation.

ROA: Net income/total assets (Compustat #172/Compustat #6) prior to loan initiation.

Rating: Actual S&P debt rating if available; imputed debt rating if the actual rating is not available. I calculate the imputed rating by estimating a regression of available S&P ratings on *firm size*, *leverage*, *ROA*, *loan size*, and *loan maturity* and then applying the estimated coefficients to the loans for which actual ratings are not available.The imputed rating is calculated as $19.33 + 0.23*loansize + 0.0026*loanmonth - 1.4*revolv - 7.26*roa + 2.57*lev - 1.283*size$. *Rating* is measured right before the loan initiation to reflect the perceived risk of the new loan.

Numcov: Number of financial covenants contained in the debt contract.

Escalate: Dichotomous variable equal to one if any of the financial covenant is escalating and zero otherwise.

Other debt: Dichotomous variable equal to one if the same borrower has other loans and zero otherwise.

Loan size: Principal/total assets of the borrower.

Loan month: Length of the loan in months.

Revolver: Dichotomous variable equal to one for revolving loans and zero otherwise.

PP: Dichotomous variable equal to one if the loan has performance pricing and zero otherwise.

[a] *Consv_coeff*, *Consv_R*^{2}, *Consv_accrual*, *Quality*, *Persistence*, *Predictability*, *Smoothness*, *Timeliness*, and *Relevance* are truncated at the top and bottom one percentile to exclude extreme outliers. The statistics reported here are all magnitudes, while the actual testing uses the rank of each attribute measure. The results are robust to including or excluding the outliers.

loans) also have a higher number of covenants and their covenants are more likely to be escalating. The findings on performance pricing go somewhat in the opposite direction. Performance pricing is more likely to be used if the borrower is larger, less leveraged, and better rated, and if the loan is revolving. It therefore appears that covenants and performance pricing are targeted at different borrowers, even though both aim to protect lenders from downside risk.

Table 8 provides the results of the multivariate regression of loan spread on conservatism and six other earnings attributes as additional controls to shed light on which earnings attributes lenders value. I predict that out of the seven accounting attributes, conservatism, smoothness, persistence, and predictability are important to lenders in determining interest rates. Lenders are likely to value conservatism because conservative financials provide a timely signal of changes in default risk, enabling lenders to mitigate their downside risk. Lenders are also likely to value smoothness, persistence, and predictability of earnings as a persistent and/or predictable earnings series generates a steady stream of future interest payments and leads to lower default risk, and a smooth earnings series correlate with a low risk profile. The definitions of these six other earnings attributes, which come from Francis et al. (2004), are as follows:

Quality: $-\sigma(\hat{v}_{jt})$ from the regression $\frac{TCA_{jt}}{Assets_{jt}} = \alpha_{0,j} + a_{1,j}\frac{CFO_{j,t-1}}{Assets_{j,t}} + \alpha_{2,j}\frac{CFO_{j,t}}{Assets_{j,t}} + \alpha_{3,j}\frac{CFO_{j,t+1}}{Assets_{j,t}} + v_{j,t}$, where TCA_{jt} is firm j's total current accruals, computed as $\Delta CA_{j,t} - \Delta CL_{j,t} - \Delta Cash_{jt} + \Delta STDEBT_{j,t}$, $Assets_{jt}$ is firm j's average total assets in year t and $t-1$, $CFO_{j,t}$ is firm j's cash flow from operations in year t, computed as $NI_{j,t} - CFO_{j,t}$, $NI_{j,t}$ is firm j's net income before extraordinary items (Compustat #18), $CFO_{j,t} = \Delta CA_{j,t} + \Delta CL_{j,t} + \Delta Cash_{j,t} - \Delta STDEBT_{j,t} + Depre_{j,t}$, $\Delta CA_{j,t}$

Table 8
Large sample evidence on the association between the initial loan spread and conservatism after controlling for the borrowers' other accounting attributes ($N = 1{,}974$)[a]

Variables	Expected sign	*Consv_coeff*	*Consv_R^2*	*Consv_negskew*	*Consv _accrual*	*Consv _avgrank*
Intercept		17.52 (0.62)	34.47 (1.22)	26.44 (0.94)	39.30 (1.39)	28.50 (1.00)
Earnings attributes						
Consv	−	**−0.009 (−3.76)****	**−0.006 (−2.41)****	**−0.005 (−1.95)***	**−0.008 (−2.47)****	**−0.006 (−4.37)****
Quality	?	0.002 (0.83)	0.01 (2.12)*	0.003 (1.09)	0.002 (0.84)	0.01 (2.10)*
Persistence	−	−0.01 (−3.77)**	−0.005 (−3.02)**	−0.009 (−3.11)**	−0.009 (−3.44)**	−0.009 (−3.12)**
Predictability	?	0.01 (2.68)**	0.01 (0.89)	0.01 (2.50)*	0.01 (2.56)**	0.01 (2.79)**
Smoothness	−	−0.01 (−3.14)**	−0.01 (−4.00)**	−0.01 (−3.28)**	−0.01 (−3.31)**	−0.01 (−3.13)**
Timeliness	?	0.007 (2.24)*	0.01 (1.95)*	0.006 (1.98)*	0.007 (2.17)*	0.006 (2.06)*
Relevance	?	−0.002 (−0.55)	0.005 (0.74)	0.0004 (0.10)	−0.0001 (−0.06)	−0.001 (−0.44)
Firm-specific control variables						
Log(Size)	−	−5.37 (−2.07)*	−8.3 (−3.20)**	−4.95 (−1.91)*	−5.13 (−1.98)*	−6.55 (−2.45)**
Leverage	+	26.14 (2.46)**	36.2 (3.69)**	29.29 (2.74)**	28.25 (2.65)**	30.66 (2.80)**
ROA	−	−31.15 (−1.60)	−35.44 (−1.30)	−27.48 (−1.40)	−29.85 (−1.53)	−26.89 (−1.37)
S&P rating	+	13.0 (12.0)**	11.98 (9.09)**	12.91 (11.80)**	12.93 (12.17)**	12.83 (11.91)**
Loan-specific control variables						
Numcov	?	7.61 (4.34)**	7.18 (3.12)**	7.55 (4.28)**	7.66 (4.35)**	6.99 (3.85)**
Escalate	?	43.76 (10.85)**	45.28 (8.71)**	43.52 (10.75)**	43.77 (10.83)**	43.03 (10.45)**
Other debt	?	0.02 (0.01)	0.6 (0.87)	−0.23 (−0.06)	0.19 (0.05)	0.09 (0.02)
Loan size	?	−15.42 (−2.77)**	−14.1 (−2.82)**	−15.63 (−2.80)**	−15.08 (−2.70)**	−14.44 (−2.55)**
Loan month	−	−0.51 (−5.94)**	−0.4 (−5.25)**	−0.51 (−5.90)**	−0.50 (−5.76)**	−0.53 (−6.06)**
Revolver	−	−66.84 (−11.91)**	−69.8 (−11.14)**	−67.06 (−11.92)**	−67.09 (−11.93)**	−69.47 (−12.12)**
PP	?	−1.5 (−0.20)	−21.5 (−2.96)**	−10.33 (−1.19)	−20.90 (−2.56)**	−11.33 (−1.35)
*PP*Consv*	?	−0.02 (−2.40)*	−0.02 (−1.41)	−0.01 (−1.26)	0.001 (0.26)	−0.01 (−1.12)
Industry dummies		Included	Included	Included	Included	Included
Adj-R^2 (%)		47.3	45.9	47.0	47.2	47.4

See Table 7 for variable definitions.

** and * represent significance at the 1% and 5% level, respectively, for one- or two-tailed tests as appropriate.

[a]I exclude firms with less than three positive or negative returns to calculate *Consv_R^2*; therefore, $N = 1{,}679$ for the *Consv_R^2* measure.

is firm j's change in current assets (Compustat #4), $\Delta CL_{j,t}$ is firm j's change in current liabilities (Compustat #5), $\Delta Cash_{j,t}$ is firm j's change in cash (Compustat #1), $\Delta STDEBT_{j,t}$ is firm j's change in debt in current liabilities (Compustat #34), and $Depre_{j,t}$ is firm j's depreciation and amortization expenses (Compustat #14). This regression is estimated using all available data prior to loan initiation.

Persistence: The slope coefficient $\hat{\phi}_{1,j}$ from the regression $E_{j,t} = \phi_{0,j} + \phi_{1,j}E_{j,t-1} + v_{j,t}$, where $E_{j,t}$ is firm j's earnings per share excluding extraordinary items (Compustat #58). This regression is estimated using all available data prior to loan initiation.

Predictability: $\sigma(\hat{v}_{jt})$ from the same regression above, i.e.,$E_{j,t} = \phi_{0,j} + \phi_{1,j}E_{j,t-1} + v_{j,t}$. This regression is estimated using all available data prior to loan initiation.

Smoothness: $\sigma(NI_{j,t})/\sigma(CFO_{j,t})$, where $NI_{j,t}$ and $CFO_{j,t}$ are defined the same as in *Quality*. This regression is estimated using all available data prior to loan initiation.

Timeliness: R_j^2 from the regression $E_{it}/P_{it-1} = \alpha_{0i} + \alpha_{1i}DR_{it} + \beta_{0i}R_{it} + \beta_{1i}R_{it} * DR_{it} + \varepsilon_{it}$, where E_{it} is the earnings per share (data58) of firm i in fiscal year t, P_{it-1} is the price per share of firm i at the beginning of fiscal year t, R_{it} is the 12-month return of firm i ending 3 months after the end of fiscal year t, and DR_{it} is a dummy variable equal to one if $R_{it}<0$ and zero otherwise. This regression is estimated using all available data prior to loan initiation.

Relevance: R_j^2 from the regression $R_{j,t} = \lambda_{0,j} + \lambda_{1,j}NI_{j,t} + \lambda_{2,j}\Delta NI_{j,t} + \varepsilon_{j,t}$, where $R_{j,t}$ is firm j's 12-month return ending 3 months after the fiscal year end, $NI_{j,t}$ is firm j's net income before extraordinary items (Compustat #18) deflated by the market value at the end of year $t-1$, and $\Delta NI_{j,t}$ is the change in $NI_{j,t}$ from year $t-1$ to t. This regression is estimated using all available data prior to loan initiation.

Table 8 illustrates a significantly negative relation between the loan spread and the level of borrower conservatism, which indicates that conservatism reduces interest rates in general. These findings are consistent with the findings from the negative shock sample. Additionally, Table 8 shows that tighter covenants usually accompany higher interest rates, as shown by the significantly positive relation between *Numcov* and *Spread*, and between *Escalate* and *Spread*. This indicates that lenders use higher interest rates and tighter covenants simultaneously to compensate the higher expected default risk. Consistent with the finding from the negative shock sample, worse debt ratings and higher leverage ratios increase interest rates. Other factors that decrease interest rates include high ROA, larger loan size, and longer loan maturity.

Table 8 also shows that out of the seven earnings attributes, conservatism, persistence, and smoothness reduce interest rates incrementally to each other.[23] This highlights the incremental importance of accounting conservatism above and beyond the other six earnings attributes. The evidence from this test indicates that lenders prefer a set of earnings attributes that reduce their downside risk.

5.3.2. Market-to-book as an alternative measure of conservatism

Market-to-book is a commonly used measure of conservatism in the accounting literature (Beaver and Ryan, 2000; Ahmed et al., 2002; Pae et al., 2005). Market-to-book captures the understatement of net assets relative to market value, which equals the sum of separable net assets and rents (Roychowdhury and Watts, 2007). Evidence suggests that, unlike separable net assets, rents in the form of goodwill are typically not written down in response to bad news, at least not prior to SFAS 142 (Roychowdhury and Watts, 2007, pp. 36–39). Holthausen and Watts (2001) argue accounting is not designed to record rents because rents are generally not verifiable and in liquidation will generally have zero value unless they are separately saleable. Given the evidence and the above interpretation, the inclusion of rents in market-to-book causes it measure conservatism with error.

[23]Earnings quality reduces interest rates in the simple correlation table (not tabulated). However, earnings quality loses its significance in the multiple regression when all other attributes are included.

Based on the above, I do not use market-to-book in the main tests. However, for comparability with the existing literature I use market-to-book as an additional proxy for conservatism. Table 9, Panel A presents the probit and hazard regression results using three market-to-book measures, specifically, market-to-book,

Table 9
Market-to-book as an alternative measure of conservatism

Variables (expected sign)	Test of H1a using three market-to-book measures of conservatism			Test of H1b using three market-to-book measures of conservatism		
	Consv_MB	*Consv_MB _indadj*	*Consv _BR*	*Consv_MB*	*Consv_MB _indadj*	*Consv _BR*
Panel A. Test of H1a and H1b using three market-to-book measures of conservatism						
Intercept	0.04 (0.00)	0.10 (0.01)	−0.28 (0.07)	N/A	N/A	N/A
Consv	−0.001 (0.60)	−0.0004 (0.24)	0.0002 (0.02)	−0.002 (2.15)	−0.0003 (0.06)	0.0004 (0.04)
Cumret (−)	−0.001 (2.91)*	−0.002 (4.18)**	−0.002 (4.90)**	−0.001 (0.71)	−0.002 (1.46)	−0.003 (1.70)
Log(Size) (−)	−0.17 (5.14)**	−0.18 (6.10)***	−0.17 (4.55)**	−0.31 (4.60)**	−0.33 (5.02)**	−0.28 (3.13)*
Leverage (?)	−0.24 (1.17)	−0.37 (2.55)*	−0.09 (0.13)	−0.25 (0.27)	−0.63 (1.42)	−0.18 (0.11)
ROA (−)	0.58 (0.91)	0.72 (1.26)	1.42 (3.15)*	0.63 (0.33)	0.96 (0.67)	1.47 (1.21)
ΔNW (−)	0.01 (0.07)	0.01 (0.08)	0.005 (0.05)	0.01 (0.06)	0.01 (0.04)	0.008 (0.06)
Rating (+)	0.03 (0.26)	0.03 (0.33)	0.05 (0.65)	0.004 (0.002)	0.02 (0.06)	0.04 (0.15)
Numcov (+)	0.12 (2.85)*	0.14 (3.94)**	0.15 (3.42)*	0.16 (1.74)	0.19 (2.26)	0.19 (1.83)
Escalate (+)	−0.12 (0.53)	−0.19 (1.23)	−0.22 (1.35)	−0.04 (0.02)	−0.13 (0.18)	−0.12 (0.12)
Other debt (+)	0.19 (1.48)	0.19 (1.36)	0.13 (0.52)	0.20 (0.53)	0.19 (0.41)	0.08 (0.06)
Loan size (?)	−0.14 (3.45)*	−0.15 (3.79)**	−0.16 (3.78)**	−0.16 (1.49)	−0.14 (0.96)	−0.15 (1.05)
Month_to maturity (?)	−0.002 (0.19)	−0.001 (0.04)	−0.002 (0.12)	−0.004 (0.34)	−0.001 (0.03)	−0.002 (0.03)
N	327	327	260	279	279	228
Pseudo-R^2 (%)	7.3	9.2	9.3	3.2	4.1	4.1

Variables	Expected sign	*Consv_MB*	*Consv_MB _indadj*	*Consv _BR*
Panel B. Test of H2 using three market-to-book measures of conservatism				
Intercept	N/A	49.81 (0.63)	69.97 (1.03)	19.50 (0.27)
Consv	−	−0.22 (−1.56)	0.02 (1.03)	0.006 (0.09)
Log(Size)	−	1.76 (0.31)	−4.02 (−0.80)	1.64 (0.31)
Leverage	+	33.92 (1.23)	47.47 (1.99)**	41.16 (1.36)
ROA	−	1.77 (0.03)	−27.70 (−0.59)	−1.10 (−0.02)
Rating	+	17.43 (4.43)**	15.72 (4.47)***	17.21 (4.61)***
Numcov	?	−1.02 (−0.20)	−2.49 (−0.57)	−0.53 (−0.11)
Escalate	?	34.70 (2.92)**	35.44 (3.49)***	37.30 (3.34)***
Other debt	?	−8.50 (−0.73)	−3.45 (−0.35)	−15.18 (−1.39)
Loan size	?	−27.26 (−1.38)	−17.41 (−0.93)	−8.35 (−0.40)
Loan month	?	−0.28 (−0.90)	−0.24 (−0.98)	−0.36 (−1.29)
Revolver	−	−45.20 (−2.37)**	−45.10 (−2.85)***	−48.48 (−2.73)***
PP	−	−65.91 (−2.83)**	−45.90 (−2.91)***	−39.96 (−2.46)***
*PP*Consv*	?	0.08 (0.47)	−0.08 (−1.21)	−0.10 (−1.21)
N		314	314	250
Adj-R^2 (%)		43.2	45.1	40.6

Variable definitions:
Consv_MB: The rank of the borrower's market-to-book ratio (Compustat Compustat #199*Compustat #25/Compustat #60) prior to loan initiation.
Consv_MB_indadj: The rank of the borrower's industry-adjusted market-to-book ratio prior to loan initiation. The industry is defined as the same 2-digit SIC code.
Consv_BR: The Beaver and Ryan (2000) measure, i.e., the firm effect in the regression of the book-to-market ratio on the current and six lagged security returns with fixed firm and time effects. Specifically, *Consv_BR*, is the rank of $\alpha_i$obtained from the following regression: $BTM_{t,i} = \alpha_t + \alpha_i + \sum_{j=0}^{6}\beta_j R_{t-j,i} + \varepsilon_{t,j}$ where $BTM_{t,i}$ is the book-to-market ratio and $R_{t-j,I}$ are the current and six lagged returns. This regression is estimated using all available book value, market value, and return data prior to loan initiation.
See Tables 4–6 for other variable definitions.
** and * represent significance at the 1% and 5% level, respectively, for one- or two-tailed tests as appropriate.

industry-adjusted market-to-book, and the Beaver and Ryan (2000) measure. The panel shows that borrowers with a higher market-to-book are no more likely to violate covenants than those with a lower market-to-book. Table 9, Panel B indicates that firms with a higher market-to-book do not receive lower interest rates. These results partially confirm that market-to-book is too noisy a measure of conservatism to be considered by lenders.

6. Conclusions

This paper investigates the contracting benefits of accounting conservatism in the debt contracting process. I find that more conservative borrowers are more likely to violate covenants after a negative price shock, and that lenders lower the interest rates they charge to conservative borrowers. The higher likelihood of covenant violations and the lower interest rates suggest that conservatism benefits both lenders and borrowers, enhancing the efficiency of debt contracting.

Additional tests reveal that after controlling for six other earnings attributes (quality, persistence, predictability, smoothness, timeliness, relevance, and conservatism), conservatism is still associated with lower interest rates. In contrast to Francis et al.'s (2004) finding that conservatism does not reduce the cost of equity, the evidence in my paper shows that lenders' demand for conservative financial reporting differs from that of shareholders.

Note that the major conclusions in this paper are based on a restricted sample of firms that experience at lease on negative shock and thus cannot be generalized to broader samples. Even though I test the second hypothesis in a broader sample, the debt examined is still restricted to bank loans, rather than public debt or private placements. As such the results herein may not be generalized to all forms of debt. Nevertheless, since accounting conservatism works directly through financial covenants and covenants are rare in both public debt and private placements, bank loans are the appropriate sample with which to test the role of conservatism.

One potential avenue for future research is to examine the factors that determine the optimal level of conservatism for each firm. In this paper I document one benefit of conservatism, namely, a reduction in interest rates. According to positive accounting theory, conservatism is also likely to reduce both litigation costs and scrutiny from the tax authorities. However, conservatism is associated with costs. Understanding the determinants of conservatism will help us understand the cost-benefit tradeoffs that firms face in determining their accounting policies.

Appendix A. Examples of the protective actions lenders take after covenant violations.

A.1. Protective actions written into the debt contract

(1) Conseco Inc. 10-k Exhibit 10, 2003

> Default Interest. …, effective immediately upon the occurrence of an Event of Default, and for as long thereafter as such Event of Default shall be continuing, the principal balance of all Loans and the amount of all other Obligations shall bear interest at a rate which is 2.00% per annum in excess of the rate of interest applicable to such Loans or such other Obligations from time to time.

(2) Oriole Homes Corp. 10-k Exhibit 10, 1999

> Upon occurrence of any Event of Default, the Loan shall, at the option of Bank and without any further notice or demand not expressly required herein, become immediately due and payable, and shall thereafter bear interest at the Default Rate, and at all times thereafter Bank shall have all rights, privileges, powers and remedies provided by law or equity and this agreement, the Mortgage and any other Loan Document, and which it may otherwise have against the Borrower, the Collateral, or otherwise.
> Default Rate means a rate of interest that is 5% per annum in excess of the rate of interest otherwise applicable to Line Advances.

A.2. Protective actions taken by lenders after a violation of financial covenants

AEP Industries Inc. 10-k, 1998

In October 1997, the Company received a waiver relating to certain financial ratios contained in the Credit Agreement and entered into an amendment to the Credit Agreement (the "Amendment"). The principle effects of the Amendment relate to the interest rate applicable to the Credit Agreement. The interest rate margins which determine the interest rates applicable to the loans under the Credit Agreement increased as follows: the margin applicable to Base Rate loans (formerly 0%) increased to a range from 0% to 0.75% and the margin applicable to LIBOR Rate loans (formerly 0.25% to 0.625%) increased to a range from 0.45% to 1.75%.

Appendix B. A simple simulation to illustrate the intuition of using earnings skewness as a proxy for the level of conservatism

Conservatism is defined as the asymmetric reporting of bad news on a more timely basis than good news, as in Basu (1997) and Watts (2003a, b). In the simulation, I take this definition to an extreme: Bad news is fully capitalized immediately into earnings and good news is disclosed gradually over 10 periods including the current period (Figs. A1 and A2).

I assume that every period the firm receives a price shock drawn from a normal (0,1) distribution. If the price shock is negative, it impacts earnings immediately. If the price shock is positive, only one-tenth of the impact effects earnings this period and the rest of the impact effects earnings evenly over the next nine periods. This pattern continues for 100 periods. The average earnings in the 100th period from 1,000 simulations are drawn in the following graph.

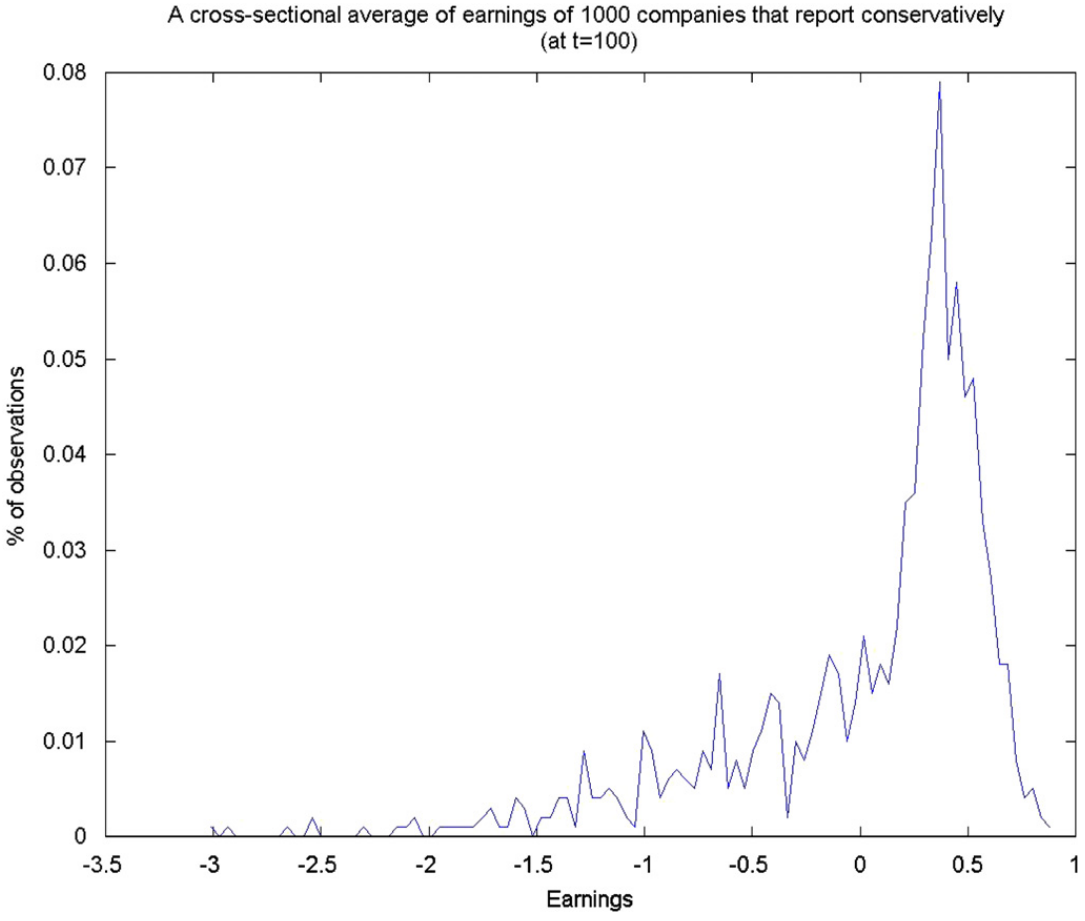

Fig. A1. Simulated distribution of earnings of 1,000 conservative firms ($T = 100$, number of bins = 100, number of simulations = 1,000).

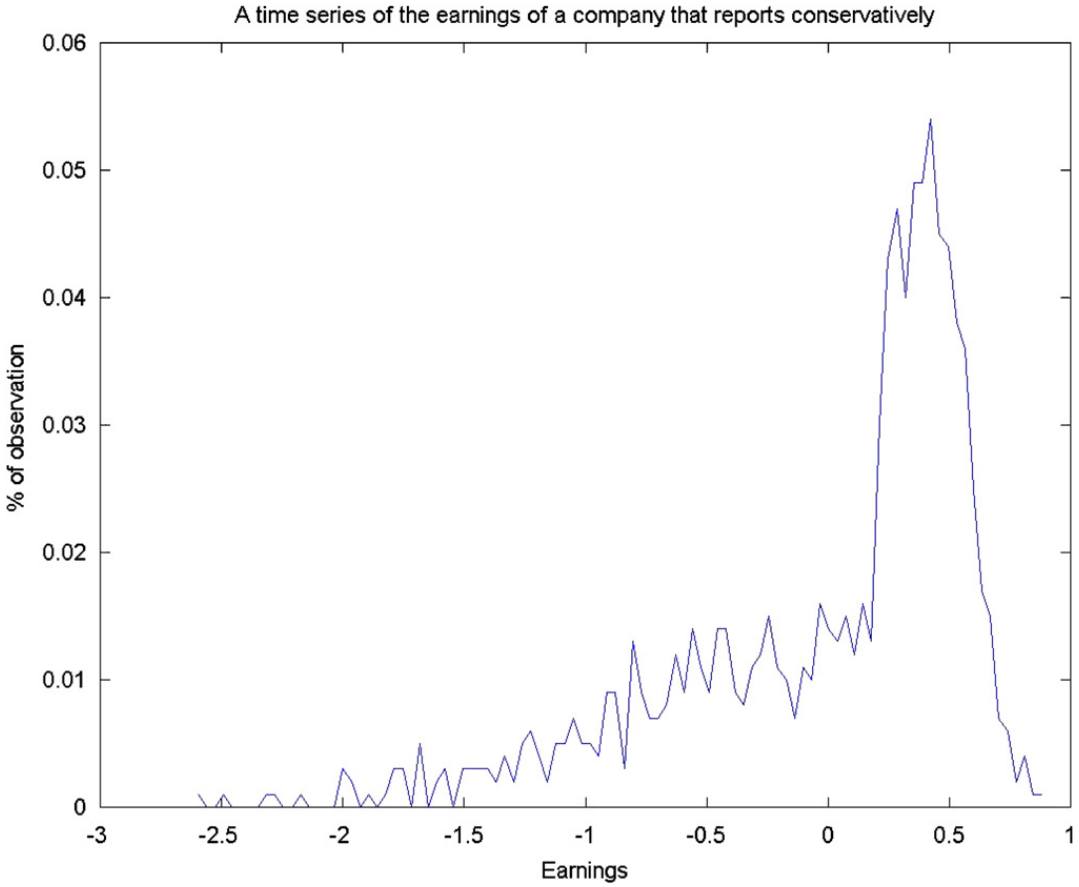

Fig. A2. Simulated time series of earnings of one conservative firm, ($T = 1{,}000$, number of bins = 100, number of simulations = 1).

The empirical distribution of the earnings time series of one company that reports conservatively looks similar to the distribution above if the process is ergodic (James. D. Hamilton, "Time Series Analysis," pp. 46–47).

Appendix C. The relation between Basu's measure of conservatism and the two earnings measures of conservatism from Givoly and Hayn (2000)

To connect the skewness of earnings and negative accumulation of nonoperating accruals with Basu's measure of conservatism, I add one more interaction term in Basu's original regression. I define DR_skew_i as a dummy variable equal to one if firm i's earnings are negatively skewed, and zero otherwise. If negatively skewed earnings reflect bad news more quickly than good news, then I expect $\beta_{2i} > 0$. I define $DR\_accrual_{it}$ as a dummy variable equal to one if firm i's cumulative nonoperating accruals is negative in year t, and zero otherwise. If negative cumulative nonoperating accruals is the result of earnings reflecting bad news more quickly than good news, then I expect $\gamma_{2i} > 0$. Using all the data available from Compustat and CRSP, I obtain the following results.

$E_{it}/P_{it-1} = \alpha_{0i} + \alpha_{1i}DR_{it} + \beta_{0i}R_{it} + \beta_{1i}R_{it} * DR_{it} + \beta_{2i}R_{it} * DR_{it} * DR\_skew_i + \varepsilon_{it}$		$E_{it}/P_{it-1} = \alpha_{0i} + \alpha_{1i}DR_{it} + \gamma_{0i}R_{it} + \gamma_{1i}R_{it} * DR_{it} + \gamma_{2i}R_{it} * DR_{it} * DR\_accrual_{it} + \varepsilon_{it}$	
Variables (expected sign)	Coefficient estimates	Variables (expected sign)	Coefficient estimates
Intercept	0.07 (98.5)***	Intercept	0.06 (101.4)***
DR_{it}	−0.007 (−5.4)***	DR_{it}	−0.005 (−3.9)***
R_{it}	−0.007 (−5.8)***	R_{it}	−0.02 (−15.8)***

$R_{it} * DR_{it}$ (+)	0.14 (28.7)***	$R_{it} * DR_{it}$ (+)	0.26 (52.2)***
$R_{it} * DR_{it} * DR\_skew_i$ (+)	0.14 (31.4)***	$R_{it} * DR_{it} * DR\_accrual_{it}$ (+)	0.03 (6.1)***
R^2	11.8%	R^2	13.2%

E_{it} EPS for firm i in fiscal year t.
P_{it-1} Price per share at the beginning of the fiscal year.
DR_{it} Dummy variable equal to one if $R_{it}<0$, zero otherwise.
R_{it} Annual return on firm i ending 3 months after fiscal year-end t.
DR_skew_i Dummy variable equal to one if firm i's earnings are negatively skewed, zero otherwise.
$DR\_accrual_{it}$ Dummy variable equal to one if firm i's nonoperating accrual is negative in year t, zero otherwise.

References

Ahmed, A., Billings, B., Morton, R., Harris, M., 2002. The role of accounting conservatism in mitigating bondholder–shareholder conflict over dividend policy and in reducing debt cost. The Accounting Review 77, 867–890.

Asquith, P., Beatty, A., Weber, J., 2005. Performance pricing in bank debt contracts. Journal of Accounting and Economics 40, 101–128.

Basu, S., 1997. The conservatism principle and the asymmetric timeliness of earnings. Journal of Accounting and Economics 24, 3–37.

Beatty, A., Weber, J., 2003. The effect of debt contracting on voluntary accounting method changes. The Accounting Review 78, 119–142.

Beatty, A., Ramesh, K., Weber, J., 2002. The importance of accounting changes in debt contracts: the cost of flexibility in covenant calculations. Journal of Accounting and Economics 33, 205–227.

Beatty, A., Weber, J., Yu, J., 2007. Conservatism and Debt. Journal of Accounting and Economics, forthcoming.

Beaver, W., Ryan, S., 2000. Biases and lags in book value and their effects on the ability of the book-to-market ratio to predict book return on equity. Journal of Accounting Research 38, 127–148.

Beneish, M., Press, E., 1993. Costs of technical violation of accounting-based debt covenants. The Accounting Review 68, 233–257.

Cox, D.R., 1972. Regression models and life-tables. Journal of the Royal Statistical Society, Series B 34, 187–220.

DeAngelo, H., DeAngelo, L., Skinner, D., 1994. Accounting choice in troubled companies. Journal of Accounting and Economics 17, 113–143.

DeFond, M., Jiambalvo, J., 1994. Debt covenant violation and manipulation of accruals. Journal of Accounting and Economics 17, 145–176.

Dichev, I., Skinner, D., 2002. Large-sample evidence on the debt covenant hypothesis. Journal of Accounting Research 40, 1091–1123.

Duke, J., Hunt, G., 1990. An empirical examination of debt covenant restrictions and accounting-related debt proxies. Journal of Accounting and Economics 12, 45–63.

Francis, J., LaFond, R., Olsson, P., Schipper, K., 2004. Cost of capital and earnings attributes. The Accounting Review 79, 967–1010.

Givoly, D., Hayn, C., 2000. The changing time-series properties of earnings, cash flows and accruals: has financial reporting become more conservative? Journal of Accounting and Economics 29, 287–320.

Givoly, D., Hayn, C., Natarajan, A., 2007. Measuring reporting conservatism. The Accounting Review 82, 65–106.

Holthausen, R., Watts, R., 2001. The relevance of the value-relevance literature for financial accounting standard setting. Journal of Accounting and Economics 31, 3–75.

Leuz, C., Nanda, D., Wysocki, P., 2003. Earnings management and investor protection: an international comparison. Journal of Financial Economics 69, 505–527.

Moerman, R., 2006. The role of information asymmetry and financial reporting quality in debt trading: evidence from the secondary loan market. Working paper, University of Pennsylvania.

Mohrman, M., 1996. The use of fixed GAAP provisions in debt contracts. Accounting Horizons 10, 78–91.

Pae, J., Thornton, D., Welker, M., 2005. The link between earnings conservatism and the price to book ratio. Working paper, Queen's University.

Press, E., Weintrop, J., 1990. Accounting-based constraints in public and private debt agreements. Journal of Accounting and Economics 12, 65–95.

Roychowdhury, S., Watts, R., 2007. Asymmetric timeliness of earnings, market-to-book and conservatism in financial reporting. Journal of Accounting and Economics 44, 2–31.

Sweeney, A., 1994. Debt-covenant violations and managers' accounting responses. Journal of Accounting and Economics 17, 281–308.

Watts, R., 2003a. Conservatism in accounting. Part I: Explanations and implications. Accounting Horizons 17, 207–221.

Watts, R., 2003b. Conservatism in accounting. Part II: Evidence and research opportunities. Accounting Horizons 17, 287–301.

Watts, R., Zimmerman, J., 1986. Positive Accounting Theory. Prentice-Hall, Englewood Cliffs, NJ (Chapter 8).