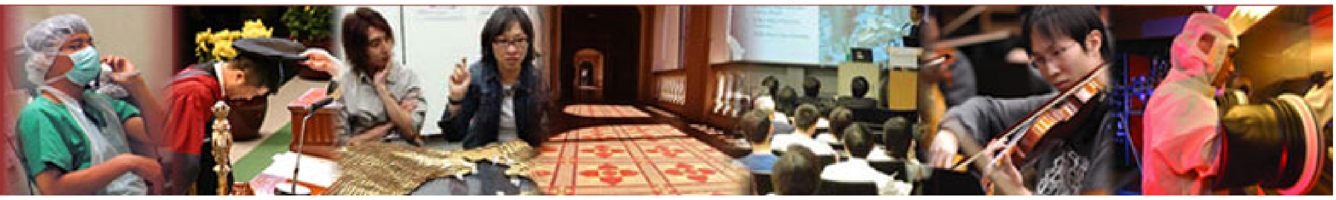

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The Risk Management Role of Accounting Conservatism for Operating Cash Flows

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The Risk Management Role of Accounting Conservatism for Operating Cash Flows

Abstract

This study examines whether accounting conservatism plays a risk management role with respect to operating cash flow downside risk, a key focus of risk management theory and practice. Unconditional (conditional) accounting conservatism is found to substitute for (complement) hedging in mitigating operating cash flow downside risk, consistent with its ex ante (ex post) application. As confirming evidence, we further document that accounting conservatism helps mitigate operating cash flow downside risk by reducing supply chain related operational risk. These findings lend support to a risk management role for accounting conservatism relevant to related literatures and continuing debates regarding conservatism's role as a pervasive and longstanding property of financial accounting.

JEL Classification: G1, M41, G32

Keywords: accounting conservatism, risk management, cash flow downside risk, corporate hedging

The Risk Management Role of Accounting Conservatism for Operating Cash Flows

1. Introduction

This study provides evidence that accounting conservatism plays a risk management role for operating cash flows. This relationship is suggested by conservatism's definition and by mixed but suggestive prior findings that conservatism influences the downside properties of operating cash flows, a key focus of risk management theory and practice. Consistent with its ex ante (ex post) application, we find unconditional (conditional) accounting conservatism substitutes for (complements) real corporate hedging in mitigating operating cash flow downside risk. Confirmatory tests indicate that accounting conservatism helps reduce operating cash flow downside risk by managing operating risk proxied by the maturity mismatch between cash holdings and maturing debt, and by customer bargaining power. As such, this study provides initial evidence on conservatism's risk management role and its joint usage with hedging in mitigating cash flow downside risk, which extends related literatures and helps to inform ongoing deliberations regarding conservatism's continuing role as a central tenet of financial accounting.

A possible risk management role for accounting conservatism follows from its definition as "a prudent reaction to risk and uncertainty to ensure that uncertainty and risk inherent in business situations are adequately considered" in *Statement of Financial Accounting Concepts (SFAC) No. 2* of the Financial Accounting Standard Board (FASB) (1980, 10). Yet despite suggestive but mixed evidence, no previous study directly examines the risk management role of accounting conservatism for operating cash flow downside risk. Notably, Francis and Martin (2010) find conservatism to improve investor monitoring over acquisitions and acquisition profitability that should reduce cash flow downside risk, and, Beatty et al. (2012) and Watts and Zuo (2012) find that conservatism promote voluntary hedging and alleviates underinvestment during financial crises, respectively. Conversely, Gigler et al. (2009) argue that conservatism triggers inefficient liquidations by hastening technical defaults, suggestive of enhanced cash flow downside risk, and Givoly and Hayn (2000), Ball and Shivakumar (2005, 2006), and Jorgensen et al. (2012) suggest that conservatism increases earnings volatility and transitory negative earnings shocks. However, these studies do not explicitly examine relations between conservatism and operating cash flow downside risk. Thus, whether and how conservatism plays a risk management role for operating cash flows remains an open empirical question.

Examining the relation between accounting conservatism and cash flow downside risk is significant to the interests of investors and other stakeholders (managers, customers, suppliers, employees, etc.). Real risk management instruments, except for cash holdings, require specialized business and financial expertise to execute and incur explicit costs, such as financial hedging and operating hedging (Disatnik et al. 2012). In contrast, accounting-based risk management tools involve less cost and expertise (Pincus and Rajgopal 2002). If conservatism manages specific risk exposures and ultimately mitigates cash flow downside risk, it provides a low-cost accounting-based risk management tool. Examining conservatism's risk management role is also relevant to ongoing debates regarding the benefits, costs, and continuing role of accounting conservatism as a longstanding central tenet of financial accounting. The FASB and International Accounting Standard Board (IASB) removed conservatism from their *SFAC* No. 8 by reasoning that it conflicts with neutrality. However, if conservatism plays a risk management role and is related with hedging, a reconsideration of its continuing role may be warranted.

We focus on cash flow downside risk to explore the risk management role of accounting conservatism. Cash flow volatility rather than earnings volatility is the traditional focus of risk management because it reflects the effects of real risk management activities on firms' operations (Smith and Stulz 1985; Froot et al. 1993; Zhang 2009). In contrast, earnings volatility captures the effects of accounting treatments in addition to the effects of real risk management activities (Zhang 2009).[1] In our setting, if conservatism manages firm risks and generates cash flow consequence, targeting on earnings volatility introduces mechanical relations between conservatism and its real risk management consequence and is thus inappropriate. Further, we particularly focus on cash flow downside risk rather than cash flow volatility because the goal of risk management is to eliminate the lower-tail rather than the volatility of cash flow (Stulz 1996; Miller 1998). Rawls and Smithson (1993) concur that chief financial officers selectively manage cash flow downside risk rather than its volatility. In addition, prospect and decision theories argue that managers, investors, and other firm stakeholders are loss averse and more attentive to downside risk than to upside potential (e.g., Roy 1952; Menezes et al. 1980; Tversky and Kahneman 1991; Koonce et al. 2005). The combination of this view with the risk management argument suggests that firm stakeholders also prefer to focus on cash flow downside risk for firm risk management activities.[2]

We propose and test whether unconditional and conditional accounting conservatism mitigate operating cash flow downside risk and whether they serve as a substitute for, and complement to hedging, respectively. Our reasoning follows from the definition of unconditional (conditional) conservatism as the ex ante (ex post) application of net income and net asset reducing accounting treatments that influence operating cash flow downside risk. Specifically, by consistently lowering net income and assets, unconditional conservatism provides in advance for risk realizations via accrual cushions and precautionary savings (e.g., Kirschenheiter and Ramakrishnan 2010), thus reducing the need for real hedges. If unconditional conservatism and real hedges fail to adequately anticipate unexpected risk

[1] Indeed, the objective of earnings smoothing, one accounting-based risk management tool, is to mitigate earnings volatility (Barton 2001; Pincus and Rajgopal 2002). However, unlike accounting conservatism and real risk management instruments, earnings smoothing only manages accounting treatments rather than real firm risk exposures.

[2] Particularly, for example, a top shareholder priority is to minimize downside risk and enhance firms' survival potentials (Dutta and Radner 1999), and a debtholder's primary concern is to lower cash flow risk and default risk.

realizations and market shocks, conditional conservatism conveys bad news risk realizations that incentivize managers to use hedging to manage risk, and enhances investor monitoring over hedging activities (e.g., Ahmed and Duellman 2007; Ball et al. 2008) thus augmenting real hedges. By so doing, unconditional and conditional conservatism help mitigate cash flow downside risk.

We next provide assurance that accounting conservatism affects operating cash flow downside risk by managing operational risk, which is incremental to its effect from improving investment efficiency or via a mechanical relation between accruals and cash flows.[3] Specifically, we examine how conservatism manage supply chain disruption risk, one type of operational risk, as proxied by maturity mismatch (the ratio of the difference between current debt and cash holdings to total assets) and customer bargaining power. Maturity mismatch indicates difficulties in servicing debts that can disrupt firm operations from the supply side and customer bargaining power reflects disruptions from the customer side. We predict that unconditional and conditional conservatism decrease operating cash flow risk by managing both types of supply chain disruption risks.

To test these propositions, we define cash flow downside risk as the probability and magnitude that cash flow drops below its expected level, and measure it as cash flow relative root lower partial moments (RRLPM), a dummy for high RRLPM, and cash flow at risk, extending Stone (1973), Fishburn (1977), and Stein et al. (2001). We add research and development (R&D) and advertising expenses back to cash flow to net out their confounding effects on cash flow downside risk. Extending Biddle et al. (2013), we measure unconditional

[3] Francis and Martin (2010) and Ahmed and Duellman (2011), for example, argue and document that conservatism improves monitoring over investments, which implies that conservatism decreases cash flow downside risk by improving investment efficiency. Dechow (1994), Basu (1997), Dechow et al. (1998), and Ball and Shivakumar (2005, 2006) document negative relations of accruals with cash flows and conservatism, which contributes to a mechanical negative relation between conservatism and cash flow downside risk. However, examining the indirect effect through operating risk proxies helps illustrate how conservatism affects cash flow downside risk through managing operational risk, which is incremental to the effects of improving investment efficiency or a mechanical relation. The purpose of this research design is not to refute alternative explanations or to test the degree to which risk management accounts for the relation.

and conditional conservatism using principal components analysis (PCA) of their respective component measures, with conditional conservatism adjusted for asymmetric cash flow timeliness (Collin et al. 2012; 2013). We employ logit models and Fama–MacBeth (1973) cross-sectional regression models to test the direct relation between conservatism and cash flow downside risk, and a system of ordinary least squares (OLS) regressions that extend Baron and Kenny (1986) to examine their indirect relation. We employ an extended Heckman (1979) model to investigate relations between conservatism and hedging.

Empirical tests yield the following main findings: (1) Unconditional and conditional conservatism are both negatively associated with subsequent cash flow downside risk, thus supporting the proposition that accounting conservatism plays a risk management role for cash flow downside risk. (2) Unconditional and conditional conservatism mitigate maturity mismatch that in turn increases cash flow downside risk and decreases the influence of customer bargaining power on cash flow downside risk. These findings lend support to conservatism influencing cash flow downside risk via operating risk. (3) Unconditional conservatism decreases hedging usage and weakens its mitigating effects on cash flow downside risk, whereas conditional conservatism increases hedging usage. These findings are consistent with unconditional (conditional) conservatism acting as a substitute for (complement to) real hedging. Our results are robust to the effects of investor monitoring, earnings smoothing, and alternative measures for cash flow downside risk, maturity mismatch, customer bargaining power, and conservatism.

These findings contribute to several academic literatures. First, this study extends the accounting conservatism literature by presenting evidence that unconditional and conditional conservatism serve a risk management role for operating cash flow downside risk. Second, we document links between accounting conservatism and operating cash flow downside risk that suggest a role for conservatism in managing supply- and demand-side operating risk proxied by maturity mismatch and customer bargaining power. In this respect, our results extend findings regarding the consequences of unconditional and conditional conservatism on investments (Francis and Martin 2010; Ahmed and Duellman 2011; Watts and Zuo 2012) to their risk management effects. Our results also complement findings in Biddle et al. (2013) that unconditional and conditional conservatism mitigate bankruptcy risk in a debt contracting setting by reducing cash flow downside risk and operational risk.

Third, our findings contribute to research on the coordinated use of risk management instruments in accounting, finance, and management. In particular, they extend Beatty et al.'s (2012) evidence that conditional conservatism promotes voluntary hedging by focusing explicitly on the risk management role of conservatism and documenting differing relations and links between unconditional and conditional conservatism conservatism, cash flow downside risk and hedging. Our results also extend findings in Barton (2001) and Pincus and Rajgopal (2002) that earnings smoothing substitutes for hedging by demonstrating both unconditional and conditional conservatism as additional accounting-based risk management instruments that interact differentially with hedging. Our study further complements risk management studies on the joint use of "real" risk management instruments such as cash holdings, hedging, and lines of credit (Allayannis et al. 2001; Vickery 2008; Bartram et al. 2010; Gamba and Triantis 2011; Disatnik et al. 2012) by advancing insights into interactions between accounting-based and real risk management tools.[4]

The remainder of this paper is organized as follows. Section 2 develops the hypotheses, Section 3 describes the research methodology, Section 4 reports the main empirical results, Section 5 conducts further analyses and sensitivity tests, and Section 6 concludes. Appendix

[4] A role for accounting conservatism as a risk management tool complements findings by Allayannis et al. (2001) and Bartram et al. (2010) that the joint usage of operating and financial hedging reduces foreign exchange risk; Vickery (2008) that the joint usage of cash holdings and financial hedging reduces interest rate risk in small firms; Gamba and Triantis (2011) regarding the joint usage of cash holdings and operational and derivative hedging; and Disatnik et al. (2012) regarding associations between cash holdings, derivative hedging, and lines of credit.

1 elaborates on cash flow expectation models and Appendix 2 provides variable definitions.

2. Hypothesis development

2.1 The risk management role of accounting conservatism

Unconditional and conditional accounting conservatism are natural responses to risk and uncertainty (especially downside risk and uncertainty) in a firm's business environment that anticipate potential losses and/or promptly report bad earnings news. This function follows from the definition of accounting conservatism (FASB 1980) and from Hsieh et al. (2013), who show that accounting conservatism is a natural response to fundamental uncertainty and argue that conservatism promotes optimal decision making by managers, investors, and other stakeholders. Unconditional conservatism, by consistently understating net assets and net income, actuates the accumulation of accrual cushions and precautionary savings (Kirschenheiter and Ramakrishnan 2010; Biddle et al. 2013) that ex ante insulate the firm from later risk realizations, in particular those related to operations, thus help buffer shocks to future cash flows (Lins et al. 2010). In this sense, unconditional conservatism can serve as an ex ante risk management instrument that anticipates downside risk rather than upside potential before the risk is realized.[5]

In comparison, conditional conservatism, by recognizing realized downside risk ex post, cannot by its nature provision for downside risk realizations (Ryan 2006), but rather timely reports and controls (downside) risk that was not anticipated by unconditional conservatism and/or promotes real risk management tools such as hedging. Conditional conservatism can also serve as an ex post risk management instrument that motivates managers and other stakeholders to take remedial actions to address downside risk, just before or after risk is

[5] The argument derives from and is consistent with the definition of unconditional conservatism regardless of whether it anticipates or incorporates upside risk. This asymmetric treatment of downside and upside risk has the direct effect of biasing the book value of net assets below market value since market value symmetrically reflects both downside and upside risk.

realized.[6] For example, as unexpected product market shocks increase and commodity prices drop, the lower-of-market-or-cost inventory valuation rule (a type of conditional conservatism) timely books expenses and losses before the product is sold. This timely treatment compels managers to take immediate risk management actions, such as postponing production or implementing commodity hedging programs to hinder the negative shocks to firm operations, thus constraining cash flow downside risk.

Unconditional and conditional conservatism thus act in a complementary fashion to ex ante anticipate and ex post recognize, respectively, a broad range of downside risk exposures that are reflected in financial reports and motivate downside cash flow risk controls. They differ in this regard from real risk management instruments that typically target a specific risk exposure, for example, interest rate swaps that manage interest rate exposures. However, Gigler et al. (2009) argue that conservatism's timely bad earnings news reporting creates "false alarms", which suggests a form of overeaction to risk that can disrupt firm operations and risk management activities and thereby increase cash flow downside risk. Nonetheless, Gao (2013) alternatively suggests that conservatism counterbalances upward earnings management and provides less biased and timelier information. Following this reasoning, we propose that unconditional and accounting conservatism serve a risk management role with respect to operating cash flow downside risk, as reflected in hypothesis H1:

Hypothesis H1: *Unconditional and conditional conservatism lower operating cash flow downside risk.*

Next we address the question about how unconditional and conditional conservatism reduce cash flow downside risk by managing firm operational risk. We focus on maturity mismatch and customer bargaining power to capture supply chain disruption risks arising from suppliers and from customers, respectively. Suppliers care about the cash flow

[6] The argument derives from and is consistent with the definition of conditional conservatism. Specifically, its asymmetric recognition of bad versus good earnings news and corresponding reductions in net book values motivates firm stakeholders to take actions that help control operating cash flow downside risks.

downside risk of customer firms and the resulting switching costs and losses on relation-specific investments if major customers experience severe cash flow shortfalls and fail unexpectedly. They are also averse to customer failure contagions conveyed by credit sales, as implied by Hertzel et al. (2008). A high maturity mismatch signals that a customer may have difficulties in paying short-term debts to suppliers and other debtholders. Although there is no direct prior evidence, the banking literature suggests that maturity mismatch can increase bankruptcy risk and its contagion to suppliers (Rodrik and Velasco 1999; Goldstein and Pauzner 2005; Adrian and Brunnermeier 2011). Thus, a high mismatch may induce suppliers to shrink or withdraw business from customers with higher levels, especially during business downturns, much like depositors withdrawing their savings from a high-mismatch banks during credit risk contagions (Gorton 2009; Iyer and Peydró 2011). A high maturity mismatch also creates difficulties for customer firms when seeking substitute suppliers. Both considerations suggest that high maturity mismatch increases the risk of disruptions to firms' operations from the supply side, which projects to operating cash flow and its downside risk if not controlled. Nonetheless, Biddle et al. (2013) document that unconditional and conditional conservatism both enhance cash holdings and reduce leverage, suggesting that they also constrain maturity mismatch and its associated disruptions and negative shocks to firm operations from the supply side. This has direct implications for reducing cash flow downside risk in a firm.

Customer bargaining power increases disruptions to firm operations from the demand side since customers with stronger bargaining power can more easily switch to other suppliers (Cool and Henderson 1988), thus producing disruptions to supplier firm operations that translate into cash flow downside risk. Unconditional and conditional conservatism help offset the deleterious effects of customer bargaining power on cash flow downside risk by reducing bankruptcy and contagion risk to customers (Hertzel et al. 2008; Biddle et al. 2013).

Customers care about supplier failure risk because they incur switching costs and losses on relation-specific investments if supplier firms experience cash flow shortfalls and fail unexpectedly; they also are loathe to bankruptcy contagions spread by suppliers. Hence, accounting conservatism, by enhancing customer trust and belief in a firm's long-term viability, encourages longer-term relationships with customers that should mitigate negative shocks to cash flows from customers with superior bargaining power, and thereby lower operating cash flow downside risk. This reasoning provides the rationales for the following hypotheses regarding the effects of unconditional and conditional conservatism on operating cash flow downside risk via operational supply- and demand-side risk proxied by maturity mismatch and customer bargaining power, respectively, as expressed below:

Hypothesis H2a: *Unconditional and conditional conservatism lower operating cash flow downside risk via a maturity mismatch channel.*

Hypothesis H2b: *Unconditional and conditional conservatism lower operating cash flow downside risk by reducing the enhancing effect of customer bargaining power.*

2.2 Corporate hedging and the risk management role of accounting conservatism

As real risk management tools, hedging instruments also mitigate the negative externalities of varied market risk exposure to firm operations and ultimately lowers cash flow downside risk.[7] If unconditional and conditional conservatism help mitigate cash flow downside risk by managing risk like real risk management instruments, a question of interest is how conservatism and hedging relate in mitigating cash flow downside risk. By the following reasoning, we propose that unconditional (conditional) conservatism, by its ex ante (ex post) nature, substitutes for (complements) real hedging in reducing operating cash flow

[7] For example, interest rate hedging address interest rate risk exposure (Guay 1999; Vickery 2008), foreign exchange hedging addresses exposure to foreign exchange risk (Guay 1999; Allayannis et al. 2001; Bartram et al. 2010), and commodity price hedging addressed exposure to commodity price risk (Tufano 1996; Jin and Jorion 2006). The relation between hedging and cash flow downside risk is actually a largely unaddressed question, although Stulz (1996) and Miller (1998) argue that the goal of risk management is to eliminate lower-tail cash flow rather than its total volatility. Some hedging instruments mitigate cash flow downside risk at the cost of constraining upside potential. For example, a collar is an option that confines the range of possible positive or negative returns on an underlying indicator. However, the purpose for entering into such a contract is to confine downside risk and most hedging instruments are designed to decrease varied risk exposures, which ultimately project into cash flow downside risk.

downside risk. We propose that unconditional conservatism relate negatively to the use and effectiveness of real hedging for the following reasons. First, it is consistently applied ex ante, and if effective in mitigating the negative effects of (operational) risk on operating cash flow downside risk, it is less unnecessary to initiate the more expensive hedging programs and maintain on-going ones. Thus, unconditional conservatism is more likely to preempt hedging and substitute for the effectiveness of ongoing hedging programs. Second, it is less costly to substitute unconditional conservatism for hedging than conversely. Unconditional conservatism is the focus of auditors and regulators because it is a major contributor to total conservatism and is employed systematically and frequently over a long period (Ryan 2006). It is also easier to assess via routine audits and does not engender bad news or regulatory "shocks" from which auditors and regulators want to evade their responsibilities (Qiang 2007). Hence under close monitoring and strict scrutiny by auditors and regulators, managers face high disciplinary costs for failure to sufficiently apply unconditional conservatism, for example, job loss, legal sanctions, regulatory penalties, and reputational damage. Meanwhile, unwinding existing hedging programs does not involve disciplinary costs unless mandated in debt covenants as Beatty et al. (2012) show. Therefore, managers dislike substituting unconditional conservatism for hedging, and on the contrary, have incentives to unwind hedging positions and switch to lower-cost unconditional conservatism. Thus, unconditional conservatism acts as a legitimate substitute for hedging usage and effectiveness in mitigating operating cash flow downside risk (Koonce et al. 2005).[8]

In contrast to unconditional conservatism, conditional conservatism is more likely to complement to hedging usage and effectiveness for several reasons. First, by reporting bad news arising from unexpected asset market shocks in a timely fashion, conditional conservatism incentivizes risk- and loss-averse managers to initiate new hedging programs

[8] Consistent with Disatnik et al. (2012), Koonce et al. (2005) report that investors consider derivatives riskier than non-derivative instruments even when the underlying economic exposure is held constant.

and/or to enhance the effectiveness of existing hedging programs. Second, it enhances the monitoring of firm risk management activities by shareholders and debtholders (Ahmed and Duellman 2007; Ball et al. 2008). Timely bad news reporting also hastens earnings and asset-based debt covenant violations, which trigger debtholder monitoring over covenants regarding interest rate hedging. Increased debtholder monitoring further enhances voluntary hedging that commits firms to meet debt obligations (Bessembinder 1991) and it constrains managerial risk-shifting behaviors (Campbell and Kracaw 1990; Beatty et al. 2012). For example, Beatty et al. (2012) find conditional conservatism to induce borrower firms to voluntarily commit to interest rate swaps. Third, unlike unconditional conservatism, conditional conservatism is less likely to substitute for real hedging. Even though it is a less costly accounting-based risk management instrument, conditional conservatism cannot preclude and preempt a precautionary hedge for a risk it recognizes because it is a smaller contributor to conservatism applied ex post and sporadically (Ryan 2006), and thus is also impossible to substitute an ongoing hedging program through its consistent application. Fourth, managers, auditors, and regulators are disinclined to "bad news" shocks associated with conditional conservatism and have incentives to mitigate their negative consequences because these shocks induce compensation changes, regulatory attention, and are costly to monitor (Qiang 2007). As such, new real hedging is an appealing response to the negative shocks conveyed by conditional conservatism. In short, the above reasoning leads to the following hypotheses:

Hypothesis H3a: *Unconditional conservatism substitutes for hedging usage and hedging effectiveness in mitigating operating cash flow downside risk.*

Hypothesis H3b: *Conditional conservatism complements hedging usage and hedging effectiveness in mitigating operating cash flow downside risk.*

3. Data, measures and estimation models

3.1 Data

We examine a sample of 28,425 firm–year observations with available data for firms listed on the NYSE, AMEX and NASDAQ for fiscal years 1992 to 2007. We omit firm–years in the lower five percent of the total asset distribution to mitigate small denominator bias[9] and delete industry–years with fewer than twenty observations to estimate cash flow benchmark models more accurately. We require at least five years of continuous data for calculating cash flow downside risk, which induces a survival bias of some degree. We winsorize all variables at the top and bottom one percent of their distributions and exclude firms in the financial and utilities industries (Standard Industrial Classification codes 6000–999 and 4900–99, respectively). We hand-collect new hedging usage data from 10-K annual reports in the Edgar Online database from 1995 to 2007.[10] Following Zhang (2009) and Guay (1999), we focus on new hedging programs because the inherent business risk for firms with derivative positions is unobservable. Data for calculating chief executive officer (CEO) incentives are obtained from ExecuComp.

3.2 Cash flow downside risk measures

Detailed below are three cash flow downside risk measures used in this study: the RRLPM of cash flow *Rlpm_OCF*, an indicator that cash flow drops below its expected level *DOCF*, and cash flow at risk *CFaR*. The measure *DOCF* is a dummy variable, the simplest of the three but insensitive to the magnitude of cash flow downside risk; *Rlpm_OCF* considers the magnitude of cash flow downside risk and incorporates all loss levels; *CFaR* considers only the extreme loss case and is computationally complex.

3.2.1 Cash flow downside risk measures within the RRLPM framework

Cash flow downside risk measures *Rlpm_OCF* and *DOCF* belong to the RRLPM

[9] We follow Stein et al. (2001) to do so. Our results do not qualitatively change when the 1 percent cutoff is used.
[10] The 10-K annual reports for U.S. listed firms in the Edgar Online database are available for fiscal years 1994 to 2007.

framework derived from the concept of lower partial moment (LPM) that means including only the downside distribution of a variable relative to its reference level in moment calculation (Stone 1973; Fishburn 1977). The continuous case of cash flow LPM for firm *i*, $LPM_\alpha(\tau{:}i)$, is expressed by the cumulative distribution function

$$\mathrm{LPM}_\alpha\left(\tau : i\right) = \int_{-\infty}^{\tau} \left|\tau - \gamma_i\right|^{\alpha} f(\gamma_i) d\gamma_i, \alpha \geq 0 \tag{1}$$

where τ is the cash flow target level, $f(\gamma_i)$ is the probability density function for firm *i*'s cash flow, and α is a moment indicator that reflects the relative importance of the magnitude by which cash flow deviates below its target level.[11] The discrete case of firm *i*'s cash flow LPM when $\alpha = 2$ is

$$\mathrm{LPM}_2\left(\tau : i\right) = \left(\frac{1}{N}\right) \sum_{\gamma_i < \tau}^{\tau} (\tau - \gamma_i)^2 \tag{2}$$

where *N* is the number of observations for calculating the cash flow LPM. The root of the cash flow LPM, RLPM, possesses linear homogeneity of degree one such that changes in τ and in the RLPM are proportional; its discrete case for firm *i* when $\alpha = 2$ is

$$\mathrm{RLPM}_2\left(\tau : i\right) = \mathrm{LPM}_2\left(\tau : i\right)^{1/2} = \left[\left(\frac{1}{N}\right) \sum_{\gamma_i < \tau}^{\tau} (\tau - \gamma_i)^2\right]^{1/2} \tag{3}$$

Corresponding to the cash flow RLPM, we also estimate a root upper partial moment of cash flow, RUPM, which captures cash flow upside potential. Since a higher RUPM usually accompanies a higher RLPM, we construct a relative RLPM measure RRLPM, which deflates RLPM by RUPM to control for firm-level differences in upside potential, such that cash flow downside risk is comparable across firms. RRLPM further applies a logarithmic transformation to normalize the distribution of the cash flow RLPM.

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[11] For $\alpha = 0$, the magnitude does not matter and $LPM_\alpha(\tau{:}i)$ collapses into an indicator of below-target cash flow. For $\alpha = 1$ and $\alpha = 2$, $LPM_\alpha(\tau{:}i)$ is consistent with below-target shortfall and semi-variance, but not with a mere shortfall or semi-variance, since even for symmetric distribution cash flow LPM differs from its shortfalls or semi-variance if the target cash flow deviates from the sample mean.
In addition, Eq. (1) suggests that the relation between cash flow level and cash flow LPM is not necessarily linearly negative but depends on the tradeoffs between two countervailing forces. Intuitively, cash flow increases cash flow sufficiency and thus reduces cash flow shortfalls, but the sample mean of cash flow (and thus cash flow level) increases cash flow downside risk monotonically, as suggested by Stone (1973).

Cash flow RRLPM *Rlpm_OCF*. *Rlpm_OCF* refers to the ranked natural logarithm of the ratio of one plus the cash flow RLPM to one plus the cash flow RUPM, both estimated over a three-year horizon covering the current and previous two years:

$$Rlpm\_OCF_{it} = \log[(1 + \text{RLPM}_2(OCF_{it})/(1 + \text{RUPM}_2(OCF_{it})] \quad (4)$$

where $RLPM_2(OCF_{it}) = [(1/3)\Sigma((\acute{\varepsilon}_{it}*I\acute{\varepsilon}_{it\leq 0})^2]^{1/2}$ and $RUPM_2(OCF_{it}) = [(1/3)\Sigma((\acute{\varepsilon}_{it}*I\acute{\varepsilon}_{it\geq 0}))^2]^{1/2}$, representing the cash flow RLPM and RUPM, respectively. $I\acute{\varepsilon}_{it\leq 0}$ is an indicator that equals one if $\acute{\varepsilon}_{it} < 0$ and zero otherwise, where $\acute{\varepsilon}_{it}$ is the residual estimated from the industry-specific OLS regressions of the cash flow expectation model

$$OCF_{it} = \beta_0 + \beta_1 OCF_{it-1} + \beta_2 OCF_{it-2} + \beta_3 OCF_{it-3} + \beta_4 SALE_{it-1} + \beta_5 Size_{it-1} + \beta_6 LEVERAGE_{it-1} + \beta_7 STD\_OCF_{it-1} + Year\_Dummies + \varepsilon_{it} \quad (5)$$

where *OCF* is the ratio of annual cash flow adjusted for R&D expenditures and advertising to total assets. This adjustment is to ensure that the estimated *Rlpm_OCF* is free of the effects of expensing R&D and marketing expenditures under Statement of Financial Accounting Standards (*SFAS*) No. 2 and No. 142, and thus reflects only cash flow shortfalls. Eq. (5) incorporates cash flow level and volatility (Minton et al. 2002) and other cash flow determinants such as firm size, sales (Dechow 1994; Dechow et al. 1998), and leverage. Further model details are described in Appendix 1.

Cash flow RLPM indicator *DOCF*. *DOCF* is a dummy variable equal to one if the actual cash flow is below its expectation estimated from Eq. (5) and zero otherwise.

3.2.2 Cash flow downside risk measures within the VaR framework

Cash flow at risk *CFaR*. *CFaR* refers to the ranked ratio of the worst case of quarterly cash flow at the one percent confidence level to the predicted quarterly cash flow estimated from Eq. (6) below. We employ a comparables approach to calculate *CFaR* over a rolling window of seventeen fiscal quarters, extending Stein et al. (2001):[12]

[12] *CFaR* falls within the framework of value at risk (*VaR*), the potential loss in value of a risky asset or portfolio over a defined period for a given confidence interval. However, unlike *VaR*, *CFaR* focuses on the overall cash flow effects of all

$$OCFQ_t = \beta_0 + \beta_1 OCFQ_{t-1} + \beta_2 OCFQ_{t-2} + \beta_3 OCFQ_{t-3} + \beta_4 OCFQ_{t-4} + \beta_5 OCFQ_{t-5} + \gamma_1 Q_1 + \gamma_2 Q_2 + \gamma_3 Q_3 + \varepsilon_t \quad (6)$$

where *OCFQ* is the ratio of quarterly cash flow adjusted for R&D and advertising expenditures to total assets, with the adjustment to ensure that *CFaR* is free from the effects of immediately expensing R&D and marketing expenditures under *SFAS* No. 2 and No. 142, and thus reflects only cash flow insufficiency.

3.3 Accounting conservatism measures

Unconditional conservatism is measured using *UC_PCA,* the factor score from a principal components analysis of three component unconditional conservatism measures following Biddle et al. (2013): *UC_ACC* (total accrual, adapted from Ahmed et al. 2002), *UC_BM* (the ranked industry-adjusted book-to-market ratio), and *UC_RES* (hidden reserve in Penman and Zhang 2002). Extending Biddle et al. (2013), conditional conservatism is measured using *CC_PCA*, the factor score generated from a principal components analysis of three conditional conservatism measures, where *CC_AR* and *CC_CR* are adjusted for asymmetric cash flow timeliness and then denoted *CC_ARA* and *CC_CRA* respectively. This adjustment removes from conditional conservatism the effects of asymmetric cash flow timeliness that overstate market-based conditional conservatism measures (Collin et al. 2012, 2013) and add noise to tests for the effects of conditional conservatism on cash flow downside risk.[13]

CC_ARA. *CC_ARA* is the ranked ratio of the sum of the *CScore_ACC* and *GScore_ACC* to the *GScore_ACC* estimated from an extended Khan and Watts (2009) model that replaces earnings with accruals to retain only asymmetric accrual timeliness.[14] *CScore_ACC*

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types of risk exposure rather than the value effect and uses expected cash flow estimated from the quarterly cash flow model as a deflator to facilitate cross-sectional comparisons between firms.
The comparables approach is a nonparametric method that sorts firms with similar risk features into pools of comparable peers to construct samples of negative cash flow shocks for estimating tail probabilities.

[13] Asymmetric cash flow timeliness could inflate *CC_AR* and *CC_CR* and increase cash flow downside risk simultaneously, leading to a spurious positive relation between them, which weakens the power of our hypothesis testing. Therefore, it is important in this study to net out asymmetric cash flow timeliness from conditional conservatism measures.

[14] We estimate the following model for fiscal years 1990 to 2007, extending Khan and Watts (2009):
$ACC_{it} = b_1 + b_2 DR_{it} + R_{it}*(m_1 + m_2 Size_{it} + m_3 M/B_{it} + m_4 LEV_{it}) + DR_{it}*R_{it}(l_1 + l_2 Size_{it} + l_3 M/B_{it} + l_4 LEV_{it})$
Then $GScore\_ACC_{it} = m_1 + m_2 Size_{it} + m_3 M/B_{it} + m_4 LEV_{it} = -1.89539 + Size_{it}*0.5239 - M/B_{it}*0.0367 - LEV_{it}*1.7393$

(*GScore_ACC*) score denotes the timeliness of bad (good) accruals news.

CC_CRA. *CC_CRA* is the ranked ratio of current accrual shocks to total accrual news multiplied by negative one for good accrual news. It focuses on the asymmetric timeliness of bad relative to good accrual news, extending Callen et al. (2010) and Biddle et al. (2013).[15]

3.4 Estimation methodology and models

3.4.1 Direct tests for the effects of unconditional and conditional conservatism on cash flow downside risk

Eq. (7) tests H1 regarding the direct effects of unconditional and conditional conservatism on subsequent cash flow downside risk, with H1 predicting $\gamma_1 < 0$:

$$DR\_OCF_{it} = \gamma_0 + \gamma_1 CON_{it-1} + Controls_{it} + \varepsilon_{it} \quad (7)$$

where *DR_OCF* refers to cash flow downside risk measures *DOCF*, *Rlpm_OCF*, or *CFaR*; *CON* refers to unconditional conservatism proxies *UC_PCA*, *UC_ACC*, *UC_BM*, and *UC_RES* and conditional conservatism metrics *CC_PCA*, *CC_ACM*, *CC_ARA*, and *CC_CRA*.

$CScore\_ACC_{it} = l_1 + l_2 Size_{it} + l_3 M/B_{it} + l_4 LEV_{it} = 3.3696 - Size*0.9200 + M/B_{it}*0.0456 + LEV_{it}*2.75340$

We also estimate the model for individual industry and individual firms with the results qualitatively unchanged.

[15] Specifically, we replace earnings with accruals (*acc*) and cash flow (*cf*) in the return decomposition model:

$$r_t - E_{t-1}(r_t) = \Delta E_t \sum_{j=1}^{\infty} \rho^j (acc_{t+j}) + \Delta E_t \sum_{j=1}^{\infty} \rho^j (cf_{t+j} - i_{t+j}) - \Delta E_t \sum_{j=1}^{\infty} \rho^j r_{t+j} = Nacc + Ncf - Nr$$

where Δ denotes first differencing, E_t is an expectation operator, $\Delta E_{t-1} = E_t(.) - E_{t-1}(.)$, ρ is a constant discount rate term, $i_t = log(1 + rf_t)$, rf_t is the risk-free rate in period *t*, $r_t = log(1 + ret_t) - i_t$, ret_t is the equity return (cum dividend) in period *t*, $acc_t = log(1 + (E_t - OCF_t)/BV_t)$, E_t is earnings, OCF_t is operating cash flow at period *t*, $cf_t = log(1 + OCF_t/BV_t)$, *Nacc* is accrual news $\Delta E_t \sum_{j=1}^{\infty} \rho^j (acc_{t+j})$, *Ncf* is cash flow news $\Delta E_t \sum_{j=1}^{\infty} \rho^j (cf_{t+j} - i_{t+j})$, and *Nr* is discount rate news $\Delta E_t \sum_{j=1}^{\infty} \rho^j r_{t+j}$.

Following Callen et al. (2006), we use r_t, acc_t, cf_t, and bm_t as inputs in the following vector autoregression (VAR) (1) model:

$$r_t = \alpha_0 + \alpha_1 r_{t-1} + \alpha_2 acc_{t-1} + \alpha_3 cf_{t-1} + \alpha_4 bm_{t-1} + \eta_{1t}$$
$$acc_t = \lambda_0 + \lambda_1 r_{t-1} + \lambda_2 acc_{t-1} + \lambda_3 cf_{t-1} + \lambda_4 bm_{t-1} + \eta_{2t}$$
$$cf_t = \beta_0 + \beta_1 r_{t-1} + \beta_2 acc_{t-1} + \beta_3 cf_{t-1} + \beta_4 bm_{t-1} + \eta_{3t}$$
$$bm_t = \phi_0 + \phi_1 r_{t-1} + \phi_2 acc_{t-1} + \phi_3 cf_{t-1} + \phi_4 bm_{t-1} + \eta_{4t}$$

Then we estimate

$$Nacc_t = \Delta E_t \sum_{j=1}^{\infty} \rho^j acc_{t+j} = r_t - E_{t-1}(r_t) + Nr_t - Ncf_t = \rho e_2'(I - \rho A))^{-1} \eta_t$$

where η_t refers to the vector $(\eta_{1t}, \eta_{2t}, \eta_{3t}\ \eta_{4t})'$, I is an identity matrix, and A is a parameter matrix. We then calculate $CC\_CRA = \eta_{2t}/Nacc_t$ if $Nacc_t < 0$ and $CC\_ACCA_t = -\eta_{2t}/Nacc_t$ if $Nacc_t > 0$.

Eq. (7) is a logit model for *DOCF* and a Fama–MacBeth (1973) model for *Rlpm_OCF* and *CFaR*. $Controls_{it}$ include identified determinants of cash flow downside risk.[16]

3.4.2 Indirect tests for the effects of unconditional and conditional conservatism via maturity mismatch and customer bargaining power

Extending Baron and Kenny (1986), we employ the following system of equations to test H2a and H2b regarding the indirect effects of unconditional and conditional conservatism on cash flow downside risk via supply chain disruption risk proxied by maturity mismatch and customer bargaining power. The first OLS model (Eq. 8) regresses unconditional and conditional conservatism on a specific risk measure, their common risk, governance, and industry determinants. The estimated residuals are thus largely free from the effects of reverse causality, endogeneity between the two types of conservatism, common risk, governance, and industry factors and are used to replace the original conservatism values in the later-stage regressions. The second OLS model (Eq. 9) regresses a specific risk variable *Risk* on the residuals of unconditional and conditional conservatism estimated from Eq. (8), *UC_R* and *CC_R*, and other controls. The third OLS model (Eq. 10) regresses future cash flow downside risk *Rlpm_OCF* on the residual estimated from Eq. (9) *Risk_R*; *UC_R* and *CC_R* from Eq. (8); their interactions; and other determinants of *Rlpm_OCF*. Note that we use the residual from Eq. (9) rather than the original value of risk to address the concern that conservatism causes a spurious relation between a risk variable and cash flow downside risk.

$$CON_{it} = \alpha_0 + \alpha_1 CON_{it-1} + \alpha_2 Risk_{it-1} + \alpha_3 ROA_{it-1} + \alpha_4 Size_{it-1} + \alpha_5 Leverage_{it-1} + \Sigma b_m Ind_m + \Sigma b_n Year_n + \upsilon_{it-1} \quad (8)$$

$$Risk_{it} = b_0 + b_1 UC\_PCA\_R_{it-1} + b_2 CC\_PCA\_R_{it-1} + Controls1_{it} + \varepsilon_{it}, \quad (9)$$[17]

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[16] Particularly, these control variables include capital investment intensity *Invest_Capx*, R&D investment intensity *Invest_RD*, organizational slack *SLACK*, human resource slack *SLACK_EMP*, firm size *Size*, return on total assets *ROA*, leverage ratio *Leverage*, operating options *OO*, past return volatility *Sigma*, CEO effort-taking incentives *CEO_Delta* and CEO risk-taking incentives *CEO_Vega*, and dummies for Fama–French (1997) industry classifications, *Ind,* and for fiscal years, *Year*. There is no consensus regarding the sources of cash flow downside risk in the literature. Zhang (2009) suggests that the determinants of cash flow volatility include the intensity of plant, property, and equipment (-), *Size* (-), *Invest_RD* (+), *Leverage* (+), *Sigma* (+), *CEO_Delta* (-), and *CEO_Vega* (+). Similarly, Ang et al. (2006) document a high downside beta in firms with high return on equity, small firm size, high asset growth, low book-to-market ratio, high return volatility, high past downside betas, and past winners. Other studies show that past organizational slackness (Miller and Reuler 1996) and operating options proxied by capitalized fixed assets (Driouchi and Bennett 2010) reduce downside risk.

$$Rlpm\_OCF_{it} = \gamma_0 + \gamma_1 Risk\_R_{it-1} + \gamma_2 Risk\_R_{it-1}*UC\_PCA\_R_{it-1} + \gamma_3 Risk\_R_{it-1}* CC\_PCA\_R_{it-1} + \gamma_4 UC\_PCA\_R_{it-1} + \gamma_5 CC\_PCA\_R_{it-1} + Controls2_{it-1} + \mu_{it} \quad (10)$$

where *CON* = *UC_PCA* or *CC_PCA* and *Risk* = *Mismatch* or *Rsize*. H2a predicts $b_1 > 0, b_2 > 0$, and $\gamma_5 < 0$ for the effects of unconditional and conditional conservatism on cash flow downside risk via the maturity mismatch channel; H2b predicts $\gamma_2 < 0$ and $\gamma_3 < 0$ to reflect their mitigation of the adverse effects customer bargaining power on cash flow downside risk.

3.4.3 Extended Heckman (1979) model for relations between conservatism and hedging

We use the extended Heckman (1979) model below to test H3a and H3b regarding relations between accounting conservatism and hedging. The model augments the Heckman (1979) model in two respects: (1) It adds two OLS regressions (Eq. 11) before the probit model, which regress *UC_PCA* and *CC_PCA,* respectively, on the hedging indicator *Hedger* and their common risk and governance determinants, to control for reverse causality from hedging to conservatism and their common risk, governance, and industry factors; (2) it employs a difference-in-differences specification in the last-stage OLS regression (Eq. 13) because examining only firms that initiate hedging programs (treatment firms) yields biased results when other changes coincide with the initiation of new hedging programs.[18] Specifically, Eq. (12) is a probit model that regresses a firm's propensity to be a *Hedger* on residuals from Eq. (11), *UC_PCA_R* and *CC_PCA_R*, and other hedging determinants to examine the effects of unconditional and conditional conservatism on hedging decisions.[19] Eq.

[17] *Controls1* differs in terms of dependent variable, maturity mismatch *Mismatch,* or customer bargaining power *CBP*. For *Mismatch*, *Controls1* includes firm size *Size,* return on assets *ROA*, capital ratio *CAP*, bond market liquidity spread *Repo*, change in the three-month T-bill rate *3M*, and industrial and year dummies, extending Kim et al. (2013). For customer bargaining power *CBP*, *Controls1* includes industry and year dummies.

[18] We use firms that have never initiated any hedging programs as control firms. In our specification, the first differencing level is the change in unconditional or conditional conservatism before and after the initiation of a hedging program for each treatment firm. The second differencing level is the change in unconditional or conditional conservatism between control and treatment firms, to remove the impact of other changes concurrent with the initiation of new hedging programs from the first-level differencing. The implicit assumption is that other changes affect both treatment and control firms similarly.

[19] Determinants of derivative hedging identified in the risk management literature (Smith and Stulz 1985; Graham and Smith 1999; Barton 2001; Zhang 2009) include: firm size *Size* (+), leverage ratio *Leverage* (+), profitability *ROA* (+), growth opportunities *Invest_RD* (+), underinvestment *Leverage*Invest_RD* (+), interest burden *INT_BD* (+), tax convexity *NOL* (+), return volatility *Sigma* (-), information asymmetry *BAS* (-), CEO effort-taking incentives *CEO_ Delta* (-), CEO risk-taking incentives *CEO_Vega* (+), and *IND* and *Year* dummies. Specifically, *Size* controls for the scale of the economy in hedging and *Leverage* and *ROA* proxy for incentives for using derivatives to reduce expected costs of financial distress and to

(13) is a difference-in-differences OLS model that regresses future *Rlpm_OCF* against *UC_PCA_R* and *CC_PCA_R*, *Hedger*, their interactions, the inverse Mills ratio estimated from Eq. (12) *Mills*, and other controls. H3a predicts b1 > 0 and $\gamma_2 > 0$ for *UC_PCA*; H3b predicts $b_1 < 0$ and $\gamma_3 < 0$ for *CC_PCA*; and H3a and H3b predict $\gamma_1 < 0$.

$$CON_{it} = \alpha_0 + \alpha_1 CON_{it-1} + \alpha_2 Rlpm\_OCF_{it-1} + \alpha_3 ROA_{it-1} + \alpha_4 Size_{it-1} + \alpha_5 Leverage_{it-1} + \alpha_6 CEO\_Delta_{it-1} + \alpha_7 CEO\_Vega_{it-1} + b_9 Hedger_{it} + \Sigma b_n Ind_n + \Sigma b_o Year_o + \upsilon_{it} \quad (11)$$

$$Hedger_{it} = b_0 + b_1 UC\_PCA\_R_{it-1} + b_2 CC\_PCA\_R_{it-1} + Controls3_{it-1} + \varepsilon_{it} \quad (12)$$

$$Rlpm\_OCF_{it} = \gamma_0 + \gamma_1 Post_{it} * Hedger_{it} + \gamma_2 Hedger_{it} * UC\_PCA\_R_{it-1} * Post_{it} + \gamma_3 Hedger_{it} * CC\_PCA\_R_{it-1} * Post_{it} + \gamma_4 UC\_PCA\_R_{it-1} + \gamma_5 CC\_PCA\_R_{it-1} + \gamma_6 Post_{it} + \gamma_7 Mills_{it-1} + Controls4_{it} + \mu_{it} \quad (13)$$

4. Main empirical results

4.1 Descriptive analysis

Table 1 reports summary statistics for the main variables used in empirical tests. Table 2 presents the Pearson and Spearman correlations between the major testing variables separately, above and below the diagonal, respectively, and indicates strong correlations between them. Specifically, the three cash flow downside risk measures (*DOCF*, *Rlpm_OCF*, *CFaR*) are significantly negatively correlated with unconditional conservatism measure *UC_PCA* and its component measures *UC_ACC*, *UC_BM*, and *UC_RES*, as well as with conditional conservatism metric *CC_PCA* and its component measures *CC_ACM*, *CC_ARA*, and *CC_CRA*, except that *CFaR* exhibits a positive Spearman (Pearson) correlation with *CC_ARA* (*CC_CRA*). These results provide initial evidence that unconditional and conditional conservatism are negatively associated with cash flow downside risk, consistent with H1. The Pearson and Spearman correlations of the cash flow downside risk measures with maturity mismatch *Mismatch* are typically positive and most are significant; those with

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facilitate external financing and are positively associated with increased incentives to use derivatives to prevent drops in profitability when firm performance is good. *Leverage*Invest_RD* and *Invest_RD* proxy for growth opportunities and incentives to use hedging to mitigate underinvestment problems, respectively. *INT_BD* captures hedging incentives from increased interest burden, *NOL* captures taxation convexity incentives for hedging, and *CEO_Vega* and *CEO_Delta* capture managerial risk-averse and risk-taking incentives for hedging, respectively, with *CEO_Vega* (*CEO_Delta*) predicted to be positively (negatively) associated with hedging (Guay 1999; Zhang 2009).

the hedging indicator *Hedger* are consistently negative, suggesting that corporate hedging reduces cash flow downside risk. Their correlations with customer bargaining power measure *Rsize* are inconsistent.

4.2 Unconditional and conditional conservatism and cash flow downside risk

Table 3 reports estimation results for testing H1 regarding the direct effects of unconditional and conditional conservatism on cash flow downside risk. Models 1 to 3 present the logit model results from regressing the cash flow downside risk indicator *DOCF* on lagged unconditional and conditional conservatism and other controls, Models 4 to 6 present Fama–MacBeth regression results for the cash flow downside risk measure *Rlpm_OCF*, and Models 7 to 9 present Fama–MacBeth regression results for the cash flow downside risk measure *CFaR*. In Models 1 and 2 the unconditional and conditional conservatism measures UC_PCA_{it-1} and CC_PCA_{it-1} are significantly negatively associated with $DOCF_{it}$. When they enter the regression together in Model 3, they remain significantly negatively associated with $DOCF_{it}$, with coefficients (*t*-statistics) -0.4507 (-4.85) and -0.1505 (-2.60), respectively, although their coefficients (*t*-statistics) are smaller compared with Models 1 and 2. These results strongly support H1 for cash flow downside risk proxied by *DOCF*.

Models 3 to 6 indicate that UC_PCA_{it-1} and CC_PCA_{it-1} are significantly negatively associated with $Rlpm\_OCF_{it}$ when considered independently (in Models 3 and 4) or together (in Model 6). Model 6 shows that the coefficients (*t*-statistics) of UC_PCA_{it-1} and CC_PCA_{it-1} are -0.0158 (-1.96) and -0.0595 (16.49), respectively. The economic meaning is that a one standard deviation increase in UC_PCA_{it-1} (CC_PCA_{it-1}), which is 0.2170 (0.3283), leads to a decrease of 34.50 (195.34) basis points in subsequent $Rlpm\_OCF_{it}$. These results suggest that both unconditional and conditional conservatism reduce future cash flow downside risk proxied by cash flow RLPM through managing firm risk, thus corroborating H1. Models 7 to

9 likewise show UC_PCA_{it-1} and CC_PCA_{it-1} to be significantly negatively associated with cash flow downside risk measure $CFaR_{it}$ when they enter a regression independently or together. These findings suggest that unconditional and conditional conservatism, thus lending added support to H1. Measures for *CFaR* based on confidence levels of five percent and ten percent yield qualitatively similar results.[20]

4.3 Maturity mismatch, customer bargaining power, and relations between unconditional and conditional conservatism and cash flow downside risk

Table 4 presents the regression results for testing H2a and H2b that unconditional and conditional conservatism mitigate cash flow downside risk via the maturity mismatch channel and by constraining the detrimental effects of customer bargaining power, respectively. We measure maturity mismatch as the ratio of the difference between current debt and cash holdings to total assets and denote it *Mismatch.* We estimate customer bargaining power *Rsize* as the ratio of the average market value of a customer's industry to the supply firm's equity market value, and then deflate it by 100, following Hui et al. (2012). The untabulated first-stage OLS regressions orthogonalize unconditional and conditional conservatism against maturity mismatch or customer bargaining power respectively together with other controls.[21] The maturity mismatch regression reported in Table 4 shows that $UC\_PCA\_R_{it-1}$ and $CC\_PCA\_R_{it-1}$ are significantly negatively associated with subsequent maturity mismatch $Mismatch_{it}$, with coefficients (*t*-statistics) of 0.0721 (-13.47) and -0.0104 (-4.37), respectively. The economic interpretation is that a one standard deviation increase in unconditional (conditional) conservatism, which is 0.2170 (0.3283), reduces maturity

[20] The control variables coefficients are generally consistent with expectations. Leverage is significantly positively associated with cash flow downside risk in all models, consistent with the intuition that distressed firms suffer more shocks to operations and thus have higher cash flow downside risk; R&D investment is significantly negatively related with cash flow downside risk consistent with R&D signaling cash flow upside potential; *ROA*, operational options *OO,* CEO risk-averse incentives and *CEO_Delta* are negatively related with cash flow downside risk.

[21] We use the estimated residuals $UC\_PCA\_R_{it-1}$ and $CC\_PCA\_R_{it-1}$ to proxy for unconditional and conditional conservatism respectively in later stage tests for maturity mismatch and customer bargaining power.

mismatch by 156.5 (34.14) basis points. This evidence is supportive of unconditional and conditional conservatism serving to alleviate disruptions to firm supply and operations. In turn, the estimated residual from the mismatch regression, $Mismatch\_R_{it-1}$, is significantly positively associated with subsequent cash flow downside risk $Rlpm\_OCF_{it}$ in the third-stage OLS regression, with a coefficient (*t*-statistic) of 0.0184 (3.75). That means a one standard deviation increase in maturity mismatch, which is 0.1358, increases $Rlpm\_OCF_{it}$ by 25.00 basis points. The result is consistent with a high mismatch being associated with disruptions to firm operations from the supply side that translate into increased cash flow downside risk. It also suggests that maturity mismatch works as a mediating channel by which unconditional and conditional conservatism reduce cash flow downside risk. The meditating effect of mismatch is equal to -0.0013 (= 0.0184*(-0.0721)) for unconditional conservatism and -0.0002 (=0.0184*(-0.0104)) for conditional conservatism. Altogether, these findings lend support to H2a regarding the maturity mismatch channel.

The rightmost two columns of Table 4 report estimation results regarding the indirect effects of unconditional and conditional conservatism for reducing the effects of customer bargaining power on firm operations and cash flow downside risk. Consistent with predictions, the OLS regression for customer bargaining power *Rsize* shows that unconditional and conditional conservatism measures $UC\_PCA\_R_{it-1}$ and $CC\_PCA\_R_{it-1}$, respectively, are insignificantly associated with customer bargaining power *Rsize*, consistent with the intuition that conservatism in a supplier firm does not affect customer bargaining power because the latter is mainly determined by the customer firm's industry- and firm-specific characteristics. Although conservatism does not affect customer bargaining power *per se*, it can still moderate the detrimental effects of customer bargaining power on cash flow downside risk. The last OLS regression for *Rlpm_OCF* reported in Table 4 indicates that the interactions of the two types of conservatism with customer bargaining power,

$UC\_PCA\_R_{it-1}*Rsize\_R_{it-1}$ and $CC\_PCA\_R_{it-1}*Rsize\_R_{it-1}$, are significantly negatively associated with subsequent cash flow downside risk $Rlpm\_OCF_{it}$, with coefficients (*t*-statistics) -0.0026 (-2.24) and -0.0157 (-2.97), respectively. The economic meaning is that a one standard deviation increase in unconditional (conditional) conservatism weakens the enhancing effect of customer bargaining power on cash flow downside risk by 5.64 (51.54) basis points. Thus, this evidence is consistent with accounting conservatism helping to reduce the adverse effects on operating downside cash flow risk of disruptions to firms' operations from the customer side as predicted by H2b.

4.4 *Corporate hedging and relations between unconditional and conditional conservatism and cash flow downside risk*

Table 5 presents results for examining H3a and H3b regarding relations between conservatism and hedging using an extended three-stage Heckman (1979) model. The first-stage OLS regressions reported in the first two columns of Table 5 address reverse causality from hedging to conservatism and indicate that the hedging firm indicator *Hedger* is significantly positively associated with unconditional and conditional conservatism, *UC_PCA* and *CC_PCA*, respectively. This result implies that hedging firms tend to choose higher levels of accounting conservatism. The third column reports the results of probit model regression for the hedging indicator *Hedger* and shows that lagged unconditional conservatism UC_PCA_{it-1} is significantly negatively associated with the probability that a firm initiates a new hedging program, with a coefficient (*t*-statistic) of -0.1587 (-1.64). These findings imply that unconditional conservatism reduces and substitutes for hedging usage in managing risk. In contrast, lagged conditional conservatism CC_PCA_{it-1} is significantly positively associated with the probability that a firm initiates a new hedging program, with a coefficient (*t*-statistic) of 0.0705 (1.77). This evidence is consistent with the prediction of H3a that timely risk warnings via conditional conservatism promote and complement hedging usage.[22]

The last column reports third-stage difference-in-differences OLS regression results for *Rlpm_OCF*. Consistent with expectations, the initiation of a hedging program significantly reduces subsequent cash flow downside risk, as indicated by the significantly negative coefficient of -0.0108 for the interaction item *Hedger*Post*. In line with Smith and Stulz (1985), Stulz (1996), and Campello et al. (2011), this result indicates that corporate hedging directly reduces specific risk exposures and weakens their detrimental effects on firm operations and investments, which ultimately projects into a decrease in cash flow downside risk. Combined with the findings for the probit model that unconditional conservatism reduces hedging usage, this result further reconfirms that unconditional conservatism substitutes for hedging usage in decreasing cash flow downside risk, thus corroborating H3a. Combined with the second-stage results that conditional conservatism complements hedging usage, this evidence also reconfirms that conditional conservatism stimulates and complements hedging usage, which reduces subsequent cash flow downside risk and thus corroborates H3b. A likely explanation is that by signaling bad news in a timely fashion, conditional conservatism promotes the initiation of productive new hedging programs that help mitigate operating cash flow downside risk.

The third-stage results confirm that the interaction of *UC_PCA_R*, *Hedger*, and *Post* is significantly positively associated with cash flow downside risk, with a coefficient (*t*-statistic) 0.0580 (2.31). The evidence suggests that unconditional conservatism also weakens hedging effectiveness for mitigating cash flow downside risk, thus supporting H3b regarding the effect of unconditional conservatism on hedging effectiveness. By comparison, the third-

[22] The results for the controlling variables in the second-stage regression are generally consistent with the risk management literature. In particular, *INT_BD*, *Leverage*, *Leverage*Invest_RD*, *ROA*, and *Size* are positively associated with all hedging types, whereas the coefficients of *BAS* and *SIGMA* are negative.

stage finding that the interaction of conditional conservatism *CC_PCA_R* with *Hedger* and *Post*, *CC_PCA_R *Hedger* Post*, is insignificantly associated with cash flow downside risk does not support H3b for conditional conservatism complementing hedging effectiveness. Thus, this finding conveys that conditional conservatism complements hedging by stimulating hedging usage rather than hedging effectiveness.

5. Further analysis and sensitivity tests

5.1 Investor monitoring and the risk management role of accounting conservatism

An alternative explanation for the observed negative relation between conservatism and cash flow downside risk is that investor monitoring both enhances conservatism and reduces cash flow downside risk. To address this possibility, we use a two-stage least squares model to determine whether our main results are robust to investor monitoring. Specifically, the first stage OLS model regresses unconditional or conditional conservatism on variables for monitoring by investors including blockholders, shareholders, and debtholders. We use the negative of *GScore* to represent blockholder monitoring (Gompers et al. 2003), percentage institutional ownership to proxy for institutional shareholder monitoring, and the ratio of long-term debt to total long-term and short-term debts to represent debtholder monitoring. We then use the estimated residuals to replace their original values to net out the effect of investor monitoring on conservatism.[23] Table 6 reports the estimation results indicating that all measures for investor monitoring increase unconditional and conditional conservatism, with a significantly positive coefficient for institutional ownership. More significantly, the second-stage OLS regression for *Rlpm_OCF* indicates that both types of conservatism

[23] *Gscore* gauges the balance of power between shareholders and top executives (Gompers et al. 2003). Using data on twenty-four governance provisions compiled by the Investor Responsibility Research Center and state takeover law data for three years—1990, 1993, 1995, and 1998—Gompers et al. (2003) construct *Gscore* for each firm in their sample by adding one point for every provision that reduces shareholder rights. Thus, a higher *Gscore* indicates less power for shareholders and hence a less well-governed firm and the higher the negative of *Gscore*, the greater the power of shareholders and hence a better-governed firm. We obtain data for *GScore* and board structure from RiskMetrics, data for institutional shareholdings from the Thomson-Reuters Institutional Holdings Database, and data for board duality information from ExecuComp, as indicated by a current CEO with the title *chairman*, *chmn*, *Chairman*, *CHAIRMAN*, *Chmn*, or *CHMN*.

continue to significantly decrease subsequent cash flow downside risk, confirming that their relation is robust to the effects of investor monitoring. Thus, the results in Table 6 suggest that unconditional and conditional conservatism play a risk management role for operating cash flow downside risk beyond of the effects of investor monitoring.

5.2 Firm size and the risk management role of accounting conservatism

Small firms are often financially constrained and small firm size is considered an important rationale for firms to engage in risk management activities (e.g., Froot et al. 1993). The risk management literature in finance further finds small firms to be sensitive to interest rate shocks (e.g., Gertler and Gilchrist 1994; Ehrmann 2000). To reduce the possibility that our results are influenced by these effects, we control for firm size in all regression results reported above. When we further omit the lowest tercile of observations sorted by firm size, untablulated results confirm that our main results are qualitatively unchanged for the subsample of large firm observations.

5.3 Earnings smoothing and the risk management role of accounting conservatism

Earnings smoothing is an accrual-based risk management tool that reduces earnings volatility and substitutes for hedging (Barton 2001). It also can be characterized as "conservatism gaming," whereby a higher level of conservatism is applied in good economic times and a lower level of conservatism in bad times (Biddle et al. 2013). We expect the risk management role of conservatism to be insensitive to the effect of earnings smoothing because conservatism targets real firm risk, rather than earnings volatility, and actually increases earnings volatility as suggested by Givoly and Hayn (2000), Ball and Shivakumar (2005, 2006), and Jorgensen et al. (2012). In contrast, the primary objective of earnings smoothing is not to manage real firm risk but rather to reduce earnings volatility (Barton 2001). Adding innate and discretionary smoothing as additional controls to Eq. (7) yields qualitatively similar results.[24]

5.4 Alternative Rlpm_OCF-based cash flow downside risk measures

To confirm that our main results are robust to different cash flow expectation models for calculating the cash flow downside risk measure *Rlpm_OCF*, we examine the following alternative cash flow benchmarks: the previous year's industry mean cash flow, the mean of firm-specific cash flow in the previous five years, and zero cash flow. We denote the cash flow RRLPMs thus calculated as *DR_OCFind*, *DR_OCFpre,* and *DR_OCFzero*, respectively. To examine whether our results are robust to alternative formula specifications for defining *Rlpm_OCF*, we alternatively define *Rlpm_OCF2* as the natural logarithm of one plus the cash flow RLPM without deflating by the cash flow RUPM and define *Rlpm_OCF3* as the natural logarithm of one plus the cash flow RLPM deflated by the standard deviation of cash flow. Panel A of Table 7 reports the estimation results and reveals that the negative relations between unconditional and conditional conservatism and cash flow risk are robust to these alternative *Rlpm_OCF* measures. In addition, to address the concern that the *CFaR* measure may be unreliable because the quarterly cash flow expectation model involves eight independent variables and is estimated using seventeen firm–quarter observations, we drop the quarter dummies with qualitatively unchanged results.

5.5 Alternative unconditional and conditional conservatism measures

Next we examine whether our main results are robust to alternative unconditional conservatism measures proxied by the component measures of *UC_PCA*, namely, *UC_ACC*, *UC_BM*, and *UC_RES*. We likewise examine three alternative conditional conservatism measures, the component measures of *CC_PCA*: *CC_AM*, *CC_ARA*, and *CC_CRA*. Using these measures, we re-examine Eq. (7) for relations between conservatism and cash flow

[24] We measure Innate smoothing as the product of negative one times the Spearman correlation between total accruals, and cash flow and discretionary smoothing as the product of negative one times the ratio of the standard deviations of net income to cash flow.

downside risk and report the results in Panels B to D of Table 7. Models 1 to 6 in Panels B to D indicate that these measures are significantly negatively associated with subsequent cash flow downside risk measures $DOCF_{it}$, $Rlpm\_OCF_{it}$, and $CFaR_{it}$, respectively, except that UC_ACC_{it-1}, UC_BM_{it-1}, and CC_ARA_{it-1} have insignificant coefficients in Panels B, C, and D, respectively.[25]

We also use negative one times earnings skewness relative to cash flow skewness, *SKEW*, as a conditional conservatism measure, but we use its predicted value from the following model to net out asymmetrical cash flow timeliness:

$$SKEW_{it} = \beta_0 + \beta_1 UC\_ACC_{it} + \beta_2 CC\_ACM_{it} + \varepsilon_{it}. \quad (14)$$

We denote the predicted $SKEW_{it}$ *CC_Skew* and calculate *CC_PCAA* as the factor score generated from a PCA of *CC_Skew*, *CC_ACM*, and *CC_CRA*. Panel E of Table 7 reports the results showing that *CC_Skew* and *CC_PCAA* are significantly negatively associated with *Rlpm_OCF* and *CFaR*, except for the insignificant results for *DOCF*, suggesting that our results are insensitive to using *CC_Skew* and *CC_PCAA* as alternative conditional conservatism measures. Altogether, the results of Table 7 indicate that the relations between unconditional and conditional conservatism and cash flow downside risk observed above are robust to alternative measures.

5.6 Alternative measures for maturity mismatch and customer bargaining power

We also consider alternative measures for maturity mismatch *Mismatcha* and customer bargaining power *RHHI*. *Mismatcha* is the ratio of current liabilities minus cash holdings to total assets and *RHHI* is the concentration ratio of a customer's four-digit North American Industry Classification System (NAICS) industry relative to that of the firm's. *RHHI* extends

[25] A possible concern is that these results are influenced by R&D and marketing expenditures that increase cash flow downside risk and hidden reserves and thus unconditional conservatism Penman and Zhang 2002), which creats a spurious relation between conservatism and cash flow downside risk, particularly when R&D is financed in stages (Bergemann et al. 2011). But we already address this possibility by adjusting all cash flow downside risk measures for R&D expenditures and controlling for the effects of R&D expenditures in all multivariate regressions of cash flow downside risk on conservatism measures. As a further check, we use a subsample without R&D expenditures to regress cash flow downside risk on conservatism measures using Eq. (7), and find that the negative relation is qualitatively unchanged.

the concentration ratio in Hui et al. (2012) by assuming that it is a relative concept depending on customer bargaining power of a firm and its customers. When using these measures to re-examine H2a and H2b regarding the indirect effects of conservatism on cash flow downside risk via maturity mismatch and customer bargaining power, the results are qualitatively similar to those in Table 3.

6. Conclusion

This study investigates whether accounting conservatism serves a risk management role for operating cash flows as follows from its definition and suggestive prior findings that it influences operating cash flows downside properties, a key focus of risk management theory and practice. Our findings indicate that (1) unconditional and conditional conservatism mitigate subsequent cash flow downside risk; (2) they operate by reducing cash-debt maturity mismatches associated with supply side disruptions, and by weakening the effects of customer bargaining power on cash flow downside risk; and (3) unconditional (conditional) conservatism substitutes for (complements) hedging usage in reducing operating cash flow downside risk.

This study contributes to the conservatism literature by articulating a risk management role of accounting conservatism and providing supportive evidence. We further advance insights into relations between conservatism and operating cash flow downside risk via maturity mismatch and customer bargaining power that help validate the relations. Importantly, our evidence that accounting conservatism serves as an accounting-based risk management instrument related to hedging extends the risk management literature. Our findings also have practical implications for economic policymaking and accounting standard setting by suggesting conservatism as a low-cost accounting-based risk management tool. Our results also help inform ongoing deliberations regarding conservatism's role as a central tenet of financial accounting. This study's findings of a risk management role for accounting conservatism with regard to operating cash flow downside risk open several avenues for future research. In particular, follow-on studies can examine how conservatism relates to other risk dimensions and risk management tools, and related implications for managers and policymakers.

Appendix 1 Benchmark models for operating cash flow

This study utilizes the following cash flow prediction model for calculating cash flow RRLPM and *DOCF*:

$$OCF_{t+1} = \beta_0 + \beta_1 OCF_t + \beta_2 OCF_{t-1} + \beta_3 OCF_{t-2} + \beta_4 SALE_t + \beta_5 Size_t + \beta_8 Leverage_t + \beta_6 STD\_OCF_t + Year\_Dummies + \varepsilon_{t+1} \quad \text{(A1)}$$

where *OCF* refers to the ratio of operating cash flow to total assets. Eq. (A1) combines an autoregressive AR (3) structure with the economic determinants of cash flow. We incorporate the autoregressive structure because Dechow et al. (1998) report that it improves cash flow predictability for future cash flow. We also include sales turnover *SALE,* measured as the ratio of total sales to total assets, because it is a major determinant of both cash flow and earnings, as suggested by Barth et al. (2001) and Dechow et al. (1998). Further, *SALE* can replace the earnings-based profitability measure, another documented determinant of future cash flow (e.g., Barth et al. 2005; Kim and Kross 2005), has the advantage of not introducing endogeneity between conservatism and cash flow downside risk, unlike earnings. Both *Size* and the operating cycle *OC* are employed as determinants for cash flow in prior research (e.g., Dechow et al. 1998). However, Hui et al. (2012) suggest that conservatism shortens operating cycles by increasing trading contract efficiencies and therefore we omit it from Eq. (A1). Eq. (A1) also includes *Leverage*, which has dual effects on cash flow. Opler and Titman (1994) document that financially distressed firms lose significant market shares to their healthy counterparts during industry downturns, and Froot et al. (1993) suggest that higher leverage causes firms to forgo positive net present value projects due to costly external financing. *Leverage* also proxies for interest expenses when firm size is controlled for. *SFAS* No. 95 requires reporting interest expenses as a cash flow item rather than as a financing flow item, which results in a negative mechanical relation between *Leverage* and subsequent cash flow. However, high *Leverage* also implies that firms have already used sufficient external financing to support operations and investment activities, which increases subsequent cash flow. Therefore, the relation between *Leverage* and cash flow is an open empirical question. Industry cash flow risk is a determinant of cash flow predictability, yet estimation by the industry at least partially controls for this industry effect. In addition, firm-specific cash flow risk increases cash flow uncertainty and difficulties in predicting cash flow (Minton et al. 2002). Therefore we include cash flow volatility *STD_OCF* in Eq. (A1) and calculate it as the volatility of quarterly cash flow over the current and previous eleven fiscal quarters, with a minimum requirement of four quarters of data. *STD_OCF* thus calculated avoids missing data, as does cash flow volatility calculated using annual cash flow, and we find that they are positively correlated, suggesting that the former is an appropriate substitute for the latter in our research setting. Lastly, we add year dummies to capture temporal factors that affect cash flow predictability.

Following the intuition of Stein et al. (2001), we delete firm–years below the lower-tail five percent of total assets for a given fiscal year to alleviate concerns that small firm size could disproportionately inflate the cash flow ratio and bias cash flow predictions, which results in 73,598 firm–year observations. We fit Eq. (A1) by Fama–French (1997) industry classifications and the average *R*-square is 0.2390. We fit the model by industry rather than by year because cash flow properties are shaped more by industry features. The average *R*-square drops from about twenty-four to eighteen percent when the model is fitted by fiscal year with industry dummies. The coefficients for OCF_t, OCF_{t-2}, $SALE_t$, and $Size_t$ are significantly positive in most industries, but those for *Leverage* are mixed (significantly positive in eight industries and significantly negative in seven industries), consistent with mixed evidence in prior studies. The mean values and *t*-statistics of the estimated coefficients for Eq. (A1) are as follows:

$$\begin{aligned} OCF_{t+1} = &\underset{(-0.08)}{-0.0016} + \underset{(4.73)^{***}}{\mathbf{0.2407}}*OCF_t + \underset{(0.85)}{0.0158}*OCF_{t-1} + \underset{(2.59)^{**}}{\mathbf{0.0157}}*OCF_{t-2} + \underset{(3.89)^{***}}{\mathbf{0.0339}}*SALE_t \\ &+ \underset{(6.26)^{***}}{\mathbf{0.0092}}*Size_t - \underset{(-0.00)}{0.01}*LEVERAGE_t - \underset{(-0.11)}{0.0048}*STD\_OCF_t + Year\_Dummies \end{aligned}$$

When we use the market value of equity to deflate cash flow, the results are qualitatively unchanged. We use estimated residuals and fitted values from Eq. (A1) to calculate the *DOCF* and *Rlpm_OCF* used in our main tests. We also use *ROA* instead of *SALE* in Eq. (A1) and the results are qualitatively unchanged as well, indicating that the endogeneity problem induced by *ROA* is not serious. We also include the operating cycle *OC* in Eq. (A1), with *OC* defined as the average time between purchasing or acquiring inventory and receiving cash from the sales and calculated as the natural logarithm of 360 days times the ratios of average accounts receivable to total revenue and of average inventory to the cost of goods. The results are qualitatively unchanged for this treatment. We also find that the coefficients of *OC* are insignificant for most industries and the addition of *OC* does not greatly improve the *R*-squared statistic.

Appendix 2 Variable definitions

Cash flow downside risk measures

DOCF: a dummy variable indicating that cash flow is below its expected level from a benchmark model for a given fiscal year. It is equal to one if the residual from the model is negative and zero otherwise. See Appendix 1 for the cash flow expectation model used for calculating *DOCF*.
Rlpm_OCF: the ranked natural logarithm of the ratio of one plus the cash flow RLPM to one plus the cash flow RUPM, calculated over a rolling window of the current and previous two years. See the text and Appendix 1 for the cash flow expectation model for calculating *Rlpm_OCF*.
CFaR: the ranked percentage cash flow shortfall below the expected quarterly cash flow at a one percent confidence level. It is estimated from a probability distribution of the quarterly cash flow of a firm and its peers, using the comparables approach.

Accounting conservatism measures

UC_PCA: proxy for unconditional conservatism, measured as the factor score from a PCA of three unconditional conservatism measures: *UC_ACC*, *UC_BM*, and *UC_RES*. The eigenvectors are 0.7078 for *UC_ACC*, 0.6978 for *UC_BM*, and 0.2038 for *UC_RES*; the eigenvalues are 1.0293 for *UC_ACC*, 0.9989 for *UC_BM*, and 0.9718 for *UC_RES*; the final communities are 0.5009 for *UC_ACC*, 0.4669 for *UC_BM*, and 0.0415 for *UC_RES*.
UC_ACC: a component unconditional conservatism measure calculated as negative one times the ratio of total accruals to average total assets, over a rolling window of the current and prior two years. Total accruals are calculated as *net income before extraordinary items* - *operating cash flow* + *depreciation expense*.
UC_BM: a component unconditional conservatism measure calculated as the industry-adjusted ranking of negative one times book to market value of common equity at the fiscal year-end.
UC_RES: a component of the unconditional conservatism measure, calculated as the ratio of hidden reserve resulting from last-in, first-out R&D and marketing expenses to total assets.
CC_PCA: proxy for conditional conservatism, measured as the factor score from a PCA of three conditional conservatism measures: *CC_ACM*, *CC_ARA*, and *CC_CRA*. The eigenvectors are 0.7154 for *CC_ACM*, 0.2436 for *CC_ARA*, and 0.7461 for *CC_CRA*; the eigenvalues are 1.1277 for *CC_ACM*, 0.9971 for *CC_ARA*, and 0.8752 for *CC_CRA*; the final communities are 0.5718 for *CC_ACM*, 0.0593 for *CC_ARA*, and 0.5566 for *CC_CRA*.
CC_ACM: a component conditional conservatism measure, computed as negative one times the ratio of accumulated non-operating accruals to accumulated total assets, calculated over a rolling window of the current and prior two years, with non-operating accruals calculated as *Total accruals* - *Δaccounts receivable* - *Δinventories* - *Δprepaid expenses* + *Δaccounts payable* + *Δtaxes payable*.
CC_ARA: a component conditional conservatism measure calculated as the ranked ratio of the sum of the CScore_ACC and GScore_ACC to the GScore_ACC estimated from an extended model from Khan and Watts (2009), detailed in the text. CScore_ACC (GScore_ACC) score measures the timeliness of bad (good) accruals news, corresponding to the C-score (G-score) in Khan and Watts (2009) that measures the timeliness of bad (good) earnings news.
CC_CRA: a component conditional conservatism measure calculated as the ratio of current accrual shocks to total accrual news for bad accrual news, with the ratio multiplied by negative one in good accrual news cases, derived from Biddle et al. (2013).

Measures for other testing variables

Mismatch: proxy for maturity mismatch measured as the ratio of the difference between current debt and cash holdings to total assets.
Rsize: proxy for customer bargaining power and is measured as the ratio of the average market value of a customer's industry to the firm's equity market value and then deflated by 100, with the industry market value estimated using all listed firms in a four-digit NAICS industry, following Hui et al. (2012).
Hedger: a dummy variable equal to one for firms with a hedging program and zero otherwise.

Measures for control variables

ΔCash: the ratio of changes in cash holdings to total assets.
Dissue: the ratio of net long-term debt issuance over long-term debt reduction to total assets.
DIV: the ratio of cash dividends to total assets.
Growth: the ratio of sale changes in the current fiscal year to sales in the previous fiscal year.
Invest_CAPX: the ratio of capital expenditures to total assets.

Invest_RD: the ratio of R&D expenditures to total assets.
Leverage: the ratio of the sum of long-term and short-term debts to total assets.
LOSS: a dummy variable equal to one if a firm has negative income for the current fiscal year and zero otherwise.
NWC: the ratio of working capital net of cash holdings to total assets.
OO: the ratio of total property, plant, and equipment to total assets.
ROA: the ratio of net income to total assets.
Sigma: the annualized standard deviation of monthly stock returns calculated over the prior twelve months.
Size: the natural logarithm of the sum of the market value of equity, total liabilities, and the carrying value of preferred stock.
SLACK: the average of the industry-adjusted ratio of inventory to total revenue, the industry-adjusted ratio of accounts receivable to total revenue, and the industry-adjusted ratio of selling, general, and administrative expense to total revenue.
SLACK_EMP: the industry-adjusted ratio of the total number of employees at fiscal year-end to total revenue.
INT_BD: the ratio of interest expense to operating income before depreciation and interest.
INT: the interaction of R&D investment (*Invest_RD*) and the leverage ratio (*Leverage*).
NOL: an indicator variable equal to one for positive net income and positive net operating loss carryforwards and zero otherwise.
CEO_Vega: the natural logarithm of one plus the sensitivity of CEO firm-specific equity-based wealth to a one percent change in stock return volatility.
CEO_Delta: the natural logarithm of one plus the sensitivity of CEO firm-specific equity-based wealth to a one percent change in stock price.
BAS: the average daily percentage of the bid–ask spread in the fiscal year.
CAP: the ratio of book value of equity to total assets.
3M: the change in the three-month T-bill rate.
Repo: proxy for bond market illiquidity measured as the difference between the three-month general collateral repo rate and the three-month T-bill rate.

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TABLE 1 Descriptive statistics for main variables

This table reports summary statistics for variables used in the main empirical tests for the full sample of firm–year observations from 1992 through 2007. The variable definitions are presented in Appendix 2.

Variables	Mean	STD	Q1	Median	Q3
DOCF	0.5798	0.4936	0	1	1
Rlpm_OCF(Raw)	0.0936	0.2970	-0.0715	0.0360	0.1321
CFaR(Raw)	0.5329	9.5376	0.1133	0.2018	0.3410
UC_PCA	0.3778	0.2170	0.1953	0.3809	0.5613
UC_ACC	0.0027	0.0461	-0.0197	0.0027	0.0241
UC_BM(Raw)	0.3051	3.8507	-0.1301	0.1500	0.4684
UC_RES	0.0897	0.2732	0.0000	0.0242	0.1049
CC_PCA	0.6162	0.3283	0.3731	0.6144	0.8594
CC_ACM	-0.0002	0.0822	-0.0305	0.0072	0.0362
CC_ARA(Raw)	-0.5937	23.0188	-0.7546	-0.7133	-0.6550
CC_CRA(Raw)	-0.0633	8.0455	-0.7135	-0.3564	0.6566
Mismatch	-0.0546	0.1358	-0.1094	-0.0266	0.0137
Rsize	9.2331	11.9608	3.3163	5.6149	10.2255
ΔCash	-0.0068	0.9585	-0.0133	0.0028	0.0307
Invest_CAPX	0.0627	0.4102	0.0223	0.0429	0.4102
Invest_RD	0.0291	0.0612	0.0000	0.0000	0.0325
DISSUE	0.0040	0.0528	0.0000	0.0000	0.0000
DIV	0.0072	0.0216	0.0000	0.0000	0.0064
Leverage	0.1925	0.1621	0.0357	0.1775	0.3061
NWC	0.1062	0.1963	-0.0207	0.0831	0.2295
OO	0.5835	0.3978	0.2806	0.5012	0.8114
ROA	0.0371	0.1011	0.0149	0.0484	0.0840
Growth	0.0084	4.6875	0.0030	0.0803	0.1623
INT	0.0032	0.0097	0	0	0.0020
NOL	0.0777	0.2677	0	0	0
Sigma	0.4576	0.2476	0.2877	0.3993	0.5579
Size	1.8449	0.3250	1.6326	1.8813	2.0804
SLACK	-0.3435	2.2937	-0.3728	-0.1488	0.0256
SLACK_EMP	-0.0051	0.1727	-0.0049	-0.0019	0.0005
CEO_Delta	0.0076	0.0381	0.0000	0.0000	0.0004
CEO_Vega	0.0970	1.1365	0.0000	0.0000	0.0056
CAP	0.5395	0.1913	0.3935	0.5280	0.6869
3M	0.0378	0.0150	0.0295	0.0407	0.0503
Repo	4.0548	1.6408	3.0500	4.4500	5.4500
INT_BD	0.1451	5.1587	0.0000	0.0834	0.2452
BAS	0.0219	0.0274	0.0044	0.0136	0.0274

TABLE 2 Correlation matrix for main testing variables for the full sample

This table reports pairwise correlations among downside risk metrics and accrual-based conservatism measures, maturity mismatch, customer bargaining power, and hedging dummy. The upper triangle displays Pearson correlations and the lower triangle displays Spearman correlations. The boldfaced figures indicate significance beyond the 90 percent confidence level. All variable definitions are presented in Appendix 2.

Variables	***1***	***2***	***3***	***4***	***5***	***6***	***7***	***8***	***9***	***10***	***11***	***12***	***13***	***14***
1. DOCF	1	**0.6451**	0.0115	**-0.0508**	-0.0078	**-0.0407**	**-0.0581**	**-0.0165**	**-0.0256**	**-0.0599**	**-0.0188**	**0.0403**	0.0388	**-0.0262**
2. Rlpm_OCF	**0.6453**	1	0.0084	**-0.1197**	**-0.1627**	**-0.0784**	**-0.1125**	**-0.1373**	**-0.0806**	**-0.0714**	**-0.1545**	**0.3576**	-0.0449	**-0.0286**
3. CFaR	**0.0531**	**0.1053**	1	0.0114	0.0031	0.0034	**0.0456**	-0.0017	-0.0062	0.0098	0.0067	0.0068	-0.0194	-0.0070
4. UC_PCA	**-0.0533**	**-0.1226**	**-0.1004**	1	**0.2044**	**0.9697**	**0.2090**	**0.1621**	**0.0978**	**-0.0556**	**0.1360**	**-0.0990**	**-0.0716**	**0.0307**
5. UC_ACC	-0.0082	**-0.1611**	**-0.0515**	**0.1973**	1	**0.0419**	**0.0950**	**0.4510**	**0.4192**	**-0.0324**	**0.2705**	**-0.1606**	**0.0336**	**0.0171**
6. UC_BM	**-0.0418**	**-0.0799**	**-0.0917**	**0.9787**	**0.0525**	1	0.0136	**0.0999**	**0.0296**	**-0.0681**	**0.1037**	**-0.0446**	-0.0896	**0.1234**
7. UC_RES	**-0.1121**	**-0.1690**	**-0.0933**	**0.0841**	**0.0337**	**-0.0148**	1	-0.0007	**0.0429**	**0.0803**	**-0.0185**	**-0.0846**	-0.0009	**-0.0385**
8. CC_PCA	**-0.0155**	**-0.1357**	-0.0016	**0.1627**	**0.4675**	**0.0994**	-0.0092	1	**0.7332**	**-0.2474**	**0.7400**	-0.0075	-0.0106	**0.0392**
9. CC_ACM	**-0.0257**	**-0.0817**	**-0.0345**	**0.0955**	**0.4166**	**0.0277**	**0.0217**	**0.7282**	1	**-0.0280**	**0.1314**	**-0.0522**	0.0052	**0.0224**
10. CC_ARA	**-0.0661**	**-0.0810**	**0.0864**	**-0.0501**	**-0.0476**	**-0.0569**	**0.0637**	**-0.2362**	**-0.0300**	1	**-0.0421**	**-0.0720**	-0.0276	**-0.0994**
11. CC_CRA	**-0.0192**	**-0.1550**	**0.0609**	**0.1368**	**0.2949**	**0.1025**	**-0.0171**	**0.7351**	**0.1311**	**-0.0421**	1	0.0163	-0.0276	**0.0285**
12. Mismatch	**0.0466**	**0.2907**	**0.0692**	**-0.1046**	**-0.1385**	**-0.0489**	**-0.2277**	0.0002	**-0.0486**	**-0.0953**	0.0151	1	0.0385	**0.0367**
13. Rsize	**0.1161**	**-0.0787**	0.0491	**-0.0625**	**0.0460**	**-0.0991**	**0.0479**	0.0175	**0.0809**	**0.0732**	-0.0346	**-0.0959**	1	-0.0448
14. Hedger	**-0.0262**	**-0.0326**	**-0.0325**	**0.0867**	**0.0527**	**0.1279**	**-0.0329**	**0.0602**	**0.0223**	**-0.0975**	**0.0455**	**0.0320**	**-0.0897**	1

TABLE 3 Relations between unconditional and conditional conservatism and cash flow downside risk

This table reports the estimation results for regressing subsequent cash flow downside risk against unconditional and conditional conservatism measures and other controls using the logit model and Fama–Macbeth cross-sectional regression model. Cash flow downside risk measures are *DOCF* in the logit model and *Rlpm_OCF* or *CFaR* in the Fama–Macbeth models. The unconditional and conditional conservatism metrics are *UC_PCA* and *CC_PCA,* respectively, in all models. The model specifications are provided in Eq. (7) in the text and variable definitions are presented in Appendix 2, respectively. *, **, and *** indicate significance at the 90 percent, 95 percent, and 99 percent confidence levels, respectively.

Independent Variables	**Logit Model for *DOCF***			**Fama–Macbeth Model for *Rlpm_OCF***			**Fama–Macbeth Model for *CFaR***		
	Model 1	**Model 2**	**Model 3**	**Model 4**	**Model 5**	**Model 6**	**Model 7**	**Model 8**	**Model 9**
Intercept	0.7236	0.6847	0.7610	0.7484	0.7621	0.7642	0.6268	0.6306	0.6396
	(4.47)***	(4.24)***	(4.68)***	(46.29)***	(49.7)***	(46.11)***	(18.71)***	(17.97)***	(19.56)***
UC_PCA_{it-1}	**-0.4812**		**-0.4507**	**-0.0270**		**-0.0158**	**-0.1252**		**-0.1154**
	(-5.22)***		**(-4.85)*****	**(-3.19)*****		**(-1.96)****	**(-11.38)*****		**(-10.10)*****
CC_PCA_{it-1}		**-0.1866**	**-0.1505**		**-0.0605**	**-0.0595**		**-0.0555**	**-0.0467**
		(-3.25)***	**(-2.60)*****		**(-14.99)*****	**(-16.49)*****		**(-11.89)*****	**(-10.30)*****
$\Delta Cash_{it-1}$	0.0085	0.0086	0.0084	-0.0111	-0.0044	-0.0047	0.0036	0.0077	0.0089
	(0.58)	(0.59)	(0.57)	(-1.17)	(-0.48)	(-0.54)	(0.58)	(1.17)	(1.39)
$Invest\_CAPX_{it-1}$	0.0278	0.0248	0.0277	-0.0038	0.0079	0.0108	-0.2989	-0.3087	-0.287
	(0.47)	(0.43)	(0.46)	(-0.16)	(0.33)	(0.47)	(-5.92)***	(-6.18)***	(-5.77)***
$Invest\_RD_{it-1}$	-7.7831	-8.1816	-7.7700	-0.7217	-0.7449	-0.7300	-0.6678	-0.7748	-0.675
	(-18.51)***	(-19.77)***	(-18.46)***	(-22.71)***	(-22.33)***	(-24.49)***	(-6.04)***	(-7.07)***	(-6.13)***
$Leverage_{it-1}$	1.1349	1.1675	1.1475	0.0729	0.0797	0.0794	0.1823	0.1917	0.1867
	(8.71)***	(8.95)***	(8.80)***	(15.24)***	(16.23)***	(16.09)***	(9.40)***	(10.19)***	(9.56)***
$Loss_{it-1}$	-0.2183	-0.218	-0.2158	-0.0124	-0.0118	-0.0113	0.0135	0.0141	0.0143
	(-3.35)***	(-3.33)***	(-3.30)***	(-2.30)**	(-2.10)**	(-2.04)**	(2.32)**	(2.35)**	(2.43)**
OO_{it-1}	-0.2865	-0.2777	-0.2679	-0.0220	-0.0159	-0.0157	-0.0462	-0.0417	-0.0411
	(-4.81)***	(-4.63)***	(-4.46)***	(-2.55)**	(-2.04)**	(-1.95)*	(-6.11)***	(-5.99)***	(-5.62)***
ROA_{it-1}	-4.1294	-4.3212	-4.1880	-0.4117	-0.4394	-0.4359	-0.0325	-0.0671	-0.0528
	(-14.80)***	(-15.33)***	(-14.92)***	(-18.59)***	(-17.30)***	(-18.23)***	(-0.43)	(-0.81)	(-0.67)
$Sigma_{it-1}$	-0.1871	-0.1875	-0.1798	-0.0198	-0.019	-0.0179	-0.1701	-0.1739	-0.1687
	(-2.10)**	(-2.10)**	(-2.01)**	(-2.69)***	(-2.52)**	(-2.50)**	(-10.79)***	(-10.51)***	(-10.35)***
$Size_{it-1}$	0.051	0.0471	0.0557	0.0024	0.0039	0.0041	-0.024	-0.0257	-0.0227
	(4.39)***	(4.07)***	(4.74)***	(1.47)	(2.61)**	(2.90)***	(-3.94)***	(-4.34)***	(-3.91)***
$Slack_{it-1}$	-0.0002	0.0017	0.0011	-0.0073	-0.0044	-0.0046	0.0077	0.0107	0.0101
	(-0.01)	(0.11)	(0.07)	(-2.43)**	(-1.49)	(-1.56)	(2.24)**	(2.65)**	(2.56)**
$Slack\_emp_{it-1}$	7.0804	6.953	7.0257	0.2968	0.257	0.2563	0.2409	0.1918	0.2025
	(5.00)***	(4.92)***	(4.97)***	(3.15)***	(3.20)***	(3.15)***	(0.89)	(0.76)	(0.78)
$CEO\_\ Delta_{it-1}$	-1.8426	-1.753	-1.8529	-0.1142	-0.1061	-0.1080	-0.0170	-0.0027	-0.0162
	(-4.05)***	(-3.86)***	(-4.06)***	(-5.86)***	(-5.54)***	(-5.55)***	(-0.78)	(-0.11)	(-0.68)
CEO_Vega_{it-1}	-0.008	-0.0075	-0.0076	-0.0174	-0.0168	-0.0173	-0.0024	-0.0026	-0.0024
	(-0.59)	(-0.55)	(-0.56)	(-0.96)	(-0.96)	(-0.96)	(-0.90)	(-0.96)	(-0.90)
Year and Ind. Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	28,425	28,425	28,425	28,425	28,425	28,425	27,018	27,018	27,018
Psuedo R-square	0.4855	0.4850	0.4856						
R-square				0.7892	0.7925	0.7932	0.3944	0.391	0.3972

TABLE 4 Maturity mismatch, customer bargaining power, and relations between unconditional and conditional conservatism and cash flow downside risk

This table reports the second- and third-stage estimation results for examining the effects of maturity mismatch and customer bargaining power on relations between unconditional and conditional conservatism and cash flow downside risk using a system of OLS regressions. Maturity mismatch and customer bargaining power are proxied by *Mismatch* and *Rsize*, respectively. The model specifications are detailed in Eqs. (8) to (10) in the text and variable definitions are presented in Appendix 2. *, **, and *** indicate significance at the 90 percent, 95 percent, and 99 percent confidence levels, respectively.

Independent Variables	Effects of Maturity Mismatch		Effects of Customer Bargaining Power	
	$Mismatch_{it}$	$Rlpm\_OCF_{it}$	$Rsize_{it}$	$Rlpm\_OCF_{it}$
Intercept	0.0769 (8.57)***	-0.0060 (-1.70)*	14.3700 (5.00)***	0.6394 (8.71)***
$Mismatch\_R_{it-1}$		0.0184 (3.75)***		
$UC\_PCA\_R_{it-1}*Mismatch\_R_{it-1}$		0.0221 (0.64)		
$CC\_PCA\_R_{it-1}*Mismatch\_R_{it-1}$		0.0031 (0.21)		
$Rsize\_R_{it-1}$				0.0006 (1.11)
$UC\_PCA\_R_{it-1}*Rsize\_R_{it-1}$				-0.0026 (-2.24)**
$CC\_PCA\_R_{it-1}*Rsize\_R_{it-1}$				-0.0157 (-2.97)***
$UC\_PCA\_R_{it-1}$	-0.0721 (-13.47)***	-0.0029 (-0.92)	-5.4600 (-0.77)	0.0538 (0.63)
$CC\_PCA\_R_{it-1}$	-0.0104 (-4.37)***	-0.0199 (-15.05)***	0.6390 (0.50)	-0.1259 (-7.25)***
$\Delta Cash_{it-1}$		-0.0000 (-0.02)		0.1549 (3.69)***
$Invest\_CAPX_{it-1}$		-0.0012 (-1.39)		0.0766 (0.82)
$Invest\_RD_{it-1}$		-0.5895 (-66.22)***		-0.6536 (-8.38)***
$Leverage_{it-1}$		0.0334 (11.77)***		0.2591 (5.45)***
$Loss_{it-1}$		-0.0081 (-5.60)***		0.0133 (0.82)
OO_{it-1}		-0.0296 (-22.95)***		0.0760 (2.45)**
ROA_{it-1}	0.0971 (12.09)***	-0.3507 (-58.25)***		-0.3879 (-5.91)***
$Sigma_{it-1}$		0.0027 (1.29)		-0.0664 (-1.85)*
$Size_{it-1}$	-0.0005 (-1.22)	0.0060 (25.41)***		-0.0096 (-1.91)*
$Slack_{it-1}$		0.0004 (1.59)		0.0006 (0.16)
$Slack\_emp_{it-1}$		0.0323 (4.17)***		0.1184 (0.55)
CEO_Vega_{it-1}	-0.0002 (-0.24)	-0.0005 (-1.46)		-0.0229 (-1.20)
CEO_Delta_{it-1}	-0.1324 (-7.00)***	-0.0539 (-5.32)***		0.0016 (-0.00)
CAP_{it-1}	-0.2835 (-64.78)***			
$Repo_{it-1}$	-0.0141 (-2.34)**			
$3M_{it-1}$	2.4366 (4.03)***			
Year and Ind. Dummies	Yes	Yes	Yes	Yes
Observations	27,631	23,800	908	819
R-square	0.2661	0.3476	0.1228	0.7579

TABLE 5 Corporate hedging and relations between unconditional and conditional conservatism and cash flow downside risk

This table reports the estimation results for examining relations of unconditional and conditional conservatism measure *UC_PCA* and *CC_PCA* with hedging in affecting cash flow downside risk proxied by *Rlpm_OCF*, using an extended three-stage Heckman (1979) model. The model specifications are provided in Eqs. (11) to (13) in the text and variable definitions are presented in Appendix 2. *, **, and *** indicate significance at the 90 percent, 95 percent, and 99 percent confidence levels, respectively.

Independent Variables	Extended Three-Stage Heckman (1979) Model			
	1st-stage *UC_PCA* Model	1st-stage *CC_PCA* Model	2nd-Stage Probit Model for *Hedger*	3rd-Stage Model for *Rlpm_OCF*
Intercept	0.0747 (9.86)***	0.4794 (26.24)***	-1.3732 (-14.16)***	0.6011 (27.39)***
UC_PCA$_{it-1}$	0.7234 (152.55)***			
CC_PCA$_{it-1}$		0.1596 (20.23)***		
UC_PCA_R$_{it-1}$			**-0.1587** **(-1.64)***	-0.0119 (-0.97)
CC_PCA_R$_{it-1}$			**0.0705** **(1.77)***	-0.0470 (-9.48)***
Hedger$_{it-1}$	**0.0170** **(7.20)*****	**0.0110** **(1.98)****		
Hedger$_{it-1}$*post$_{it-1}$				**-0.0108** **(-2.35)****
UC_PCA_R$_{it-1}$ *Hedger*post$_{it-1}$				**0.0580** **(2.31)****
CC_PCA_R$_{it-1}$ *Hedger*post$_{it-1}$				0.0069 (0.75)
Rlpm_OCF$_{it-1}$	-0.0612 (-14.94)***	-0.2712 (-27.53)***		
INT_BD$_{it-1}$			0.0041 (1.21)	
Invest_RD$_{it-1}$ *Leverage$_{it-1}$			3.9362 (2.11)**	
NOL$_{it-1}$			0.0045 (0.10)	
BAS$_{it-1}$			-10.1451 (-11.96)***	
ΔCash$_{it-1}$				-0.0028 (-1.52)
Invest_CAPX$_{it-1}$				0.0022 (1.07)
Invest_RD$_{it-1}$			-0.4089 (-1.23)	-0.7471 (-25.29)***
Leverage$_{it-1}$	0.0064 (0.90)	0.2454 (14.54)***	0.6895 (7.35)***	0.0662 (7.19)***
Loss$_{it-1}$				-0.0121 (-2.61)**
OO$_{it-1}$				-0.0062 (-1.52)
ROA$_{it-1}$	-0.1065 (-9.09)***	-0.3328 (-11.79)***	1.4424 (8.31)***	-0.4275 (-221.57)***
Sigma$_{it-1}$			-0.0848	-0.0130

			(-1.32)	(-2.02)**
***Size**it-1*	0.0048	0.0272	0.0441	0.0088
	(8.29)***	(19.75)***	(5.47)***	(9.26)***
***Slack**it-1*				0.0003
				(0.43)
***Slack_emp**it-1*				0.0160
				(0.80)
***CEO_ Delta**it-1*	0.0256	-0.1087	-1.7097	-0.2000
	(0.92)	(-1.65)*	(-4.82)***	(-5.89)***
***CEO_Vega**it-1*	0.0028	-0.0021	0.0446	0.0040
	(1.85)*	(-0.57)	(2.50)**	(2.11)**
***Post**it-1*				0.1036
				(5.66)***
***Mills**it-1*				0.0733
				(6.96)***
Year and Ind. Dummies	Yes	Yes	Yes	Yes
Observations	16,250	16,250	13,391	12,068
Pseudo R_square			0.1054	
R_square	0.6657	0.1441		0.7767

TABLE 6 Investor monitoring and relations between unconditional and conditional conservatism and cash flow downside risk

This table reports the estimation results for regressing subsequent cash flow downside risk on measures for unconditional and conditional conservatism, controlling for the effects of investor monitoring, such as blockholder monitoring, *GScore*; institutional investor monitoring, *Inst_Own*; and debtholder monitoring, *Mon_Debt*. The columns 1st-stage *UC_PCA* Model and 1st-stage *CC_PCA* Model report the results for OLS regressions of unconditional and conditional conservatism measures *UC_PCA* and *CC_PCA,* respectively, on lagged *GScore*, *Inst_Own*, *Mon_Debt*, and other controls. The residuals from these regressions, *UC_PCA_R* and *CC_PCA_R*, together with investor monitoring measures *GScore*, *Inst_Own*, and *Mon_Debt*, are used in the second-stage *Rlpm_OCF* regressions reported in the last three columns. The model specifications are provided in Eq. (7) in the text and variable definitions are presented in Appendix 2. *, **, and *** indicate significance at the 90 percent, 95 percent, and 99 percent confidence levels, respectively.

Independent Variable	**1st-stage *UC_PCA* Model**	**1st-stage *CC_PCA* Model**	**2nd-stage *Rlpm_OCF* Model**	**2nd-stage *Rlpm_OCF* Model**	**2nd-stage *Rlpm_OCF* Model**
Intercept	0.0601	0.2879	0.7075	0.7071	0.7060
	(2.59)***	(4.13)***	(19.22)***	(19.33)***	(19.28)***
$UC\_PCA\_R_{it-1}$			**-0.3636**		**-0.3251**
			(-1.97)***		**(-1.74)*****
$CC\_PCA\_R_{it-1}$				**-0.1483**	**-0.1309**
				(-2.45)**	**(-2.13)****
$UC\_PCA\_R_{it-1}*Gscore_{it-1}$			-0.0105		-0.0100
			(-1.07)		(-1.00)
$UC\_PCA\_R_{it-1}*Inst\_Own_{it-1}$			0.2043		0.2038
			(1.38)		(1.36)
$UC\_PCA\_R_{it-1}*Mon\_debt_{it-1}$			0.0920		0.0846
			(0.69)		(0.62)
$CC\_PCA\_R_{it-1}*Gscore_{it-1}$				-0.0025	-0.0019
				(-0.75)	(-0.56)
$CC\_PCA\_R_{it-1}*Inst\_Own_{it-1}$				0.0542	0.0409
				(1.05)	(0.78)
$CC\_PCA\_R_{it-1}*Mon\_debt_{it-1}$				0.0447	0.0424
				(1.08)	(1.01)
$Gscore_{it-1}$	0.0013	-0.0013	-0.0017	-0.0017	-0.0017
	(1.58)	(-0.52)	(-1.52)	(-1.59)	(-1.57)
$Inst\_Own_{it-1}$	**0.0233**	**0.0742**	-0.0167	-0.0184	-0.0174
	(1.83)*	**(1.96)****	(-0.96)	(-1.06)	(-1.00)
Mon_debt_{it-1}	0.0098	0.0451	0.0387	0.0376	0.0387
	(0.96)	(1.48)	(2.91)***	(2.84)***	(2.92)***
Other Controls	Yes	Yes	Yes	Yes	Yes
Observations	4,142	4,142	3,035	3,035	3,035
R-square	0.7096	0.0877	0.7992	0.8014	0.8018

TABLE 7 Alternative measures and relations between unconditional and conditional conservatism and cash flow downside risk

This table reports the estimation results for examining whether relations between unconditional and conditional conservatism and cash flow downside risk are robust to alternative measures for cash flow downside risk and unconditional and conditional conservatism. Panel A reports the results for alternative cash flow downside risk measures *Rlpm_OCFind*, *Rlpm_OCFzero*, *Rlpm_OCFpre*, *Rlpm_OCF2*, and *Rlpm_OCF3*. *DR_OCFind*, *DR_OCFpre*, and *DR_OCFzero* refer to the cash flow RRLPMs calculated by replacing the cash flow expectation model in (5) with the industry mean of cash flow in the previous year, the mean of firm-specific cash flow, and zero cash flow, respectively. *Rlpm_OCF2* is the natural logarithm of one plus the cash flow RLPM without deflating by the cash flow RUPM and *Rlpm_OCF3* refers to the natural logarithm of one plus the cash flow RLPM deflated by the standard deviation of cash flow. The unconditional and conditional conservatism measures in Panel A are *UC_PCA* and *CC_PCA*, respectively. Panels B to D report the results for alternative unconditional conservatism metrics that are component measures for *UC_PCA*—*UC_ACC*, *UC_BM*, and *UC_RES*—and for alternative conditional conservatism metrics that are component measures for *CC_PCA*—*CC_ACM*, *CC_ARA*, and *CC_CRA*. Panel E reports the results for the alternative conditional conservatism metrics *CC_Skew* and *CC_PCAA*. Cash flow downside risk measures are *DOCF* in the logit models in Panel B and *Rlpm_OCF* and *CFaR* in Panels C and D, respectively. The model specifications are provided in Eq. (7) in the text and variable definitions are presented in Appendix 2. *, **, and *** indicate significance at the 90 percent, 95 percent, and 99 percent confidence levels, respectively.

Panel A: Alternative *Rlpm_OCF*-based cash flow downside risk measures

Variables	Model 1: *Rlpm_OCFind*	Model 2: *Rlpm_OCFzero*	Model 3: *Rlpm_OCFpre*	Model 5: *Rlpm_OCF2*	Model 6: *Rlpm_OCF3*
Intercept	0.8882	0.8374	0.5892	0.5994	0.5299
	(56.48)***	(47.30)***	(14.28)***	(26.80)***	(24.28)***
UC_PCA_{it-1}	**-0.1643**	**-0.1756**	**-0.0677**	**-0.0359**	**-0.0811**
	(-17.99)***	**(-22.97)*****	**(-5.14)*****	**(-7.67)*****	**(-20.73)*****
CC_PCA_{it-1}	**-0.1771**	**-0.1899**	**-0.1693**	**-0.1165**	**-0.1136**
	(-52.49)***	**(-78.04)*****	**(-35.61)*****	**(-52.53)*****	**(-47.73)*****
Other Controls	Yes	Yes	Yes	Yes	Yes
Observations	22,456	22,456	22,456	28,425	28,425
R-square	0.5667	0.5449	0.1686	0.3725	0.3266

Panel B: Alternative conservatism measures in logit models for *DOCF*

Variables	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Intercept	0.7818 (4.75)***	0.8380 (5.07)***	0.7853 (4.78)***	0.7978 (4.84)***	0.8309 (5.04)***	1.0104 (5.91)***
UC_ACC_{it-1}	0.1516 (0.33)					
UC_BM_{it-1}		**-0.2542** **(-3.70)*****				
UC_RES_{it-1}			**-0.2924** **(-4.71)*****			
CC_ACM_{it-1}				**-0.6279** **(-2.79)*****		
CC_ARA_{it-1}					**-0.1620** **(-2.50)*****	
CC_CRA_{it-1}						**-0.3117** **(-4.38)*****
UC_PCA_{it-1}				-0.4418 (-4.77)***	-0.4386 (-4.73)***	-0.4604 (-5.00)***
CC_PCA_{it-1}	-0.1858 (-2.97)***	-0.1628 (-2.82)***	-0.1798 (-3.13)***			
Other Controls	Yes	Yes	Yes	Yes	Yes	Yes
Observations	28,425	28,425	28,425	28,425	28,425	28,425
R-square	0.4852	0.4856	0.4857	0.4859	0.4861	0.4858

Panel C: Alternative conservatism measures in Fama–MacBeth regressions for *Rlpm_OCF*

Variables	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Intercept	0.7679 (42.85)***	0.7752 (41.60)***	0.7755 (43.85)***	0.7694 (43.84)***	0.7713 (43.25)***	0.7774 (39.90)***
UC_ACC_{it-1}	**-0.1911** **(-3.58)*****					

Variables	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
UC_BM$_{it-1}$		-0.0044 (-0.76)				
UC_RES $_{it-1}$			**-0.0305** **(-2.83)*****			
CC_ACM $_{it-1}$				**-0.0221** **(-6.29)*****		
CC_ARA$_{it-1}$					**-0.0150** **(-4.44)*****	
CC_CRA$_{it-1}$						**-0.0812** **(-14.95)*****
UC_PCA$_{it-1}$				-0.0220 (-2.68)***	-0.0241 (-2.85)***	-0.0132 (-1.61)
CC_PCA$_{it-1}$	-0.0486 (-10.85)***	-0.0595 (-16.67)***	-0.0600 (-15.41)***			
Other Controls	Yes	Yes	Yes		Yes	Yes
Observations	28,425	28,425	28,425	28,425	28,425	28,425
R-square	0.7943	0.7940	0.7937	0.7906	0.7903	0.7960

Panel D: Alternative conservatism measures in Fama–MacBeth regressions for *CFaR*

Variables	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Intercept	0.6510 (17.13)***	0.6724 (17.88)***	0.6712 (17.46)***	0.6796 (18.49)***	0.6616 (15.11)***	0.6674 (16.84)***
UC_ACC$_{it-1}$	**-0.5526** **(-14.24)****					
UC_BM$_{it-1}$		**-0.0668** **(-8.94)*****				
UC_RES $_{it-1}$			**-0.1038** **(-2.21)****			
CC_ACM $_{it-1}$				**-0.0502** **(-11.56)****		
CC_ARA$_{it-1}$					-0.0008 (-0.08)	
CC_CRA$_{it-1}$						**-0.0261** **(-3.66)*****
UC_PCA$_{it-1}$				-0.1093 (-11.47)***	-0.1171 (-11.77)***	-0.1121 (-10.96)***
CC_PCA$_{it-1}$	-0.0211 (-4.91)***	-0.0494 (-13.28)***	-0.0534 (-14.07)***			
Other Controls	Yes	Yes	Yes	Yes	Yes	Yes
Observations	27,018	27,018	27,018	27,018	27,018	27,018
R-square	0.4017	0.3993	0.3986	0.4011	0.3990	0.3998

Panel E: *CC_Skew* and *CC_PCAA* as alternative conditional conservatism measures

Variables	Logit Models for *DOCF*		Fama MacBeth Models for *Rlpm_OCF*		Fama MacBeth Models for *CFaR*	
	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2
Intercept	0.8718 (5.74)***	0.9115 (5.94)***	0.7594 (37.80)***	0.7546 (36.86)***	0.8303 (10.89)***	0.8181 (10.37)***
CC_Skew$_{it-1}$		0.0271 (0.44)		**-0.0677** **(-3.66)*****		**-0.1261** **(-4.66)*****
CC_PCAA$_{it-1}$	-0.0770 (-1.36)		**-0.0779** **(-5.89)*****		**-0.0783** **(-7.36)*****	
UC_PCA$_{it-1}$	**-0.4568** **(-4.92)*****	**-0.4874** **(-5.26)*****	-0.0070 (-0.85)	**-0.0149** **(-1.76)***	**-0.1036** **(-15.98)*****	**-0.1014** **(-17.34)*****
Other Controls	Yes	Yes	Yes	Yes	Yes	Yes
Observations	28,425	28,425	28,425	28,425	24,554	24,554
Psuedo R-square	0.4857	0.4857				
R-square			0.7955	0.7924	0.4258	0.4271