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Accounting conservatism and firm investment efficiency ☆

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We argue that conservatism improves investment efficiency. In particular, we predict that it resolves debt-equity conflicts, facilitating a firm's access to debt financing and limiting underinvestment. This permits the financing of prudent investments that otherwise might not be pursued. Our empirical results confirm these predictions. We find that more conservative firms invest more and issue more debt in settings prone to underinvestment and that these effects are more pronounced in firms characterized by greater information asymmetries. We also find that conservatism is associated with reduced overinvestment, even for opaque investments such as research and development.

1. Introduction

Prior research (e.g. Biddle et al., 2009) hypothesizes and finds that accounting quality improves investment efficiency. They identify a conditional negative (positive) association between accounting quality and investment for firms operating in settings prone to overinvestment (underinvestment). We extend this line of research, similarly hypothesizing and finding a conditional negative (positive) association between conservatism and investment for firms operating in settings prone to overinvestment (underinvestment). We also find that more conservative firms in settings prone to underinvestment issue more debt and invest in more prudent projects, and that the investment and financing effects of conservatism are more pronounced in the presence of greater information asymmetries.

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Accounting conservatism imposes more stringent verifiability requirements for the recognition of economic gains relative to losses (Basu, 1997; Watts, 2003). This results in earnings that capture difficult-to-verify economic losses more quickly than gains and generates a downward bias in the value of net assets. The literature shows that conservatism improves investment efficiency by reducing managerial overinvestment (Francis and Martin, 2010; Bushman et al., 2011). We explore the related issue of when conservatism can increase investment in situations where firms are more prone to underinvestment.

Prior research provides evidence that conservatism (1) discourages managerial selection of projects with negative net present value (NPV) and triggers the early abandonment of poorly performing projects (Ball, 2001; Ball and Shivakumar, 2005) and (2) creates incentives to discard positive-NPV but high-risk projects (Leuz, 2001; Roychowdhury, 2010; Bushman et al., 2011).

We predict that conservatism also mitigates underinvestment among firms facing financing difficulties. These firms likely suffer from related problems such as the risk of insolvency and low profitability. For them, the costs associated with negative-NPV investments—or overly risky positive-NPV investments—are high. Both debt- and equityholders are reluctant to grant new capital to such firms (Jensen and Meckling, 1976; Myers, 1977). Conservatism can help to alleviate agency problems and thus mitigate financing constraints for these firms.

Investors likely fear that financially constrained firms may tumble into insolvency if their projects fail. In these situations, we expect conservative accounting to facilitate access to additional debt for new investments, as it encourages prudent investments that can increase firm value without exacerbating financial risk. In contrast, conservatism is less likely to alleviate shareholders' reluctance to provide additional financing. Dispersed shareholders are less capable of ensuring that firms maintain conservative accounting policies and undertake prudent investments. Furthermore, shareholders, when they provide financing, may prefer risky projects that can transfer wealth to them from debtholders. Conservative reporting discourages managers from engaging in this kind of conduct because of the timely recognition of losses. Overall, these arguments lead to the prediction that conservatism facilitates additional debt for financially constrained firms seeking to invest but does not necessarily facilitate their access to additional equity.

We also expect conservatism to help to limit overinvestment problems. Overinvestment is likely to pervade firms that have a high investment capacity. In these firms, managers are more able to pursue projects that have a negative NPV but generate private benefits for them. Conservatism, by imposing timely reporting of losses, makes such self-interested decisions apparent sooner, enabling stakeholders to discipline managers, if necessary, and deterring such conduct in the future. We predict these roles of conservatism hold not only for acquisitions, as illustrated by Francis and Martin (2010), but also for more opaque investments such as capital expenditures and research and development (R&D).[1]

Finally, we predict that conservatism affects differently future profitability and its volatility depending on whether the firm is in a setting prone to over- or underinvestment. In settings prone to overinvestment (i.e., in firms with a high investment capacity), conservatism leads to better project selection and earlier abandonment of loss-making projects, increasing the future return on assets (ROA). However, this may not always be true in firms prone to underinvestment (i.e., those with a low investment capacity). For these firms, conservatism instead facilitates the access to additional funding, particularly for low-risk and less volatile projects that do not necessarily generate a higher rate of return than existing ones.

Using a large US sample for the period 1990–2007, we follow the method of Biddle et al. (2009) and test these predictions on the association between accounting conservatism and firm investment, financing, and performance. In our main tests, we use the firm-level measure of conservative reporting—timely loss recognition—proposed by Khan and Watts (2009). Our results are robust to the use of alternative proxies based on Callen et al. (2010) and Givoly and Hayn (2000). We incorporate in our tests measures of financial reporting quality to ensure that we isolate the incremental economic consequences of conservatism. The analysis yields several key findings.

First, more conservative firms invest more and issue more debt than less conservative ones in settings where underinvestment is more likely. We also show that conservatism is associated with lower overinvestment not only for acquisitions but also for more opaque investments, such as capital expenditures and R&D. Finally, we show that the association between conservatism and accounting profitability, as measured by the future ROA, is conditional on whether the firm is prone to over- or underinvestment. For firms prone to overinvestment, conservatism is associated with a higher ROA. However, for firms prone to underinvestment, conservatism is associated with less volatile investments that do not necessarily lead to a higher ROA.

Our results contribute to the literature in several ways. First, we extend the growing literature on the links between accounting quality and investment efficiency.[2] We show that, among firms prone to underinvest, those with more conservative accounting invest more (in less profitable but more prudent projects) and issue more debt. This suggests that conservatism encourages low-risk, positive-NPV investments and that these new investments are financed with new debt. This is consistent with conservatism limiting debt-equity conflicts. Our finding that conservatism mitigates

[1] Acquisitions are highly visible investments where moral hazard can be monitored more easily than in the case of capital expenditures or R&D. With acquisitions, outside parties have access to the financial statements of the acquired firm and other information sources. However, for outsiders it is more difficult to assess whether investments in capex and R&D are efficient (Aboody and Lev, 2000). We refer to these investments as being relatively more "opaque" than acquisitions.

[2] See, among others, Bens and Monahan (2004), Biddle and Hilary (2006), Hope and Thomas (2008), McNichols and Stubben (2008), Biddle et al. (2009), Beatty et al. (2010), and Cheng et al. (2013).

underinvestment in financially constrained firms is novel, as prior research focuses only on the role of conservatism in reducing overinvestment (Francis and Martin, 2010; Bushman et al., 2011).

We also contribute to the stream of literature on the links between accounting quality and financing (e.g., Balakrishnan et al., 2014). Prior work shows that conservatism can lead to a lower cost of debt (Ahmed et al., 2002; Zhang 2008; Wittenberg-Moerman, 2008). We provide evidence of an association between conservatism and new debt issuances for financially constrained firms. This finding complements the related analytical evidence provided by Göx and Wagenhofer (2009), who show that conditional conservatism is the optimal accounting policy for financially constrained firms seeking to issue debt. Our evidence also complements the work of Beatty et al. (2010). Their work on the role accounting quality in facilitating investment focuses on access to private versus public debt. We examine debt versus equity.

We also expand the evidence on the role of conservatism in mitigating the overinvestment problems documented in Francis and Martin (2010). We show that conservatism, in overinvestment scenarios, is also associated with reduced investment in more opaque investments, such as R&D and capital expenditures, where outsider monitoring is less likely to affect investment outcomes. We also add to their findings by showing that the investment-related effects of conservatism affect performance differently depending on whether the firm is over- or underinvesting. While prior research finds that the investment effects of improved accounting quality lead to greater profitability (Hope and Thomas, 2008; Francis and Martin, 2010), we find that this is true only in settings prone to overinvestment. In settings prone to underinvestment, conservatism is associated with investment in prudent projects and therefore does not lead to a higher ROA.

The remainder of the paper is organized as follows. Section 2 discusses the expected association between conservatism and investment and financing. Section 3 contains the research design. Section 4 describes the sample and discusses the main empirical results. Sections 5 and 6 contain additional analyses and robustness checks, and Section 7 concludes.

2. Conservatism, investment and financing: development of hypotheses

We make two major predictions: (1) conservatism is associated with increased investment in firms prone to underinvest, and (2) conservatism reduces overinvestment problems in firms prone to overinvest. These predictions lead to two further hypotheses about the role of debt- and equityholders in alleviating investment constraints.

Our study builds on the literature linking financing and investment decisions. In their seminal work, Modigliani and Miller (1958) argue that financing and investment decisions are separate in perfect capital markets. However, a large stream of literature subsequently shows that information frictions drive linkages between financing and investment decisions (Myers, 1977, 1984; Childs et al., 2005). In line with this literature and similar to the work of Balakrishnan et al. (2014), we assume that information frictions can affect financing and investment and that financial reporting can help to decrease these frictions.

Biddle et al. (2009) argue that firms constrained in their ability to make new investments are probably characterized by having low cash balances and high leverage. These firms might even suffer from such related problems as low profitability and the risk of insolvency. Both debt- and equityholders are unlikely to finance these firms, as the costs associated with negative-NPV projects or with positive-NPV but high-risk investments are high, particularly when information asymmetry is also high. We predict that conservative reporting can mitigate these constraints. By imposing timely loss recognition and delayed gain recognition, conservatism makes poor investment decisions apparent in earnings sooner. This lowers managerial incentives to invest in negative-NPV projects and prompts the early abandonment of poorly performing projects (Ball, 2001; Ball and Shivakumar, 2005). Thus conservatism enables a firm's stakeholders to discipline managers, if necessary and encourages managers to avoid high-risk projects and select more prudent ones (Roychowdhury, 2010; Bushman et al., 2011).

For financially constrained firms, conservative reporting signals that managers will likely engage in low-risk, positive-NPV projects (which we designate as “prudent investments”). We predict that this, in turn, will facilitate a firm's access to capital. Even for these prudent investments, without conservative reporting, we expect firms operating in settings prone to underinvestment to be unlikely to gain access to capital.

In contrast, for firms prone to overinvest, conservatism lowers investment. In these firms, managers are more likely to pursue negative-NPV investments, such as pet projects or trophy acquisitions, that generate private benefits for those managers. We predict that conservatism will stem these kinds of investments because it triggers the early recognition of losses and thus intervention by disciplining bodies such as boards of directors (Ahmed and Duellman, 2007).

While not directly examining the issues under analysis, prior research offers evidence consistent with these predictions. Bushman et al. (2011) find that, in countries with more conservative accounting, firm investment decisions are more sensitive to declining investment opportunities. Pinnuck and Lillis (2007) likewise show that loss reporting serves to resolve agency problems and triggers the exercise of the abandonment option. More closely related to our research, Francis and Martin (2010) demonstrate that conservative firms make more profitable acquisitions and divest sooner from poorly performing acquisitions.

The above discussion leads to the following predictions:

H1a. Among firms prone to underinvestment, more conservative firms invest more.

H1b. Among firms prone to overinvestment, more conservative firms invest less.

Information asymmetry can exacerbate over- and underinvestment problems. When information asymmetry is high, financially constrained firms face difficulties securing credit or equity. Conversely, for firms that are not financially constrained, information asymmetry can lead to greater overinvestment, as managers can more easily evade monitoring. Conservatism helps to alleviate these problems. Prior evidence shows that conservatism arises in response to information asymmetries (LaFond and Watts, 2008; Khan and Watts, 2009) and that it can lower the negative consequences of information asymmetry for debt and equity markets (Wittenberg-Moerman, 2008; Kim et al., 2013). This leads to our second hypothesis:

H2. The effects of conservatism on investment are more pronounced among firms characterized by greater information asymmetry.

Next, we delve into specific agency issues that arise when firms are prone to underinvest versus when they are prone to overinvest. For those prone to underinvest, especially those at risk of insolvency, two main conflicts arise. First, equityholders have no incentives to raise new capital that would make debt safer, even if the firm is considering prudent projects. This is the debt-overhang problem described in Myers (1977). Second, equityholders have an incentive to increase risk, as they primarily benefit from this risk. This is the risk-shifting problem described by Jensen and Meckling (1976). Myers (2003) describes an additional problem for debtholders: managers can procrastinate, concealing problems from creditors and lengthening the effective maturity of debt.

In this situation, when firms are prone to underinvest, we expect debtholders to be the better monitors and to find conservatism particularly useful. This occurs because conservatism triggers the timely violation of debt covenants (Zhang, 2008; Nikolaev, 2010) and promotes the early transfer of control rights to debtholders, thus addressing the concealment problem identified by Myers (2003). This possibility that debtholders may seize control of the firm disciplines managers, motivating them to make prudent investments. These investments may improve the firm's financial condition and help to ensure its survival.

A lengthy literature confirms the view that conservatism contributes to debtholder monitoring. Lenders use lower bounds of the current value of the borrower's assets in the loan-granting decision and require an assurance that this asset value will be enough to recover their loans (Watts 2003). Conservatism provides this lower bound. Consistent with this argument, Göx and Wagenhofer (2009, p. 13) show that conservatism “maximizes the ex ante probability of obtaining financing” and that it can reduce debt costs. In particular, Ahmed et al. (2002) and Zhang (2008) show, respectively, that conservatism improves a firm's debt rating and decreases the initial interest rate that lenders offer. Similarly, Wittenberg-Moerman (2008) shows that conservatism reduces information asymmetries between informed and uninformed traders in the secondary loan market. Finally, conservatism deters the artificial inflation of earnings (Chen et al., 2007; Gao, 2013). This reduces agency costs for debtholders, as it limits the earnings available for distribution to shareholders at the expense of lenders (Ahmed et al., 2002) and discourages managerial self dealing (Khan and Watts, 2009).

To the best of our knowledge, there is no prior literature on the links between conservatism and equity financing in firms prone to underinvest. We expect debtholders to play a more important disciplinary role when the firm suffers financial problems. Therefore we expect shareholders to restrict equity financing in such firms. Also, given the call-option nature of shareholders' claims, among firms likely to underinvest, shareholders have incentives to pursue high-risk projects. However, these are precisely the type of projects that conservatism would make unattractive to managers, because of early loss recognition. Equityholders thus will be less willing to provide additional capital to more conservative firms prone to underinvestment.

The above discussion leads to our final hypotheses:

H3a. Among firms prone to underinvestment, accounting conservatism is associated with future debt issuances.

H3b. Among firms prone to underinvestment, accounting conservatism is not associated with future equity issuances.

An extension of our arguments is that we expect conservatism to play a more limited role in debt contracting for firms likely to overinvest. In these firms, conservative accounting may not contribute to monitoring. Aggregation across many investment projects may reduce the likelihood of poor decision-making triggering debt-covenant violations in healthy profitable firms, and thus there would be no transfer of control rights to debtholders. In addition, in such cases, even if equityholders try to restrict access to equity capital, the firms will have sufficient internal funds to forge ahead. Therefore, for firms prone to overinvest, other monitoring mechanisms such as boards of directors are likely to matter more. However, conservatism may also facilitate access to debt financing in the case of nonfinancially constrained firms, as it may reduce overinvestment. This reduction will also benefit debtholders, who might in turn be more willing to lend additional funds. Given these opposing effects, the relation between conservatism and debt financing in firms without financing constraints is an empirical open question.

To summarize, our initial setting is that of a firm likely to underinvest. This firm would experience the debt-equity conflicts that arise when firms are highly levered and might be at risk of insolvency, i.e., debt overhang and risk-shifting problems (Myers, 1977; Jensen and Meckling, 1976; Becker and Strömberg, 2012). Both equity- and (particularly) debtholders might then withhold financing, leading to underinvestment. We predict that conservatism alleviates these agency conflicts, by benefiting debt-holders. Therefore, under more conservative accounting, we expect to observe less underinvestment, greater debt financing and less risk taking (greater investment in prudent projects, leading to a lower future volatility of income) in this firm.

3. Research design

3.1. Main proxy for reporting conservatism

In our main tests, we employ the firm-year proxy for conditional conservatism developed by Khan and Watts (2009). Drawing from the Basu (1997) model, they estimate, at the firm level, the timeliness of earnings to good news (G-Score) and the incremental timeliness of earnings to bad news (C-Score). By adding both, they obtain the total timeliness of bad news recognition. We define our conservatism proxy as the annual decile ranks of the three-year average (years t, $t-1$, and $t-2$) of the total timeliness of loss recognition (G-Score + C-Score) and designate this measure as CONS.

We use deciles to mitigate measurement error in the estimates and reduce concerns about nonlinearities. Appendix A contains the definitions of all variables. In Appendix B, we provide a detailed description of how we construct CONS, as well as evidence on its correlations and association with the economic determinants of conservatism. CONS captures long-term conditional conservatism, which has contracting value and thus is relevant to our research (Ball and Shivakumar, 2005, pp. 90–91). We view conservatism as being exogenous and predetermined for the current generation of managers: an ex ante managerial choice that prevents opportunism, thereby permitting firms to accrue debt-financing benefits. As is common in accounting research, we cannot entirely rule out endogeneity concerns. However, prior research demonstrates that, in line with our view, conservative accounting is sticky and changes slowly. Khan and Watts (2009) and Callen et al. (2010) confirm that conservatism proxies are stable over time. In addition, we take the three-year average to alleviate some of these concerns. Finally, the use of the proxy of Khan and Watts (2009) further mitigates the concerns, given that they base their measure on a linear combination of size, leverage and market-to-book ratio. Because of its construction, the Khan and Watts proxy (2009) changes when the determinants of conservatism change. Ettredge et al. (2012) and Jayaraman (2012) show that the Khan and Watts measure captures variation in conservatism at the firm's level, despite criticisms of the validity of conservatism measures based on the Basu (1997) model.[3]

In Section 6.2, we perform robustness tests using three additional conservatism proxies: the conservatism ratio of Callen et al. (2010), a measure based on the skewness of earnings and cash flows and a measure based on the accumulation of non-operating accruals (Givoly and Hayn, 2000).

3.2. Association between conservatism and investment efficiency

Our tests are based on the method of Biddle et al. (2009), which permits an analysis of the effects of accounting choices in reducing both over- and underinvestment. We adapt their model to capture the effects of conservatism on investment as follows:

$$\begin{aligned}\text{Investment}_{t+1} = {} & \beta_t + \delta_1\ \text{CONS}_t + \delta_2\ \text{CONS}_t{*}\text{UnderInvest}_t + \delta_3\ \text{UnderInvest}_t \\ & + \delta_4\ \text{FRQ}_t + \delta_5\ \text{FRQ}_t{*}\text{UnderInvest}_t + \delta_6\ \text{GOV}_t + \delta_7\ \text{GOV}_t{*}\text{UnderInvest}_t \\ & + \gamma\ \text{Controls}_t + \varepsilon_{t+1} \end{aligned} \tag{1}$$

In Eq. (1), Investment is a measure of total future investment in both capital and noncapital goods. CONS is a firm-year-specific measure of conservatism. UnderInvest is a ranked variable constructed at the industry-year level capturing settings where under- or overinvestment is more likely. FRQ is a measure of financial reporting quality. GOV is a set of governance variables, and Controls is a vector of control variables that affect investment and financing. We estimate Eq. (1) in a panel-data fashion with a fixed-effects model that includes year-indicator variables to control for year-specific shocks to investment. We report robust standard errors based on a firm and year clustering (Petersen, 2009).

The dependent variable, Investment, measures total investment defined as capital expenditures, research and development, and acquisition expenditures; less cash receipts from sales of property, plant, and equipment; multiplied by 100; and scaled by lagged sales.[4] In our robustness tests, we use an alternative definition of Investment.

UnderInvest is a proxy used to detect settings in which there is greater likelihood of under- or overinvestment problems. Following Biddle et al. (2009), we identify industry-year combinations where there is aggregate under- or overinvestment at

[3] There is debate about the validity of the Basu (1997) measure of conditional conservatism. Some authors claim it is invalid (e.g., Dietrich et al., 2007; Givoly et al., 2007; Patatoukas and Thomas, 2011), while others such as Ball et al. (2013a, 2013b) provide a number of counterarguments.

[4] We use sales instead of assets in the denominator to avoid introducing a mechanical association between CONS and Investment: a high level of conservatism results in lower assets, and lower assets increase Investment if assets is used in the denominator.

the industry level. To do so, we estimate the following regression:

$$\text{Investment}_{I,\ t} = \beta_0 + \beta_1\ \text{SalesGrowth}_{I,\ t-1} + \mu_{I,\ t} \quad (2)$$

where Investment is the average investment of all the firms in each industry-year group (I, t), and SalesGrowth, a proxy for investment opportunities, is the average sales growth of all the firms in each industry-year group, where sales growth for each firm is calculated as $100{*}\Delta\text{Sales}_{i,\ t-1}/\text{Sales}_{i,\ t-2}$. To compute the averages, we impose a minimum of 20 firms per industry-year. Industry groups are the industry classifications in Fama and French (1997). We rank the industry-year specific residuals of model 2 multiplied by -1 into deciles and rescale the decile rankings from 0 to 1. We refer to these rankings as UnderInvest. We then assign these decile rankings to each firm by year and industry membership. High (low) values of UnderInvest identify settings in which under-investment (over-investment) at the industry-year level is most likely. In unreported sensitivity tests, we also use an alternative definition of UnderInvest: a ranked variable based on the average of a decile-ranked measure of cash and a decile-ranked measure of leverage. Using this alternative definition, also based on the work of Biddle et al. (2009), we obtain identical inferences.

We use Eq. (1) to test hypotheses H1a and H1b, that is, whether conservatism reduces under- and overinvestment. In Eq. (1), the coefficients of interest are δ_1 and δ_2. We expect conservatism to reduce both under- and overinvestment. Therefore, when underinvestment is likely (i.e., UnderInvest$=1$), we expect the sum of the coefficients δ_1 and δ_2 to be positive, indicating that conservatism increases investment in settings where underinvestment is most likely. On the contrary, when overinvestment is likely (i.e., UnderInvest$=0$), we expect coefficient δ_1 to be negative and significant, indicating that conservatism decreases investment in such settings.

To test H2, we extend the previous analysis to investigate whether conservatism contributes to the reduction of investment inefficiencies in settings where information asymmetries between managers and the providers of finance are more pronounced. Given that conservatism appears in response to information asymmetries, we expect the effects of conservatism on investment to be particularly pronounced when information asymmetry is high. To test this idea, we estimate the following regression:

$$\begin{aligned}\text{Investment}_{t+1} = {} & \beta_t + \delta_1\ \text{CONS}_t + \delta_2\ \text{CONS}_t{*}\text{InfoAsym}_t + \delta_3\ \text{CONS}_t{*}\text{UnderInvest}_t \\ & + \delta_4\ \text{CONS}_t{*}\text{UnderInvest}_t{*}\text{InfoAsym}_t + \gamma\ \text{Controls}_t + \varepsilon_{t+1} \end{aligned} \quad (3)$$

where all variables have been defined previously, except for InfoAsym. We use three proxies for information asymmetry (InfoAsym). Given our prior theoretical arguments, we are particularly interested in measuring information asymmetry for debt investors. To measure information asymmetry for debt investors, LaFond and Watts (2008) use a market-based proxy, and finance researchers commonly use proxies such as the bid–ask spread (e.g., Krishnaswami et al., 1999), given that information asymmetries between all users of accounting information are likely correlated. Thus our first proxy (IA) is market-based. It is the average of the standardized values of bid–ask spread, stock return volatility, and idiosyncratic risk. Regarding information asymmetries between the firm and debtholders, we introduce two proxies following Sufi (2007, 2009) and Faulkender and Petersen (2006): (1) a dummy variable that takes the value of 1 if the firm has no credit rating (NCR) and (2) the negative of the firm's age (Young), as younger firms are less known by investors. Firms with no credit rating and younger firms are more likely to have higher information asymmetries. The details of the calculations of these proxies can be found in Appendix A.

Finally, to test hypothesis H3a, we use the following model:

$$\begin{aligned}\Delta\text{Debt issuance}_{t+1} = {} & \beta_t + \delta_1\ \text{CONS}_t + \delta_2\ \text{CONS}_t{*}\text{UnderInvest}_t + \delta_3\ \text{UnderInvest}_t \\ & + \delta_4\ \text{FRQ}_t + \delta_5\ \text{FRQ}_t{*}\text{UnderInvest}_t + \delta_6\ \text{GOV}_t + \delta_7\ \text{GOV}_t{*}\text{UnderInvest}_t \\ & + \gamma\ \text{Controls}_t + \varepsilon_{t+1} \end{aligned} \quad (4)$$

The dependent variable, $\Delta\text{Debt issuance}_{t+1}$, is defined as the future change in new debt issuance scaled by current sales. Debt issuance equals long-term debt issuance, minus the reduction in long-term debt, plus changes in current debt. If more conservative firms in settings prone to underinvestment issue more debt than less conservative firms, we expect the sum of δ_1 and δ_2 to be positive and significant. We also predict a negative association between conservatism and equity issuance in settings prone to underinvestment. We test H3b using the change in future equity issuance ($\Delta\text{Equity issuance}_{t+1}$) as the dependent variable in Eq. (4), keeping the rest of the model unaltered. In this case, we expect conservatism to relate negatively to equity issuance. This occurs for two reasons. First, equityholders, in settings prone to underinvestment, would prefer prudent new projects to be funded by debtholders, who are likely better at monitoring in such cases. Also, equityholders are expected to be less willing to provide additional capital to more conservative financially constrained firms. In these firms, conservatism prevents investments in risky projects that benefit equityholders at the expense of debtholders. We therefore expect the sum of δ_1 and δ_2 to be negative when we model future equity issuance. The details of the measurement of this new dependent variable are in Appendix A.

Throughout Eqs. (1), (3), and (4) we control for financial reporting quality (FRQ) to ensure that conservatism is not a proxy for accruals quality. We follow Biddle et al. (2009) and use a measure of accruals quality based on the work of Dechow and Dichev (2002). Appendix A contains the estimation details.

Corporate governance quality can also affect a firm's investments and financing, so to ensure that we isolate the effects of conservatism, we follow Biddle et al. (2009) and incorporate the following into our three main models: (a) the percentage of the firm's shares held by institutional investors (Institutions), (b) the number of analysts following the firm (Analysts), and (c) the measure of antitakeover protection developed by Gompers et al. (2003), multiplied by -1 (InvGIM-Score). Because InvGIM-Score is not available for the full sample, we also incorporate (d) GIM-Score-dum, a dummy variable that takes the value of 1 when the GIM-Score is missing and 0 otherwise.

Finally, we include additional controls for effects that can confound our results. In particular, we follow previous research and identify variables that affect either investment[5] or financing.[6] Specifically, we control for size, leverage, market-to-book ratio (MTB), depreciation method (AcceDep), the volatility of cash flow from operations (StdCFO), volatility of sales (StdSales), volatility of investment (StdInvestment), bankruptcy risk (Z-Score), proportion of tangible assets (Tangibility), industry capital structure (Ind-Cap-Struc), operating cash flow to sales (CFOsale), dividend payout ratio (Dividend), length of the operating cycle (OperCycle), length of the investment cycle (InvCycle), frequency of losses (Loss), and financial slack (Slack). We also control for information asymmetries between the firm and capital providers. To capture information asymmetries with equityholders, we use our previously described summary measure (IA), constructed by averaging the standardized values of three measures: the bid–ask spread, the standard deviation of daily stock returns, and idiosyncratic risk. Regarding information asymmetries between the firm and debtholders, we use NCR (no credit rating) and Young, as previously defined. As past stock performance can influence the issuance of equity, we also include annual stock returns (Ret) as an additional control variable (Lucas and McDonald, 1990) when we use equity issuance as a dependent variable in Eq. (4). Appendix A describes how all of these variables are constructed.

4. Main empirical results

4.1. Sample and data

We use Compustat for accounting data and CRSP for stock market data. Analyst data come from IBES, ownership data from Thomson Financial, and governance data from Gompers et al. (2003). To increase the power of our tests, we employ as many observations as possible from the available data sources. Our sample covers 18 years—1990 to 2007. The sample spans these years because this is when some of the governance variables are available. Financial firms are excluded because their accounting differs and because they invest differently. To mitigate the influence of outliers, all continuous variables are winsorized annually at the first and 99th percentiles. These selection procedures result in a maximum of 41,626 firm-year observations, although the number of observations varies depending on the type of test conducted. Table 1 presents descriptive statistics of the main variables. The reported values for the conservatism proxy are in line with those in Khan and Watts (2009), and the values of the control variables are also similar to those in Biddle et al. (2009). Table 1 also contains descriptive statistics for the full sample and the underinvestment and overinvestment subsamples. The under- and overinvestment subsamples correspond to observations in the first and third tercile, respectively, of the distribution of UnderInvest.

4.2. Association between conservatism and investment efficiency

In our first analysis, we study the association between conservatism and investment efficiency. Table 2 reports the results of estimating Eq. (1). In Column I, we replicate the results in Biddle et al. (2009) on the effects of financial reporting quality on over- and underinvestment. Consistent with their results, we find that financial reporting quality (FRQ) mitigates both overinvestment and underinvestment. The results on conservatism are reported in Column II. We find evidence that conservatism is positively associated with investment in firm-year observations with a greater likelihood of underinvestment. In particular, the sum of coefficients δ_1 and δ_2 (1.338, t-stat$=$3.40) is positive and significant at conventional levels, confirming that more conservative firms invest more in settings prone to underinvestment (i.e., UnderInvest$=$1). The negative and significant δ_1 coefficient (-2.182, t-stat$=-4.46$) also confirms that conservatism constrains investment in firms that are likely to overinvest (i.e., UnderInvest$=$0). The economic significance is such that a one decile change in CONS translates into an increase (decrease) in investment, relative to its mean, of 5.3% (8.6%). These results confirm hypotheses H1a and H1b.

As for the effect of the governance variables, the results are generally insignificant or have an unexpected sign. These findings resemble those of Biddle et al. (2009) and point to the difficulties in measuring governance. They may also indicate that the financial reporting proxies (FRQ and CONS) subsume governance. These results could also be attributable to the drawbacks of tight governance mechanisms over managerial investment decisions (e.g., Bargeron et al., 2010).

[5] Dechow (1994), Dechow et al. (1998), Dechow and Dichev (2002), Biddle and Hilary (2006), Liu and Wysocki (2007), Jackson (2008), Jackson et al. (2009), and Biddle et al. (2009).

[6] Titman and Wessels (1988), Harris and Raviv (1991), Leland (1994), Rajan and Zingales (1995), Barclay and Smith (1999), Hovakimian et al. (2001), Fama and French (2002), Frank and Goyal (2003, 2009), Hovakimian (2004), Chang et al. (2006, 2009), and Rauh and Sufi (2010).

Table 1
Univariate statistics.

Variable	Full sample			UnderInvest		OverInvest	
	Mean	Median	std	Mean	Median	Mean	Median
Investment$_{t+1}$%	25.29	10.05	62.49	9.90	4.83	39.64	15.79
CONS	0.136	0.136	0.08	0.144	0.141	0.131	0.133
FRQ	0.00	−0.18	1.00	0.08	−0.11	−0.08	−0.23
Institutions	0.35	0.32	0.30	0.38	0.37	0.34	0.29
Analysts	4.38	2.00	6.37	4.42	2.00	4.51	2.00
InvGIM-Score	−3.41	0.00	4.74	−3.77	0.00	−3.16	0.00
GIM-Score-dum	0.63	1.00	0.48	0.60	1.00	0.65	1.00
IA	0.00	−0.11	0.91	−0.11	−0.24	0.09	0.04
NCR	0.60	1.00	0.49	0.62	1.00	0.58	1.00
Young	−17.82	−12.76	14.71	−18.85	−13.59	−16.97	−11.92
Size	5.60	5.48	2.02	5.59	5.47	5.67	5.55
MTB	2.70	1.92	2.53	2.37	1.77	2.97	2.08
Leverage	0.42	0.17	0.70	0.50	0.23	0.34	0.12
AcceDep	0.16	0.00	0.37	0.14	0.00	0.18	0.00
StdCFO %	9.19	6.53	9.04	8.18	6.05	10.24	7.11
StdSales %	20.83	14.37	20.75	23.25	15.98	19.76	13.63
StdInvestment	0.42	0.06	2.14	0.15	0.03	0.68	0.08
Z-Score	1.60	1.85	2.04	2.43	2.46	0.99	1.34
Tangibility %	31.36	24.51	23.84	29.69	25.36	31.62	22.25
Ind-Cap-Struc	0.19	0.16	0.12	0.21	0.19	0.16	0.11
CFOsale	−0.16	0.07	9.40	0.04	0.05	−0.37	0.09
Dividend	0.45	0.00	0.50	0.50	0.00	0.39	0.00
OperCycle	4.69	4.76	0.70	4.63	4.74	4.75	4.79
InvCycle %	5.20	4.51	3.16	4.65	4.22	5.41	4.53
Loss	0.24	0.00	0.43	0.17	0.00	0.29	0.00
Slack	2.10	0.28	5.84	1.05	0.20	3.15	0.45
Stock return	0.17	0.07	0.60	0.15	0.07	0.18	0.07
ΔNew debt issuance$_{t+1}$%	0.91	0.00	19.34	0.76	0.00	1.24	0.00
ΔNew equity issuance$_{t+1}$%	−0.17	0.00	28.08	−0.12	0.00	−0.38	0.00
Volatility Future ROA, adjusted %	0.02	−1.72	12.09	−0.04	−1.65	0.13	−1.73
Volatility Past ROA, adjusted %	0.02	−1.84	14.49	−0.04	−1.72	0.05	−1.96
Mean (ROA$_{t+1}$ ROA$_{t+2}$ ROA$_{t+3}$) %	5.68	8.01	16.27	7.75	8.50	3.70	7.42

The sample covers the period 1990–2007 and contains a maximum of 41,626 observations. The UnderInvest (or OverInvest) subsample includes observations in the top (bottom) tercile of the distribution of UnderInvest, which captures settings where under- or overinvestment is more likely. Details for the construction of the variables can be found in Appendix A. Investment is a measure of total investment calculated as capital expenditures plus research and development plus acquisition expenditures less cash receipts from sales of PPE, multiplied by 100, and scaled by lagged sales. CONS is based on the firm-year measure of conditional conservatism constructed by Khan and Watts (2009). It measures the timeliness of loss recognition, and it is defined as the three-year average of *G*-Score plus *C*-Score. *G*-Score is the timeliness of good news, and *C*-Score is the incremental timeliness of bad news. Higher values of CONS are associated with higher conservatism. FRQ is a measure of accruals quality based on Dechow and Dichev (2002), standardized. Institutions is the percentage of the firm's shares held by institutional investors. Analysts is the number of analysts following the firm. InvGIM-Score is the measure of antitakeover protection developed by Gompers et al. (2003), multiplied by −1. When GIM-Score is missing, InvGIM-Score is assigned the value of 0. GIM-Score-dum is an indicator variable that takes the value of 1 if GIM-Score is missing and 0 otherwise. IA is a continuous variable that measures market-based information asymmetry. It is computed as the average of the standardized values of BAS, Volatility, and Idiosyncratic risk. BAS is the bid–ask spread defined as the annual average of daily spread scaled by the midpoint between bid and ask. Volatility is the standard deviation of one year of daily stock returns. Idiosyncratic risk is defined as the natural logarithm of the standard deviation of the residual return from a market model regression of excess returns on value-weighted market excess returns for 60 months (minimum 24 months). NCR is an indicator variable that equals 1 if the firm does not have a credit rating in Compustat and 0 otherwise. Size is the log of the market value of equity. Young is the negative of the difference between the first year when the firm appears in CRSP and the current year. MTB is the market-to-book value of equity ratio. Leverage equals short-term plus long-term debt scaled by the market value of equity. AcceDep is an indicator variable that equals 1 if the firm uses accelerated depreciation and 0 otherwise. StdCFO is the firm-specific standard deviation of the cash flow from operations scaled by average total assets, for years $t-5$ to $t-1$, as a percentage. StdSales is the firm-specific standard deviation of annual sales deflated by average total assets, for years $t-5$ to $t-1$, as a percentage. StdInvestment is the firm-specific standard deviation of annual Investment for years $t-5$ to $t-1$. Z-Score is a measure of bankruptcy risk. Tangibility is the ratio of property, plant, and equipment to total assets, as a percentage. Ind-Cap-Struc is the mean of capital structure for firms in the same SIC three-digit industry group, where capital structure is the ratio of long-term debt to the sum of long-term debt and the market value of equity. CFOsale is the ratio of CFO to average sales. Dividend is a dummy variable that takes the value of 1 if the firm paid a dividend and 0 otherwise. OperCycle is the log of receivables to sales plus inventory to COGS multiplied by 360. InvCycle is a decreasing measure of the length of the investment cycle defined as depreciation expense scaled by lagged total assets, as a percentage. Loss is a dummy variable that takes the value of 1 if net income before extraordinary items is negative and 0 otherwise. Slack is the ratio of cash to net property, plant, and equipment, as a percentage. Stock return is the annual stock rate of return of the firm, measured by compounding 12-monthly CRSP stock returns ending at the fiscal-year end. ΔDebt issuance is defined as the future change in debt issuance, scaled by current sales, as a percentage: (Debt issuance$_{t+1}$ − Debt issuance$_t$)/Sales$_t$ where Debt issuance = (Long-term debt issuance − Long-term debt reduction + Current debt changes). ΔEquity issuance is defined as the future change in equity issuance, scaled by current sales, as a percentage: (Equity issuance$_{t+1}$ − Equity issuance$_t$)/Sales$_t$ where Equity issuance = (Sale of common and preferred stock − Purchase of common and preferred stock). Volatility Future ROA adjusted is the standard deviation of future ROA, measured over the period $t+1$ to $t+5$, and adjusted by subtracting the industry-year mean, where ROA equals pretax income plus interest expense scaled by lagged total assets, as a percentage. Volatility Past ROA adjusted is the standard deviation of past ROA, measured over the period *t*-4 to *t*, and adjusted by subtracting the industry-year mean. Mean (ROA$_{t+1}$ ROA$_{t+2}$ ROA$_{t+3}$) is the three-year average of ROA$_{t+1}$, ROA$_{t+2}$, ROA$_{t+3}$, as a percentage. All continuous variables are winsorized annually at the top and bottom percentiles.

Table 2
Association between future investment and accounting conservatism.

$$\text{Investment}_{t+1} = \beta_t + \delta_1\ \text{CONS}_t + \delta_2\ \text{CONS}_t{*}\text{UnderInvest}_t + \gamma\ \text{Controls}_t + \varepsilon_{t+1}$$

	Column I		Column II	
	Coeff.	***t*-Stat**	**Coeff.**	***t*-Stat**
CONS (δ_1)			−2.182	−4.46***
CONS*UnderInvest (δ_2)			3.520	6.05***
CONS+CONS*UnderInvest (i.e., $\delta_1+\delta_2$)			**1.338**	**3.40*** **
Controls				
FRQ	−0.909	−1.70*	−0.877	−1.65*
FRQ*UnderInvest	2.889	3.13***	2.845	3.13***
Institutions	6.127	2.07**	5.822	1.92*
Institutions*UnderInvest	−0.700	−0.16	−0.569	−0.13
Analysts	0.064	0.50	−0.156	−1.13
Analysts*UnderInvest	−0.520	−2.80***	0.142	0.64
InvGIM-Score	0.536	2.67***	0.759	3.64***
InvGIM-Score*UnderInvest	−1.613	−6.32***	−2.107	−8.25***
GIM-Score-dum	6.180	3.87***	5.751	3.59***
UnderInvest	−16.42	−7.51***	−40.63	−9.43***
IA	2.014	2.29**	1.963	2.25**
NCR	1.619	1.30	1.531	1.25
Young	0.123	5.12***	0.113	4.61***
Size	2.226	5.54***	1.096	1.90*
MTB	1.387	4.18***	1.219	3.85***
Leverage	−4.733	−6.12***	−4.497	−6.09***
AcceDep	6.719	4.80***	6.665	4.79***
StdCFO	−0.165	−1.86*	−0.189	−2.07**
StdSales	−0.132	−3.81***	−0.130	−3.76***
StdInvestment	8.482	11.38***	8.449	11.41***
Z-Score	−6.252	−10.83***	−6.270	−10.89***
Tangibility	0.326	6.16***	0.331	6.27***
Ind-Cap-Struc	−22.01	−5.22***	−20.08	−4.72***
CFOsale	−0.712	−1.98**	−0.711	−1.98**
Dividend	−4.203	−4.42***	−4.233	−4.32***
OperCycle	1.460	1.24	1.415	1.20
InvCycle	−0.427	−1.63	−0.428	−1.62
Loss	5.430	3.21***	5.280	3.09***
Slack	1.695	5.69***	1.680	5.64***
R^2	0.337		0.339	
N. obs.	41,626		41,626	

Investment is a measure of total investment. CONS is the annual decile rankings of the three-year average of the conditional conservatism measure constructed by Khan and Watts (2009). UnderInvest is a ranked variable that identifies settings in which underinvestment (overinvestment) at the industry-year level is most likely. UnderInvest takes values from 1 to 0; values closer to 1 (0) indicate settings in which underinvestment (overinvestment) is most likely at the industry level. The other control variables are defined in Appendix A. The regressions include year fixed effects. Reported *t*-statistics are based on robust standard errors adjusted using a cluster at the firm and year level. The symbols ***, **, and * denote two-sided significance at the level of 1%, 5%, and 10%, respectively.

4.3. Future investment and conservatism: effects of information asymmetry

Under H2, we predict that information asymmetries contribute to the investment effects of conservatism. Table 3 contains the results of estimating Eq. (3) for each of our three information asymmetry proxies. For parsimony, we report only the coefficients of interest. In settings prone to underinvestment, the coefficient δ_4 on the three-way interaction among CONS, UnderInvest, and InfoAsym is positive and significant for all three, which confirms that, in under-investment settings, the contribution of conservatism to increase investment is greater when information asymmetry is high. In overinvestment settings with high information asymmetry, conservatism also plays a greater role in decreasing investment: the coefficient δ_2 is significantly negative in all cases. Overall, these findings suggest that the investment benefits of conservatism are greater for firms subject to larger information asymmetries, as expected.

4.4. Association between conservatism and access to debt financing

In our third analysis, we study whether more conservative firms, in settings where underinvestment is likely, issue more debt than less conservative ones, as predicted by hypothesis H3a. Table 4, Panel A, displays the results of estimating Eq. (4). We observe that the sum of δ_1 and δ_2 is positive and significant ($\delta_1+\delta_2=0.778$, t-stat$=3.63$). This indicates a positive association between conservatism and future change in debt issuance in settings prone to underinvestment (i.e.,

Table 3
Effect of information asymmetry on the association between future investment and conservatism.

$$\text{Investment}_{t+1} = \beta_t + \delta_1 \text{ CONS}_t + \delta_2 \text{ CONS}_t{*}\text{InfoAsym}_t + \delta_3 \text{ CONS}_t{*}\text{UnderInvest}_t + \delta_4 \text{CONS}_t{*}\text{UnderInvest}_t{*}\text{InfoAsym}_t + \gamma \text{ Controls}_t + \varepsilon_{t+1}$$

Information asymmetry proxy: IA	**Coeff.**	***t*-Stat**
CONS	−2.123	−4.40***
CONS*IA	−2.189	−6.63***
CONS + CONS*IA (i.e., $\delta_1+\delta_2$)	**−4.312**	**−6.07*** **
CONS*UnderInvest	3.839	6.38***
CONS*UnderInvest*IA	2.672	4.96***
CONS + CONS*IA + CONS*UnderInvest + CONS*UnderInvest*IA (i.e., $\delta_1+\delta_2+\delta_3+\delta_4$)	**2.199**	**3.70*** **
Controls included	Yes	
Information asymmetry proxy: No Credit Rating (NCR)	**Coeff.**	***t*-Stat**
CONS	−0.968	−1.44
CONS*NCR	−2.038	−3.37***
CONS + CONS*NCR (i.e., $\delta_1+\delta_2$)	**−3.006**	**6.16*** **
CONS*UnderInvest	1.754	2.09**
CONS*UnderInvest*NCR	2.980	3.36***
CONS + CONS*NCR + CONS* UnderInvest + CONS*UnderInvest*NCR (i.e., $\delta_1+\delta_2+\delta_3+\delta_4$)	**1.728**	**4.05*** **
Controls included	Yes	
Information asymmetry proxy: Young	**Coeff.**	***t*-Stat**
CONS	−2.877	−4.67***
CONS*Young	−0.046	−3.43***
CONS + CONS*Young (i.e., $\delta_1+\delta_2$)	**−2.923**	**4.67*** **
CONS*UnderInvest	4.028	5.06***
CONS*UnderInvest*Young	0.037	1.75*
CONS + CONS*Young + CONS* UnderInvest + CONS*UnderInvest*Young (i.e., $\delta_1+\delta_2+\delta_3+\delta_4$)	**1.142**	**2.61*** **
Controls included	Yes	
N. obs.	41,626	

The table reports only the coefficients of interest of the above regression using three different proxies for information asymmetry. Investment is a measure of total investment. CONS is the annual decile rankings of the three-year average of the conditional conservatism measure constructed by Khan and Watts (2009). UnderInvest is a ranked variable that identifies settings in which underinvestment (overinvestment) at the industry-year level is most likely. UnderInvest takes values from 1 to 0; values closer to 1 (0) indicate settings in which underinvestment (overinvestment) is most likely at the industry level. IA is a continuous variable that measures market-based information asymmetry. It is computed as the average of the standardized values of the bid–ask spread, stock return volatility, and idiosyncratic risk. The next two variables capture information asymmetry between the firm and debtholders. NCR is an indicator variable that equals 1 if the firm has no credit rating in Compustat and 0 otherwise. Young is the negative of the difference between the first year when the firm appears in CRSP and the current year. The other control variables are defined in Appendix A. The regressions include year fixed effects. Reported *t*-statistics are based on robust standard errors adjusted using a cluster at the firm and year level. The symbols ***, **, and * denote two-sided significance at the level of 1%, 5%, and 10%, respectively.

UnderInvest = 1), consistent with our predictions. In terms of economic significance, a one-decile change in conservatism results in an increase in future debt issuance of 2.6%, relative to average total debt, among firms that are underinvesting. In settings where overinvestment is likely (i.e., UnderInvest = 0), there is no association between conservatism and future change in debt issuance (δ_1 is not significant at conventional levels). This is consistent with our expectation that the role of conservatism in debt financing is less important for healthy firms.

We also analyze the effect of conservatism on equity issuance. Table 4, Panel B, contains the results. Under H3b, we do not expect an association between conservatism and the issuance of equity. Consistent with our hypothesis, the sum of δ_1 and δ_2 is not significant at conventional levels. Overall, the evidence reported in Table 4 confirms that the additional funding obtained by conservative firms comes from new debt, not equity.

5. Analysis of profitability consequences

The predicted effects of conservatism on investment and financing have consequences for a firm's profitability that are not particularly obvious. In settings prone to overinvestment, we predict that, conservatism reduces the investment in negative-NPV projects and hastens the abandonment of poorly performing ones, thereby increasing the future ROA. This is consistent with the results of Francis and Martin (2010), who find that more conservative firms make more profitable acquisitions. It is also consistent with the evidence of Hope and Thomas (2008), who show that better reporting in the form of improved geographic earnings disclosures prevents empire building, leading to greater profitability. However, in settings

Table 4
Association between future debt or equity issuance and accounting conservatism.

Panel A: Debt issuance and conservatism.
$\Delta\text{Debt issuance}_{t+1} = \beta_t + \delta_1\ \text{CONS}_t + \delta_2\ \text{CONS}_t{*}\text{UnderInvest}_t + \gamma\ \text{Controls}_t + \varepsilon_{t+1}$

Dependent variable: ΔDebt issuance$_{t+1}$	Coeff.	t-Stat
CONS	0.058	0.32
CONS*UnderInvest	0.720	5.22***
CONS+CONS*UnderInvest (i.e., $\delta_1+\delta_2$)	**0.778**	**3.63*** **
Controls included	Yes	
R^2	0.033	
N. obs.	33,899	

Panel B: Equity issuance and conservatism
$\Delta\text{Equity issuance}_{t+1} = \beta_t + \delta_1\ \text{CONS}_t + \delta_2\ \text{CONS}_t{*}\text{UnderInvest}_t + \gamma\ \text{Controls}_t + \varepsilon_{t+1}$

Dependent variable: ΔEquity issuance$_{t+1}$	Coeff.	t-Stat
CONS	−0.201	−0.26
CONS*UnderInvest	−0.241	−0.73
CONS+CONS*UnderInvest (i.e., $\delta_1+\delta_2$)	**−0.442**	**0.76**
Controls included	Yes	
R^2	0.043	
N. obs.	33,862	

The dependent variable ΔDebt issuance$_{t+1}$ equals (Debt issuance$_{t+1}$ − Debt issuance$_t$)/Sales$_t$, as a percentage. The dependent variable ΔEquity issuance$_{t+1}$ equals (Equity issuance$_{t+1}$ − Equity issuance$_t$)/Sales$_t$, as a percentage. CONS is the annual decile rankings of the three-year average of the conservatism measure constructed by Khan and Watts (2009). Higher values of CONS are associated with higher conservatism. UnderInvest is a ranked variable that identifies settings in which underinvestment (overinvestment) at the industry-year level is most likely. UnderInvest takes values from 1 to 0; values closer to 1 (0) indicate settings in which underinvestment (overinvestment) is most likely at the industry level. The other control variables are defined in Appendix A. The regressions include year fixed effects. Reported t-statistics are based on robust standard errors adjusted using a cluster at the firm and year level. The symbols ***, **, and * denote two-sided significance at the level of 1%, 5%, and 10%, respectively.

prone to underinvestment, it is less clear how the effects of conservatism on financing and investment affect the future ROA. In such settings, conservatism increases investment by facilitating access to additional debt. As previously argued, conservatism is expected to foster investment in prudent (low-risk) projects, which probably yield positive but low net present values. Also, assuming that managers have several projects to choose from and prefer projects that, ceteris paribus, are more profitable, they would start by choosing the most profitable ones before moving to the increasingly less profitable ones (i.e., there are diminishing marginal returns on investment). If so, increased investment by more conservative firms in underinvestment settings would lead to investment in prudent projects—that is, projects with lower volatility than that of their existing investments. These prudent projects would, in turn, result in a) lower volatility of the future ROA and b) a future ROA that is no greater than that of less conservative firms. We thus also examine the association of conservatism with the volatility of a firm's future ROA. Our model is as follows:

$$\begin{aligned}\text{Volatility Future ROA} = \beta_t &+ \delta_1\ \text{CONS}_t + \delta_2\ \text{CONS}_t{*}\text{UnderInvest}_t \\ &+ \delta_3\ \text{UnderInvest}_t + \delta_4\ \text{FRQ}_t + \delta_5\ \text{FRQ}_t{*}\text{UnderInvest}_t + \delta_4\ \text{GOV}_t \\ &+ \delta_5\ \text{GOV}_t{*}\text{UnderInvest}_t + \gamma\ \text{Controls}_t + \varepsilon \end{aligned} \tag{5}$$

where Volatility Future ROA is the standard deviation of the future ROA, measured over the period $t+1$ to $t+5$, and adjusted by subtracting the Fama and French (1997) industry-year mean.[7] ROA equals pretax income plus interest expense scaled by lagged total assets, as a percentage. We use the same set of control variables as in Eq. (3) and add as a control variable the volatility of the past ROA, measured over the period $t-4$ to t, and adjusted by subtracting the industry-year mean. The main coefficient of interest in Eq. (5) is the sum of δ_1 and δ_2. According to our hypotheses, conservative firms have greater access to debt to invest in low-risk (prudent) projects. As conservative firms pursue additional low-risk projects (with lower risk than the existing projects), we expect to observe a decrease in the firms' overall future (total) risk. Therefore we expect the sum of δ_1 and δ_2 to be significantly negative if conservatism is associated with investments in more prudent projects.

Finally, we directly study the effects of conservatism on future performance. To do so, we employ the following model:

$$\begin{aligned}\text{Mean}(\text{ROA}_{t+1}\ \text{ROA}_{t+2}\ \text{ROA}_{t+3}) = \beta_t &+ \delta_1\ \text{CONS}_t + \delta_2\ \text{CONS}_t{*}\text{UnderInvest}_t \\ &+ \delta_3\ \text{UnderInvest}_t + \delta_4\ \text{FRQ}_t + \delta_5\ \text{FRQ}_t{*}\text{UnderInvest}_t + \delta_4\text{GOV}_t \\ &+ \delta_5\ \text{GOV}_t{*}\text{UnderInvest}_t + \gamma\ \text{Controls}_t + \varepsilon \end{aligned} \tag{6}$$

Our metric of accounting performance is the return-on-assets ratio. The dependent variable, Mean ($\text{ROA}_{t+1}\ \text{ROA}_{t+2}\ \text{ROA}_{t+3}$), is defined as the mean of ROA for the following three years, where ROA is defined as before. We use a three-year

[7] We use a period of five years to obtain reasonable estimates of the standard deviation.

average to reduce measurement error and also because new investments may take more than one year to produce returns. In Eq. (6) we add current ROA to the set of control variables to account for the effect of current profitability on future profitability. All other variables are defined as before.

If conservatism curbs overinvestment in poor projects, we predict that δ_1 in Eq. (6) should be significantly positive, indicating greater future profitability for more conservative firms in settings prone to overinvestment, consistent with Francis and Martin (2010). On the other hand, we predict that conservative firms in settings prone to underinvestment will gain access to additional debt and will be able to undertake additional prudent investments. Given this, we make no prediction about the sign of the sum of coefficients δ_1 and δ_2.

Table 5 reports the results for these predictions. The sample size is slightly reduced given that we require additional data to calculate the future ROA and its volatility. Table 5, Panel A, displays the results of the estimation of Eq. (5), on the effects of conservatism on the volatility of the future ROA. The sum of coefficients δ_1 and δ_2 is significantly negative ($\delta_1+\delta_2=-0.203$, t-stat$=2.20$), confirming the negative association between conservatism and future ROA volatility for firms in settings prone to underinvestment. In an unreported sensitivity test, we replicate Table 5, Panel A, using the volatility of future returns, and the inferences do not change.

In Table 5, Panel B, we report the results of the estimation of Eq. (6), on the effect of conservatism on future performance. We observe a positive and marginally significant δ_1 coefficient (p-val. $\delta_1>0=0.081$). This is consistent with the expectation that conservatism prompts the termination of bad investments in overinvesting firms, leading to increases in future performance. For underinvesting firms, even though δ_2 is negative and consistent with our prediction, the sum of δ_1 and δ_2 is not significant at conventional levels. Overall, the results in Table 5 support our arguments that, in underinvestment scenarios, conservatism is associated with increased investment in more prudent projects and that these investments do not necessarily lead to higher future profitability.

6. Robustness tests

6.1. Alternative measure of investment

Acquisitions are highly visible and easily monitored. Other investments, such as capital expenditures or R&D, are more opaque. Investments in R&D are particularly difficult to monitor. As noted in Aboody and Lev (2000), R&D tends to be unique to the firm, and investors can derive little information about a firm's R&D productivity and value from observing the performance of other firms. Also, there are no organized markets for R&D, and the immediate expensing of R&D outlays

Table 5
Association between conservatism and future accounting performance.

Panel A: Volatility of future ROA and conservatism.
Volatility Future ROA $=\beta_t+\delta_1$ CONS$_t+\delta_2$ CONS$_t$*UnderInvest$_t+\gamma$ Controls$_t+\varepsilon$

Dependent variable: Volatility Future ROA	**Coeff.**	***t*-Stat**
CONS	0.051	0.48
CONS*UnderInvest	−0.254	−2.68***
CONS+CONS*UnderInvest (i.e., $\delta_1+\delta_2$)	**−0.203**	**2.20****
Controls included	Yes	
R^2	0.138	
N. obs.	32,362	

Panel B: Future ROA and conservatism
Mean (ROA$_{t+1}$ ROA$_{t+2}$ ROA$_{t+3}$) $=\beta_t+\delta_1$ CONS$_t+\delta_2$ CONS$_t$*UnderInvest$_t+\gamma$ Controls$_t+\varepsilon$

Dependent variable: Mean (ROA$_{t+1}$ ROA$_{t+2}$ ROA$_{t+3}$)	**Coeff.**	***t*-Stat**
CONS	0.181	1.40†
CONS*UnderInvest	−0.107	−0.79
CONS+CONS*UnderInvest (i.e., $\delta_1+\delta_2$)	**0.074**	**0.46**
Controls included	Yes	
R^2	0.478	
N. obs.	38,726	

The dependent variable in Panel A, Volatility Future ROA, is the standard deviation of future ROA, measured over the period $t+1$ to $t+5$, and adjusted by subtracting the industry-year mean. The dependent variable in Panel B, Mean (ROA$_{t+1}$ ROA$_{t+2}$ ROA$_{t+3}$), is the three-year average of ROA$_{t+1}$, ROA$_{t+2}$, ROA$_{t+3}$, as a percentage. ROA equals pretax income plus interest expense scaled by lagged total assets, as a percentage. CONS is the annual decile rankings of the three-year average of the conservatism measure constructed by Khan and Watts (2009). Higher values of CONS are associated with higher conservatism. UnderInvest is a ranked variable that identifies settings in which underinvestment (overinvestment) at the industry-year level is most likely. UnderInvest takes values from 1 to 0; values closer to 1 (0) indicate settings in which underinvestment (overinvestment) is most likely at the industry level. The other control variables are defined in Appendix A. The regressions include year fixed effects. Reported t-statistics are based on robust standard errors adjusted using a cluster at the firm and year level. The symbols ***, **, *, and † denote two-sided significance at the level of 1%, 5%, 10%, and 20%, respectively.

precludes reporting to investors about R&D value and productivity. Given this, we repeat the analysis of Table 2 using an alternative dependent variable that captures investments that are less transparent than acquisitions and harder to monitor. This results in a higher demand for conservatism. Our alternative dependent variable is future capital expenditures plus R&D (Capex_R&D). Capex_R&D is defined as future capital expenditure plus R&D scaled by lagged sales, as a percentage. Because R&D is immediately expensed under US GAAP, one might think that conditional conservatism plays no role in its monitoring. However, if an R&D investment fails, in all likelihood, project-specific capital assets and inventories will have to be written off. If there is bad news about a particular R&D investment, more conservative firms will accelerate the write-off of project-specific assets, recording a reduction in earnings.[8] This effect is expected to be an important reason why more conservative firms are less likely to engage in bad R&D projects. In line with this idea, Göx and Wagenhofer (2009) develop an analytical model that predicts that firms with high proportions of intangible assets will be more conservative and have stricter impairment rules.

Unreported results using Capex_R&D as the dependent variable provide strong evidence in favor of the previous findings. More conservative firms are less likely to under- and overinvest. In particular, a one-decile increase in CONS increases (decreases) investment in Capex_R&D by 4.4% (8.0%) among firms that are underinvesting (overinvesting). Overall, these results with Capex_R&D confirm the role of conservatism as a monitoring tool in the case of less transparent investments. Also, these results rule out the possibility that our main findings could simply be capturing the results in Francis and Martin (2010).

6.2. *Alternative conservatism proxies*

In our final set of tests, we use three alternative measures of conservatism. The first is the conservatism ratio proposed by Callen et al. (2010). The other two are based on the work of Givoly and Hayn (2000).

Callen et al.'s (2010) ratio, which we designate as CONS=CR, builds on the return decomposition model of Vuolteenaho (2002). CR is a measure of conditional conservatism that shows the proportion of the total shock to current and expected future earnings recognized in current year earnings. As with the previous measure, we define CONS=CR as the annual decile ranks of the three-year average of CR. To calculate CR, we follow Callen et al. (2010), estimating a pooled regression per industry across time using all sample years available (up to 2007 in our sample). This can cause a look-ahead bias in the estimates of CR because, for example, the conservatism measure for 1995 uses future information from 1996 to 2007. To avoid look-ahead bias, we use a 25-year rolling-window approach ending in the current year of each CR measure. For example, to estimate CR for 1995, our pooled regressions across time only include the years 1971–1995. Finally, since conservatism is likely to manifest itself when news is bad, following Callen et al. (2010, p. 168), we restrict the sample to observations with negative unexpected returns. Like Callen et al., we also drop observations with negative CR as its interpretation is ambiguous. In this way, our CR measure captures the total timeliness of bad news recognition and mirrors the measure of Khan and Watts (2009). Using this alternative measure of conservatism, we can replicate all of the tests in the paper, reaching identical inferences, with the following exceptions. In Table 3, the information asymmetry proxy NCR does not load significantly, and in Table 5, Panel B, about future profitability, the results are not significant at conventional levels.

Regarding the measures based on the work of Givoly and Hayn (2000), we first use the negative of the ratio of the skewness of net income to the skewness of cash flow from operations, as in Zhang (2008). To obtain measures of skewness, we use rolling five-year windows. Finally, we take annual decile rankings and denote this measure as CONS=SKW. Our second proxy based on Givoly and Hayn (2000) is the three-year accumulation of non-operating accruals.[9] To control for the great variation in the type and size of non-operating accruals across industry groups, we adjust our measure by subtracting the industry mean every year, using the Fama and French industry groups. Next, we multiply the industry-adjusted non-operating accruals by -1 so that the resulting figure is increasing in conservatism. Finally, we take annual decile rankings and denote this measure as CONS=NOACC.

These two proxies (CONS=SKW and CONS=NOACC) capture both conditional and unconditional conservatism. We are interested in conditional conservatism, as it is the only one with contracting value. Thus these proxies capture conditional conservatism with greater noise, and we expect weaker results. Untabulated results are summarized as follows. When we use CONS=SKW, we can reproduce the findings in all previous tests except for Table 4, Panel A, and Table 5, Panel A. For CONS=NOACC, we reproduce the main results reported in Tables 2 and 3, but only for underinvestment settings, and Table 4, Panel B.

[8] An example of a failing R&D project that led to impairments was the recent battle between the developers of Blu-ray and HD DVD formats to replace the DVD standard. Eventually the HD DVD format lost and, in February 2008, Toshiba, the format's creator, announced plans to stop developing, manufacturing and marketing HD DVD players and recorders. As a result, Toshiba recognized an impairment charge of $483 million, equivalent to 38% of reported net income. Approximately 50% of the write-off corresponded to long-lived assets and the rest to inventories.

[9] Non-operating accruals are defined as follows. Total accruals before depreciation − Operating accruals = IBC − (OANCF − XIDOC) + DP − (ΔACT − ΔCHE − ΔLCT + ΔDLC). All items are scaled by sales. The acronyms represent Compustat items.

7. Conclusions

We study the association between conservatism and the investment efficiency of firms. We find that, in settings where firms are prone to underinvest, more conservative firms invest more and raise more debt than less conservative ones. These effects of conservatism on investment and financing are more pronounced in the presence of information asymmetries. Our empirical evidence is consistent with prior analytical work showing that conservatism facilitates access to debt (Göx and Wagenhofer, 2009). This comports with prior research that indicates that debtholders demand conservative accounting because it facilitates their monitoring. We also find that, in settings prone to overinvestment, conservatism reduces investment not only for acquisitions, as documented by Francis and Martin (2010), but also for other harder-to-monitor types of investments.

Overall, our evidence strongly suggests that conservatism can lead to a direct benefit to investors in the form of more efficient investments. Therefore we add to a growing number of studies that demonstrate that accounting conservatism, through the timelier recognition of losses in the income statement, generates positive economic outcomes (Ahmed et al., 2002; Guay and Verrecchia, 2007; LaFond and Watts, 2008; Suijs, 2008; Wittenberg-Moerman, 2008; Zhang, 2008; Khan and Watts, 2009; Göx and Wagenhofer, 2009; Francis and Martin, 2010; García Lara et al., 2011; Gormley et al., 2012; Ettredge et al., 2012; Jayaraman and Shivakumar, 2013). One interpretation of our evidence is that the elimination of conservatism from accounting regulatory frameworks may lead to undesired economic consequences.

Appendix A. Definitions of variables

Investment$_{t+1}$	is the sum of research and development expenditure, capital expenditure, and acquisition expenditure, less cash receipts from the sale of property, plant, and equipment; multiplied by 100; and scaled by lagged sales.
ΔDebt issuance$_{t+1}$	is defined as the future change in new debt issuance, scaled by current sales, as a percentage: (Debt issuance$_{t+1}$ − Debt issuance$_t$)/Sales$_t$, where Debt issuance = (Long-term debt issuance − Long-term debt reduction + Current debt changes).
ΔEquity issuance$_{t+1}$	is defined as the future change in new equity issuance, scaled by current sales, as a percentage: (Equity issuance$_{t+1}$ − Equity issuance$_t$)/Sales$_t$, where Equity issuance = (Sale of common and preferred stock − Purchase of common and preferred stock).
CONS	is a conservatism proxy developed by Khan and Watts (2009). It is defined as the annual decile rankings of the three-year average of total loss recognition timeliness (G-Score + C-Score). G-Score is the timeliness of earnings to good news, and C-Score is the incremental timeliness of earnings to bad news. The estimation details are in Appendix B.
CONS = CR	is the annual decile rankings of the three-year average of the conservatism ratio as developed by Callen et al. (2010).
CONS = SKW	is the annual decile rankings of the negative of the ratio of the skewness of net income to the skewness of cash flow from operations, as in Zhang (2008). To obtain the skewness we use rolling windows of five years.
CONS = NOACC	is the annual decile rankings of the three-year accumulation of non-operating accruals. We adjust our measure by subtracting the industry mean every year, using the Fama and French industry groups. Next, we multiply the industry-adjusted non-operating accruals by −1 so that the resulting figure is increasing in conservatism.
UnderInvest	is a ranked variable that identifies settings in which underinvestment (overinvestment) at the industry-year level is most likely. The details are described in Section 3.1. UnderInvest takes values from 1 to 0; values closer to 1 (0) indicate settings in which underinvestment (overinvestment) is most likely at the industry level.
FRQ	is the standard deviation of the firm-level residuals from the model of Dechow and Dichev (2002) during the years $t-5$ to $t-1$, multiplied by −1, and standardized. The model is a regression of working capital accruals on lagged, current, and future cash flows plus the change in revenue and PPE. All variables are scaled by average total assets. The model is estimated cross-sectionally for each industry with at least 20 observations in a given year based on the industry classification of Fama and French (1997).
Institutions	is the percentage of a firm's shares held by institutional investors.
Analysts	is the number of analysts following a firm.
InvGIM-Score	is the measure of anti-takeover protection developed by Gompers et al. (2003), multiplied by −1. When GIM-Score is missing, InvGIM-Score is assigned the value of 0.
GIM-Score-dum	is an indicator variable that takes the value of 1 if GIM-Score is missing and 0 otherwise.
IA	is a continuous variable that measures market-based information asymmetry. It is computed as the average of the standardized values of BAS, Volatility, and Idiosyncratic risk, described below.
BAS	is the bid–ask spread defined as the annual average of daily spread scaled by the midpoint between bid and ask.
Volatility	is the standard deviation of one year of daily stock returns.
Idiosyncratic risk	is defined as the natural logarithm of the standard deviation of the residual return from a market-model regression of excess returns on value-weighted market excess returns for 60 months (minimum 24 months).
Young	is the negative of the difference between the first year when the firm appears in CRSP and the current year.
NCR	is an indicator variable that equals 1 if the firm does not have a credit rating in Compustat and 0 otherwise.
Size	is the log of the market value of equity.
MTB	is the market-to-book value of equity ratio.
Leverage	equals short-term plus long-term debt scaled by the market value of equity.
AcceDep	is an indicator variable that equals 1 if the firm uses accelerated depreciation and 0 otherwise.
StdCFO	is the firm-specific standard deviation of the cash flow from operations scaled by average total assets, for years $t-5$ to $t-1$, as a percentage.
StdSales	is the firm-specific standard deviation of annual sales deflated by average total assets, for years $t-5$ to $t-1$, as a percentage.
StdInvestment	is the firm-specific standard deviation of annual Investment for years $t-5$ to $t-1$.
Z-Score	is a measure of bankruptcy risk defined in Biddle and Hilary (2006) and is based on the methodology of Altman (1968).

Tangibility	is the ratio of property, plant, and equipment to total assets, as a percentage.
Ind-Cap-Struc	is the mean of capital structure for firms in the same SIC three-digit industry group, where capital structure is the ratio of long-term debt to the sum of long-term debt and the market value of equity.
CFOsale	is the ratio of CFO to average sales.
Dividend	is a dummy variable that takes the value of 1 if the firm paid dividends and 0 otherwise.
OperCycle	is the log of receivables to sales plus inventory to COGS multiplied by 360.
InvCycle	is a decreasing measure of the length of the investment cycle defined as depreciation expense scaled by lagged total assets, as a percentage.
Loss	is a dummy variable that takes the value of 1 if net income before extraordinary items is negative and 0 otherwise.
Slack	is the ratio of cash to net property, plant, and equipment, as a percentage.
Ret	is the annual stock rate of return of the firm, measured compounding 12-monthly CRSP stock returns ending at the fiscal-year end.
ROA	equals pretax income plus interest expense scaled by lagged total assets, as a percentage.
Mean ($ROA_{t+1}ROA_{t+2}$ ROA_{t+3})	is the three-year average of ROA_{t+1}, ROA_{t+2}, ROA_{t+3}, in percentage terms.
Volatility Fut. ROA	is the standard deviation of the future ROA, measured over the period $t+1$ to $t+5$, and adjusted by subtracting the industry-year mean. Industry is defined as in Fama and French (1997).
Volatility Past ROA	is the standard deviation of the past ROA, measured over the period $t-4$ to t, and adjusted by subtracting the industry-year mean. Industry is defined as in Fama and French (1997).

Appendix B

B.1. Estimation details of the conservatism proxies

B.1.1. Conservatism proxy (CONS) of Khan and Watts (2009)

Our main proxy for conservatism, CONS, is based on Khan and Watts (2009). It is defined as the annual decile rankings of the three-year average (years t, $t-1$, and $t-2$) of total loss recognition timeliness (G-Score+C-Score). G-Score is the timeliness of earnings to good news, and C-Score is the incremental timeliness of earnings to bad news. In building their proxy, Khan and Watts draw from the cross-sectional specification of Basu (1997), which is as follows:

$$\text{Earn}_j = \beta_0 + \beta_1\ \text{Neg}_j + \beta_2\ \text{Ret}_j + \beta_3\ \text{Neg}_j\ \text{Ret}_j + \varepsilon_j \tag{B1}$$

where Earn is earnings; Ret is returns (a measure of news); and Neg is a dummy variable that equals 1 when Ret is negative and 0 otherwise. In Eq. (B1) above, β_2 is the good news timeliness measure, and β_3 is the incremental timeliness of earnings to bad news (over good news). The total timeliness of bad news is $(\beta_2+\beta_3)$. Khan and Watts modify this model to obtain a firm-level proxy for conservatism by adding up an annual measure of the timeliness of earnings to good news (G-Score) and a measure of the incremental timeliness of bad news with respect to good news (C-Score), which they define as follows:

$$G-\text{Score} = \beta_2 = \mu_1 + \mu_2\ \text{Size}_j + \mu_3\ \text{MTB}_j + \mu_4\ \text{Leverage}_j \tag{B2}$$

$$C-\text{Score} = \beta_3 = \lambda_1 + \lambda_2\ \text{Size}_j + \lambda_3\ \text{MTB}_j + \lambda_4\ \text{Leverage}_j \tag{B3}$$

where μ_i and λ_i $(i=1\text{–}4)$ are estimated using annual cross-sectional regressions, by substituting Eqs. (B2) and (B3) into (B1). Thus they are constant across firms but vary over time. C-Score and G-Score also vary across firms through cross-sectional variation in the firm's characteristics (Size, MTB and Leverage). The annual cross-section model used is as follows:

$$\begin{aligned}\text{Earn}_j = {} & \beta_0 + \beta_1\ \text{Neg}_j + \text{Ret}_j\left(\mu_1 + \mu_2\ \text{Size}_j + \mu_3\ \text{MTB}_j + \mu_4\ \text{Leverage}_j\right) \\ & + \text{Neg}_j\ \text{Ret}_j\left(\lambda_1 + \lambda_2\ \text{Size}_j + \lambda_3\ \text{MTB}_j + \lambda_4\ \text{Leverage}_j\right) + (\delta_1\ \text{Size}_j + \delta_2\ \text{MTB}_j \\ & + \delta_3\ \text{Leverage}_j + \delta_4\ \text{Neg}_j\ \text{Size}_j + \delta_5\ \text{Neg}_j\ \text{MTB}_j + \delta_6\ \text{Neg}_j\ \text{Leverage}_j) + \varepsilon_j\end{aligned} \tag{B4}$$

where Earn is net income before extraordinary items, scaled by the lagged market value of equity; Ret is the annual stock rate of return of the firm, measured by compounding 12-monthly CRSP stock returns ending at the fiscal-year end; Size is the log of the market value of equity; MTB is the market-to-book value of equity ratio; Leverage equals short-term plus long-term debt scaled by the market value of equity. Following Khan and Watts, we delete firm-years with a price per share of less than $1, with negative total assets or book value of equity, and firms in the top and bottom 1% of earnings, returns, size, market-to-book ratio, leverage, and depreciation each year.

Variation in CONS captures variations in conservatism. To illustrate how variation in conservatism is associated with changes in CONS, consider the following: when a conservative firm reduces the value of its assets in response to a bad news shock, the size (MVE) of the firm decreases, as the market is likely to reflect the asset write-downs. Leverage also increases through a decrease in the denominator of the debt-to-assets or equity ratio because the firm does not instantaneously adjust its debt structure (Ball et al., 1976). MTB, a proxy for growth opportunities, is also likely to decrease because of the negative shock. The decreases in size and MTB and the increase in leverage increase CONS via Eq. (B3), the incremental timeliness of bad news with respect to good news, because coefficients λ_2 and λ_3 are negative and coefficient λ_4 is positive. The empirical evidence in Ettredge et al. (2012) and Jayaraman (2012) confirms that the Khan and Watts proxy captures variation in conservatism at the firm's level.

B.1.2. Evidence on the correlation between the conservatism proxies and their association with the determinants of conservatism

We use a number of conservatism proxies in our robustness checks. In particular, and aside from CONS as described above, we also use a proxy based on the conservatism ratio described in Callen et al. (2010) (CONS=CR), as well as the annual decile rankings of the negative of the ratio of the skewness of net income to the skewness of cash flow from operations (CONS=SKW) and the annual decile rankings of the three-year accumulation of non-operating accruals (CONS=NOACC).

In this appendix, we provide evidence on the correlations between the different proxies used in the paper (Panel A), and we also show the results obtained when we regress our conservatism proxies on the three determinants of conservatism: Size, MTB, and Leverage (Panel B).

Panel A shows that the correlations among raw values of the four conservatism proxies are low and insignificant, probably indicating that they capture different dimensions of conservatism. In particular, CONS=SKW and CONS=NOACC capture aggregate conservatism (both conditional and unconditional).

In panel B, when we regress the annual decile rankings of the four conservatism proxies on their economic determinants, we find evidence that all four proxies are positively and significantly associated with Leverage, as expected. Also, the association with MTB is negative in all cases except for CONS=NOACC. Finally, the association with Size is significant in all cases but only negative for CONS=K&W.

Panel A: Correlations among conservatism proxies, Size, MTB, and Leverage

Pearson correlations	K&W	CR	SKW	NOACC	Size	MTB
CONS=K&W	1.00					
CONS=CR	0.00	1.00				
CONS=SKW	0.01	−0.02	1.00			
CONS=NOACC	0.01	0.00	0.00	1.00		
Size	**0.41**	0.01	0.00	0.02	1.00	
MTB	−**0.42**	−0.01	−**0.02**	0.01	−**0.28**	1.00
Leverage	−**0.68**	**0.07**	0.00	−**0.02**	−**0.08**	**0.30**

Panel B: Regression of conservatism proxies on Size, MTB and Leverage

	Expected sign	**CONS=K&W** Coeff. *t-Stat*	**CONS=CR** Coeff. *t-Stat*	**CONS=SKW** Coeff. *t-Stat*	**CONS=NOACC** Coeff. *t-Stat*
Leverage	+	0.903***	0.147***	0.053*	0.320***
		6.39	*3.47*	*2.40*	*5.37*
MTB	–	−0.177***	−0.002	−0.040***	0.016
		−3.46	*−0.07*	*−5.63*	*1.00*
Size	–	−1.040***	0.122***	0.048***	0.048**
		−24.62	*4.64*	*6.26*	*1.97*
Constant		11.445***	4.746***	5.320***	5.055***
		50.60	*34.15*	*127.60*	*40.62*
R^2		0.715	0.007	0.002	0.006
N. obs.		41,626	20,252	41,114	40,943

The sample covers the period 1990–2007. CONS=K&W is the annual decile rankings of the three-year average of the firm-year measure of conservatism constructed by Khan and Watts (2009). CONS=CR is the annual decile rankings of the three-year average of the conservatism ratio as developed by Callen et al. (2010) and modified as described in the text. CONS=SKW is the annual decile rankings of the negative of the ratio of the skewness of net income to the skewness of cash flow from operations, using rolling windows of five years. CONS=NOACC is the annual decile rankings of the three-year accumulation of non-operating accruals. We subtract the industry mean every year, using the Fama and French industry groups. Next, we multiply the industry-adjusted non-operating accruals by −1 so that the resulting figure is increasing in conservatism. In all four cases, higher values of CONS are associated with higher conservatism. Leverage equals short-term plus long-term debt scaled by the market value of equity. MTB is the market-to-book value of the equity ratio. Size is the log of the market value of equity. Reported t-statistics are based on robust standard errors adjusted using a cluster at the firm and year level. The symbols ***, **, and * denote two-sided significance at the level of 1%, 5%, and 10% respectively.

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