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Stock-Bond Return Co-Movement and Accounting Information

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Abstract

I examine how an important attribute of financial reporting quality, i.e., accounting conservatism, affects the sensitivity of corporate bond returns to changes in the value of equity (i.e., the hedge ratio). The correlation between stock and bond returns (co-movement) is a fundamental input for asset allocation decisions as it determines the diversification benefits of bonds relative to equities within an investment portfolio. According to structural models of credit risk, co-movement should be generally positive, but lower when the risk of wealth transfers from bondholders to shareholders is severe. I find that firms that report conservative earnings and use covenants in their bond contracts exhibit on average stronger co-movement. This result is consistent with conservatism providing bondholders with a credible and contractible signal that improves monitoring thus preventing wealth transfers.

Keywords: Stock-bond correlation, Co-movement, Asset allocation, Hedge ratios, Credit risk, Wealth transfers, Accounting conservatism, Debt covenants

JEL Classification*:* G12, G32, M41

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Abstract

I examine how an important attribute of financial reporting quality, i.e., accounting conservatism, affects the sensitivity of corporate bond returns to changes in the value of equity (i.e., the hedge ratio). The correlation between stock and bond returns (co-movement) is a fundamental input for asset allocation decisions as it determines the diversification benefits of bonds relative to equities within an investment portfolio. According to structural models of credit risk, co-movement should be generally positive, but lower when the risk of wealth transfers from bondholders to shareholders is severe. I find that firms that report conservative earnings and use covenants in their bond contracts exhibit on average stronger co-movement. This result is consistent with conservatism providing bondholders with a credible and contractible signal that improves monitoring thus preventing wealth transfers.

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1. Introduction

I study how a fundamental property of financial reporting (i.e., accounting conservatism) affects the correlation between the returns of stocks and bonds issued by the same firm.[1] The sensitivity of corporate bond returns to changes in the value of equity (i.e., the hedge ratio) is a fundamental input for portfolio asset allocation. Since imperfect correlation of asset returns is a key assumption in portfolio theory (Markowitz, 1952; Sharpe, 1964), stock-bond return co-movement is important to determine the diversification benefits of bonds, and to hedge common exposures across the two asset markets. Because bonds exhibit on average lower expected returns, a higher stock-bond return co-movement implies a greater allocation to equities.[2]

The relation between bondholders and shareholders' claims on the firm's assets has been largely investigated in the finance literature (Black and Scholes, 1973; Merton, 1974). According to structural models of default risk, an upward revision in firm expected cash flow should increase both the value of equity (because of increased profitability) and the value of debt (because of lower bankruptcy risk). Hence, *ceteris paribus*, stock and bond returns should exhibit a positive correlation on average.

However, differences in the payoff structures of shareholders and bondholders may give rise to agency conflicts (Jensen and Meckling, 1976). Shareholders may expropriate bondholders' wealth by engaging in risk shifting activities (i.e., by switching from safe to risky investments). These wealth transfers from bondholders to shareholders represent a manifestation of agency problems which reduce (or even reverse) the correlation between stock and bond returns.

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[1] I henceforth use the terms *stock-bond return correlation* and *stock-bond return co-movement* interchangeably.

[2] To appreciate the investment implications of cross-sectional and time-series variation in stock-bond return co-movement, a research report by MSCI (2009) estimates that a change in stock-bond return correlation from -0.5 to +0.5 would imply an increase in the optimal portfolio allocation of stocks from 36% to 67%. Therefore, a better understanding of the fundamental drivers behind the extent of co-movement is warranted.

If bondholders rationally anticipate the possibility of these conflicts, they will accordingly price-protect themselves by requiring a higher rate of return on their investment. Ultimately, therefore, shareholders will bear the deadweight costs of risk shifting. Shareholders, however, may *ex ante* signal their commitment to refrain from opportunistic behaviour through several contracting devices (e.g., debt covenants). Prior research shows that, similar to debt covenants, high-quality financial reporting acts as an efficient contracting mechanism that limits shareholders' ability to shift risk to bondholders (Bushman and Smith, 2001; Ball et al., 2008; Biddle et al., 2009; Bushman et al., 2011). In particular, the property of asymmetric recognition of gains and losses (i.e., accounting conservatism) (Basu, 1997; Watts 2003a and 2003b) meets creditors' differential demand for positive and negative earnings innovations given the payoff structure of their claim.[3] Conservatism provides a timely and credible signal to creditors because it increases the likelihood of covenant violations and facilitates early transfer of decision rights to creditors (Nikolaev, 2010; Tan, 2013).

I therefore argue that accounting conservatism, by decreasing *ex ante* shareholders' incentives to expropriate bondholders' wealth (i.e., agency cost of debt), increases *ex post* the extent of stock-bond return co-movement. Moreover, as agency conflicts between shareholders and bondholders are more severe when default risk is higher (Eisdorfer, 2008) and debt maturities are longer (Leland and Toft, 1996), I hypothesize the effect of conservatism on stock-bond correlation to be more pronounced in these instances.[4] Lastly, as prior research shows that

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[3] The accounting literature distinguishes between conditional and unconditional conservatism (see for example: Ball and Shivakumar, 2005; Roychowdhury and Watts, 2007). Since prior research shows that it is unclear whether or not unconditional conservatism enhances debt contracting efficiency (Ball and Shivakumar, 2005; 2006), I focus my analysis on conditional conservatism. The asymmetric timeliness property of conditional conservatism has been shown to play a crucial contracting and monitoring role (Beaver and Ryan, 2005).

[4] The fact that the effect of conservatism on stock-bond return correlation is hypothesized to be more pronounced when default risk is higher and, therefore, when one would *ex-ante* predict a higher stock-bond return correlation, creates significant challenges to my empirical analysis. I discuss these challenges, as well as the strategy I employ to address them, in detail in Section 4.

the demand for accounting conservatism increases when firms rely more on debt covenants (Nikolaev, 2010; Tan, 2013), I contend that firms with more conservative financial reports *and* with more covenants in their bond contracts exhibit on average stronger stock-bond return co-movement.

I test my predictions on a sample of 48,597 (1,478) bond-month (bond) observations pertaining to 301 unique firms. To analyze the relation between stock-bond return co-movement and accounting conservatism, I follow prior research and regress monthly bond returns on equity and treasury returns to calculate implied hedge ratios (my proxy for co-movement). To capture the degree of asymmetric loss recognition in financial reports, I use a quarterly estimation of the Khan and Watts' (2009) firm-level conservatism measure (Tan, 2013; Heflin et al., 2014).

In line with my predictions, I find that the correlation between stock and bond returns is increasing in the extent of accounting conservatism, and that the effect of conservatism is more pronounced when default risk is higher and bond maturities are longer. Further, I provide support for the idea that conservatism and debt covenants are both efficient contracting mechanisms. I show that co-movement is stronger for firms that use more covenants in their bond contracts *and* report more conservatively. The results are robust to alternative proxies for accounting conservatism as well to controls for bond-, firm- and macro-level determinants of stock-bond return correlation.

Further, to provide evidence of a causal link between accounting conservatism and co-movement, I run a battery of tests to mitigate potential endogeneity concerns. Results from these tests suggest that the relation I document is not affected by omitted correlated variables problems or reverse causality issues. While each of these tests could be subject to criticism, the fact that the evidence from each individual test supports the idea of a causal link between conservatism and stock-bond return correlation provides support for such a causal relation.

This study contributes to the literature that seeks to understand the role of accounting information in credit markets along several dimensions. First, by showing that accounting conservatism, a fundamental property of financial reporting information, explains cross-sectional variation in stock-bond return co-movement, I contribute to the literature that examines the credit market implications of information transparency (e.g., Daffie and Lando, 2001; Yu, 2005; Beaver et al., 2012; Arora et al., 2014).[5]

Second, my study is related to the literature on the economic consequences accounting conservatism (e.g., Ahmed et al., 2002; Beatty et al., 2008; Zhang, 2008; Francis and Martin, 2010; Ahmed and Duellman, 2011; Tan, 2013; Kravet, 2014). I complement this line of research by showing how the ability of conservatism to mitigate agency conflicts between shareholders and creditors extends to the co-movement of bonds and stocks.

Third, following the call from Lok and Richardson (2011) who highlight the need for more empirical studies on the role of accounting information in guiding portfolio asset allocation, I show how accounting conservatism affects firm-specific stock-bond return co-movement which in turn has important implications for portfolio allocation decisions. While the importance of *aggregate* stock-bond return co-movement for asset allocation is immediately clear, the relevance of *firm-specific* co-movement is not straightforward.[6] Firm-specific co-movement matters for asset allocation decisions because wealth transfers from debtholders to shareholders

[5] Duffie and Lando (2001) theoretically demonstrate that the opaqueness of accounting information leads to different predictions on the shape of the term structure of credit spreads. Other studies (Yu, 2005; Beaver et al., 2012; Correia et al., 2012; Arora et al., 2014; Correia et al., 2015) highlight how different features of financial reporting affect the credit market.

[6] While several studies focus on stock-bond return co-movement at the *aggregate level* (Keim and Stambaugh, 1986; Campbell and Ammer, 1993; Yang et al., 2009; Baele et al., 2010; Baker and Wurgler, 2012; Campbell et al., 2015), firm-level evidence is surprisingly scant. Among the few exceptions, Kwan (1996) finds that the degree of stock-bond return correlation is likely to be influenced by firm-specific information about the firm's net assets.

are unlikely to be independent across firms and, as a result, are difficult to diversify. Especially in periods of economic downturn, debt-equity conflicts may deteriorate systematically across firms in the economy, and thus many firms may exhibit wealth transfers at the same time. Consequently, understanding how accounting conservatism relates to firm-level co-movement of equity and bond returns is of importance for the optimal allocation of funds across the two asset classes.[7]

Fourth, my findings contribute to the literature that tries to understand the links between financial reporting properties and the use of covenants in public debt contracts (Nikolaev, 2010; Amiraslani et al., 2015). While Nikolaev (2010) and Amiraslani et al. (2015) investigate the complementarities between conservatism and bond covenants as contracting mechanisms, my focus is on their combined effect on stock-bond return correlation.

Finally, I provide new insights to the finance literature that empirically assesses the ability of structural models of credit risk to price corporate bonds (Campbell and Taksler, 2003; Huang and Huang, 2003; Arora et al., 2005; Schaefer and Strebulaev, 2008; Correia et al., 2012; Bao and Pan, 2013) by offering empirical support for the role of accounting information as theorized by Duffie and Lando (2001).

The remainder of the paper proceeds as follows. Section 2 provides the necessary background to the study and discusses the hypotheses development. Section 3 presents the sample selection procedure. Section 4 describes the empirical analysis. Section 5 presents a set of robustness tests, and Section 6 concludes.

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[7] Conservatism may also affect systematic risk and asset allocation through other channels. For example, it is possible that a stronger stock-bond co-movement is associated with a lower role of private information regarding the correlation between debt and equity returns, thus lowering the premium required by uninformed investors in the spirit of Easley and O'Hara (2004). Conservatism may also affect actual cash flows (i.e., may generate a *real effect*), as well as the assessed correlation between the cash flows to each firm's different security holders and the cash flows of the other firms in the market (Lambert et al., 2007).

2. Background and Hypotheses Development

2.1. Stock-Bond Return Co-Movement and Shareholder-Bondholder Conflicts

The finance literature has extensively studied the phenomenon of stock-bond return correlation at the *aggregate level* (Keim and Stambaugh, 1986; Campbell and Ammer, 1993; Yang et al., 2009; Baele et al., 2010; Baker and Wurgler, 2012; Campbell et al., 2015) providing evidence on how macroeconomic factors impact the return association across portfolios of stocks and bonds. Prior studies find that stock and bonds exhibit a positive (*albeit* small) return co-movement with substantial time-series variation (e.g., Connolly et al., 2005; Baele et al., 2010).

However, evidence on stock-bond co-movement at the *firm level* (i.e., return correlation between stocks and bonds issued by the same firm) is surprisingly scant. Kwan (1996) and Hotchkiss and Ronen (1999) document a positive firm-level co-movement of stocks and (high-yield) bonds. Schaefer and Strebulaev (2008) find that the magnitude of stock-bond co-movement is in line with the Merton (1974) model implied hedge ratio. Bao and Hou (2014) extend the Merton (1974) model and show that corporate bond maturity and credit risk are factors associated with stronger co-movement. In line with that, Bhanot et al. (2010) find that takeover risk explains cross-sectional variation in the correlation between stock and bond returns. Finally, Nieto and Rodriguez (2015) show that co-movement has important implications for capital structure choices.

Similarly to aggregate co-movement, understanding firm-specific stock-bond return correlation and its cross-sectional determinants is important for asset allocation. This is because wealth transfers from debtholders to shareholders are likely correlated across firms (especially during periods of economic downturn) and hence very difficult to diversify.

The returns expected by shareholders and bondholders should exhibit, on average, a positive correlation because an improvement in investors' expectations about future earnings increases both the value of equity and debt (Leland, 1994; Klock et al., 2005).

However, Jensen and Meckling (1976) show that differences in payoff structure between equity and debt claims may give rise to potential conflicts between shareholders and bondholders. Following a standard option-pricing framework (Black and Scholes, 1973; Merton, 1974), while the value of equity mimics a call option on the firm's assets, the value of debt resembles a put option. In the presence of risky debt, shareholders have incentives to shift risk to bondholders by taking actions that increase asset volatility. Whereas increased risk benefits shareholders (the value of the call increases), it provides detriment to bondholders (the value of the put decreases). As a consequence, conflicts between shareholders and bondholders make stock and bond returns become less synchronous (i.e., less positively correlated).

Shareholders may expropriate wealth from bondholders by switching from safe to risky investment strategies (i.e., asset substitution). If risky investments perform well, shareholders get most of the gains (the value of their call option increases), whereas bondholders bear most of the cost because of their limited upside potential (Fama and Miller, 1972; Parrino and Weisbach, 1999; Flor, 2011). Similarly, if bonds are priced under the assumption that no additional debt securities will be issued by the firm, bondholders may be expropriated if additional bonds of equal or higher priority are issued (i.e., claim dilution). Masulis (1980) shows that, when firms issue additional debt or exchange preferred stock for outstanding common stock, existing creditors bear more risk on average.[8]

[8] Other instances in which stockholder-bondholder conflicts become particularly important are: (*i*) dividend distributions (Handjinicolaou and Kalay, 1984); (*ii*) leveraged buyouts (Warga and Welch, 1993); (*iii*) spin-offs (Parrino, 1997; Maxwell and Rao, 2003); and (*iv*) stock repurchases (Maxwell and Stephens, 2003).

Rational bondholders anticipate shareholders' incentives to engage in wealth transfers and accordingly price-protect themselves by transferring the ensuing costs to the firm (i.e., the cost of debt increases) (Jensen and Smith, 1985). Since shareholders ultimately bear the costs of conflicts with bondholders, they have strong incentives to put in place contractual mechanisms *ex ante* to mitigate the agency cost of debt *ex post*.

The finance literature emphasizes the role of different contracting mechanisms through which the incentives of creditors and shareholders can be aligned (Bodie and Taggart 1978; Smith et al., 1991; Myers, 1997; Nash et al., 2003). Firms typically mitigate shareholder-bondholder conflicts by using restrictive covenants in their debt contracts (Lehn and Poulsen, 1991; Smith and Warner, 1979; Billett et al., 2007; Chava and Roberts, 2008; Nini et al., 2009; Wittenberg-Moerman, 2008; Nikolaev, 2010; Christensen et al., 2016) or by keeping the maturity of their debt short (Ozkan, 2000). Covenants that constrain the borrowing firm's production and investment policies (including mergers and acquisition restrictions), as well as those that limit financing activities (issuance of new debt or equity instruments) or payout policy, mitigate the asset substitution and claim dilution problems.

Covenants, however, are associated with significant costs for the firm as they cannot fully address the agency cost of debt for at least two reasons. First, because a firm's investment opportunity set is unobservable and hence cannot be contracted upon (i.e., markets are incomplete), covenants cannot effectively monitor all possible investment decisions. Second, when covenants become binding, they may cause either failure to abandon unproductive investments, or inability to invest in positive net present value projects. As a consequence, firms typically trade off costs and benefits of using covenants in their debt contracts (Smith and Warner, 1976; Nash et al., 2003).

2.2. Link between Stock-Bond Return Co-Movement and Accounting Information

Along with covenants, firms may use other contracting mechanisms to (further) enhance the efficiency of debt contracting and mitigate shareholders' incentives to expropriate bondholders. The quality of financial reporting has been shown to complement other contracting mechanisms to mitigate the agency cost of debt. A number of studies finds that high-quality financial reporting improves investment efficiency and limits shareholders' ability to shift risk to bondholders (Bushman and Smith, 2001; Biddle et al., 2009).

Financial reporting quality is inherently a multi-dimensional concept (Francis et al., 2004; Dechow et al., 2010) and different stakeholders are likely to be interested in different properties of accounting information. Creditors regard accounting information as of high quality if it provides them with a credible (and timely) signal to assess the credit standing of the firm. Because creditors' claims have an asymmetric payoff structure, creditors are more sensitive to increases, rather than decreases, in default risk and hence put more weight on the left tail of the earnings distribution.[9]

This idea of creditors' differential demand for positive and negative earnings innovations is theoretically linked to the concept of accounting conservatism (Basu, 1997; Watts 2003a and 2003b). Several empirical studies suggest that the asymmetric recognition of gains and losses inherent in conservative financial reports enhances contracting efficiency (Watts 2003a and 2003b; Ball and Shivakumar, 2005; Francis and Martin, 2010; Ahmed and Duellman, 2011; Kravet, 2014) by reducing shareholders' incentives to expropriate creditors (Ahmed et al., 2002; Beatty et al., 2008; Zhang, 2008; Tan 2013). By putting downwards pressure on earnings (i.e.,

[9] Easton et al. (2009) show that bond price reactions to earnings announcements tend to be larger for high-yield bonds and generally stronger when earnings convey bad news. Similarly, Shivakumar et al. (2010) find that cash flow news via management forecasts exhibit a stronger association with bond returns when credit ratings are lower and during the financial crisis.

asymmetric recognition of bad news relative to good news) accounting conservatism increases the likelihood of covenant violations and facilitates early transfer of decision rights to creditors (Nikolaev, 2010; Tan, 2013; Christensen et al., 2016).[10]

Although the idea that accounting conservatism enhances contracting efficiency appears undoubtedly appealing, theoretical studies do not provide uniform support for this view. On the one hand, Kwon et al. (2001) demonstrate that conservatism efficiently motivates managers in a principal-agent setting, and Guay and Verrecchia (2007) show that conservatism enhances quality and timeliness of disclosure. On the other hand, Gigler et al. (2009) derive conditions under which accounting conservatism decreases contracting efficiency, i.e., when the costs associated with the measurement error induced by conservative reporting outweigh its benefits. The main idea is that contracts are endogenous and can be designed differently depending on the level of conservatism (i.e., contracts can incorporate direct adjustments to accounting information). Several subsequent theory studies relax the assumptions in Gigler et al. (2009). Caskey and Hughes (2012) show that conservatism mitigates the asset substitution problem. Chen et al. (2007) argue that conservative accounting reduces managerial incentives to manipulate earnings upwards. Gox and Wagenhofer (2009) show that conservatism maximizes the ex-ante probability of obtaining debt financing. Jiang (2012; 2016) argues that whether conservatism affects debt contracting depends on the interaction between accounting and non-accounting information. Finally, Gao (2013) formalizes a general rationale for accounting conservatism as a measurement principle using an incomplete contracting setting. Taken together, insights from analytical studies suggest that a trade-off between costs and benefits of

[10] Moreover, DeFond et al. (2012) provide support for the conjecture that conservatism mitigates bankruptcy risk through its cash enhancing and informational properties.

conservatism explain the extent to which conservatism affects contracting efficiency (Chen et al., 2010).

2.3. Predictions

When agency conflicts between shareholders and bondholders are severe stock-bond return co-movement is less positive. Prior empirical literature shows that accounting conservatism is one of the monitoring mechanisms capable of reducing the likelihood of these conflicts (Ahmed et al., 2002; Beatty et al., 2008; Zhang, 2008; Chun et al., 2011; Costello and Wittenberg-Moerman, 2011; Tan, 2013). By providing bondholders with a credible signal of poor performance that allows them more time to take remedial actions, accounting conservatism mitigates the extent of risk shifting. I therefore expect more conservative firms to exhibit, on average, stronger co-movement.

H1: Stock-bond return co-movement increases in accounting conservatism.

Both time- and firm-specific changes in conservatism are likely to be associated with variation in stock-bond return co-movement. Observable commitment to conservative reporting mitigates agency costs and therefore limits shareholders' ability to shift risk to bondholders. At the same time though, agency concerns vary over time for a given firm,[11] and therefore a firm-specific increase in conservatism, by decreasing shareholders' incentives to expropriate bondholders' wealth, would in turn generate an increase in stock-bond return co-movement.

H1 predicts that accounting conservatism increases the extent of co-movement between stock and bond returns. However, analytical studies (Gigler et al., 2009; Gao, 2013) show that the endogenous nature of financial contracts implies that these contracts may incorporate

[11] An example is a change in information asymmetry between equity and debt investors caused by a firm-specific reduction in growth opportunities (LaFond and Watts, 2008).

adjustments to take into account different degrees of accounting conservatism. To the extent that financial contracts are designed with direct adjustments *H1* may not hold.

Option pricing theory (Black and Scholes, 1973; Merton, 1974) which characterizes the value of equity (debt) as a call (put) option on the firm's assets, shows that, as the volatility of assets increases (i.e., higher default risk), bondholders' claims become more equity-like and hence stock-bond correlation becomes stronger (Schaefer and Strebulaev 2008; Lok and Richardson, 2011; Bao and Hou, 2014). Conversely, a lower default risk reduces bondholders' sensitivity to improvements in earnings expectations and makes stock and bond returns less synchronous.

The presence of risky debt makes shareholder-bondholder conflicts become more severe (i.e., agency cost of debt). When default risk increases, the non-linearity in bondholders' payoff structure provides shareholders with more incentives to shift risk to bondholders (Eisdorfer, 2008). Moreover, Caskey and Hughes (2012) argue that conservatism can increase contracting efficiency when moral hazard problems (e.g., asset substitution) are severe. I therefore predict that this higher demand for accounting conservatism is associated with stronger co-movement.

H2: The effect of conservatism on stock-bond return co-movement is stronger the higher the risk of default.

Bao and Hou (2014) find that, consistent with the predictions of the Merton (1974) model, bonds with longer maturities tends to co-move more with equities. This is because bonds with longer maturities are junior in the capital structure and thus more equity-like. Risky debt increases shareholder-bondholder conflicts and in turn generates greater demand for contracting mechanisms, such as conservative reporting, to exert contingent allocation of control rights (Smith and Warner, 1979). In line with this argument, Khurana and Wang (2015) find that debt maturity is associated with the extent of accounting conservatism. Consequently, I expect the effect of conservatism on stock-bond return co-movement to be stronger the longer the bond maturity.

H3: The effect of conservatism on stock-bond return co-movement is increasing in bond maturity.

Debt covenants are designed to mitigate shareholder-bondholder conflicts and constitute a key feature of debt contracts. Covenants act as tripwires by facilitating a timely transfer of control rights to creditors when performance deteriorates (Smith and Warner, 1979; Chava and Roberts, 2008). Nikolaev (2010) finds that the demand for accounting conservatism increases when firms rely more on covenants in their public debt contracts. Tan (2013) provides evidence consistent with the conjecture that firms' financial reporting becomes more conservative in the event of a covenant violation. The evidence from prior studies collectively suggests that covenants and conservatism are both effective mechanisms that firms use to mitigate the agency cost of debt. I therefore expect accounting conservatism *and* the use of covenants in bond contracts to jointly increase stock-bond return correlation.

H4: Accounting conservatism together with bond covenants increases stock-bond return co-movement.

3. Data

3.1. Sample Selection

Data on secondary market corporate bond transactions are from the Financial Industry Regulatory Authority's (FINRA) Trade Reporting and Compliance Engine (TRACE). Since July 2002 the TRACE database disseminates bond transaction information as a result of an initiative to increase price transparency. As Easton et al. (2009), Dick-Nielsen et al. (2012) and others point out, the main advantage of TRACE is the reliance on actual trades, whereas other commercial databases, such as Datastream for example, provide bond quotes potentially contaminated by matrix pricing and other types of adjustments.

The sample selection starts with the universe of TRACE corporate bond transactions from July 2002 to December 2012. I then merge bond transaction information from TRACE with bond-level characteristics provided by Mergent FISD to restrict the sample to "straight bonds" by eliminating those that are callable, puttable, exchangeable, asset-backed, enhanced, preferred, convertible, and with variable coupon rates. Next, I limit the sample to bonds that are issued by non-financial U.S. firms (SIC codes 6000-6999 are excluded), are denominated in U.S. dollars, and are not privately placed under SEC Rule 144A. I then merge bond-level information from the intersection of TRACE-Mergent FISD with Compustat and CRSP following the three-step procedure described by Easton et al. (2009). First, I match bond issuer CUSIPs reported in Mergent FISD with CUSIP information provided by Compustat if an unambiguous match is available. Second, I check the validity of the previous matches by verifying company name and industry. Third, I manually match those bonds without a CUSIP match to their respective issuers by company name and industry membership. Finally, I require availability of credit rating data and limit the sample to those observations with available information to compute bond returns, equity returns, accounting conservatism, and all other variables included in the baseline model.

Applying the above filters, the final sample comprises 48,597 (1,478) bond-month (bond) observations pertaining to 301 unique firms (i.e., multiple bonds per issuer are retained in the sample).[12]

3.2. Bond Returns

To calculate monthly bond returns from TRACE intra-day transaction data, I first apply the filters proposed by Dick-Nielsen (2012) to eliminate the effects of erroneous reports by deleting: (*i*) true duplicate transactions identified by the same message sequence number; (*ii*) reversals of original trades; and (*iii*) same-day corrections. Next, following Bessembinder et al. (2009), who point out that relying on the last trade of the day could introduce noise when last trades are small, I compute daily bond flat prices by weighting each intra-day trade by its size. This approach puts more weight on institutional trades (i.e., larger trades) and is likely to reflect more accurately the underlying daily flat price. Next, for each bond, I calculate the monthly adjusted buy and hold returns ($Bond\ Return_{j,m}$) by using the last trade of the month as follows:

$$Bond\ Return_{j,m} = \left(\frac{P_{j,m} + AI_{j,m} + I_{j,m} \frac{C_j}{N}}{P_{j,m-1} + AI_{j,m-1}} - 1 \right) - rf_m^{1m}, \quad (1)$$

where $P_{j,m}$ is the flat price of bond j at the end of month m; $AI_{j,m}$ is the accrued interest accumulated from the previous coupon payment; C_j is the annual coupon rate; N is the coupon frequency per year; $I_{j,m}$ is an indicator variable taking the value of one if the coupon is due within the month, and zero otherwise; and rf_m^{1m} is the return on the one-month treasury bill up to month m.

[12] In Section 5.3 I perform an addition analysis where I limit the sample to "representative bonds." The sample used in the representative bond analysis includes only one bond per issuer. These bonds are selected following the criteria suggested by Haesen et al. (2013) to identify liquid and cross-sectionally comparable bonds.

3.3. Firm-Specific Measure of Accounting Conservatism

Existing literature has proposed a variety of conservatism measures. Each measure has its strengths and weaknesses. My proxy for accounting conservatism is based on the well-known and widely-used Khan and Watts (2009) $C\text{-}Score$ measure. This choice is motivated by the relative advantages of this measure (*vis-à-vis* other proxies) in my specific setting which requires a conservatism measure able to yield consistent estimates with higher frequency data (e.g., quarterly data) and capture both cross-sectional and time-series variation in conservatism. Nonetheless, because ultimately any empirical proxy captures the underlying construct of conservatism with error, to mitigate the concern that my specific conservatism measure is potentially subject to some degree of measurement error (Patatoukas and Thomas, 2011), in Section 5.1 I consider two alternative conservatism proxies.

The $C\text{-}Score$ has the advantage of being a firm-specific measure of accounting conservatism. Prior research (e.g., Ettredge et al., 2012; Jayaraman, 2012) has shown that the $C\text{-}Score$ appropriately captures the timing of conservatism changes, as well as cross-sectional variation in different determinants of conservatism such as probability of litigation and information asymmetry among investors. The $C\text{-}Score$ captures cross-sectional variation in conservatism through variation in firm-specific characteristics (i.e., size, market-to-book, and leverage). Hence, a potential limitation of the $C\text{-}Score$ is that the identified relation between conservatism and the outcome variable may be driven by differences in these firm-specific characteristics. To mitigate this concern, the tests presented in Section 5.2 account for the inputs to the $C\text{-}Score$ measure to identify the effect of conservatism on stock-bond return co-movement controlling for its firm-specific determinants.

As I use monthly bond and equity returns in my analysis, I estimate the Khan and Watts' (2009) $C\text{-}Score$ measure using quarterly data to minimize the variable measurement frequency gap.[13] Accordingly, I first estimate a cross-sectional specification of the Basu (1997) model as follows:

$$E_{i,q} = \beta_0 + \beta_1 DR_{i,q} + \beta_2 R_{i,q} + \beta_3 R_{i,q} \times DR_{i,q} + \varepsilon_i, \tag{2}$$

where $E_{i,q}$ is firm i's quarterly net income before extraordinary items deflated by market value of equity at the beginning of fiscal quarter q; $R_{i,q}$ is firm i's three months buy and hold return ending one month after the end of fiscal quarter q; $DR_{i,q}$ is an indicator variable taking the value of one if $R_{i,q} < 0$ and zero otherwise. The coefficient β_3 captures the asymmetric timeliness of earnings to bad news relative to good news. Khan and Watts (2009) modify model (2) to obtain a firm-specific measure of accounting conservatism. Thus, I estimate the following quarterly cross-sectional model:

$$\begin{aligned} E_{i,q} = {} & \beta_1 + \beta_2 Size_{i,q} + \beta_3 MTB_{i,q} + \beta_4 Leverage_{i,q} + DR_{i,q}\big(\gamma_1 + \gamma_2 Size_{i,q} + \\ & \gamma_3 MTB_{i,q} + \gamma_4 Leverage_{i,q}\big) + R_{i,q}\big(\mu_1 + \mu_2 Size_{i,q} + \mu_3 MTB_{i,q} + \mu_4 Leverage_{i,q}\big) + \\ & R_{i,q} \times DR_{i,q}\big(\lambda_1 + \lambda_2 Size_{i,q} + \lambda_3 MTB_{i,q} + \lambda_4 Leverage_{i,q}\big) + \varepsilon_{i,q}, \end{aligned} \tag{3}$$

where $Size_{i,q}$ is the natural logarithm of market value of equity for firm i at the end of fiscal quarter q; $MTB_{i,q}$ is the ratio of market value of equity to book value of equity for firm i at the end of fiscal quarter q; $Leverage_{i,q}$ is the ratio of total liabilities to market value of equity for firm i at the end of fiscal quarter q. All other variables are as previously defined.

I then calculate a firm-quarter specific measure of accounting conservatism, $C\text{-}Score_{i,q}$, as follows:

[13] Among prior studies using a quarterly approach to estimate the $C\text{-}Score$, see: Tan (2013), and Heflin et al. (2014).

$$C\text{-}Score_{i,q} = \lambda_{1,q} + \lambda_{2,q}Size_{i,q} + \lambda_{3,q}MTB_{i,q} + \lambda_{4,q}Leverage_{i,q}. \quad (4)$$

The empirical estimators λ_i, i=1 to 4, are constant across firms, but vary over time as they are estimated from quarterly cross-sectional regressions. $C\text{-}Score_{i,q}$ varies across firms through cross-sectional variation in firm-quarter characteristics ($Size_{i,q}$, $MTB_{i,q}$, and $Leverage_{i,q}$). Higher values of $C\text{-}Score_{i,q}$ capture greater degree of conservatism.

3.4. Descriptive Statistics

Table 1 reports the distributional properties of the main variables used in the analysis. All continuous variables are winsorized at the 1st and 99th percentile of their distributions. Detailed variable definitions are presented in the Appendix.

Panel A provides summary statistics for the sample of corporate bonds separately by S&P credit rating buckets. The fraction of bonds is generally increasing in credit quality with approximately 82% of bonds being investment grade (i.e., BBB credit rating or above). Bonds with lower credit ratings tend to be smaller in size ($Face\ Value_j$) and offer higher coupon rates ($Coupon_j$). Across rating buckets, the average time to maturity ($Maturity_{j,m}$) and duration ($Macaulay\ Duration_{j,m}$) range from six to ten years, and four to seven years, respectively. The average (median) monthly adjusted bond return is 0.004 (0.002). Over the sample period, investment grade bonds display lower mean, median, and standard deviation of adjusted returns relative to speculative bonds.

Panel B presents descriptive statistics for the 301 bond issuers included in my sample. Accounting data are retrieved from Compustat quarterly files, while equity market data come from CRSP monthly files. The average (median) firm size measured in terms of market capitalization ($Firm\ Size_{i,q}$) is 22.4 (10.3) billion U.S. dollars, while the average (median) monthly adjusted equity return ($Equity\ Return_{i,m}$) is 0.011 (0.011).

4. Empirical Analysis

4.1. Stock-Bond Return Co-movement Baseline Model

The empirical specification I use to measure stock-bond return correlation is based on the following model which, following the approach of Schaefer and Strebulaev (2008), is meant to capture the theoretical sensitivity of debt to equity (i.e., the hedge ratio) from the Merton (1974) model:

$$Bond\ Return_{j,m} = \beta_0 + \beta_1 Equity\ Return_{i,m} + \beta_2 Treasury\ Return_{j,m} + \varepsilon_{j,m}, \quad (5)$$

where $Bond\ Return_{j,m}$ is the adjusted monthly buy and hold bond return of bond j over month m; $Equity\ Return_{i,m}$ is the adjusted monthly buy and hold equity return of firm i over month m; $Treasury\ Return_{j,m}$ is the adjusted monthly buy and hold return of treasuries matched to bonds based on their maturity. Because the significance of the coefficients may be affected by cross-sectional and time-series correlation, I cluster standard errors in all specifications at the firm and year-month level. Following Kwan (1996) and Schaefer and Strebulaev (2008), I use bond returns (rather than equity returns) as dependent variable in model (5) to mitigate the attenuation bias arising from inaccurately measured regressors. I include treasury returns as controls since these are of particular importance for investment grade bonds that are typically more sensitive to variation in interest rates rather than firm value.

Model (5) allows me to gauge the correlation between bond and stock returns and serves as a baseline for comparison once I augment the model by including my proxy for conservatism and different sets of controls.

Table 2, Panel A reports regression results for the whole sample of bonds (column (1)) as well as for different S&P bond credit rating buckets (columns (2) to (8)). In line with the standard option-pricing framework and with the findings of prior empirical studies (Kwan, 1996; Schaefer and Strebulaev, 2008; Bao and Hou, 2014) the correlation between bond and equity returns, as measured by the coefficient on $Equity\ Return_{i,m}$ is, as expected, positive and significant. Also, the extent of stock-bond correlation monotonically strengthens when credit quality deteriorates. The p-value of a χ^2-test (0.000) confirms that the difference in the $Equity\ Return_{i,m}$ coefficients across AAA-rated and CCC-rated bonds is statistically significant at conventional levels.

As expected, treasury returns are also an important determinant of bond returns as shown by the positive and significant coefficient on $Treasury\ Return_{j,m}$. Moreover, bond returns are increasingly more sensitive to changes in treasury returns when credit quality is higher. This is in line with the intuition that investment grade bonds with low default risk correlate more with treasuries. The p-value of a χ^2-test (0.055) confirms that the difference in the $Treasury\ Return_{j,m}$ coefficients measured across AAA-rated (column (2)) and CCC-rated (column (8)) bonds is statistically significant at conventional levels.

4.2. Accounting Conservatism and Stock-Bond Return Co-movement

To intuitively provide preliminary evidence on the effect conservatism on co-movement, I estimate, each month, model (5) separately for firms with high and low levels of accounting conservatism using the median value of $C\text{-}Score_{i,q}$ as a cut-off. Figure 1 plots the de-trended stock-bond return co-movement time-series for high (solid line) versus low (dotted line) conservatism firms and visually suggests that, over time, firms that report more conservatively experience higher levels of co-movement.

To formally test whether bonds of firms exhibiting higher degrees of accounting conservatism co-move more with their respective equities, I augment the baseline model (model (5)) as follows:

$$\begin{aligned} Bond\ Return_{j,m} &= \beta_0 + \beta_1 Equity\ Return_{i,m} + \beta_2 Treasury\ Return_{j,m} + \beta_3 C\text{-}Score_{i,q} \\ &+ \beta_4 C\text{-}Score_{i,q} \times Equity\ Return_{i,m} + \sum Time\ Fixed\ Effects \\ &+ \varepsilon_{j,m}, \end{aligned} \tag{6}$$

where $C\text{-}Score_{i,q}$ is firm i's proxy for accounting conservatism at the end of fiscal quarter q and is computed as described in Section 3.3; and $Time\ Fixed\ Effects$ are year-month fixed effects intended to capture unobservable characteristics that are likely to affect corporate bond returns over time. All other variables are as previously defined.

Note that, while one should expect a positive association between *changes* in conservatism and bond returns (as prior studies, e.g., Ahmed et al. (2002), show that conservatism reduces the cost of debt capital), the expected sign on the coefficient capturing the association between the *level* of conservatism (β_3) and bond returns is theoretically unclear. Accordingly, I make no prediction for the sign of $C\text{-}Score_{i,q}$.

The coefficient β_4 on the interaction term $C\text{-}Score_{i,q} \times Equity\ Return_{i,m}$ is the main coefficient of interest. β_4 captures the incremental effect of accounting conservatism on co-movement. A positive and significant β_4 would suggest that conservative firms exhibit on average stronger stock-bond return co-movement.

Table 2, Panel B reports regression results for the estimation of model (6). Column (1) shows that the interaction term $C\text{-}Score_{i,q} \times Equity\ Return_{i,m}$ is positive and statistically significant for the full sample of bonds providing empirical support for *H1*.

A concern with this type of analysis is that the demand for conservatism may be higher for firms closer to financial distress. Absent the effect of conservatism, these firms should exhibit higher co-movement as the equity option is more likely to be in-the-money. To address this concern, in columns (2) to (8) I re-estimate model (6) within each rating group. The fact that β_4 remains positive and significant across several of these rating groups, despite firms within each rating group being relatively homogeneous with regards to credit quality, provides reassurance that my findings are not simply driven by the fact that probability of distress simultaneously drives co-movement and demand for conservatism.[14] In Section 4.4, I discuss other empirical strategies that I employ to address this issue.

Moreover, the extent to which conservatism influences co-movement varies, as expected, with firm credit quality. The coefficient on the interaction term, in fact, monotonically increases as credit quality deteriorates (column (2) to (8)). The p-value of a χ^2-test (0.080) confirms that the difference in the coefficients for the interaction term $C\text{-}Score_{i,q} \times Equity\ Return_{i,m}$ across AAA-rated (column (2)) and CCC-rated (column (8)) bonds is statistically significant at conventional levels.

In terms of economic magnitude, for the average bond, one standard deviation increase in $C\text{-}Score_{i,q}$ is associated with an 87.8% increase in stock-bond return co-movement relative to its average value. This effect is even more pronounced for speculative bonds. For CCC-rated bond

[14] However, this possibility cannot be entirely excluded.

issues, one standard deviation increase in $C\text{-}Score_{i,q}$ is associated with a 108.3% increase in stock-bond return co-movement movement relative to its average value.

4.3. Bond-, Firm- and Macro-level Factors

I next consider the impact of other factors that previous research has shown to be relevant predictors of corporate bond returns (e.g., Collin-Dufresne et al., 2001; Schaefer and Strebulaev, 2008) on the association between conservatism and stock-bond return co-movement. To this end, I estimate an alternative version of model (6) that includes a vector of bond-level controls ($Bond\ Controls_{j,m|y}$), a vector of firm-level controls ($Firm\ Controls_{i,q|y}$), a vector of macro-level controls ($Macro\ Controls_{m}$).

Among the bond-level controls, I include a proxy for time to maturity ($Ln(1 + Maturity_{j,y})$), bond credit rating ($Ln(Bond\ Rating_{j,y})$), bond age ($Ln(Bond\ Age_{j,y})$), a proxy for liquidity ($Amihud\ Illiquidity_{j,m}$), and a measure of duration ($Macaulay\ Duration_{j,y}$). Among the firm-level controls, I include a proxy for default risk ($EDF_{i,m}$), firm size ($Ln(Firm\ Size_{i,q})$), leverage ($Leverage_{i,q}$), and asset volatility ($Asset\ Volatility_{i,m}$). Following Collin-Dufresne et al. (2001), Elton et al. (2001), and Schaefer and Strebulaev (2008), I include the following macro-level controls: the change in term structure ($\Delta Term\ Structure_{m}$), the return of the S&P 500 index ($S\&P\ 500\ Return_{m}$), the change in VIX index ($\Delta\ VIX_{m}$), and the Fama-French SMB_{m}, HML_{m}, and $Momentum_{m}$ factors.[15]

The results of this analysis are presented in Table 3. Among the bond-level controls (column (1)), the coefficient on $Amihud\ Illiquidity_{j,m}$ is negative and statistically significant, and the coefficient on $Macaulay\ Duration_{j,y}$ is positive and statistically significant. This is

[15] A detailed presentation of the variable definitions is included in the Appendix.

consistent with prior evidence suggesting that liquidity and duration are priced risk factors in credit markets. Among the firm-level controls (column (2)), the coefficients on $Ln(Firm\ Size_{i,q})$, $Leverage_{i,q}$, and $Asset\ Volatility_{i,m}$ are all positive and statistically significant. Again, these results are in line with those of prior studies (Correia et al., 2012; Correia et al., 2015) and show that smaller and riskier firms exhibit on average higher returns. As for the macro-level controls, I find that $\Delta Term\ Structure_m$ and HML_m exhibit a negative and statistically significant association with bond returns, whereas SMB_m is positive and statistically significant (column (3)). These results are again in line with expectations based on prior research (Fama and French, 1993; Collin-Dufresne et al., 2001). I report p-values from F-tests that strongly reject the hypothesis that the coefficients on bond-, firm-, and macro-level controls are equal to zero. The effect of conservatism on co-movement remains statistically and economically significant even after including the three sets of controls simultaneously (the coefficient on the interaction term $C\text{-}Score_{i,q} \times Equity\ Return_{i,m}$ in column (4) is 0.229).

4.4. The Role of Expected Default Frequency and Time to Maturity

To test my *H2* which predicts a stronger effect of conservatism on stock-bond return co-movement when default risk is higher, I augment model (6) by including a proxy for one-month-ahead expected default probability ($EDF_{i,m}$) from the Merton (1974) model computed following the approach described in Bharath and Shumway (2008). Also, to capture the incremental effect of default risk on co-movement, I interact $EDF_{i,m}$ with $Equity\ Return_{i,m}$. A detailed description of the $EDF_{i,m}$ variable construction is presented in the Appendix.

Table 4 reports the results of this test and shows that a higher default probability is associated, as expected, with stronger co-movement (column (1)). The effect of conservatism on co-movement remains statistically and economically significant (*albeit* smaller), even after controlling for default risk (the coefficient on the interaction term $C\text{-}Score_{i,q} \times Equity\ Return_{i,m}$ is 0.121). This provides additional reassurance that the documented higher co-movement for firms with greater degrees of conservatism is not simply driven by higher demand for conservatism in firms where the equity option is more likely to be in-the-money. In columns (2) and (3), I respectively split the sample into low and high default risk sub-samples based on the median value of $EDF_{i,m}$. In line with expectations, I document a stronger effect of $C\text{-}Score_{i,q}$ on co-movement when credit risk is higher (high $EDF_{i,m}$ sub-sample).[16]

To test my *H3* which predicts a stronger effect of conservatism on stock-bond return co-movement when bond maturity is longer, I augment model (6) by including a proxy for time to maturity ($Ln(1 + Maturity_{j,y})$) and its interaction with $Equity\ Return_{i,m}$. The Merton (1974) model predicts that returns of more mature bonds should exhibit higher sensitivities to equity returns (i.e., larger hedge ratios). My regression results (column (4)) confirm this prediction with the coefficient on the interaction term ($Ln(1 + Maturity_{j,y}) \times Equity\ Return_{i,m}$) being positive and statistically significant.

After controlling for differences in maturity structures, the effect of conservatism on co-movement remains statistically and economically significant (the coefficient on the interaction term $C\text{-}Score_{i,q} \times Equity\ Return_{i,m}$ is 0.198). Moreover, as shown in columns (5) and (6) respectively, the effect of conservatism is stronger for bonds with longer maturities.[17]

[16] The p-value of a χ^2-test (0.000) confirms that the difference in the coefficients for the interaction term $C\text{-}Score_{i,q} \times Equity\ Return_{i,m}$ across low EDF and high EDF bonds is statistically significant at conventional levels.

[17] The p-value of a χ^2-test (0.052) confirms that the difference in the coefficients for the interaction term $C\text{-}Score_{i,q} \times Equity\ Return_{i,m}$ across low $Maturity_{j,y}$ and high $Maturity_{j,y}$ bonds is statistically significant at conventional levels.

4.5. Stock-Bond Return Co-Movement and Bond Covenants

To test my *H4* which predicts that conservatism and bond covenants jointly increase stock-bond return co-movement, I limit my sample to bonds for which the Mergent FISD database provides information on covenant provisions. The sample size, accordingly, decreases to 35,208 bond-month observations.

To capture the stringency of covenant requirements, I follow prior research (e.g., Nikolaev, 2010; Christensen and Nikolaev, 2012; Amiraslani et al., 2015; Bradley and Roberts, 2015) and build an overall covenant intensity score ($Covenant\ Intensity_j$) based on the total number of covenants in the borrowing firm's bond contract. Moreover, I construct two additional scores: (i) $Accounting\ Covenant_j$ which captures contractual constraints imposed on the borrowing firms on the basis of accounting and control measures; and (ii) $FIP\ Covenant_j$ which tracks the number of covenants associated with issuers' financing, investment, and payout restrictions. A detailed presentation of these variables' definitions is provided in the Appendix.

Table 5 presents the results of the analysis where model specifications include the proxy for overall covenant intensity (column (1)), the proxy for the presence of accounting covenants (column (2)), and the proxy for covenants related to the issuer's financing, investment, and payout activities (column (3)), as well as their respective interactions with $Equity\ Return_{i,m}$. The model includes, but coefficients are not reported for parsimony, the bond-, firm-, and macro-level controls described in Section 4.3 and year-month fixed effects. As expected, I observe a positive and significant coefficient on the interaction terms with $Equity\ Return_{i,m}$ for all covenant scores. This is consistent with the idea that covenants act as a control mechanisms aligning the interest of shareholders and bondholders (Billett et al., 2007; Chava and Roberts, 2008; Nini et al., 2009; Nikolaev, 2010; Christensen et al., 2016). Note that the effect of conservatism on co-movement remains statistically and economically significant even after controlling for the effects of covenants. This result suggests that covenants and accounting conservatism jointly affect the extent of stock-bond return co-movement.[18]

4.6. Mitigating Endogeneity Concerns

So far, I have documented a strong positive association between accounting conservatism and the extent of stock-bond return co-movement. However, my findings are potentially subject to two types of endogeneity concerns, and namely: (*i*) a correlated omitted variable problem; and (*ii*) a reverse causality issue running from co-movement to conservatism.

To mitigate the concern that my findings could be driven by correlated omitted variables, I have tested for the inclusion of an extensive set of bond-, firm-, and macro-level control variables. In the following sub-sections, I perform a series of additional tests to alleviate the concerns that the documented relation between conservatism and co-movement could suffer from an endogeneity bias. Additionally, to account for potential endogeneity driven by reverse causality, I evaluate the impact of past stock-bond return co-movement on accounting conservatism by implementing a panel vector autoregressive (PVAR) approach. Results of this specific analysis are presented in the Appendix.

While each of the tests conducted could be individually subject to criticism, and an endogeneity can never be fully ruled out, consistent evidence across multiple tests could jointly provide reasonable reassurance of a causal relationship.

[18] In additional (untabulated) tests, I analyze "finer" covenants partitions by constructing scores for performance and capital covenants (following Christensen and Nikolaev (2012)), and scores for investment, financing, and payout covenants (following Nikolaev (2010) and Bradley and Roberts (2015)). The tenor of the findings from tests performed using these scores is qualitatively similar to that of the main analysis.

4.6.1. Two-Stages Least Squares (2-SLS) Estimation

As the relation between accounting conservatism and stock-bond return co-movement could be driven by correlated omitted variables which I fail to control for in the previous analyses (notwithstanding the extensive set of controls employed), I use an instrumental variable two-stages least squares (2-SLS) regression approach to address this concern.

Khan and Watts (2009) document that longer investment cycle and younger firm age are associated with more conditional conservatism. Following an approach similar to DeFond et al. (2012), I instrument accounting conservatism with: (i) an increasing measure of firm investment cycle ($Young\ Company_{i,y}$); and (ii) a decreasing measure of firm age ($Long\ Investment\ Cycle_{i,q}$).[19] Details on these variables' definitions are provided in the Appendix.

Table 6, Panel A presents the results for the 2-SLS estimation. The specification presented in columns (1) to (3) include year-month fixed effects, while, in addition to that, the specifications presented in columns (4) to (6) include bond-, firm-, and macro-level controls.

In the first stage, I regress $C\text{-}Score_{i,q}$ on $Young\ Company_{i,y}$ and $Long\ Investment\ Cycle_{i,q}$ (columns (1) and (4)), as well as on their respective interactions with $Equity\ Return_{i,m}$ (columns (2) and (5)). Following the approach described by Larcker and Rusticus (2010), I test the validity of the instruments by conducting partial F-tests on the first stage regressions where all of the exogenous variables are included. The partial F-statistics of the instruments range from 9.96 to 114.54 which is above the thresholds recommended by Stock et al. (2002). Therefore, I conclude that the selected instruments are highly correlated with my

[19] While DeFond et al. (2012) use firm age and a decreasing measure of firm investment cycle as instruments, for expositional reasons I use $Young\ Company_{i,y}$ and $Long\ Investment\ Cycle_{i,q}$. This is because the expected signs on their coefficients and those of their interactions with $Equity\ Return_{i,m}$ defined this way make more intuitive sense in my setting.

accounting conservatism measure. Columns (3) and (6) present the results from the second stage. The coefficient on the fitted interaction term $C\text{-}Score_{i,q} \times Equity\ Return_{i,m}$ remains positive and significant (in both columns (3) and (6)) and close in magnitude to that reported in the main analysis. The tests for the over-identifying restrictions are encouraging in the sense that they fail to reject the hypothesis that the instruments are exogenous (p-values are 0.495 and 0.163 in column (3) and columns (6), respectively). Overall, these results suggest that the documented relation between accounting conservatism and co-movement is not likely to be affected by endogeneity bias.

4.6.2. Controlling for Audit Litigation Risk and Firm Litigation Risk

Another potential concern with the relation between conservatism and stock-bond return co-movement is that when a firm is close to financial distress and stock-bond return co-movement is high, bondholders may influence the timeliness of the recognition of economic losses in earnings through implicit threats that would result in increased litigation risk. The fact that the coefficient on $C\text{-}Score_{i,q} \times Equity\ Return_{i,m}$ remains significant when I estimate model (6) within rating buckets (Table 2, Panel B) or control for $EDF_{i,m} \times Equity\ Return_{i,m}$ (Table 4) partially addresses this issue. To further mitigate this concern, the model specification presented in Table 6, Panel B is augmented with two proxies aimed at capturing changes in litigation risk and their respective interactions with $Equity\ Return_{i,m}$. Following the approach of Qiang (2007), $Audit\ Litigation\ Risk_{i,y}$ captures the extent of potential auditor liability and is based on whether or not the firm is audit by a big4 auditor, whereas $Firm\ Litigation\ Risk_{i,y}$ is meant to capture litigation risk beyond increased auditor liability and is based on the industry membership proxy developed by Francis et al.

(1994). The results presented in columns (1) to (6) of Table 6, Panel B show that, even after controlling for the extent of litigation risk, the coefficient on the interaction term $C\text{-}Score_{i,q} \times Equity\ Return_{i,m}$ is positive and significant. Overall, these findings seem to suggest that the relation between accounting conservatism and stock-bond return co-movement obtains even after controlling for variation in litigation risk.

4.6.3. Firm Fixed Effects Estimation

To further address the possibility that unobserved firm-level omitted variables could be driving my results, I implement a firm fixed effects estimation. The firm fixed effects estimation approach is widely used in empirical studies to control for cross-sectional heterogeneity and to mitigate endogeneity issues. To be effective, firm-fixed effect models requires the dependent variable to display sufficient within-firm variation over time (Wooldridge 2000), which is certainly the case for monthly bond returns.

Table 6, Panel C presents the results of this analysis. Once again, the coefficient on the interaction term $C\text{-}Score_{i,q} \times Equity\ Return_{i,m}$ is positive and significant.

Although unobservable confounding factors and reverse causality are always hard to rule out, taken together, results from the battery of tests conducted to mitigate potential endogeneity concerns seem to reject the hypothesis that my findings are driven by these issues.

5. Robustness Tests

5.1. Alternative Measures of Accounting Conservatism

I perform a number of additional tests to ensure that my findings are robust to alternative proxies for accounting conservatism. Specifically, I show that the empirical results documented in the previous sections are qualitatively similar when using: (i) the Basu (1997) asymmetric timeliness ($Basu$); and (ii) the Callen et al. (2010) conservatism ratio ($Callen\ CR$).

To construct the asymmetric timeliness proxy, I follow prior literature (Basu, 1997; Pope and Walker, 1999; Givoly and Hayn, 2000; Garcia Lara et al., 2005) and use the following firm-specific earnings-returns regression:

$$E_{i,q} = \alpha_{0,i} + \alpha_{1,i} DR_{i,q} + \beta_{0,i} R_{i,q} + \beta_{1,i} R_{i,q} \times DR_{i,q} + \varepsilon_{i,q}, \quad (7)$$

where $E_{i,q}$ is firm i's quarterly net income before extraordinary items deflated by market value of equity at the beginning of fiscal quarter q; $R_{i,q}$ is firm i's three months buy and hold return ending one month after the end of fiscal quarter q; $DR_{i,q}$ is an indicator variable taking the value of one if $R_{i,q} < 0$ and zero otherwise. Following Francis et al. (2004) and Heflin et al. (2015), model (7) is estimated on a firm- and quarter-specific basis, using rolling 24-quarter windows.[20] The conservatism measure from this regression, $Basu$, equals the coefficient $\beta_{1,i}$ and captures the asymmetric timeliness of earnings to bad news relative to good news.

The Basu (1997) asymmetric timeliness measure has at least two limitations (Roychowdhury and Watts, 2007). First, it does not capture the cumulative effect of conservatism across all previous periods. Second, when measured at the firm-level, the construct is potentially subject to downward bias. As an further robustness test, I therefore employ an additional conservatism proxy: the conservatism ratio ($Callen\ CR$) developed by Callen et al. (2010). Details on the construction of the Callen et al. (2010) conservatism ratio are presented in the Appendix.

Table 7 reports the results of the additional tests conducted using the alternative conservatism proxies described above. Consistent with the previously reported evidence, I again

[20] Francis et al. (2004) and Heflin et al. (2015) adopt a time-series approach to estimate conservatism. However, while Francis et al. (2004) estimate their measure using annual data, Heflin et al. (2015) utilize quarterly data.

find that stock-bond return co-movement is increasing in the degree of accounting conservatism as captured by both the Basu (1997) measure ($Basu_{i,q}$) and the Callen et al. (2010) conservatism ratio ($Callen\ CR_{i,q}$). The coefficients on the interaction terms ($Basu_{i,q} \times Equity\ Return_{i,m}$ in columns (1) and (2) and $Callen\ CR_{i,q} \times Equity\ Return_{i,m}$ in columns (3) and (4)) are, in fact, positive and significant across all specifications.

5.2. Controlling for the Inputs to the C-Score Measure

$C\text{-}Score_{i,q}$ is a time-varying measure of accounting conservatism and its cross-sectional variation is driven firm-specific characteristics ($Size_{i,q}$, $MTB_{i,q}$, and $Leverage_{i,q}$) that are inputs to the measure calculation. To alleviate the concern that the identified relation between conservatism and stock-bond return co-movement could be driven by differences in these firm-specific characteristics, I perform an additional test. Specifically, in the model specifications presented in Table 8, I further control for the main effects of the inputs to $C\text{-}Score_{i,q}$ as well as for their respective interactions with $Equity\ Return_{i,m}$ both individually (columns (1) to (3)) and simultaneously (column (4)). These are variables that could be simultaneously correlated with conservatism and co-movement and hence drive the documented association. Across all the specifications, my main coefficient of interest $C\text{-}Score_{i,q} \times Equity\ Return_{i,m}$ remains positive and significant.

5.3. Representative Bond Analysis

As corporate issuers often issue multiple bonds, treating each bond as a separate observation has potential shortcomings (Bessembinder et al., 2009). First, a bond-level approach violates the assumption that sample observations are independent. Second, firms with multiple bonds receive a larger weight relative to firms with a single bond. While in the previous analyses I correct for these problems by clustering standard errors by firm and year-month, in this section I perform an additional test using a parsimonious approach based on the selection of a *representative bond* for each firm in the sample. To this end, I follow the filters described in Haesen et al. (2013) so as to identify a representative bond for each firm every month for my sample period.

The idea behind the selection criteria for the representative bond is to identify a sub-sample of liquid and cross-sectionally comparable bonds. To do this, I select representative bonds based on: (*i*) seniority; (*ii*) maturity; (*iii*) age; and (*iv*) size.

I implement the following filters sequentially. First, I filter bonds on the basis of seniority by selecting only bonds that correspond to the largest rating of the issuer. I compute the number of bonds outstanding for each rating bucket and then keep only those bonds that belong to the rating bucket with the largest fraction of debt outstanding. Second, I filter bonds on the basis of maturity as follows: If the issuer has bonds with time to maturity between 5 and 15 years, I drop all other bonds for that firm from the sample; Alternatively, I keep all bonds in the sample. Third, I filter bonds on the basis of time since issuance by removing all bonds that are older than two years if the firm has any bonds that are two years old at most. Alternatively, I keep all bonds in the sample. Lastly, I filter all the remaining bonds on basis of size by selecting for each firm the bond with the largest amount outstanding.

Following the selection criteria above, the sample size decreases from the original 48,597 to 15,438 bond-month observations. Table 9 reports the results of the representative bond analysis. In line with the findings from the main analysis, I find that, even for a sub-sample of representative bonds, stock-bond return co-movement increases with the degree of accounting conservatism across all specifications also when using alternative conservatism constructs and different sets of control variables.

6. Conclusion

I examine the extent to which reporting conservatism, a fundamental property of accounting information, affects the co-movement of stock and bond returns.

While prior research has focused on stock-bond return correlation at the aggregate level (Yang et al., 2009), evidence on the co-movement between stocks and bonds issued by the same firm is relatively scarce. In theory, while stock-bond return correlation is on average positive, it becomes weaker when shareholders have incentives to expropriate bondholders' wealth by engaging in risk shifting activities (Jensen and Meckling, 1976).

The *aggregate* correlation between stock and bond returns is a central input for asset allocation decisions as it measures the diversification benefits of bonds, and it is helpful in designing portfolio strategies to hedge common exposures across equity and credit markets (Markowitz, 1952; Sharpe, 1964). Similarly, *firm-specific* stock-bond return co-movement is important for asset allocation decisions. This is because wealth transfers from bondholders to shareholders are likely correlated across firms in the economy (especially in periods of economic downturn), and thus understanding how accounting conservatism relates to firm-level co-movement of equity and bond returns is of importance for portfolio asset allocation.

I hypothesize and provide evidence that accounting conservatism increases the extent of stock-bond return co-movement. Firms that choose to report conservatively provide a timely and credible signal to bondholders. This is in line with the conjecture that conservative financial reports improve bondholders' ability to monitor managerial actions and effectively intervene if needed. Furthermore, I find that the effect of accounting conservatism on stock-bond return co-movement is more pronounced when default risk is higher (Eisdorfer, 2008) and debt maturities are longer (Leland and Toft, 1996). Finally, in line with findings from prior research (Nikolaev, 2010; Tan, 2013), I show that conservatism and bond covenants jointly increase stock-bond return co-movement.

To mitigate the concern that my results could be driven by omitted correlated variables, or suffer from a reverse causality bias, I perform a number of additional tests all suggesting that endogeneity does not seem to affect my findings. While each of these tests could be individually subject to criticism, the fact that all converge towards the same evidence supports the idea of a causal relation between conservatism and stock-bond return correlation.

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Appendix

A. Variable Definitions

Variable	*Description*
<u>*Bond-level variables:*</u>	
$Face\ Value_j$	Face value (in U.S. \$ Mil.) of bond j at the time of issuance (Source: Mergent FISD).
$Bond\ Age_{j,y}$	Number of years (y) since bond j's issuance (Source: Mergent FISD).
$Coupon_j$	Bond j's percentage coupon rate (Source: Mergent FISD).
$Maturity_{j,y}$	Time to maturity for bond j computed as the number of years (y) remaining until the bond is redeemed (Source: Mergent FISD).
$Macaulay\ Duration_{j,y}$	Bond j's Macaulay duration calculated each year y as the weighted average term to maturity of the cash flows. The Macaulay duration is calculated as follows: $$Macaulay\ Duration_{j,y} = \sum_{k=1}^{n} t_{j,k} \frac{PV_{j,k}}{V_j},$$ where k indexes the cash flows; $PV_{j,k}$ is the present value of the the k^{th} cash flow payment from bond j; $t_{j,k}$ is the time in years (y) until the payment will be received; and V_j is the present value of all future cash payments from the bond (Source: Mergent FISD).
$Bond\ Rating_{j,y}$	Numerically-coded (e.g., CCC=1, ... AAA=21) S&P credit rating for bond j in year y. If the S&P bond rating is missing, the Moody's bond rating is used instead. If S&P and Moody's bond ratings are both missing, the Fitch bond rating is used instead (Source: Mergent FISD).
$Amihud\ Illiquidity_{j,m}$	Bond j's Amihud (2002) illiquidity score calculated at the end of each month m by first calculating a daily Amihud (2002) score and then taking the median across days with a non-zero score. The daily score ($Amihud\ Illiquidity_{j,d}$) is calculated as follows: $$Amihud\ Illiquidity_{j,d} = \frac{1}{N} \sum^{N} \frac{\lvert r_{p,q} \rvert}{Q_p},$$ where N is the number of trades for bond j in day d; $r_{p,q}$ is the (intraday) return between consecutive trades p and q; and Q_p is the dollar par volume for trade p. The score is normalized to vary between zero and one (Source: FINRA TRACE).
$Covenant\ Intensity_j$	Overall covenant intensity score based on the total number of accounting, financing, investment and payout covenants in bond j's contract. The definitions are based on the classifications by Bradley and Roberts (2015), Nikolaev (2010), Christensen and Nikolaev (2012), and Amiraslani et al. (2015). The score is normalized to vary between zero and one (Source: Mergent FISD).

Variable	*Description*
Bond-level variables:	
$Accounting\ Covenant_j$	Accounting covenant intensity score capturing the number of covenants in bond j's contract based on the issuer's accounting numbers. Accounting covenants are defined following the classification by Christensen and Nikolaev (2012) and include both capital covenants and performance covenants. The score is normalized to vary between zero and one (Source: Mergent FISD).
$FIP\ Covenant_j$	Financing, investment and payout covenant intensity score based on the number of covenants in bond j's contract restricting the issuer's financing, investment and payout activities. The classification follows the approach by Nikolaev (2010) and Bradley and Roberts (2015). The score is normalized to vary between zero and one (Source: Mergent FISD).
$Bond\ Return_{j,m}$	Bond j's monthly buy-and-hold adjusted bond return computed over month m as follows: $$Bond\ Return_{j,m} = \left(\frac{P_{j,m} + AI_{j,m} + I_{j,m}\frac{C_j}{N}}{P_{j,m-1} + AI_{j,m-1}} - 1 \right) - rf_m^{1m},$$ where $P_{j,m}$ is the flat price of bond j at the end on month m; $AI_{j,m}$ is the accrued interest accumulated from the previous coupon payment; C_j is the annual coupon rate; N is the coupon frequency per year; $I_{j,m}$ is an indicator function taking the value of one is the coupon is due between month, and zero otherwise; and rf_m^{1m} is the return on one-month treasury bill up to month m (Source: FINRA TRACE).
Conservatism measures:	
$C\text{-}Score_{i,q}$	Firm-quarter-specific measure of accounting conservatism for firm i at the end of fiscal quarter q developed by Khan and Watts (2009). It measures the incremental timeliness of earnings to bad news relative to good news (Source: Compustat and CRSP).
$Callen\ CR_{i,q}$	Firm-quarter-specific measure of accounting conservatism for firm i at the end of fiscal quarter q developed by Callen et al. (2010). The measure is computed as the ratio of current earnings shocks to earnings news. Current earnings shocks and earnings news are estimated based on a vector autoregressive (VAR) model with three state variables consisting of log of stock returns, log of one plus return on equity, and log of book-to-market ratio (Source: Compustat and CRSP).
$Basu_{i,q}$	Firm-quarter-specific measure of accounting conservatism for firm i at the end of fiscal quarter q developed by Basu (1997). The measure captures the incremental timely loss recognition and is computed by estimating firm-specific rolling regressions following the approach by Francis et al. (2004) and Heflin et al. (2015) (Source: Compustat and CRSP).

Variable	*Description*
Firm-level variables:	
$Firm\ Size_{i,q}$	Market capitalization (U.S. \$ Mil.) for firm i at the end of fiscal quarter q (Source: Compustat).
$MTB_{i,q}$	Market to book ratio for firm i at the end of the fiscal quarter q. Market to book is computed as the ratio of market value of equity to book value of equity for firm i at the end of fiscal quarter q (Source: Compustat and CRSP).
$Leverage_{i,q}$	Market leverage for firm i at the end of the fiscal quarter q. Market leverage is computed as the ratio of long-term debt to the sum of long-term debt to the market value of equity (Source: Compustat and CRSP).
$EDF_{i,m}$	One-month-ahead expected default probability from the Merton (1974) model for firm i, computed following the approach by Bharath and Shumway (2008) as follows: $EDF_{i,m} = \mathcal{N}\left(-\left(\frac{ln\left(\frac{V_{i,m}}{F_{i,m}}\right)+\left(\mu_{i,m}-0.5\sigma^2_{V_{i,m}}\right)T}{\sigma_{V_{i,m}}\sqrt{T}}\right)\right)$, where $\mathcal{N}(\cdot)$ is the cumulative standard normal distribution function; $V_{i,m}$ is the total value of firm i at the end of month m; $F_{i,m}$ is the face value of firm i's debt (short-term debt plus one-half long-term debt) at the end of month m; $\mu_{i,m}$ is the expected continuously compounded return on $V_{i,m}$; $\sigma_{V_{i,m}}$is the volatility of firm i's value; and T is equal to one (Source: Compustat and CRSP).
$Asset\ Volatility_{i,m}$	Monthly estimate of the volatility of firm i's assets (firm value) from the Merton (1974) model calculated following Bharath and Shumway (2008) (Source: Compustat and CRSP).
$Audit\ Litigation\ Risk_{i,y}$	Audit litigation risk proxy of firm i in year y. Following the approach of Qiang (2007), the variable takes the value of one if the firm is audited by a big four auditor, and zero otherwise.
$Firm\ Litigation\ Risk_{i}$	Firm litigation risk proxy of firm i. Following the approach of Francis, Philbrick and Schipper (1994), the variable takes the value of one if the firm is in the biotech (SIC codes 2833-2836 and 8731-8734), computer (3570-3577 and 7370-7374), electronics (3600-3674), or retail (5200-5961) industry, and zero otherwise.
$Young\ Company_{i,y}$	Natural logarithm of one plus firm age, multiplied by negative one. Firm i's age is computed each year y as the difference between the first year when the firm appears in CRSP and the current year (Source: CRSP).
$Long\ Investment\ Cycle_{i,q}$	Natural logarithm of investment cycle, multiplied by negative one. Firm i's investment cycle is computed each quarter q as depreciation expense divided by lagged total assets (Source: Compustat).
$Equity\ Return_{i,m}$	Monthly buy-and-hold adjusted equity return for firm i over month m defined as the monthly buy-and-hold raw equity return minus the return the monthly on one-month treasury bill (Source: CRSP).

Variable	*Description*
Macro-level variables:	
$Treasury\ Return_{j,m}$	Monthly buy-and-hold adjusted treasury return matched to the respective bond j based on maturity. The monthly buy-and-hold adjusted treasury return is defined as the monthly buy-and-hold raw treasury return minus the return the monthly on one-month treasury bill (Source: CRSP).
$\Delta Term\ Structure_m$	Monthly change in term structure computed as the change in the ten-year minus two-year yield spread on U.S. treasury bonds (Source: Board of Governors of the Federal Reserve System).
$S\&P\ 500\ Return_m$	Monthly return on the S&P 500 index calculated over month m (Source: CRSP).
$\Delta\ VIX_m$	Monthly change in the Chicago Board Options Exchange (CBOE) VIX Index of implied volatility of options on the S&P 100 index at the end of month m (Source: Chicago Board Options Exchange).
SMB_m	Fama-French 'Small Minus Big' monthly mimicking factor portfolio return to the size factor at the end of month m (Source: Kenneth French's website at: http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html).
HML_m	Fama-French 'High Minus Low' monthly mimicking factor portfolio return to the value factor at the end of month m (Source: Kenneth French's website at: http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html).
$Momentum_m$	Fama-French 'Momentum' monthly factor based on the average return on the two high prior return portfolios minus the average return on the two low prior return portfolios at the end of month m (Source: Kenneth French's website at: http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html).

B. *Panel Vector Autoregressive (PVAR) Estimation*

To account for potential endogeneity driven by reverse causality, I evaluate the impact of past stock-bond return co-movement on accounting conservatism by implementing a panel vector autoregressive (PVAR) approach, a technique typically used in macroeconometrics (Holtz-Eakin et al., 1988).[21] I thus estimate the following three-equation reduced-form model

[21] The PVAR approach combines together the traditional vector autoregression (VAR) approach with a panel-data approach. While the first approach treats all variables in the VAR system as endogenous, the latter allows to control for unobservable heterogeneity. Combined, the two approaches are useful to disentangle the impact of exogenous shocks onto the VAR system.

with a General Method of Moments (GMM) approach. The model examines the causal relation between stock-bond return co-movement and conservatism, allowing co-movement to affect conservatism over time and vice versa:

$$
\begin{aligned}
&Bond\ Return_{j,m} \\
&\quad = \beta_0 + \beta_1 Equity\ Return_{i,m-1} + \beta_2 C\text{-}Score_{i,q-1} \\
&\quad + \beta_3 C\_Score_{i,q-1} \times Equity\ Return_{i,m-1} + \beta_4 Equity\ Return_{m-1} \\
&\quad + \beta_5 Treasury\ Return_{j,m} + \sum Time\ Fixed\ Effects + \varepsilon_{j,m},
\end{aligned}
\tag{A1a}
$$

$$
\begin{aligned}
C\_Score_{i,q} &= \beta_0 + \beta_1 Equity\ Return_{i,m-1} + \beta_2 C\text{-}Score_{i,q-1} \\
&\quad + \beta_3 C\_Score_{i,q-1} \times Equity\ Return_{i,m-1} + \beta_4 Equity\ Return_{m-1} \\
&\quad + \beta_5 Treasury\ Return_{m} + \sum Time\ Fixed\ Effects + \varepsilon_{j,m},
\end{aligned}
\tag{A1b}
$$

$$
\begin{aligned}
&C\_Score_{i,q} \times Equity\ Return_{i,m} \\
&\quad = \beta_0 + \beta_1 Equity\ Return_{i,m-1} + \beta_2 C\text{-}Score_{i,q-1} \\
&\quad + \beta_3 C\_Score_{i,q-1} \times Equity\ Return_{i,m-1} + \beta_4 Equity\ Return_{i,m-1} \\
&\quad + \beta_5 Treasury\ Return_{m} + \sum Time\ Fixed\ Effects + \varepsilon_{j,m}.
\end{aligned}
\tag{A1c}
$$

Table A.1 reports the results of this analysis. All specifications (columns (1) to (6)) include year-month fixed effects. The specifications presented in columns (4) to (6) also include bond-, firm-, and macro-level controls. The effect of past conservatism on current co-movement is captured by the coefficient on the interaction term $C\text{-}Score_{i,q-1} \times Equity\ Return_{i,m-1}$ in columns (1) and (4) which is positive and significant, whereas the effect of past co-movement on current levels of conservatism (i.e., reverse causality) is captured by the coefficient on $Bond\ Return_{j,m-1}$ in columns (3) and (6) which is positive but insignificant. Granger causality tests confirm that while past co-movement does not Granger-cause current levels of conservatism, past conservatism Granger-causes current co-movement levels. Taken together, the evidence from this series of tests increases my confidence that the results I document in the previous sections are not driven by reverse causality.

C. Callen et al. (2010) Conservatism Ratio Calculation

The Callen et al. (2010) conservatism ratio is based on the Vuolteenaho (2002) return decomposition. Vuolteenaho (2002) decomposes return shocks into shocks to current and future dividends (or cash flows) and shocks to current and future discount rates. By replacing dividends with earnings in the clean surplus relation, shocks to returns can be expressed as a function of earnings news and discount rate news:

$$R_{i,q} - E_{q-1}(R_{i,q}) = NE_{i,q} - NR_{i,q}, \tag{A2}$$

where $R_{i,q}$ is firm i's *actual* return over fiscal quarter q; $E_{q-1}(R_{i,q})$ is firm i's *expected* return over fiscal quarter q; $NE_{i,q}$ is firm i's earnings news at the end of fiscal quarter q; and $NR_{i,q}$ is firm i's discount rates news at the end of fiscal quarter q.

The Callen et al. (2010) conservatism measure is based on the relation between earnings news ($NE_{i,q}$) and current period unexpected earnings under the assumption that accounting conservatism induces nonlinearities between revisions to returns and earnings innovations.

I perform the Vuolteenaho (2002) return decomposition using a log-linear vector autoregressive (VAR) model consisting of the following system of equations:

$$R_{i,q} = \alpha_1 R_{q-1} + \alpha_2 ROE_{q-1} + \alpha_3 BTM_{q-1} + \mu_{1,q}, \tag{A3a}$$

$$ROE_{i,q} = \beta_1 R_{q-1} + \beta_2 ROE_{q-1} + \beta_3 BTM_{q-1} + \mu_{2,q}, \tag{A3b}$$

$$BTM_{i,q} = \gamma_1 R_{q-1} + \gamma_2 ROE_{t-1} + \gamma_3 BTM_{q-1} + \mu_{3,q}, \tag{A3c}$$

where $R_{i,q}$ is the natural logarithm of one plus firm i's three months buy and hold return ending one month after the end of fiscal quarter q minus the natural logarithm of one plus the annualized three-month treasury bill rate; $ROE_{i,q}$ is the natural logarithm of one plus firm i's return on equity at the end of fiscal quarter q minus the natural logarithm of one plus the annualized three-month treasury bill rate; $BTM_{i,q}$ is the natural logarithm of one plus firm i's book to market at the end of fiscal quarter q minus the natural logarithm of one plus the annualized three-month treasury bill rate.[22] Callen et al. (2010) follow Vuolteenaho (2002) and use the VAR matrix of estimated coefficients from the system of equations above (i.e., equations (A3a), (A3b), and (A3c)) and the vectors of residuals $\mu_{i,q}$, to derive unexpected shock to returns ($R_{i,q} - E_{q-1}(R_q)$), discount rate news ($NR_{i,q}$), and earnings news ($NE_{i,q}$) as follows:

$$R_{i,q} - E_{q-1}(R_q) = \mu_{1,q}, \tag{A4a}$$

$$NR_{i,q} = e_1{}'\rho A(I - \rho A)^{-1}\mu_{i,q}, \tag{A4b}$$

$$NE_{i,q} = e_2{}'\rho A(I - \rho A)^{-1}\mu_{i,q}, \tag{A4c}$$

Finally, I compute the Callen et al. (2010) conservatism ratio ($Callen\ CR_{i,q}$) as follows:

$$Callen\ CR_{i,q} = \frac{\mu_{2,q}}{NE_{i,q}}. \tag{A5}$$

$Callen\ CR_{i,q}$ captures the asymmetric recognition of losses relative to gains. In the case of adverse earnings shocks, a higher score implies that a larger proportion of the negative shock is reflected in current period earnings.[23]

---

[22] Following Callen et al. (2010), the VAR system is estimated for each Fama and French (1997) industry group using weighted least squares to control for industry effects. I demean all variables in the system and, to perform equal-weighting, I deflate all data in each quarterly cross-section by the number of firms in that quarter. Finally, I drop financial firms (SIC codes 6000-6999), observations with market value of equity below ten million U.S. dollars, and observations in the 1st and 99th percentile of each variable distribution.

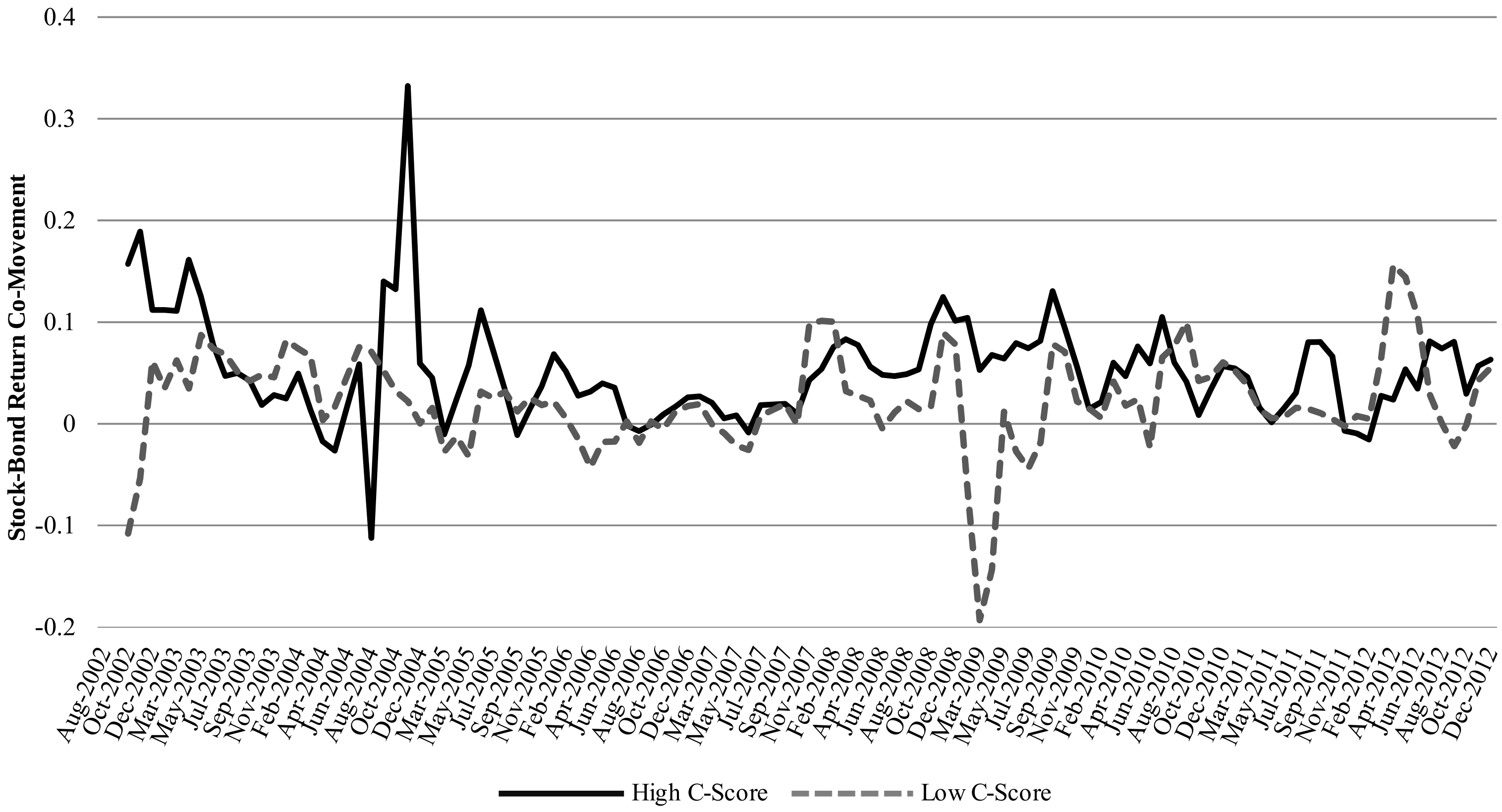
[23] Following Callen et al. (2010), I delete firm-quarter observations with negative $Callen\ CR_{i,q}$.

Table A1: Panel Vector Autoregressive (PVAR) Estimation

	GMM Estimation					
	Dependent variables:					
	$Bond\ Return_{j,m}$	$C\text{-}Score_{i,q}$	$C\text{-}Score_{i,q} \times Equity\ Return_{i,m}$	$Bond\ Return_{j,m}$	$C\text{-}Score_{i,q}$	$C\text{-}Score_{i,q} \times Equity\ Return_{i,m}$
Independent variables:	(1)	(2)	(3)	(4)	(5)	(6)
$Bond\ Return_{j,m-1}$	-0.218***	0.000	0.002	-0.216***	0.126	0.001
	(-21.74)	(0.02)	(1.42)	(-20.09)	(0.92)	(0.62)
$C\text{-}Score_{i,q-1}$	-0.007	0.659***	0.014***	0.009***	0.615***	0.010***
	(-1.25)	(45.41)	(5.91)	(2.79)	(57.00)	(4.98)
$C\text{-}Score_{i,q-1} \times Equity\ Return_{i,m-1}$	0.134***	-0.246***	-0.040*	0.072**	-0.180**	-0.040**
	(4.15)	(-2.89)	(-1.93)	(2.37)	(-2.11)	(-1.97)
$Equity\ Return_{i,m-1}$	0.018***	-0.009	-0.010***	0.017***	-0.006	-0.011***
	(7.83)	(-1.41)	(-2.66)	(5.69)	(-0.97)	(-2.78)
$Treasury\ Return_{j,m}$	-0.008	-0.068	0.003	0.044	-0.010	0.001
	(-0.38)	(-1.52)	(1.06)	(1.31)	(-0.21)	(0.08)
Firm controls	No	No	No	Yes	Yes	Yes
Bond controls	No	No	No	Yes	Yes	Yes
Macro controls	No	No	No	Yes	Yes	Yes
Year-Month fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Granger-causality tests:						
χ2-test p-value: $Bond\ Return_{j,m}$		0.982	0.154		0.357	0.534
χ2-test p-value: $C\text{-}Score_{i,q}$	0.210		0.000	0.005		0.000
χ2-test p-value: $C\text{-}Score_{i,q} \times Equity\ Return_{i,m}$	0.001	0.004		0.018	0.034	
Obs.	42,882	42,882	42,882	42,809	42,809	42,809

This table reports results from additional analyses conducted to mitigate potential endogeneity concerns. A panel vector autoregressive (PVAR) approach is used to capture the effect of past conservatism on current stock-bond return co-movement. All specifications include year-month fixed effects, as well as bond-, firm-, and macro-level controls in the specifications presented in columns (4), (5), and (6) (coefficients are not reported for parsimony). p-values from Granger-causality χ^2-tests for the coefficients on $Bond\ Return_{j,m}$ (in columns (2), (3), (5) and (6)), $C\text{-}Score_{i,q}$ (in columns (1), (3), (4) and (6)), and $C\text{-}Score_{i,q} \times Equity\ Return_{i,m}$ (in columns (1), (2), (4) and (5)) are reported. GMM coefficient estimates and (in parentheses) z-scores are based on heteroskedasticity-robust standard errors clustered by firm and year-month. A detailed presentation of all variable definitions is provided in the Appendix. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels (two-tailed), respectively.

Figure 1: Stock-Bond Return Co-Movement Time-Series for High versus Low Conservatism



This figure presents a de-trended stock-bond return co-movement time-series for high (solid line) versus low (dotted line) conservatism firms. The time-series is based on monthly estimations of model (5). The cut-off for the high and low levels of accounting conservatism is based on median values of $C\text{-}Score$.

Table 1: Descriptive Statistics

Panel A: Bond-Level Distributional Properties

	All	AAA	AA	A	BBB	BB	B	C
Bonds	1,478	30	125	516	538	180	72	17
Bond-months	48,597	835	5,619	17,480	15,883	5,656	2,468	656
$Face\ Value_j$ (U.S. $ Mil.)								
Mean	320	493	763	248	283	206	264	318
Median	200	500	500	200	200	200	200	294
Std. Dev.	451	597	891	292	355	150	233	273
$Bond\ Age_{j,y}$								
Mean	7.948	6.196	5.687	7.950	8.464	8.559	8.591	9.284
Median	8.000	5.000	4.000	8.000	8.000	9.000	9.000	9.000
Std. Dev.	4.261	4.152	3.874	4.537	3.888	3.976	4.244	3.970
$Coupon_j$								
Mean	6.676	5.291	5.214	6.466	6.955	7.541	7.745	8.323
Median	6.875	5.250	5.200	6.625	7.000	7.500	7.750	7.800
Std. Dev.	1.593	1.452	1.628	1.600	1.304	1.067	1.119	1.156
$Maturity_{j,y}$								
Mean	6.828	10.463	5.955	6.748	6.864	7.128	7.115	7.279
Median	4.000	9.000	3.000	4.000	4.000	5.000	5.000	5.000
Std. Dev.	6.877	7.790	6.525	6.758	7.050	6.823	6.774	6.510
$Macaulay\ Duration_{j,y}$								
Mean	4.708	6.768	4.484	4.807	4.665	4.670	4.315	4.251
Median	3.783	7.759	3.521	3.873	3.565	4.041	3.776	3.764
Std. Dev.	3.441	3.790	3.381	3.483	3.512	3.227	3.082	2.569
$Bond\ Return_{j,m}$								
Mean	0.004	0.004	0.003	0.003	0.004	0.005	0.006	0.005
Median	0.002	0.003	0.001	0.001	0.002	0.004	0.004	0.004
Std. Dev.	0.017	0.017	0.014	0.016	0.018	0.019	0.021	0.023

Panel B: Firm-Level Distributional Properties

Variable	*Firms*	*Firm-Months*	*Mean*	*Std. Dev.*	*P25*	*Median*	*P75*
$Firm\ Size_{i,q}$ (U.S. $ Mil.)	301	15,438	22,441	30,794	3,306	10,272	26,617
$C\text{-}Score_{i,q}$	301	15,438	-0.012	0.072	-0.063	-0.016	0.040
$Market\ Leverage_{i,q}$	301	15,438	0.485	0.384	0.172	0.344	0.704
$EDF_{i,m}$	301	15,438	0.001	0.002	0.000	0.000	0.000
$Asset\ Volatility_{i,m}$	301	15,438	0.248	0.080	0.178	0.236	0.311
$Equity\ Return_{i,m}$	301	15,438	0.011	0.061	-0.035	0.011	0.057

This table reports descriptive statistics for the sample over the period 2002-2012. The sample selection is based on the following criteria: Bonds are issued by non-financial U.S. firms (SIC codes 6000-6999 are excluded) and are denominated in U.S. dollars; bonds are straight (i.e., bonds that are callable, puttable, exchangeable, asset-backed, enhanced, preferred, convertible, and with variable coupon rate are excluded), and are not privately placed under SEC Rule 144A. Panel A presents summary statistics for bond issues separately by S&P bond issue credit rating buckets. Panel B presents summary statistics for bond issuers. All continuous variables are winsorized at the 1st and 99th percentile of their distributions. Detailed variable definitions are presented in the Appendix.

Table 2: Stock-Bond Return Co-Movement and Accounting Conservatism

Panel A: Stock-Bond Return Co-Movement Base Model

	Dependent variable: $Bond\ Return_{j,m}$							
Independent variables:	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	All	*AAA*	*AA*	*A*	*BBB*	*BB*	*B*	*CCC*
Intercept	0.004***	0.004***	0.004***	0.004***	0.004***	0.005***	0.005***	0.006***
	(5.33)	(4.22)	(4.20)	(4.28)	(5.40)	(6.20)	(6.26)	(4.40)
$Equity\ Return_{i,m}$	0.023***	-0.010	0.009	-0.001	0.021***	0.041***	0.083***	0.102***
	(3.74)	(-0.75)	(1.16)	(-0.22)	(2.63)	(5.31)	(8.59)	(3.86)
$Treasury\ Return_{j,m}$	0.052***	0.153**	0.061***	0.062***	0.047*	0.014	-0.020	0.011
	(2.77)	(2.43)	(5.55)	(2.99)	(1.92)	(0.69)	(-0.82)	(0.28)
Test for difference in $Equity\ Return_{i,m}$ (2)-(8)								
χ^2*-test p-value: AAA=CCC*		0.000						
Test for difference in $Treasury\ Return_{j,m}$ (2)-(8)								
χ^2*-test p-value: AAA=CCC*		0.055						
Obs.	48,597	835	5,619	17,480	15,883	5,656	2,468	656
Adj. R^2	0.0102	0.0353	0.0132	0.0075	0.0083	0.0209	0.0865	0.1116

Panel B: The Effect of Accounting Conservatism

	Dependent variable: $Bond\ Return_{j,m}$							
Independent variables:	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	All	*AAA*	*AA*	*A*	*BBB*	*BB*	*B*	*CCC*
Intercept	0.009***	0.020	0.010***	0.013***	0.010***	0.006***	-0.001	-0.032***
	(23.06)	(0.00)	(32.32)	(28.86)	(24.69)	(5.18)	(-0.90)	(-8.70)
$Equity\ Return_{i,m}$	0.022***	-0.007	0.018**	0.010***	0.013**	0.018***	0.043***	0.036***
	(6.63)	(-0.26)	(2.19)	(2.60)	(2.47)	(4.54)	(4.45)	(3.56)
$C\text{-}Score_{i,q}$	0.008**	0.011	-0.000	0.001	0.003	-0.003	0.012	0.041*
	(2.30)	(0.68)	(-0.07)	(0.32)	(0.68)	(-0.30)	(0.88)	(1.90)
$C\text{-}Score_{i,q} \times Equity\ Return_{i,m}$	0.234***	-0.018	0.108	0.014	0.153*	0.154**	0.023	0.510***
	(5.11)	(-0.09)	(1.09)	(0.28)	(1.88)	(2.07)	(0.24)	(2.65)
$Treasury\ Return_{j,m}$	0.018***	0.072**	0.028***	0.018**	0.025**	-0.009	0.004	-0.110
	(2.87)	(2.07)	(3.04)	(2.53)	(2.38)	(-0.50)	(0.22)	(-1.42)
Year-Month fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Test for difference in $C\text{-}Score_{i,q} \times Equity\ Return_{i,m}$ (2)-(8)								
χ^2*-test p-value: AAA=CCC*		0.080						
Obs.	48,597	835	5,619	17,480	15,883	5,656	2,468	656
Adj. R^2	0.1552	0.4195	0.3279	0.1914	0.1495	0.1543	0.2035	0.3702

This table reports regressions of corporate bond returns on equity returns, treasury returns and accounting conservatism. Panel A presents the baseline stock-bond co-movement model, where the extent of stock-bond return correlation is captured by the coefficient on $Equity\ Return_{i,m}$. Panel B presents the model augmented with the accounting conservatism score ($C\text{-}Score_{i,q}$). The interaction term $C\text{-}Score_{i,q} \times Equity\ Return_{i,m}$ captures the incremental stock-bond return co-movement for conservative firms. All specifications in Panel B include year-month fixed effects (coefficients are not reported for parsimony). In Panel A, p-values from χ2-tests for the difference in the $Equity\ Return_{i,m}$ and $Treasury\ Return_{j,m}$ coefficients across bonds rated AAA (column (2)) and CCC (column (8)) are reported. In Panel B, the p-value from a χ2-test for the difference in the coefficient on the interaction term $C\text{-}Score_{i,q} \times Equity\ Return_{i,m}$ across bonds rated AAA (column (2)) and CCC (column (8)) is reported. The table reports OLS coefficient estimates and (in parentheses) *t*-statistics based on heteroskedasticity-robust standard errors clustered by firm and year-month. A detailed presentation of all variable definitions is provided in the Appendix. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels (two-tailed), respectively.

Table 3: Bond-, Firm- and Macro-Level Factors

	Dependent variable: $Bond\ Return_{j,m}$			
Independent variables:	(1)	(2)	(3)	(4)
Intercept	0.002*	-0.007*	0.004***	-0.006*
	(1.74)	(-1.88)	(6.04)	(-1.82)
$Equity\ Return_{i,m}$	0.024***	0.025***	0.025***	0.025***
	(4.31)	(4.47)	(4.63)	(4.60)
$C\text{-}Score_{i,q}$	0.019**	0.017*	0.017***	0.017**
	(2.33)	(1.76)	(3.05)	(2.14)
$C\text{-}Score_{i,q} \times Equity\ Return_{i,m}$	0.214***	0.218***	0.222***	0.229***
	(3.46)	(3.82)	(3.44)	(3.65)
$Treasury\ Return_{j,m}$	0.035*	0.036**	0.085***	0.075***
	(1.84)	(2.08)	(5.03)	(4.44)
Bond-level controls:				
$Ln(1 + Maturity_{j,y})$	0.000			-0.000
	(0.14)			(-0.49)
$Ln(Bond\ Rating_{j,y})$	-0.002			-0.002
	(-0.92)			(-0.98)
$Amihud\ Illiquidity_{j,m}$	-0.002***			-0.002***
	(-2.83)			(-4.51)
$Macaulay\ Duration_{j,y}$	0.000***			0.001***
	(2.65)			(3.49)
$Ln(Bond\ Age_{j,y})$	-0.000			-0.001**
	(-0.95)			(-2.20)
Firm-level controls:				
$Ln(Firm\ Size_{i,q})$		0.001*		0.001**
		(1.94)		(1.97)
$Leverage_{i,q}$		0.001*		0.001
		(1.83)		(0.72)
$EDF_{i,m}$		-0.020		0.095
		(-0.11)		(0.52)
$Asset\ Volatility_{i,m}$		0.018***		0.014**
		(3.26)		(2.51)
Macro-level controls:				
$\Delta Term\ Structure_m$			-0.085***	-0.078***
			(-3.48)	(-3.28)
$S\&P\ 500\ Return_m$			0.021	0.027
			(0.87)	(1.17)
$\Delta\ VIX_m$			0.000	0.000
			(0.80)	(0.98)
SMB_m			0.060**	0.051**
			(2.28)	(2.00)
HML_m			-0.048*	-0.041
			(-1.81)	(-1.59)
$Momentum_m$			-0.003	0.004
			(-0.22)	(0.28)
Test for the inclusion of firm-level controls (1)				
F-test p-value:	0.000			
Test for the inclusion of bond-level controls (2)				
F-test p-value:	0.016			
Test for the inclusion of macro-level controls (3)				
F-test p-value:	0.000			
Obs.	48,597	48,597	48,597	48,597
Adj. R^2	0.0301	0.0274	0.0371	0.0487

This table reports regressions of corporate bond returns on equity returns, treasury returns and accounting conservatism controlling for bond-, firm-, and macro-level factors. The interaction term $C\text{-}Score_{i,q} \times Equity\ Return_{i,m}$ captures the incremental stock-bond return co-movement for conservative firms. The model specifications presented in columns (1), (2), and (3) include bond-, firm-, and macro-level controls, respectively. The model specification presented in column (4) includes bond-, firm-, and macro-level controls simultaneously. p-values from Wald F-tests assessing that the coefficients for bond-, firm-, and macro-level controls are (respectively) jointly equal to zero are reported. The table reports OLS coefficient estimates and (in parentheses) *t*-statistics based on heteroskedasticity-robust standard errors clustered by firm and year-month. A detailed presentation of all variable definitions is provided in the Appendix. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels (two-tailed), respectively.

Table 4: The Role of Expected Default Frequency and Time to Maturity

	Dependent variable: Bond Return$_{j,m}$					
Independent variables:	(1)	(2)	(3)	(4)	(5)	(6)
	All	*Low* $EDF_{i,m}$	*High* $EDF_{i,m}$	*All*	*Low* $Maturity_{j,y}$	*High* $Maturity_{j,y}$
Intercept	0.009***	0.012***	0.009***	0.007***	0.007***	0.013***
	(18.72)	(57.33)	(19.17)	(11.87)	(23.73)	(18.51)
$Equity\ Return_{i,m}$	0.011***	0.009***	0.020***	0.003	0.019***	0.024***
	(3.98)	(2.75)	(5.07)	(0.76)	(7.66)	(5.23)
$C\text{-}Score_{i,q}$	0.009***	0.004	0.008*	0.008**	0.009***	0.005
	(2.94)	(0.97)	(1.92)	(2.38)	(3.16)	(1.17)
$C\text{-}Score_{i,q} \times Equity\ Return_{i,m}$	0.121***	0.033	0.233***	0.198***	0.193***	0.278***
	(3.88)	(0.62)	(4.37)	(4.97)	(5.79)	(4.22)
$EDF_{i,m}$	0.075					
	(0.53)					
$EDF_{i,m} \times Equity\ Return_{i,m}$	8.288***					
	(5.65)					
$Ln(1 + Maturity_{j,y})$				0.001***		
				(3.29)		
$Ln(1 + Maturity_{j,y}) \times Equity\ Return_{i,m}$				0.009***		
				(6.17)		
$Treasury\ Return_{j,m}$	0.019***	0.026***	0.013*	0.006	0.009***	-0.015
	(2.85)	(3.39)	(1.82)	(1.24)	(2.74)	(-0.98)
Year-Month fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Test for difference in $C\text{-}Score_{i,q} \times Equity\ Return_{i,m}$ (2)-(3)						
χ^2-test p-value: Low $EDF_{i,m}$=High $EDF_{i,m}$			0.000			
Test for difference in $C\text{-}Score_{i,q} \times Equity\ Return_{i,m}$(5)-(6)						
χ^2-test p-value: Low $Maturity_{j,y}$=High$Maturity_{j,y}$			0.052			
Obs.	48,597	24,288	24,309	48,597	26,115	22,482
Adj. R^2	0.1591	0.1905	0.1352	0.1651	0.1086	0.2319

This table reports regressions of corporate bond returns on equity returns, treasury returns and accounting conservatism. Model specifications presented in columns (1) to (3) and (4) to (6) include proxies for default risk ($EDF_{i,m}$) and time to maturity ($Ln(1 + Maturity_{j,y})$), respectively. All specifications include year-month fixed effects (coefficients are not reported for parsimony). p-values from $\chi2$-tests for the difference in the coefficient on the interaction term $C\text{-}Score_{i,q} \times Equity\ Return_{i,m}$ across Low $EDF_{i,m}$ (column (2)) and High $EDF_{i,m}$ (column (3)), as well as Low $Maturity_{j,y}$ (column (5)) and High $Maturity_{j,y}$ (column (6)) are reported. The table reports OLS coefficient estimates and (in parentheses) *t*-statistics based on heteroskedasticity-robust standard errors clustered by firm and year-month. A detailed presentation of all variable definitions is provided in the Appendix. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels (two-tailed), respectively.

Table 5: Stock-Bond Return Co-Movement and Bond Covenants

	Dependent variable: Bond $Return_{j,m}$		
Independent variables:	(1)	(2)	(3)
Intercept	0.002	0.003	0.002
	(0.95)	(1.04)	(0.93)
$Equity\ Return_{i,m}$	0.001	0.015***	0.003
	(0.16)	(3.51)	(0.25)
$C\text{-}Score_{i,q}$	0.004	0.004	0.004
	(1.18)	(1.13)	(1.17)
$C\text{-}Score_{i,q} \times Equity\ Return_{i,m}$	0.245***	0.245***	0.254***
	(4.86)	(4.90)	(5.10)
$Covenant\ Intensity_j$	0.000		
	(0.63)		
$Covenant\ Intensity_j \times Equity\ Return_{i,m}$	0.063***		
	(2.79)		
$Accounting\ Covenant_j$		0.000	
		(0.07)	
$Accounting\ Covenant_j \times Equity\ Return_{i,m}$		0.047***	
		(2.93)	
$FIP\ Covenant_j$			0.000
			(0.77)
$FIP\ Covenant_j \times Equity\ Return_{i,m}$			0.047*
			(1.92)
$Treasury\ Return_{j,m}$	0.013*	0.014*	0.014*
	(1.71)	(1.75)	(1.73)
Bond controls	Yes	Yes	Yes
Firm controls	Yes	Yes	Yes
Macro controls	Yes	Yes	Yes
Year-Month fixed effects	Yes	Yes	Yes
Obs.	35,208	35,208	35,208
Adj. R^2	0.1874	0.1874	0.1870

This table reports regressions of corporate bond returns on equity returns, treasury returns and accounting conservatism, as well as different categories of bond covenant provisions. The interaction term $C\text{-}Score_{i,q} \times Equity\ Return_{i,m}$ captures the incremental stock-bond return co-movement for conservative firms. Columns (1), (2), and (3) present the base model augmented with the overall covenant intensity score ($Covenant\ Intensity_j$), the accounting covenant score ($Accounting\ Covenant_j$) and the financing, investment and payout covenant score ($FIP\ Covenant_j$), respectively. All specifications include year-month fixed effects , as well as bond-, firm-, and macro-level controls (coefficients are not reported for parsimony). The table reports OLS coefficient estimates and (in parentheses) *t*-statistics based on heteroskedasticity-robust standard errors clustered by firm and year-month. A detailed presentation of all variable definitions is provided in the Appendix. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels (two-tailed), respectively.

Table 6: Mitigating Potential Endogeneity Concerns

Panel A: Two-Stages Least Squares (2-SLS) Estimation

	2-SLS Estimation					
	Dependent variables:					
	$C\text{-}Score_{i,q}$	$C\text{-}Score_{i,q} \times Equity\ Return_{i,m}$	$Bond\ Return_{j,r}$	$C\text{-}Score_{i,q}$	$C\text{-}Score_{i,q} \times Equity\ Return_{i,m}$	$Bond\ Return_{j,m}$
	(1)	(2)	(3)	(4)	(5)	(6)
Independent variables:	1st Stage	1st Stage	2nd Stage	1st Stage	1st Stage	2nd Stage
Intercept	0.179***	0.001	0.009***	0.216***	0.001	0.011
	(34.02)	(1.30)	(8.12)	(17.79)	(0.79)	(1.17)
$Young\ Company_{i,q}$	0.013***	-0.000		0.003***	-0.000	
	(11.76)	(-0.10)		(3.66)	(-0.37)	
$Long\ Investment\ Cycle_{i,q}$	0.022***	0.000		0.003***	0.000	
	(29.75)	(1.41)		(2.98)	(0.33)	
$Young\ Company_{i,q} \times Equity\ Return_{i,m}$	0.006	0.016***		0.017	0.016***	
	(0.30)	(7.31)		(1.08)	(7.32)	
$Long\ Investment\ Cycle_{i,q} \times Equity\ Return_{i,m}$	0.031**	0.024***		0.029***	0.024***	
	(2.52)	(16.20)		(2.87)	(16.16)	
$C\text{-}Score_{i,q}$			0.012***			-0.027
			(2.74)			(-0.65)
$C\text{-}Score_{i,q} \times Equity\ Return_{i,m}$			0.300***			0.352***
			(4.31)			(4.04)
$Equity\ Return_{i,m}$	0.083	0.120***	0.023***	0.148**	0.120***	0.023***
	(1.13)	(13.28)	(10.67)	(2.41)	(13.25)	(10.34)
$Treasury\ Return_{j,m}$	0.081***	-0.002	0.018***	0.029	-0.004*	0.011**
	(3.31)	(-1.06)	(3.80)	(1.55)	(-1.86)	(2.19)
Firm controls	No	No	No	Yes	Yes	Yes
Bond controls	No	No	No	Yes	Yes	Yes
Macro controls	No	No	No	Yes	Yes	Yes
Year-Month fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Partial F-test of excluded instruments	114.54	58.40		9.96	56.02	
Over-identifying restrictions test p-value			0.495			0.163
Endogeneity test p-value			0.188			0.413
Obs.	48,597	48,597	48,597	48,597	48,597	48,597
Adj. R^2	0.5206	0.2697	0.1519	0.6945	0.2723	0.1613

Table 6 (continued)

Panel B: Controlling for Audit Litigation Risk and Firm Litigation Risk

	Dependent variable: $Bond\ Return_{j,m}$					
Independent variables:	(1)	(2)	(3)	(4)	(5)	(6)
Intercept	0.007***	0.009***	0.007***	0.002	0.005**	0.002
	(13.18)	(20.99)	(12.82)	(0.99)	(2.39)	(1.03)
$Equity\ Return_{i,m}$	0.017	0.023***	0.017	0.019	0.022***	0.020
	(0.57)	(5.51)	(0.58)	(0.69)	(5.44)	(0.69)
$C\text{-}Score_{i,q}$	0.008**	0.008**	0.008**	0.002	0.002	0.002
	(2.34)	(2.34)	(2.38)	(0.65)	(0.64)	(0.65)
$C\text{-}Score_{i,q} \times Equity\ Return_{i,m}$	0.234***	0.232***	0.233***	0.243***	0.242***	0.242***
	(5.11)	(5.17)	(5.18)	(5.24)	(5.31)	(5.31)
$Audit\ Litigation\ Risk_{i,y}$	0.002***		0.002***	0.002***		0.002***
	(3.11)		(3.10)	(2.71)		(2.70)
$Audit\ Litigation\ Risk_{i,y} \times Equity\ Return_{i,m}$	0.005		0.005	0.002		0.002
	(0.18)		(0.19)	(0.08)		(0.09)
$Firm\ Litigation\ Risk_{i}$		0.000	0.000		0.000	0.000
		(0.71)	(0.69)		(1.13)	(1.18)
$Firm\ Litigation\ Risk_{i} \times Equity\ Return_{i,m}$		-0.002	-0.002		-0.002	-0.002
		(-0.34)	(-0.34)		(-0.36)	(-0.37)
$Treasury\ Return_{j,m}$	0.019***	0.019***	0.019***	0.010	0.010	0.010
	(2.88)	(2.84)	(2.86)	(1.57)	(1.60)	(1.59)
Bond controls	No	No	No	Yes	Yes	Yes
Firm controls	No	No	No	Yes	Yes	Yes
Macro controls	No	No	No	Yes	Yes	Yes
Year-Month fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Obs.	48,597	48,597	48,597	48,597	48,597	48,597
Adj. R^2	0.1553	0.1552	0.1552	0.1644	0.1643	0.1644

Table 6 (continued)

Panel C: Fixed Effects Specification

	Dependent variable: $Bond\ Return_{j,m}$	
Independent variables:	(1)	(2)
Intercept	0.010***	-0.002
	(23.44)	(-0.34)
$Equity\ Return_{i,m}$	0.022***	0.021***
	(6.39)	(6.09)
$C\text{-}Score_{i,q}$	0.002	0.003
	(0.50)	(0.77)
$C\text{-}Score_{i,q} \times Equity\ Return_{i,m}$	0.241***	0.239***
	(5.18)	(5.04)
$Treasury\ Return_{j,m}$	0.015**	0.009
	(2.21)	(1.13)
Bond controls	No	Yes
Firm controls	No	Yes
Macro controls	No	Yes
Year-Month fixed effects	Yes	Yes
Firm fixed effects	Yes	Yes
Obs.	48,597	48,597
Adj. R^2	0.1576	0.1647

This table reports results from three different sets of analyses conducted to mitigate potential endogeneity concerns. Panel A presents regression results from a two-stages least squares (2SLS) estimation with $C\text{-}Score_{i,q}$ instrumented using $Young\ Company_{i,q}$ and $Long\ Investment\ Cycle_{i,q}$. Partial F-tests of excluded instruments in columns (1), (2), (4) and (5), p-values from tests of *over-identifying restrictions* in columns (3) and (6), and p-values from endogeneity tests performed on the 2-SLS estimations are reported. All specifications include year-month fixed effects, as well as bond-, firm-, and macro-level controls in the specifications presented in columns (4), (5), and (6) (coefficients are not reported for parsimony). 2-SLS coefficient estimates and (in parentheses) t-statistics are based on heteroskedasticity-robust standard errors clustered by firm and year-month. Panel B presents: (*i*) the base model augmented with the audit litigation risk proxy ($Audit\ Litigation\ Risk_{i,y}$) in columns (1) and (4); (*ii*) the base model augmented with the firm litigation risk proxy ($Firm\ Litigation\ Risk_i$) in columns (2) and (5); and (*iii*) the base model augmented with both firm and audit litigation risk proxies in columns (3) and (6). Panel C reports regression results from a firm fixed effects estimation. All specifications include year-month fixed effects, as well as bond-, firm-, and macro-level controls in the specification presented in column (2). OLS coefficient estimates and (in parentheses) t-statistics are based on heteroskedasticity-robust standard errors clustered by firm and year-month. A detailed presentation of all variable definitions is provided in the Appendix. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels (two-tailed), respectively.

Table 7: Alternative Measures of Accounting Conservatism

	Dependent variable: $Bond\ Return_{j,m}$			
Independent variables:	(1)	(2)	(3)	(4)
Intercept	0.010***	0.006***	0.010***	0.006***
	(20.61)	(2.75)	(32.43)	(2.78)
$Equity\ Return_{i,m}$	0.005	0.004	0.015***	0.015***
	(1.47)	(1.24)	(3.75)	(3.68)
$Callen\ CR_{i,q}$	0.001**	0.001**		
	(2.46)	(2.54)		
$Callen\ CR_{i,q} \times Equity\ Return_{i,m}$	0.021***	0.021***		
	(3.67)	(3.95)		
$Basu_{i,q}$			0.001	-0.000
			(0.38)	(-0.07)
$Basu_{i,q} \times Equity\ Return_{i,m}$			0.106***	0.103***
			(3.24)	(3.10)
$Treasury\ Return_{j,m}$	0.022***	0.010	0.032***	0.014*
	(3.05)	(1.40)	(3.02)	(1.78)
Bond controls	No	Yes	No	Yes
Firm controls	No	Yes	No	Yes
Macro controls	No	Yes	No	Yes
Year-Month fixed effects	Yes	Yes	Yes	Yes
Obs.	39,240	39,240	37,669	37,669
Adj. R^2	0.1537	0.1639	0.1480	0.1570

This table reports regressions of corporate bond returns on equity returns, treasury returns and accounting conservatism proxied by alternative measure of accounting conservatism ($Callen\ CR_{i,q}$ and $Basu_{i,q}$). The interaction terms $Callen\ CR_{i,q} \times Equity\ Return_{i,m}$ (in columns (1) and (2)) and $Basu_{i,q} \times Equity\ Return_{i,m}$ (in columns (3) and (4)) capture the incremental stock-bond return co-movement for conservative firms. All specifications include year-month fixed effects, as well as bond-, firm-, and macro-level controls in the specifications presented in columns (2) and (4) (coefficients are not reported for parsimony). The table reports OLS coefficient estimates and (in parentheses) *t*-statistics based on heteroskedasticity-robust standard errors clustered by firm and year-month. A detailed presentation of all variable definitions is provided in the Appendix. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels (two-tailed), respectively.

Table 8: Controlling for the Inputs to the C-Score Measure

	Dependent variable: Bond $Return_{j,m}$			
Independent variables:	(1)	(2)	(3)	(4)
Intercept	0.010***	0.011***	0.010***	0.011***
	(3.90)	(18.65)	(22.33)	(4.09)
$Equity\ Return_{i,m}$	0.102***	0.004	0.042***	0.080***
	(4.70)	(0.62)	(5.16)	(3.47)
$C\text{-}Score_{i,q} \times Equity\ Return_{i,m}$	0.010***	0.010***	0.010***	0.010***
	(2.75)	(2.78)	(2.66)	(2.69)
$Ln(Firm\ Size_{i,q})$	0.179***	0.195***	0.196***	0.142***
	(3.53)	(3.66)	(3.83)	(2.61)
$Ln(Firm\ Size_{i,q}) \times Equity\ Return_{i,m}$	0.000			0.000
	(0.09)			(0.03)
$Leverage_{i,q}$	-0.010***			-0.008**
	(-3.91)			(-2.46)
$Leverage_{i,q} \times Equity\ Return_{i,m}$		-0.000		-0.000
		(-0.27)		(-0.29)
$MTB_{i,q}$		0.041**		0.031*
		(2.48)		(1.92)
$MTB_{i,q} \times Equity\ Return_{i,m}$			0.000	0.000
			(0.77)	(0.50)
$Treasury\ Return_{j,m}$			-0.011***	-0.005
			(-3.17)	(-1.13)
Year-Month fixed effects	Yes	Yes	Yes	Yes
Obs.	15,438	15,438	15,438	15,438
Adj. R^2	0.1503	0.1499	0.1501	0.1506

This table reports regressions of corporate bond returns on equity returns, treasury returns and accounting conservatism controlling for the inputs ($Ln(Firm\ Size_{i,q}$, $Leverage_{i,q}$ and $MTB_{i,q}$) to the $C\text{-}Score$ measure (Khan and Watts, 2009) and their respective interactions with $Equity\ Return_{i,m}$. The interaction term $C\text{-}Score_{i,q} \times Equity\ Return_{i,m}$ captures the incremental stock-bond return co-movement for conservative firms. All specifications include year-month fixed effects (coefficients are not reported for parsimony). The table reports OLS coefficient estimates and (in parentheses) *t*-statistics based on heteroskedasticity-robust standard errors clustered by firm and year-month. A detailed presentation of all variable definitions is provided in the Appendix. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels (two-tailed), respectively.

Table 9: Representative Bond Analysis

	Dependent variable: $Bond\ Return_{j,m}$					
Independent variables:	(1)	(2)	(3)	(4)	(5)	(6)
Intercept	0.010***	0.004*	0.011***	0.008***	0.011***	0.005**
	(24.28)	(1.77)	(30.77)	(3.04)	(29.51)	(2.38)
$Equity\ Return_{i,m}$	0.019***	0.018***	-0.002	-0.001	0.017***	0.017***
	(5.64)	(5.45)	(-0.42)	(-0.23)	(4.56)	(4.51)
$C\text{-}Score_{i,q}$	0.010**	0.008**				
	(2.41)	(2.18)				
$C\text{-}Score_{i,q} \times Equity\ Return_{i,m}$	0.239***	0.242***				
	(4.87)	(5.03)				
$Callen\ CR_{i,q}$			0.001	0.001		
			(1.23)	(1.29)		
$Callen\ CR_{i,q} \times Equity\ Return_{i,m}$			0.032***	0.031***		
			(5.30)	(5.21)		
$Basu_{i,q}$					0.001	-0.001
					(0.69)	(-0.77)
$Basu_{i,q} \times Equity\ Return_{i,m}$					0.110**	0.108**
					(2.53)	(2.49)
$Treasury\ Return_{j,m}$	0.025**	0.018**	0.025**	0.012	0.071***	0.046***
	(2.56)	(2.00)	(2.20)	(1.22)	(4.45)	(3.41)
Bond controls	No	Yes	No	Yes	No	Yes
Firm controls	No	Yes	No	Yes	No	Yes
Macro controls	No	Yes	No	Yes	No	Yes
Year-Month fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Obs.	15,438	15,438	12,450	12,450	12,479	12,479
Adj. R^2	0.1494	0.1580	0.1534	0.1630	0.1447	0.1533

This table reports regressions of corporate bond returns on equity returns, treasury returns and accounting conservatism for a sample of *representative bonds*. Representative bonds are selected following the criteria in Haesen et al. (2013) and specifically bonds are selected on the basis of (*i*) seniority, (*ii*) maturity, (*iii*) age, and (*iv*) size. The interaction terms $C\text{-}Score_{i,q} \times Equity\ Return_{i,m}$ (in columns (1) and (2)), $Callen\ CR_{i,q} \times Equity\ Return_{i,m}$ (in columns (3) and (4)) and $Basu_{i,q} \times Equity\ Return_{i,m}$ (in columns (5) and (6)) capture the incremental stock-bond return co-movement for conservative firms. All specifications include year-month fixed effects, as well as bond-, firm-, and macro-level controls in the specifications presented in columns (2), (4), and (6) (coefficients are not reported for parsimony). The table reports OLS coefficient estimates and (in parentheses) *t*-statistics based on heteroskedasticity-robust standard errors clustered by firm and year-month. A detailed presentation of all variable definitions is provided in the Appendix. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels (two-tailed), respectively.