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Institutional dual holdings and expected crash risk: Evidence from mergers between lenders and equity holders

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Abstract

Exploiting mergers between lenders and shareholders of the same firm as an exogenous shock to shareholder–creditor conflicts, we examine the causal effect of these conflicts on firms' ex ante expected stock price crash risk evident in the options implied volatility smirk. The decrease in conflicts of interest between lenders and shareholders induces dual holders to encourage the disclosure of more information to alleviate costly information asymmetry with other investors and better execute their oversight role in constraining managers' bad news suppression. Consistent with expectations, we find that a firm's ex ante expected crash risk declines after a shareholder–creditor merger. We also report strong, robust evidence that the negative impact of mergers on firms' expected crash risk increases when institutional investors or lenders have a greater stake in the treatment firms or when shareholder–creditor conflicts are apt to be exacerbated. Additionally, we document that firms issue management earnings forecasts (especially bad news forecasts) more frequently after these mergers. Finally, we find that expected crash risk decreases more after mergers in firms suffering worse information asymmetry and with weak monitoring mechanisms. Our evidence suggests that option market participants value the dual holder's role in deterring managers' bad news hoarding.

KEYWORDS
bad news hoarding, dual holding, expected crash risk, monitoring, shareholder–creditor conflicts

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Double détention institutionnelle et risque de krach anticipé : données sur les fusions entre prêteurs et détenteurs d'actions

Résumé

En utilisant les fusions entre prêteurs et actionnaires d'une même entreprise comme un choc exogène sur les conflits entre actionnaires et créanciers, les auteurs examinent le lien de causalité entre ces conflits et le risque de krach boursier anticipé par les entreprises, mesuré par le *smile* de volatilité implicite des prix des options. La réduction des conflits d'intérêts entre prêteurs et actionnaires incite les détenteurs doubles à favoriser une meilleure communication d'informations pour réduire l'asymétrie des informations (et ses couts) avec d'autres investisseurs, renforçant ainsi leur rôle de surveillance en limitant la dissimulation des mauvaises nouvelles par les gestionnaires. Conformément à leurs hypothèses, les auteurs constatent une diminution du risque de krach anticipé par une entreprise après une fusion entre actionnaires et créanciers. Ils présentent aussi des données solides montrant que l'impact négatif des fusions sur le risque de krach anticipé par les entreprises est plus important lorsque les investisseurs institutionnels ou les prêteurs détiennent une participation plus importante dans les entreprises concernées, ou lorsque les conflits entre actionnaires et créanciers sont susceptibles d'être exacerbés. En outre, les entreprises établissent plus fréquemment des prévisions de résultats de la direction (notamment de mauvaises nouvelles) après de telles fusions. Enfin, les résultats indiquent une plus forte diminution du risque de krach anticipé après les fusions dans des entreprises présentant une asymétrie des informations plus marquée et des mécanismes de contrôle moins solides. Ces données suggèrent que les participants au marché des options reconnaissent l'importance du détenteur double dans la prévention de la dissimulation des mauvaises nouvelles par les gestionnaires.

MOTS-CLÉS

conflits entre actionnaires et créanciers, contrôle, dissimulation de mauvaises nouvelles, double détention, risque de krach anticipé

JEL CLASSIFICATION

G12, G21, G23, G32, G34

1 | INTRODUCTION

In a Modigliani-Miller world, capital structure is irrelevant to firm value. However, in reality, the different payoff structures for debtholders and shareholders raise conflicts of interest. This is because the former bear downside credit risk but do not participate in the upside payoff,

whereas the latter enjoy the residual profits and are more risk-seeking (i.e., the asset substitution problem). It has become increasingly common for institutional investors to hold both equity and debt in the same firm (i.e., to be dual holders) (Jiang et al., 2010). Emerging research provides insights on the impact of incentive misalignment between shareholders and creditors in equity-debt dual holding firms. Jiang et al. (2010) and Chava et al. (2019) propose that dual ownership—the simultaneous holding of equity and debt claims of the same firm—better aligns shareholder–creditor objectives, which manifests in cheaper borrowing costs and less frequent use of capital expenditure restrictions in loan contracts. However, Ferreira and Matos (2012) find that, although bank dual holders charged lower loan spreads during the 2007–2008 financial crisis, they charge higher spreads during credit booms to extract rents from their information monopoly. Additionally, Gilje (2016) reports that firms suffering financial distress take less investment risk when there are more severe shareholder–creditor conflicts, as evident in exogenously increased leverage. Collectively, prior research remains inconclusive on how shareholder–creditor conflicts affect firm risk-taking behavior and the role that monitoring structures play in shaping this relation.

We provide empirical evidence on these issues by focusing on how the reduction in conflicts of interest between lenders and shareholders strengthens dual holders' monitoring and induces them to lower information asymmetry with other investors. More specifically, we analyze whether dual holding affects managers' incentives to suppress negative information and, in turn, the firm's ex ante stock price crash risk. Extant research contends that crash risk arises from opportunistic information management (J. B. Kim et al., 2011; J. B. Kim & Zhang, 2016) because managers have incentives to hoard bad news (Baginski et al., 2018), which gradually accumulates until it is released all at once, causing a sudden, sharp drop in stock price. We expect that dual holders' monitoring incentives and disclosure preferences influence management's bad news hoarding activities that result in ex ante crash risk. However, injecting tension into our analysis, prior research suggests that it is difficult to form a directional prediction on the relation between dual holding and expected crash risk.

On the one hand, dual holdings may lessen ex ante crash risk. Lenders that also hold equity in the firm experience fewer shareholder–creditor conflicts given their dual interests in the firm. Dual holders may be more eager to devote resources to monitoring and securing higher quality information from the investee firms (Boot, 2000; Diamond, 1984; Jiang et al., 2010), which narrows the scope for managers to suppress negative information. Alternatively, through their loan granting and monitoring activities, lenders enjoy privileged access to private information from the borrowing firm. Consequently, dual holders have an information advantage over other equity investors (Dass & Massa, 2011; Rajan, 1992; Sharpe, 1990), which, in turn, widens information asymmetry. To avoid the costly effects of information asymmetry between investors (e.g., lower liquidity and higher cost of capital), managers may refrain from bad news hoarding and provide more information to the market.

On the other hand, dual holdings may increase ex ante crash risk. Given their private access to inside information on borrowers, banks are in a better position to acquire an information monopoly and erect information barriers for other stakeholders (Dass & Massa, 2011; Rajan, 1992; Sharpe, 1990; Vashishtha, 2014). In the event that a bank simultaneously holds both equity and debt, it may have stronger incentives and abilities to increase the information asymmetry between other lenders/shareholders and the borrowing firm in order to extract private benefits (Ferreira & Matos, 2012). Indeed, prior research implies that trading profits stemming from private information are larger in an opaque corporate information environment (Maffett, 2012). Accordingly, dual holders may pressure firm managers to reduce bad news disclosure, which could undermine dual holders' information advantage. It follows that the increased bad news hoarding will lead to higher investor-perceived crash risk (Hutton et al., 2009; Jin & Myers, 2006; J. B. Kim et al., 2016; J. B. Kim & Zhang, 2014).

These competing arguments reveal that it is theoretically unclear which forces dominate in shaping the role that dual holding plays in ex ante crash risk. Empirically, this link is also subject to the concern that dual holding may be endogenously determined. In confronting this threat to reliable identification, we provide direct causal evidence on the impact of dual holding on ex ante crash risk by exploiting mergers between lending banks and institutional investors of the same firm (Chu, 2018). Importantly, we also evaluate whether increased disclosure and enhanced monitoring are channels through which dual holding impacts expected crash risk. Rather than focusing on ex post crash risk, we analyze investors' subjective assessment of future stock price crash risk because their fear of a steep price drop was a major factor driving the 2007–2008 financial crisis.[1] Reflecting the relevance of our research question, stock price crashes have risen sharply in the past two decades (Callen & Fang, 2013; Hutton et al., 2009). In addition, extensive prior work implies that investors perceive that extreme equity market outcomes play an integral role in their welfare (e.g., Pan, 2002; Yan, 2011).

We closely follow Chu (2018) in assembling a sample of treatment firms and matched control firms using a manually collected shareholder–creditor merger sample. The matched sample based on dual holder merger events allows us to undertake a differences-in-differences (DiD) analysis of the impact of shareholder–creditor mergers on expected crash risk. In a DiD regression framework, we find that the expected crash risk of the treatment firms declines after the merger between a firm's institutional investors and lenders, compared with the matched control firms. The reduction in expected crash risk is also economically material: for our sample, treatment firms' expected crash risk falls by, on average, 0.013 (which is 22.8% of the mean value for the treatment firms before the merger) after shareholders and lenders merge. Our evidence suggests that dual holding is expected to help constrain managers from hoarding bad news.

The validity of our DiD regression design hinges on the parallel trends assumption; that is, the dependent variable (i.e., expected crash risk) exhibits parallel trends in the absence of treatment (i.e., the mergers between shareholders and creditors). Although assembling matched control firms is constructive for ensuring that this assumption is justified (Roberts & Whited, 2013), we implement a dynamic analysis to further validate the parallel trends assumption. We find that the levels of expected crash risk are similar between treatment and matched control firms in each of the 2 years prior to the merger, providing some assurance that the parallel trends assumption is satisfied in our setting. However, the expected crash risk of treatment firms decreases relative to that of the matched control firms in each of the 3 years after the merger.

Next, we perform several cross-sectional tests to deepen our understanding of the role of information suppression. First, we find that the negative impact of mergers on firms' expected crash risk increases when the stakes that institutional investors or lenders hold in the treatment firms are higher. In these cases, mergers magnify the monitoring incentives and information advantage of the two merging parties. Second, supporting the intuition that the decrease in expected crash risk after the mergers stems from a reduction in shareholder–creditor conflicts, we document that the impact of dual holding on expected crash risk is stronger when shareholder–creditor conflicts are exacerbated, as evident in the firm suffering worse financial distress. Third, supporting the prediction that managers focus more intently on reducing their bad news hoarding after mergers between shareholders and creditors when other equity investors perceive higher information asymmetry, the negative impact of mergers on expected crash risk is stronger for firms operating in a worse information environment, as evident in a larger

[1]Prior work suggests that expected stock price crash risk differs from realized stock price crash risk in several important respects (Ak et al., 2016; J. B. Kim et al., 2016, 2019; J. B. Kim & Zhang, 2014; Santa-Clara & Yan, 2010). Expected crash risk is estimated based on investors' forward-looking perceptions about a firm's future crashes evident in the options implied volatility smirk, whereas realized stock price crash risk captures the ex post distribution of stock returns. Although there are several advantages to focusing on ex ante crash risk, we verify in Appendix S1 (see the Supporting Information) that our core inferences hold when we focus on ex post realized stock price crash risk.

bid-ask spread, more divergent analyst earnings forecasts, and less frequent 8-K filings. In addition, we directly establish the increased disclosure channel by measuring the impact of dual holding on the frequency and tone of management earnings forecasts. We find the number of earnings forecasts (especially bad news forecasts) increases after the mergers, suggesting an increase in bad news disclosure. Fourth, we report that the importance of mergers for reducing expected crash risk is greater for mergers in which the merging lender is a lead arranger or a non-commercial bank as well as in poorly governed firms, as evident in the absence of an independent board or audit committee, lower takeover threats, and lower institutional ownership. This latter finding suggests that dual holders play a cross-monitoring role in constraining managers' bad news hoarding activities.

We contribute to extant research in several ways. First, we rely on the quasi-natural experiment of financial institution mergers to explore the impact of dual holding on expected crash risk. We report causal evidence that dual holding mitigates managers' negative information suppression that manifests in firms' ex ante crash risk. We also extend recent work on the dual holders' portfolio value. Jiang et al. (2010) report that firms with a non-bank dual holder are more likely to enjoy cheaper and uninterrupted access to financing. Chu (2018) shows that borrowing firms with dual holders experience lower payouts. By focusing on how investors assess dual ownership as evident in the options implied volatility smirk, our evidence suggests that option market participants value the dual holder's role in deterring managers' bad news hoarding.

Second, our study also adds to a growing stream of research on ex ante stock price crash risk. Most prior research on stock price crash risk focuses on realized (or ex post) crash risk (An & Zhang, 2013; Callen & Fang, 2015; Hutton et al., 2009; Jin & Myers, 2006; J. B. Kim & Zhang, 2016). Recently, researchers have begun to pay more attention to investors' perceived ex ante crash risk (Ak et al., 2016; Jackwerth & Rubinstein, 1996; J. B. Kim et al., 2016, 2019; J. B. Kim & Zhang, 2014; Santa-Clara & Yan, 2010). Ex ante crash risk is quite different from the ex post realized distributions of stock returns because extreme negative returns are rare events and do not capture all risks rationally expected by market participants (Ak et al., 2016; Jackwerth & Rubinstein, 1996; Santa-Clara & Yan, 2010).[2] Because we examine the dual holder's role in constraining managers' information hoarding activities, our evidence also contributes to the strand of research linking disclosure and analyst earnings forecasts to ex ante stock price crash risk (DeFond et al., 2014; J. B. Kim et al., 2016).

Finally, we provide evidence implying that dual holders play an oversight role in restricting managers from hoarding bad news, which substitutes for monitoring structures—such as independent boards, independent audit committees, larger takeover threats from the market for corporate control, and higher institutional ownership—known to constrain firms from distorting their financial reports. By documenting that dual holders are another governance mechanism that disciplines managers against suppressing information, we advance research on firms' governance structures (Abbott et al., 2004; Carcello & Nagy, 2004; Jayaraman & Milbourn, 2015; J. B. Kim et al., 2019; Shleifer & Vishny, 1986; Zhao & Chen, 2008).

2 | MOTIVATION

Against the backdrop of no prior study providing causal evidence on how lender–shareholder mergers affect investors' crash risk perceptions, we outline the potential connections between dual holdings and ex ante stock price crash risk from two competing perspectives: merged dual

[2]As detailed in Appendix S1, several unique advantages come with examining ex ante crash risk. By investigating the impact of an exogenous shock to firms' dual holding status on expected crash risk, we can develop a better understanding of how changes in shareholder–creditor conflicts shape investors' forward-looking perceptions about a firm's future crashes, irrespective of how unlikely they are to materialize.

holders constrain information suppression and merged dual holders increase information suppression.

2.1 | Merged dual holders constrain information suppression

Seminal theoretical work contends that the objectives of a firm's shareholders and creditors diverge from one another (Jensen & Meckling, 1976; Leland, 1994; Myers, 1977). This divergence is often reflected in their differing preferences toward risky firm investments. Creditors have a fixed claim on firm value, whereas equity holders have a residual claim. Shareholders, or managers acting on their behalf, have incentives to extract wealth from creditors by taking more risks, which is commonly labeled the asset substitution problem. Creditors tend to impose constraints on excessive firm risk-taking to prevent shareholders from diverting corporate assets.

Emerging research investigates how conflicts of interest between shareholders and creditors shape firm risk-taking by examining creditors' simultaneous equity holding in the borrowing firm. Jiang et al. (2010) argue that dual ownership mitigates shareholder–creditor conflicts, as evident in lower loan yield spreads at firms with dual holders. Consistent with Jiang et al. (2010), Chava et al. (2019) demonstrate that simultaneous institutional holdings of debt and equity in the same firm reduce the likelihood of lenders constraining borrowers by requiring a capital expenditure restriction covenant in loan contracts. Yang (2021) finds that dual ownership prompts managers to reduce excessive risk-taking, as evident in fewer but more valuable patents generated by the firm. However, diverging from Jiang et al. (2010), Chava et al. (2019), and Yang (2021), Ferreira and Matos (2012) report evidence that borrowers with dual holdings pay higher loan spreads during credit booms, although they paid lower spreads during the 2007–2008 financial crisis. Moreover, in exploiting exogenous shocks to leverage as a proxy for shareholder–creditor conflicts, Gilje (2016) shows that decreased conflicts between shareholders and creditors increase, rather than reduce, risky firm investments.

Our analysis extends prior research on dual ownership by utilizing mergers between bank lenders and institutional shareholders as an exogenous shock to the borrowing firm's dual holding status. Informing the debate on how shareholder–creditor conflicts affect real corporate decisions (Chava et al., 2019; Chu, 2018; Jiang et al., 2010), we explore whether a decrease in conflicts of interest between lenders and shareholders strengthens dual holders' monitoring incentives and shifts their disclosure preferences, which, in turn, influences investors' perceptions of crash risk. As such, we focus on managers' information withholding decisions that shape option market investors' perceived ex ante crash risk.

A shareholder–creditor merger could lead to lower expected crash risk because dual holders with reduced agency conflicts can better discipline managers against hoarding bad news. This disciplining stems from their stronger monitoring incentives and preferences for providing more disclosure to alleviate costly information asymmetry with other investors. First, decreased conflicts of interest between lenders and shareholders and their double stakes will strengthen merging lenders' and shareholders' incentives to invest in producing information (Boot, 2000) and better executing their oversight role to improve firms' information environment; for example, by constraining managers' bad news hoarding. They are also in a better position to improve firms' information environments because either the merging bank or the institutional investor likely possesses superior information about the borrowing firm. As such, the merged dual holder enjoys an information advantage. Collectively, the intuition that merged dual holders with fewer agency conflicts can better monitor and discipline managers' information suppression incentives imply a decrease in ex ante stock price crash risk.

Second, after banks merge with an institutional shareholder to become dual holders, they are likely to be better informed than other equity investors, given that they secure privileged

information through their loan initiation and monitoring activities. The resulting information advantage is detrimental to other capital market participants as well as to the affected firms. When market makers know that they are trading with investors who have private information, they will increase the bid-ask spread to protect themselves from informed trading (Glosten & Milgrom, 1985; Kyle, 1985). Larger bid-ask spreads increase the trading costs for other market participants and reduce their incentives to trade, which, in turn, reduces liquidity and increases financing costs. In order to narrow the information asymmetry among investors that accompanies dual holding, firms may disclose more information (e.g., decrease bad news hoarding), improve liquidity, and lower the cost of capital (Armstrong et al., 2010; O. Kim, 1993). This line of reasoning predicts a negative relation between dual holding and expected stock price crash risk.

2.2 | Merged dual holders increase information suppression

However, in contrast to the reasoning above, when dual holders have incentives to leverage their information advantage and trade based on private information elicited through lending activities, they may pressure the firm to reduce transparency by refraining from disclosing bad news. Banks have privileged information about the borrowing firm that they can exploit at the expense of other market participants. Dass and Massa (2011) show that bank inside information increases adverse selection for other market participants, which widens information asymmetry and lowers stock liquidity for the borrowing firm. Vashishtha (2014) reports that stricter bank monitoring after covenant violations reduces firm disclosure, which enhances incumbent banks' private information set and allows them to better protect their profits from competing lenders. In a lender–shareholder merger, the merging institutional investors normally hold large equity stakes and are thus likely to be better informed than other stakeholders. In fact, institutional investors wield major influence over firms' disclosure decisions (Park et al., 2019).[3] When the merging equity holder's information superiority is combined with the lending bank's information privilege, the merged dual holder could widen its information advantage over other market participants, securing an information monopoly that undermines transparency. In support of this conjecture, Ferreira and Matos (2012) find that banks with equity holdings in the borrowing firm intentionally raise information barriers to other lenders and arrange more favorable loan terms for themselves. Consequently, dual holders may encourage managers to hoard bad news, aiming to secure private gains at the expense of other creditors and investors. These arguments imply a positive relation between dual holding and expected crash risk.

Given the opposing predictions above, the relation between lender–shareholder mergers and ex ante crash risk is an empirical question. We formulate our first hypothesis in the null and examine which explanation dominates:

> **Hypothesis 1 (H1).** Mergers between shareholders and creditors of the same firm do not change firms' ex ante stock price crash risk.

2.3 | Dual holder's monitoring role, agency conflicts, and the information environment

The link between shareholder–creditor mergers and firms' ex ante crash risk, if any, may vary systematically with the dual holder's monitoring capacity and incentives, firms' agency

[3]Del Guercio and Hawkins (1999) and McCahery et al. (2016) highlight that large institutional investors actively influence firm policy through private communications with management, board member elections, and shareholder proposals. Other studies argue that institutional investors' exit threats (i.e., threats to sell shares and drive down share prices) may be an effective mechanism for influencing corporate decisions (Bharath et al., 2013; Edmans & Manso, 2011; Gallagher et al., 2013).

conflicts, and the information environment. To the extent that the dual holder's monitoring capacity and incentives are stronger when the merging institutional investor or lender holds a large stake, we expect any observed relation to vary with the merging institutional investor's or lender's stakes in the treatment firm. This is the rationale behind our next hypothesis:

> **Hypothesis 2a (H2a).** The relation between shareholder–creditor mergers and firms' ex ante stock price crash risk varies with the merging institutional investor's and lender's pre-merger stakes.

One alternative leading to our main hypothesis is that the reduction in shareholder–creditor conflicts after the mergers motivates dual holders to encourage more transparency and constrain bad news hoarding activities. If a decrease in shareholder–creditor conflicts underlies any negative relation between dual holding and expected crash risk, we expect the observed relation to be sensitive to agency conflicts embedded in the treatment firm. This leads to our next hypothesis:

> **Hypothesis 2b (H2b).** The relation between shareholder–creditor mergers and firms' ex ante stock price crash risk varies with pre-merger shareholder–creditor conflicts.

If the alternative where information suppression is constrained holds, the impact of mergers on firms' expected crash risk would be concentrated among firms with a worse pre-merger information environment. This is because the mergers induce creditors to invest more in information gathering such that they are in a better position to impose stricter oversight in constraining managers from hiding bad news. In contrast, if the alternative where information suppression is increased holds, the impact of mergers on firms' expected crash risk would be larger for firms with a better pre-merger information environment. After the mergers, when the dual holders are more able to leverage their information advantage, they may pressure managers to reduce information transparency in order to secure an information monopoly, magnifying the impact of mergers on expected crash risk. Therefore, we develop this hypothesis conditional on the pre-merger information environment:

> **Hypothesis 2c (H2c).** The relation between shareholder–creditor mergers and firms' ex ante stock price crash risk varies with the pre-merger information environment.

Finally, a prediction under the alternative where information suppression is constrained is that dual holders enjoy an information advantage over other equity investors, who will naturally price-protect against better informed dual holders. As such, mergers between lenders and shareholders will induce dual holders to encourage the disclosure of more information to narrow costly information asymmetry with other investors. Furthermore, merged dual holders with fewer agency conflicts can better monitor and discipline managers' bad news hoarding activities. Accordingly, we evaluate this increased disclosure channel in our final hypothesis, stated in alternative form:

> **Hypothesis 2d (H2d).** Firms provide more disclosure (especially bad news) after shareholder–creditor mergers.

2.4 | The monitoring effects of lead arrangers and non-commercial banks, and the moderating role of other governance structures

Lead arrangers in syndicated loans are known to play a larger role than other participating lenders, that routinely delegate screening and monitoring responsibilities to the lead arranger

(Ivashina, 2009; Sufi, 2007). Prior research also documents that equity holdings of non-commercial banks originate from active investment, whereas equity holdings of commercial banks often originate from their fiduciary capacity in trust accounts (Chava et al., 2019; Jiang et al., 2010). Commercial banks ordinarily lack strong monitoring incentives, relative to non-commercial banks (Holmstrom & Tirole, 1997). It follows that the monitoring incentives of the dual holders will be stronger for mergers in which the merging lender is either a lead arranger or a non-commercial bank. The alternative where information suppression is constrained implies that the role that shareholder–lender mergers play in shaping expected crash risk could work through increased monitoring after mergers. Accordingly, any observed relation should vary with whether the merging lender is a lead arranger or a non-commercial bank. This leads to our next hypothesis:

> **Hypothesis 3a (H3a).** The relation between shareholder–creditor mergers and firms' ex ante stock price crash risk varies with whether the merging lender is a lead arranger or a non-commercial bank.

Shareholders, creditors, and other stakeholders of the same firm rely on various economic agents to alleviate agency problems arising from the divergent interests of the different parties (Jensen & Meckling, 1976). Prior evidence implies that firms' monitoring mechanisms, such as an independent board and audit committee, larger takeover threats from the market for corporate control, and higher institutional ownership, play major roles in mitigating agency issues by narrowing information asymmetry (Abbott et al., 2004; J. B. Kim et al., 2011; Shleifer & Vishny, 1986; Zhao & Chen, 2008). We expect these governance structures to moderate managers' incentives to withhold information. Under the alternative where information suppression is constrained, a shareholder–creditor merger limits the scope for managers to hide bad news. We expect that this impact would be concentrated among poorly governed firms given that strict monitoring prevents managers from hoarding bad news in the first place. In comparison, the alternative where managers are pressured to suppress information predicts that stock price crash risk will increase after shareholders merge with creditors because of the creditors' superior information advantage. This impact would be intensified in the presence of lax governance structures. As such, our final hypothesis reflects a moderating effect of a firm's monitoring mechanisms:

> **Hypothesis 3b (H3b).** The relation between shareholder–creditor mergers and firms' ex ante stock price crash risk varies with firms' governance (i.e., board independence, audit committee independence, takeover threats, and institutional ownership).

3 | SAMPLE CONSTRUCTION AND REGRESSION MODEL

3.1 | Sample construction

Our sample construction involves two main steps. In the first step, we follow Chu (2018) by assembling a comprehensive sample of mergers between shareholders and creditors of the same firm. We begin by extracting all completed mergers between financial firms from the Securities Data Company (SDC) M&A database from 1996 through 2018. Our merger sample starts in 1996 when the OptionMetrics database that we require to derive the expected crash risk measure became available. Our merger sample ends in 2018, reflecting data availability when we began to compile the sample. To ensure that mergers significantly reduce the incentive misalignment between shareholders and creditors, we require that the acquirer controls less than 50% of the target's shares prior to the announcement and owns 100% of the target's shares after

the merger deal (Masulis et al., 2007).[4] Afterward, we extract lender information (lender name, address, and parent name) from the DealScan database. We then match lender names or lender parent names from DealScan with either SDC acquirer names or SDC target names using computer algorithm matching and manual screening. To facilitate accurate matching, we also rely on the addresses of lenders, acquirers, and targets. After applying this procedure, we retain SDC mergers with either the acquirer or the target that are matched to a lender from DealScan. Next, we extract institutional investor information from the Thomson Reuters 13F database. Unmatched acquirer or target names (and their parent names) of SDC mergers from the previous step are then matched with institutional investors' names. Finally, we arrive at a sample of 1,065 mergers between 13F institutional investors and DealScan lenders.

In the second step, we construct a sample of treatment firms and matched control firms. To identify treatment firms, we start with all firm-year observations from the Compustat universe. The treatment firms are those with at least 1% of shares outstanding that are held by the merging institutional investor at the end of the quarter immediately before the merger and that borrow more than 10% of the loan at origination from the merging lender (and the loan is still outstanding at the time of the merger). We impose these two thresholds to ensure that the merger significantly reduces shareholder–creditor conflicts (Jiang et al., 2010).[5] We follow Chu (2018) by excluding firms with dual holders prior to the merger, retaining the first merger if there are multiple ones, excluding firms that experience another merger in less than 3 years, excluding financial and utility firms, and excluding firms with missing key variables 1 year before or after the merger. Next, for each treatment firm, we identify one propensity score matched (PSM) control firm in the same industry. The covariates adopted in the matching model consist of institutional ownership (*INSTOWN*), the market-to-book ratio (*MB*), leverage (*LEV*), firm size (*ASSETS*), stock return (*STOCK_RET*), ROA (*ROA*), a common ownership dummy (*COMMON_DUM*), and industry affiliation.[6] We match control firms based on institutional ownership and leverage because treated firms, by construction, are owned by institutional investors and have debt in their capital structures. We match control firms based on the market-to-book ratio, firm size, the stock return, and profitability because they are determinants of expected crash risk. Given that prior work implies that common ownership is related to a firm's information environment, we include a dummy variable for common institutional ownership in the matching (Li et al., 2022; Park et al., 2019; Ramalingegowda et al., 2021). We also match on industry to ensure that the matched control firms run similar businesses as the treatment firms. Additionally, the matched control firms should have bank loans outstanding at the time of the mergers, should have never been treated, and should not be dual holders during fiscal years [−3, 3] surrounding the mergers. After matching, we obtain a final sample of 318 treatment firms from 35 mergers during 1996 through 2018. The yearly distribution of the number of mergers and treatment firms is reported in Panel A of Table 1, and the distribution of treatment firms across one-digit SIC industries is reported in Panel B.[7]

[4]Our core inferences are insensitive to not imposing this criterion. Similar to Chu (2018), we focus on lenders but not bondholders because atomistic corporate bondholders are less likely to engage in monitoring given that they are more dispersed and fluid than lenders.

[5]Although these design choices closely follow prior research, we verify that our main inferences hold when we apply 20% for the bank loan or 2% for equity holding as alternative thresholds.

[6]Control firms are first matched with treatment firms by two-digit SIC industry. For unmatched treatment firms, we next match by one-digit SIC industry. The caliper used in the propensity score matching process is 0.2. This retains a large matched sample while reducing the differences between treatment and matched control firms. Our inferences are insensitive to relying on alternative calipers (e.g., 0.1 or 0.3). Similarly, we report in Table SA2 in Appendix S2 that our inferences are robust to implementing the matching after replacing two-digit SIC industries with Fama-French 30 or 48 industries. Additionally, inferences from our main regression results hold if we adopt alternative sets of matching variables including (1) *INSTOWN*, *MB*, *LEV*, and *ASSETS*; (2) *INSTOWN*, *MB*, *LEV*, *ASSETS*, and *ROA*; or (3) *INSTOWN*, *MB*, *LEV*, *ASSETS*, and *STOCK_RET*. We report the results of these robustness checks in Table SA2 in Appendix S2.

[7]In Table SA2 in Appendix S2, we verify that our main inferences persist after excluding merger events in 2010, which contribute about one third of the observations to the treatment sample.

TABLE 1 Distribution of mergers and treatment firms.

Panel A: Distribution of mergers and treatment firms by merger year

Year	Number of mergers	Number of treatment firms
1996	2	9
1997	6	6
1998	3	49
1999	3	3
2000	1	10
2002	1	2
2003	3	37
2004	1	12
2005	1	2
2006	1	2
2008	3	59
2009	5	11
2010	1	106
2011	1	1
2012	1	1
2016	1	5
2018	1	3
Total	35	318

Panel B: Distribution of treatment firms by one-digit SIC industry

One-digit SIC code	Included industries	Number of treatment firms	Percentage (%)
1	Mining and construction	17	5.35
2	Food, tobacco, textile mill, apparel, and lumber and wood products; furniture and fixtures; paper, printing, publishing, and chemical products; petroleum refining, and so forth	64	20.13
3	Rubber and plastic products; leather, stone, clay, glass, concrete, and metal products; machinery, electronic and electrical equipment; transportation equipment, measuring, analyzing, and controlling instruments, and so forth	126	39.62
4	Transportation, communications, electric, gas, and sanitary services	18	5.66
5	Retail and wholesale trade	46	14.47
7	Hotels, personal and business services; automotive repair services; motion pictures, amusement and recreation services, and so forth	44	13.84
8	Health, legal, educational, and social services; museums, art galleries, botanical and zoological gardens; membership organizations; engineering, accounting, research, and management services; private households, and so forth	3	0.94

Note: Panel A reports the yearly distribution of the number of mergers and treatment firms in our final sample. Panel B shows the distribution of treatment firms across one-digit SIC industries. The sample construction procedure closely follows Chu (2018). We require both treatment and control firms to have nonmissing key variables 1 year before and 1 year after the merger. The final sample consists of 35 mergers and 318 treatment firms from 1996 through 2018.

We follow Chu (2018) by specifying a testing window of 6 years, spanning from 3 years before the mergers to 3 years afterward, with the merger years excluded for both treatment and control firms to facilitate clean identification. We require available observations in years −1

and 1 around the mergers for both treatment and control firms.[8] There are 3,351 firm-year observations in our matched sample.

3.2 | Measuring firm-specific expected crash risk

The implied volatility derived from the Black-Scholes option pricing model is based on the prevailing market price of the option. The Black-Scholes model assumes that the implied volatility should remain constant across options with different degrees of moneyness for a fixed expiration date. However, empirical evidence shows that this is not usually the case. Specifically, patterns known as "volatility smirks" emerge, where the implied volatilities for out-of-the-money (OTM) put options exceed the model's predictions. This phenomenon becomes more prominent before significant negative price movements in the underlying assets (Bollen & Whaley, 2004; Xing et al., 2010).

Consistent with prior research, we define a volatility smirk as the difference in implied volatilities between OTM put options and at-the-money (ATM) call options. Prior evidence suggests that the steepness of the options implied volatility smirk reflects investors' perceived ex ante crash risk (Bollen & Whaley, 2004; J. B. Kim et al., 2016, 2019; J. B. Kim & Zhang, 2014; Van Buskirk, 2011; Xing et al., 2010). In the event that investors anticipate that a sharp stock price drop is probable, they can purchase OTM puts to hedge against the decline in stock price. Although OTM puts are typically cheaper, the demand for these options will increase their implied volatilities relative to those of ATM call options and, in turn, the steepness of the implied volatility smirk. As such, the slope of the implied volatility smirk captures a firm's ex ante expected crash risk. Consistent with extant research, we measure the options implied volatility smirk to proxy for expected crash risk (*IV_SKEW*) as the difference between the implied volatility of OTM put options (IV_{it}^{OTMP}) and that of ATM call options (IV_{it}^{ATMC}) on the same day for firm *i* on day *t*:

$$IV\_SKEW_{it} = IV_{it}^{OTMP} - IV_{it}^{ATMC},$$

where the OTM put options are those with a delta between −0.375 and −0.125, and the ATM call options are those with a delta between 0.375 and 0.625. For multiple put or call option contracts on a single day, the daily implied volatility of the put or call option is the open interest-weighted average of the individual put or call options. The yearly measure of the volatility smirk (*IV_SKEW*) is the average of the daily *IV_SKEW* over the 12-month period ending 3 months after the fiscal year-end (Bollen & Whaley, 2004; J. B. Kim & Zhang, 2014). Figure 1 plots the time series of the average level of *IV_SKEW* for firms with and without dual holders. We generally observe an increasing trend of expected crash risk over time and a spike in the expected crash risk during the dot-com bubble (2000–2002) and the financial crisis (2007–2008) periods.[9] More relevant to our study, the patterns in Figure 1 suggest that the average implied volatility smirk is always lower for firms with dual holders, compared to those without.

3.3 | Regression model

To establish the causal impact of dual holders on ex ante expected crash risk, we use mergers between institutional investors and lenders of the same firm as an exogenous shock to dual

[8]To ensure that shifting sample composition is not spuriously responsible for our results, we alternatively require both treatment and control firms to have a fully balanced panel in all 6 years before undertaking the matching process. Although this results in severe attrition (the sample shrinks to 2,376 observations), all of our main inferences hold.

[9]In Table SA2 in Appendix S2, we find that our main inferences are qualitatively unaffected if we exclude the dot-com bubble or the financial crisis periods from the analyses.

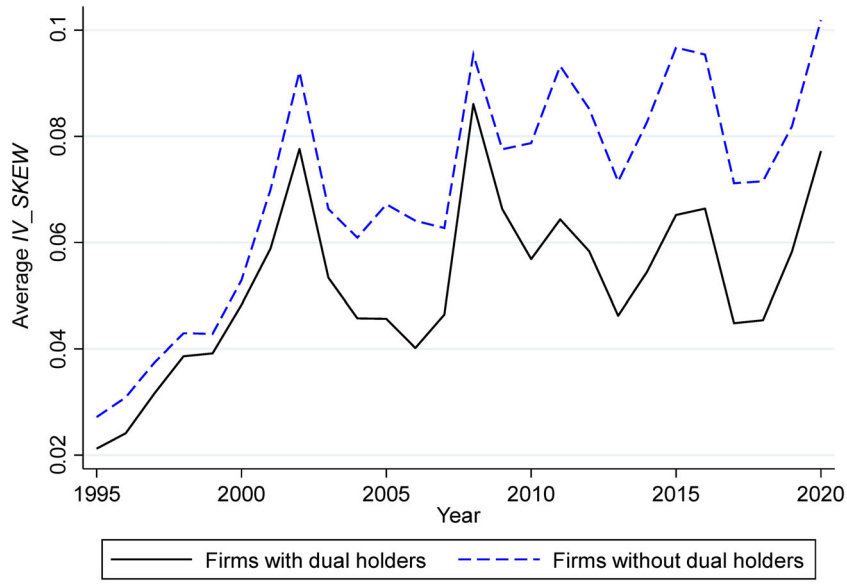

FIGURE 1 Time series of expected crash risk in firms with and without dual holders. This figure plots the time series of the average expected crash risk measure, the options implied volatility smirk (*IV_SKEW*), in firms with and without dual holders. The sample is based on a full sample of 38,032 firm-year observations from 4,319 unique firms with available data to compute *IV_SKEW*. Financial and utility firms are excluded. For each year, we calculate the average *IV_SKEW* for firms with dual holders and firms without dual holders, respectively. The solid (dashed) line plots the time series of the average *IV_SKEW* for firms with dual holders (without dual holders). See the Appendix for the detailed specification of the *IV_SKEW* measure.

holding status. To measure the impact of dual holding for perceived crash risk, we estimate a DiD regression model with firm fixed effects to help mitigate endogeneity concerns, consistent with Bertrand and Mullainathan (2003) and Roberts and Whited (2013):

$$\begin{aligned} IV\_SKEW = {} & \beta_0 + \beta_1 Treatment \times Post + \beta_2 Post + \beta_3 ATM\_IV + \beta_4 SIZE + \beta_5 LEV \\ & + \beta_6 MB + \beta_7 CASHFLOW\_VOL + \beta_8 EARNINGS\_VOL + \beta_9 SALES\_VOL \\ & + \beta_{10} STOCK\_RET + \beta_{11} STOCK\_TURN + \beta_{12} BETA + \beta_{13} IDOSY\_VOL \\ & + \beta_{14} TOTAL\_VOL + \beta_{15} NCSKEW + \beta_{16} ACCM + \beta_{17} COMMON\_DUM \\ & + Firm\ Fixed\ Effects + Year\ Fixed\ Effects + \varepsilon, \end{aligned} \quad (1)$$

where the dependent variable is the expected crash risk (*IV_SKEW*). The variable of interest, *Treatment*×*Post*, is the interaction between *Treatment* and *Post*. *Treatment* is a dummy variable set to one if a firm belongs to the treatment group and zero if it belongs to the matched control group. *Post* is a dummy variable that equals one for firm-year observations within 3 years after the corresponding merger occurs, and zero otherwise. The dummy variable *Treatment* is not separately included in the regression model because it is subsumed by the firm fixed effects. The alternative that dual holders constrain managers from suppressing information predicts a negative association between shareholder–creditor mergers and ex ante stock price crash risk (i.e., $\beta_1 < 0$), whereas the alternative that dual holders press managers to suppress information suggests a positive relation (i.e., $\beta_1 > 0$).

To help ensure that our findings are not driven by changes in time-varying firm covariates around mergers, we include a large set of control variables that are related to expected crash risk according

to prior work (J. B. Kim et al., 2016, 2019; J. B. Kim & Zhang, 2014; Van Buskirk, 2011; Xing et al., 2010). Specifically, we include the average daily implied volatility of ATM options over the fiscal year (*ATM_IV*) (Dennis & Mayhew, 2002), firm size (*SIZE*) (Pastor & Pietro, 2003), leverage (*LEV*) (Beaver et al., 2005),[10] the market-to-book ratio (*MB*) (Harvey & Siddique, 2000), cash flow volatility over the past 5 years (*CASHFLOW_VOL*) (Pastor & Pietro, 2003), earnings volatility over the past 5 years (*EARNINGS_VOL*) (Pastor & Pietro, 2003), sales revenue volatility over the past 5 years (*SALES_VOL*) (Pastor & Pietro, 2003), the stock return over the fiscal year (*STOCK_RET*) (J. Chen et al., 2001; Van Buskirk, 2011), monthly stock turnover (*STOCK_TURN*) (Hong & Stein, 2003), market beta (*BETA*) (Duan & Wei, 2009), idiosyncratic stock return volatility (*IDOSY_VOL*) (J. Chen et al., 2001), total stock return volatility (*TOTAL_VOL*) (J. Chen et al., 2001), negative skewness of firm-specific weekly returns (*NCSKEW*) (Bates, 2000; Jin & Myers, 2006), financial reporting quality (*ACCM*) (Hutton et al., 2009; J. B. Kim & Zhang, 2014), and a dummy variable identifying common institutional ownership (*COMMON_DUM*) (Li et al., 2022; Park et al., 2019). We include firm fixed effects to control for the effect of unobserved time-invariant firm characteristics, and year fixed effects to control for potential year-specific shocks to expected crash risk. Our regression model in Equation (1) with firm fixed effects and year fixed effects, combined with the interaction $Treatment \times Post$, represents a general case of the traditional DiD regression specification (Bertrand & Mullainathan, 2003).

4 | EMPIRICAL RESULTS

4.1 | Descriptive statistics

Table 2 reports the balance test results for the main firm characteristics between the treatment and control firms before and after matching in the year prior to the merger. Panel A shows that the treatment group firms differ from the control group firms along several characteristics before matching, including institutional ownership (*INSTOWN*), leverage (*LEV*), total assets (*ASSETS*), ROA (*ROA*), and common ownership (*COMMON_DUM*). The treatment firms also have a significantly different implied volatility smirk (*IV_SKEW*) from the control group before the mergers, reinforcing the necessity of identifying balanced matched control firms. After applying the matching procedure outlined in Section 3.1, we verify, as shown in Panel B, that the treatment firms resemble the PSM control firms along all important dimensions. All differences are economically small and statistically insignificant.

Table 3 reports summary statistics for the pooled treatment and control firms. To address concerns about outliers, we winsorize all continuous variables at the 1st and 99th percentiles. The mean *IV_SKEW* (*ATM_IV*) is 0.053 (0.438), which is comparable to that reported in prior expected crash risk studies (e.g., J. B. Kim et al., 2016, 2019; Zhang et al., 2019). Other control variables are also generally consistent with prior work (e.g., J. B. Kim & Zhang, 2014).

4.2 | Main results on the impact of mergers on expected crash risk

In Table 4, we report the main results from testing H1 using Equation (1). The dependent variable is the expected crash risk measure (*IV_SKEW*), and the variable of interest is the

[10]Consistent with prior research on the determinants of expected stock price crash risk (Beaver et al., 2005; J. B. Kim et al., 2016; J. B. Kim & Zhang, 2014), we define leverage as long-term debt divided by total assets. However, our inferences hold when we respecify leverage as total debt divided by total assets.

TABLE 2 Balance test.

Panel A: Before matching			
	Treatment	**Control**	**Difference**
INSTOWN	0.759	0.582	0.177***
	(0.009)	(0.008)	(0.015)
MB	3.338	3.598	−0.260
	(0.178)	(0.118)	(0.227)
LEV	0.236	0.150	0.086***
	(0.008)	(0.005)	(0.009)
ASSETS	7.839	6.205	1.634***
	(0.061)	(0.038)	(0.074)
STOCK_RET	0.297	0.273	0.024
	(0.035)	(0.024)	(0.046)
ROA	0.054	0.021	0.033***
	(0.005)	(0.005)	(0.009)
COMMON_DUM	0.762	0.700	0.062**
	(0.020)	(0.013)	(0.025)
IV_SKEW	0.055	0.063	−0.008***
	(0.002)	(0.002)	(0.003)
Panel B: After matching			
	Treatment	**Control**	**Difference**
INSTOWN	0.756	0.729	0.027
	(0.012)	(0.017)	(0.020)
MB	3.336	3.535	−0.200
	(0.218)	(0.207)	(0.301)
LEV	0.216	0.197	0.019
	(0.009)	(0.010)	(0.014)
SIZE	7.560	7.546	0.014
	(0.068)	(0.091)	(0.114)
STOCK_RET	0.332	0.338	−0.006
	(0.044)	(0.036)	(0.057)
ROA	0.058	0.067	−0.009
	(0.006)	(0.006)	(0.009)
COMMON_DUM	0.755	0.701	0.053
	(0.024)	(0.026)	(0.035)
IV_SKEW	0.057	0.058	−0.001
	(0.003)	(0.002)	(0.003)

Note: This table reports the balance test results for the main firm characteristics between the treatment and control firms in the year immediately prior to the mergers. Panel A (B) reports the comparison before (after) matching. Continuous variables are winsorized at the 1st and 99th percentiles. Standard errors are reported in parentheses. See the Appendix for variable definitions.
*, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

interaction *Treatment*×*Post*. In Columns 1 and 2, we tabulate the baseline DiD results without control variables; in Columns 3 and 4, we present the regression results with the full set of controls. For all estimations, reported *t*-statistics reflect robust standard errors corrected

TABLE 3 Summary statistics.

Variable	*N*	Mean	SD	P5	P25	P50	P75	P95
IV_SKEW	3,351	0.053	0.040	0.011	0.030	0.044	0.065	0.128
ATM_IV	3,351	0.438	0.163	0.230	0.319	0.405	0.528	0.763
SIZE	3,351	7.815	1.534	5.596	6.690	7.681	8.745	10.752
LEV	3,351	0.195	0.164	0.000	0.038	0.180	0.305	0.506
MB	3,351	3.476	3.057	0.789	1.624	2.502	4.085	9.445
CASHFLOW_VOL	3,351	0.060	0.052	0.013	0.027	0.045	0.075	0.170
EARNINGS_VOL	3,351	0.067	0.078	0.009	0.020	0.041	0.081	0.215
SALES_VOL	3,351	0.255	0.278	0.040	0.086	0.166	0.317	0.753
STOCK_RET	3,351	0.165	0.527	−0.542	−0.163	0.081	0.395	1.142
STOCK_TURN	3,351	0.003	0.002	0.001	0.001	0.002	0.003	0.006
BETA	3,351	1.182	0.517	0.437	0.826	1.111	1.479	2.143
IDOSY_VOL	3,351	0.049	0.024	0.021	0.031	0.043	0.061	0.096
TOTAL_VOL	3,351	0.061	0.030	0.026	0.040	0.054	0.076	0.123
NCSKEW	3,351	0.120	0.753	−1.052	−0.310	0.087	0.480	1.413
ACCM	3,351	0.092	0.068	0.020	0.042	0.076	0.120	0.230
COMMON_DUM	3,351	0.759	0.428	0.000	1.000	1.000	1.000	1.000

Note: This table presents summary statistics for our matched sample based on merger events, with firm-year observations across the 6-year testing windows. See the Appendix for variable definitions.

for heteroskedasticity (White, 1980). We cluster standard errors at the firm level in Columns 1 and 3.[11] To reduce concern that multiple firms can be affected by the same merger, we cluster standard errors at the merger level in Columns 2 and 4.

We find that the coefficient estimates on *Treatment*×*Post* in all four columns are negative and significant (*t*-statistics range from −1.99 to −4.83), leading us to reject the null hypothesis in H1. These findings suggest that mergers between shareholders and creditors reduce expected crash risk. Economically, the coefficient estimate of −0.013 on *Treatment*×*Post* in Columns 3 and 4 implies that the ex ante crash risk perceived in the options market decreases by 22.8%, relative to the pre-merger level of expected crash risk for treatment firms (0.057), more than for control firms.[12] When we cluster standard errors at the merger level in Columns 2 and 4, we continue to find that the coefficients on *Treatment*×*Post* are negative and significant. Additionally, the coefficient estimates on the control variables in Table 4 are generally consistent with expectations rooted in prior research.

Overall, we provide strong, robust evidence that the implied volatility smirk decreases after a firm's institutional investors and creditors merge, which alleviates shareholder–creditor conflicts. Our results also suggest that dual holders constrain managers' information suppression rather than press managers to hoard bad news, on average, after a shareholder–creditor merger.

[11]Given that prior research implies that also clustering by year only yields reliable standard errors when there are a sufficient number of clusters (e.g., Thompson (2011) recommends a minimum of 25 time periods under study), we follow Petersen (2009) by handling the potential time effect parametrically and adjusting standard errors for correlation along only the firm dimension. However, we report in Table SA2 in Appendix S2 that the coefficient estimate on *Treatment*×*Post* remains negative and significant (coefficient = −0.013, *t*-statistic = −3.16) when we alternatively double cluster the standard errors at both the firm and year levels.

[12]In Table SA3 of Appendix S3, we examine the impact of shareholder–creditor mergers on the implied volatility of OTM puts and ATM calls in separate regressions. The results suggest that the observed decline in ex ante crash risk primarily stems from a decrease in the implied volatility of OTM puts, consistent with a reduction in perceived crash risk.

TABLE 4 The impact of shareholder–creditor mergers on expected crash risk based on the matched sample.

Dependent variable	*IV_SKEW* (1)	*IV_SKEW* (2)	*IV_SKEW* (3)	*IV_SKEW* (4)
Treatment×*Post*	−0.012***	−0.012**	−0.013***	−0.013***
	(−4.26)	(−1.99)	(−4.83)	(−2.82)
Post	0.004	0.004	0.003	0.003
	(1.30)	(0.97)	(1.00)	(0.88)
ATM_IV			0.063***	0.063*
			(3.32)	(1.81)
SIZE			−0.013***	−0.013***
			(−5.34)	(−5.92)
LEV			0.010	0.010*
			(1.22)	(1.94)
MB			0.001*	0.001**
			(1.74)	(2.66)
CASHFLOW_VOL			0.030	0.030
			(1.00)	(1.12)
EARNINGS_VOL			−0.009	−0.009
			(−0.44)	(−0.43)
SALES_VOL			0.003	0.003
			(0.51)	(0.62)
STOCK_RET			0.001	0.001
			(0.84)	(0.81)
STOCK_TURN			2.437***	2.437***
			(2.72)	(3.09)
BETA			−0.001	−0.001
			(−0.43)	(−0.23)
IDOSY_VOL			−0.071	−0.071
			(−0.62)	(−0.61)
TOTAL_VOL			−0.027	−0.027
			(−0.28)	(−0.24)
NCSKEW			0.001	0.001*
			(0.99)	(1.93)
ACCM			−0.015	−0.015
			(−0.78)	(−0.85)
COMMON_DUM			0.000	0.000
			(0.10)	(0.14)
Constant	0.054***	0.054***	0.124***	0.124***
	(35.77)	(42.13)	(6.00)	(5.59)
Firm FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Clustered SE	By firm	By merger	By firm	By merger

(Continues)

TABLE 4 (Continued)

Dependent variable	*IV_SKEW* (1)	*IV_SKEW* (2)	*IV_SKEW* (3)	*IV_SKEW* (4)
Observations	3,351	3,351	3,351	3,351
Adjusted R^2	0.398	0.398	0.445	0.445

Note: This table reports the regression results for the impact of shareholder–creditor mergers on firms' ex ante stock price crash risk based on the matched sample in a DiD regression. The dependent variable is the expected crash risk measure (*IV_SKEW*). The independent variable of interest is *Treatment*×*Post*, which is an interaction between *Treatment* and *Post*. *Treatment* is a dummy variable that takes the value one if a firm belongs to the treatment group and zero if it belongs to the matched control group. *Post* is a dummy variable that equals one for firm-year observations after the mergers occur, and zero otherwise. *t*-statistics (in parentheses) are calculated based on standard errors adjusted for heteroskedasticity (White, 1980). We cluster the standard errors at the firm level in Columns 1 and 3 and at the merger level in Columns 2 and 4. See the Appendix for variable definitions.
*, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

4.3 | Validating the parallel trends assumption

The validity of our DiD research design in Equation (1) rests on whether the parallel trends assumption—that is, the expected crash risk follows parallel trends prior to the mergers—is satisfied in our setting. We follow Bertrand and Mullainathan (2003) by estimating a dynamic effects model to address the concern that the parallel trends assumption may be violated. If we do not observe a perceptible decrease in the options implied volatility smirk prior to the mergers or if any decrease does not differ for treatment and control firms, then the parallel trends assumption is likely justifiable (Heider & Ljungqvist, 2015).

To implement the dynamic effects model, we modify Equation (1) by replacing the interaction *Treatment*×*Post* with five interactions: *Treatment*×*Before*(−2), *Treatment*×*Before*(−1), *Treatment*×*After*(+1), *Treatment*×*After*(+2), and *Treatment*×*After*(+3). *Before*(−2) and *Before*(−1) are dummy variables that take the value one for observations 2 years and 1 year prior to the mergers, respectively; *After*(+1), *After*(+2), and *After*(+3) are dummy variables that equal one for observations 1, 2, and 3 years after the mergers, respectively. The omitted *Before*(−3) serves as the base group for comparison. By design, the two interactions, *Treatment*×*Before*(−2) and *Treatment*×*Before*(−1), capture any changes in firms' implied volatility smirk prior to the mergers.

Table 5 reports the regression results for the dynamic effects model. Again, we cluster standard errors at the firm level in Column 1 and at the merger level in Column 2. All the coefficient estimates on *Treatment*×*Before*(−2) and *Treatment*×*Before*(−1) are small in magnitude and statistically indistinguishable from zero, suggesting that there is no discernible trend in firms' expected crash risk prior to the mergers. In contrast, the coefficient estimate on *Treatment*×*After*(+1) is negative and significant in Column 1, whereas *Treatment*×*After*(+2) and *Treatment*×*After*(+3) are negative and significant in both columns; these results indicate that treatment firms' expected crash risk decreases compared to control firms starting from the first post-merger year and that the impact persists. Overall, the evidence from the dynamic effects model helps dispel the concern that our main results are driven by divergent trends prior to treatment.

5 | CROSS-SECTIONAL ANALYSES AND ADDITIONAL TESTS

5.1 | Merging institutional investor's and lender's stakes and the impact of mergers on expected crash risk

We expect under H2a that the impact of mergers would be greater when the merging institutional investor's or lender's stake in the treatment firm is larger. To evaluate H2a, we construct

TABLE 5 Dynamic effects model.

Dependent variable	*IV_SKEW* (1)	*IV_SKEW* (2)
Treatment×Before(−2)	0.003	0.003
	(0.76)	(0.39)
Treatment×Before(−1)	−0.003	−0.003
	(−0.73)	(−0.41)
Treatment×After(+1)	−0.012***	−0.012
	(−2.86)	(−1.30)
Treatment×After(+2)	−0.016***	−0.016**
	(−3.99)	(−2.18)
Treatment×After(+3)	−0.011***	−0.011*
	(−2.70)	(−1.74)
ATM_IV	0.064***	0.064*
	(3.35)	(1.86)
SIZE	−0.013***	−0.013***
	(−5.29)	(−6.12)
LEV	0.009	0.009*
	(1.17)	(1.92)
MB	0.001*	0.001***
	(1.80)	(2.73)
CASHFLOW_VOL	0.031	0.031
	(1.00)	(1.12)
EARNINGS_VOL	−0.011	−0.011
	(−0.52)	(−0.52)
SALES_VOL	0.003	0.003
	(0.54)	(0.66)
STOCK_RET	0.001	0.001
	(0.83)	(0.78)
STOCK_TURN	2.407***	2.407***
	(2.69)	(3.04)
BETA	−0.002	−0.002
	(−0.60)	(−0.31)
IDOSY_VOL	−0.094	−0.094
	(−0.81)	(−0.78)
TOTAL_VOL	−0.001	−0.001
	(−0.01)	(−0.01)
NCSKEW	0.001	0.001*
	(0.98)	(1.93)
ACCM	−0.015	−0.015
	(−0.77)	(−0.82)
COMMON_DUM	0.000	0.000
	(0.06)	(0.08)

(Continues)

TABLE 5 (Continued)

Dependent variable	*IV_SKEW* (1)	*IV_SKEW* (2)
Constant	0.124***	0.124***
	(5.97)	(5.47)
Before(·) and *After(·)* dummy variables	Yes	Yes
Firm FE	Yes	Yes
Year FE	Yes	Yes
Clustered SE	By firm	By merger
Observations	3,351	3,351
Adjusted R^2	0.446	0.446

Note: This table reports the results from a dynamic effects model evaluating whether the parallel trends assumption that underlies our DiD design is satisfied (Bertrand & Mullainathan, 2003). We replace the interaction *Treatment*×*Post* in Equation (1) with five interactions: *Treatment*×*Before(−2)*, *Treatment*×*Before(−1)*, *Treatment*×*After(+1)*, *Treatment*×*After(+2)*, and *Treatment*×*After(+3)*. *Before(−2)*, *Before(−1)*, *After(+1)*, *After(+2)*, and *After(+3)* are dummy variables that denote the relative years around the mergers. By design, the two interactions *Treatment*×*Before(−2)* and *Treatment*×*Before(−1)* capture any changes in firms' implied volatility smirk prior to the mergers. *t*-statistics (in parentheses) are calculated based on standard errors adjusted for heteroskedasticity (White, 1980). We cluster the standard errors at the firm level in Column 1 and at the merger level in Column 2. See the Appendix for variable definitions.
*, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

a dummy variable, *High shareholder stake*, that equals one if the merging shareholder's equity position exceeds the median in the year before the merger, and zero otherwise. We measure the shareholder's stake as the ratio of shares owned by the merging institutional investors divided by the shares owned by all institutional shareholders. We interact *High shareholder stake* with *Treatment*×*Post* and *Post* and include these two terms in Equation (1). The coefficient on *Treatment*×*Post*×*High shareholder stake* captures the difference in the impact of mergers on treatment firms with high versus low equity stakes. In Table 6, we report in Column 1 that the coefficient on *Treatment*×*Post*×*High shareholder stake* is negative and statistically significant. Similarly, we bisect the matched sample into two subgroups according to the median value of the merging lender's stake, which we measure by dividing the merging lender's loan size by the firm's long-term debt. We construct another dummy variable, *High lender stake*, and interact it with *Treatment*×*Post* and *Post*. In Column 2, we find that the effect is stronger among firms with high lender stakes. Consistent with H2a, the evidence in Table 6 suggests that a larger stake held by the merging shareholders or creditors in the treatment firm intensifies the role that dual holding plays in constraining managers from hoarding bad news.

5.2 | Reduction in agency conflicts and the impact of mergers on expected crash risk

According to H2b, firms with more severe pre-merger shareholder–creditor conflicts are likely to exhibit a larger reduction in expected crash risk. In testing this hypothesis, we gauge shareholder–creditor conflicts using the level of financial distress, which we measure in successive regressions using Altman's (1968) *Z*-score and financial leverage. We define *High financial distress* as a dummy variable set to one if the treatment firm's *Z*-score (or leverage) exceeds the median, and zero otherwise. Next, we interact *High financial distress* with *Treatment*×*Post* and *Post* and include these terms in Equation (1). In Table 7, we find in Columns 1 and 2 that the coefficients on *Treatment*×*Post*×*High financial distress* are negative and significant, indicating that firms with higher pre-merger shareholder–creditor conflicts enjoy a larger decline in their

TABLE 6 Merging institutional investor's and lender's stakes and the impact of mergers on expected crash risk.

Dependent variable	*IV_SKEW*	
	(1)	(2)
Treatment×*Post*×*High shareholder stake*	−0.007**	
	(−2.21)	
Post×*High shareholder stake*	0.004	
	(1.18)	
Treatment×*Post*×*High lender stake*		−0.010***
		(−3.04)
Post×*High lender stake*		0.007*
		(1.94)
Treatment×*Post*	−0.009*	−0.008
	(−1.89)	(−1.60)
Post	0.001	0.000
	(0.33)	(0.03)
Controls from Table 4	Yes	Yes
Firm FE	Yes	Yes
Year FE	Yes	Yes
Clustered SE	By merger	By merger
Observations	3,351	3,351
Adjusted R^2	0.445	0.446

Note: This table presents cross-sectional evidence on whether the impact of mergers on expected crash risk varies with the merging institutional investor's or lender's stakes. In Column 1, *High shareholder stake* is a dummy variable that equals one if the merging shareholder's equity position exceeds the median in the year before the merger, and zero otherwise. We specify the shareholder's stake as the ratio of shares owned by the merging institutional investors divided by the shares owned by all institutional shareholders. In Column 2, *High lender stake* is a dummy variable that equals one if the merging lender's loan position is above the median in the year before the merger, and zero otherwise. We measure the merging lender's stake as its loan size scaled by the firm's long-term debt. The regressions include the same set of control variables as in Table 4, although these results are suppressed for brevity. *t*-statistics (in parentheses) are calculated based on standard errors adjusted for heteroskedasticity (White, 1980) and merger clustering. See the Appendix for variable definitions.
*, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

expected crash risk. This evidence lends empirical support to the intuition that a decrease in shareholder–creditor conflicts underlies the mechanism through which dual holdings reduce expected stock price crash risk.

5.3 | The information environment and the impact of mergers on expected crash risk

Under the alternative that information suppression is constrained, we expect under H2c that the impact of mergers in reducing firms' expected crash risk would be larger in firms subject to a worse information environment (DeFond et al., 2014; J. B. Kim et al., 2016). In testing H2c, we follow Bourveau et al. (2018) and Gao et al. (2022) by adopting three widely used measures to capture a firm's information quality: the bid-ask spread (*SPREAD*), analyst forecast dispersion (*DISP*), and the frequency of 8-K filings. Larger bid-ask spreads, wider analyst forecast dispersion, and less frequent 8-K filings reflect a relatively poor information environment. Again, we split the matched sample observations into poor versus good information environment subgroups according to the median value of each of the three measures for the treatment

TABLE 7 Reduction in agency conflicts.

Dependent variable	***IV_SKEW***	
Measure of agency conflicts	***Z*-score (1)**	***LEV* (2)**
Treatment×*Post*×*High financial distress*	−0.012***	−0.012**
	(−3.75)	(−2.57)
Treatment×*Post*	−0.007	−0.008**
	(−1.21)	(−2.39)
Post×*High financial distress*	0.010***	0.004
	(2.76)	(1.31)
Post	−0.002	0.002
	(−0.45)	(0.49)
Controls from Table 4	Yes	Yes
Firm FE	Yes	Yes
Year FE	Yes	Yes
Clustered SE	By merger	By merger
Observations	3,351	3,351
Adjusted R^2	0.447	0.446

Note: This table presents the empirical test results on whether the reduction in shareholder–creditor conflicts underlies the mechanism through which dual holdings decrease expected stock price crash risk. We investigate whether the impact of mergers in reducing firms' expected crash risk is stronger for firms experiencing worse financial distress. The dependent variable is the expected crash risk measure (*IV_SKEW*). In Columns 1 and 2, *High financial distress* is a dummy variable set to one if the treatment firm's *Z-Score* or leverage (*LEV*) exceeds the median, respectively, and zero otherwise. The regressions include the same set of control variables as in Table 4, although these results are suppressed for brevity. *t*-statistics (in parentheses) are calculated based on standard errors adjusted for heteroskedasticity (White, 1980) and merger clustering. See the Appendix for variable definitions.
*, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

firms in the year before the merger. After specifying this dummy variable, *Poor information environment*, we include its interactions with *Treatment*×*Post* and *Post* in Equation (1). In the regression results reported in Panel A of Table 8, we find that the role that mergers play in lowering expected crash risk mainly manifests in the subsample of firms operating in worse information environments, as evident in the negative and significant coefficients on *Treatment*×*Post*×*Poor information environment*. This evidence supports H2c and is consistent with the alternative that information suppression is constrained.

5.4 | Reduction in bad news hoarding and the impact of mergers on expected crash risk

We predict in H2d that mergers between lenders and shareholders will motivate dual holders to disclose more information to alleviate costly information asymmetry with other investors. In evaluating this increased disclosure channel, we examine the impact of dual holding on the frequency of management earnings forecasts. We also explore the tone of management earnings forecasts to analyze whether merged dual holders with fewer agency conflicts can better monitor managers' information hoarding by eliciting more bad news disclosures.

We specify three dependent variables: the number of management forecasts issued during the year, *MF*, and the number of management forecasts that are lower (higher) than the prior analyst consensus issued during the year, *MF_BAD* (*MF_GOOD*). We follow S. Chen et al. (2008) by including these control variables in the estimations: the equity stake held by

TABLE 8 The role of the information environment and reductions in bad news hoarding.

Panel A: Information environments and the impact of mergers on expected crash risk			
Dependent variable	***IV_SKEW***		
Measure of information environment	***SPREAD*** **(1)**	***DISP*** **(2)**	***FREQ_8K*** **(3)**
Treatment×*Post*×*Poor information environment*	−0.021***	−0.014***	−0.013**
	(−2.83)	(−3.26)	(−2.22)
Treatment×*Post*	−0.003	−0.006	−0.007***
	(−0.67)	(−0.99)	(−3.02)
Post×*Poor information environment*	0.010**	0.004	0.010**
	(2.18)	(1.11)	(2.46)
Post	−0.001	0.003	−0.001
	(−0.30)	(0.56)	(−0.44)
Controls from Table 4	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Clustered SE	By merger	By merger	By merger
Observations	3,351	3,239	3,220
Adjusted R^2	0.450	0.445	0.452

Panel B: The impact of mergers on management forecasts			
Dependent variable	***MF*** **(1)**	***MF_BAD*** **(2)**	***MF_GOOD*** **(3)**
Treatment×*Post*	0.357**	0.269***	0.064
	(2.11)	(3.58)	(0.73)
Post	−0.056	0.021	−0.059
	(−0.56)	(0.28)	(−0.82)
INSTOWN	0.276	0.170	−0.072
	(0.86)	(0.93)	(−0.73)
BLOCK	−0.110	−0.036	−0.103
	(−0.49)	(−0.39)	(−1.03)
AC	0.033**	0.023	0.019**
	(2.04)	(1.51)	(2.62)
DISP	−5.947	−1.440	−6.082*
	(−0.79)	(−0.66)	(−1.76)
TOTAL_VOL	2.809	1.557	0.682
	(1.30)	(1.16)	(0.59)
BDIND	−0.054	−0.045	−0.016
	(−0.80)	(−0.89)	(−0.34)
BDSIZE	0.034	0.005	0.023
	(0.99)	(0.24)	(1.20)
LIT	−0.574*	0.163	−0.602
	(−1.72)	(0.59)	(−1.51)

(Continues)

TABLE 8 (Continued)

Panel B: The impact of mergers on management forecasts			
Dependent variable	***MF*** **(1)**	***MF_BAD*** **(2)**	***MF_GOOD*** **(3)**
SIZE	0.233	0.092	0.126*
	(1.40)	(0.97)	(1.77)
MB	−0.040***	−0.024**	−0.004
	(−4.51)	(−2.16)	(−0.49)
D_CAP	−0.188*	−0.012	−0.157*
	(−1.75)	(−0.25)	(−1.97)
ROA	0.653*	0.088	0.507***
	(1.94)	(0.43)	(3.27)
Constant	−0.766	−0.439	−0.326
	(−0.56)	(−1.09)	(−0.39)
Firm FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Clustered SE	By merger	By merger	By merger
Observations	3,223	3,223	3,223
Pseudo R^2	0.677	0.565	0.479

Note: This table presents the empirical test results on the reduced information asymmetry channel through which dual holding may impact expected crash risk. Panel A tabulates the results from analyzing whether the impact of mergers in reducing firms' expected crash risk is larger for firms subject to a worse information environment. In Columns 1–3, *Poor information environment* is a dummy variable that equals one if the average bid-ask spread (*SPREAD*) is above the median, the analyst forecast dispersion (*DISP*) is above the median, or the frequency of 8-K filings (*FREQ_8K*) is below the median in the year before the merger, respectively, and zero otherwise. Panel B reports the results from examining the impact of shareholder–creditor mergers on the frequency and tone of management earnings forecasts. In successive regressions, the dependent variables are the number of management forecasts issued during the year (*MF*), the number of management forecasts that are lower than the prior analyst consensus issued during the year (*MF_BAD*), and the number of management forecasts that are higher than prior analyst consensus issued during the year (*MF_GOOD*). Panel A regressions include the same set of control variables as in Table 4, although these results are suppressed for brevity. *t*-statistics (in parentheses) are calculated based on standard errors adjusted for heteroskedasticity (White, 1980) and merger clustering. See the Appendix for variable definitions.
*, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

institutional investors (*INSTOWN*), a blockholder dummy (*BLOCK*), analyst coverage (*AC*), analyst forecast dispersion (*DISP*), stock return volatility (*TOTAL_VOL*), a board independence dummy (*BDIND*), board size (*BDSIZE*), a high litigation risk dummy (*LIT*), firm size (*SIZE*), the market-to-book ratio (*MB*), a dummy variable capturing debt or equity issuance (*D_CAP*), and the return on assets (*ROA*). In Panel B of Table 8, we report in Column 1 a positive and significant coefficient on *Treatment*×*Post*, suggesting that the overall frequency of management earnings forecasts increases following the mergers. This finding reconciles with Peyravan and Wittenberg-Moerman (2022), which documents that dual ownership is associated with increased management earnings forecasts. Moreover, we find in Columns 2 and 3 that the coefficients on *Treatment*×*Post* are positive and significant (insignificant) when the dependent variable is *MF_BAD* (*MF_GOOD*); that is, the increase in the frequency of earnings forecasts is concentrated among bad news forecasts. These results support H2d and imply that the decreased implied volatility smirk is driven by a reduction in managers suppressing negative information.

5.5 | Monitoring effects and the impact of mergers on expected crash risk

Our evidence so far implies that dual holdings mitigate managers' bad news hoarding activities. In the presence of strict monitoring, managers have less ability to suppress negative

information. H3a predicts that the observed effect of the mergers in reducing investors' expected crash risk will be magnified in mergers where the merging lender is a lead arranger or a non-commercial bank (Chava et al., 2019; Jiang et al., 2010; Lim et al., 2014;

TABLE 9 Monitoring effects.

Panel A: The monitoring effects of lead arrangers and non-commercial banks		
Dependent variable	***IV_SKEW***	
	(1)	**(2)**
Treatment×*Post*×*Lead arranger*	−0.008***	
	(−3.37)	
Post×*Lead arranger*	0.003	
	(1.30)	
Treatment×*Post*×*Non-commercial bank*		−0.017***
		(−3.77)
Post×*Non-commercial bank*		0.006
		(1.04)
Treatment×*Post*	−0.011**	0.002
	(−2.33)	(1.09)
Post	0.003	−0.002
	(0.64)	(−0.52)
Controls from Table 4	Yes	Yes
Firm FE	Yes	Yes
Year FE	Yes	Yes
Clustered SE	By merger	By merger
Observations	3,351	3,351
Adjusted R^2	0.445	0.447

Panel B: The moderating effect of governance structures				
Dependent variable	***IV_SKEW***			
Measure of internal monitoring mechanism	***BDIND*** **(1)**	***AUDIT_IND*** **(2)**	***THREAT*** **(3)**	***INSTOWN*** **(4)**
Treatment×*Post*×*Poor governance*	−0.016***	−0.014*	−0.013**	−0.006*
	(−2.98)	(−1.94)	(−2.55)	(−1.92)
Treatment×*Post*	−0.012**	−0.007	−0.007	−0.010**
	(−2.52)	(−1.65)	(−0.99)	(−2.41)
Post×*Poor governance*	0.007	0.007	0.008**	−0.001
	(1.08)	(1.01)	(2.23)	(−0.28)
Post	0.001	−0.002	−0.001	0.004
	(0.33)	(−0.72)	(−0.10)	(0.99)
Controls from Table 4	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Clustered SE	By merger	By merger	By merger	By merger
Observations	2,414	2,001	3,036	3,351

(Continues)

TABLE 9 (Continued)

Panel B: The moderating effect of governance structures				
Dependent variable	***IV_SKEW***			
Measure of internal monitoring mechanism	***BDIND*** **(1)**	***AUDIT_IND*** **(2)**	***THREAT*** **(3)**	***INSTOWN*** **(4)**
Adjusted R^2	0.479	0.447	0.443	0.446

Note: This table presents the empirical test results on the increased monitoring channel through which dual holding may impact expected crash risk. Panel A reports the results relating to the monitoring effects of lead arrangers and non-commercial banks. In Column 1, *Lead arranger* is a dummy variable that equals one if the merging lender is a lead arranger, and zero otherwise. In Column 2, *Non-commercial bank* is a dummy variable that equals one if the merging lender is a non-commercial bank, and zero otherwise. Panel B tabulates the results exploring the moderating effects of governance structures. In Columns 1–4, *Poor governance* is a dummy variable that equals one if the treatment firm lacks an independent board (*BDIND*) or audit committee (*AUDIT_IND*), or the takeover threat from the market for corporate control (*THREAT*) or the institutional ownership (*INSTOWN*) is below the median in the year before the merger, respectively, and zero otherwise. The regressions include the same set of control variables as in Table 4, although these results are suppressed for brevity. *t*-statistics (in parentheses) are calculated based on standard errors adjusted for heteroskedasticity (White, 1980) and merger clustering. See the Appendix for variable definitions.
*, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

Peyravan, 2020), both of which have stronger monitoring incentives. To examine this issue, we construct two dummy variables, *Lead arranger* and *Non-commercial bank*, and include their interactions with *Treatment*×*Post* and *Post* in separate regressions. In Panel A of Table 9, we find that the coefficients on *Treatment*×*Post*×*Lead arranger* and *Treatment*×*Post*×*Non-commercial bank* are negative and significant in Columns 1 and 2, respectively, consistent with H3a.

Similarly, we expect under H3b that the role that the mergers play in reducing investors' expected crash risk will be concentrated among poorly governed firms. In testing this prediction, we successively treat a firm as having relatively poor governance if it lacks an independent board (*BDIND*) or audit committee (*AUDIT_IND*), or if the treatment firm's takeover threat from the market for corporate control (*THREAT*) or the proportion of equity held by institutions (*INSTOWN*) fall below the median in the year before the merger (Abbott et al., 2004; J. B. Kim et al., 2011; Shleifer & Vishny, 1986; Zhao & Chen, 2008). We interact a dummy variable for each situation (*Poor governance*) with *Treatment*×*Post* and *Post*. In Panel B of Table 9, we find in Columns 1–4 that the coefficients on *Treatment*×*Post*×*Poor governance* are negative and significant. Supporting H3b, this evidence indicates that the impact of mergers in reducing firms' expected crash risk is higher for poorly governed firms.

6 | ADDITIONAL ANALYSES

In this section, we perform sensitivity analyses to substantiate our main results. First, because most of the arguments underlying our hypotheses also apply to realized crash risk, we verify that our inferences hold when we examine the impact of dual holding on ex post realized stock price crash risk.[13] Second, we estimate an OLS regression to explore the impact of the presence of dual holders on expected crash risk based on the full sample, rather than restricted to the merger sample and the matched control sample. These full sample results reveal that dual holdings are negatively associated with expected crash risk, indicating that the inferences from DiD tests are externally valid.[14] Third, we construct an alternative merger sample between creditors only and another alternative merger sample between shareholders only and perform regression analyses that mirror our main analyses to investigate the role of creditor (shareholder) mergers

[13]In Table SA1 of Appendix S1, we report results implying that shareholder–creditor mergers reduce realized stock price crash risk.
[14]We report these regression results in Table SA4 of Appendix S4.

on expected crash risk. We find that mergers between creditors (shareholders) generally have some impacts on expected crash risk, although the effects are much weaker compared to mergers between dual holders. The weaker, less robust results suggest that the enhanced monitoring channel cannot fully explain the strong impact of shareholder and creditor mergers on expected crash risk.[15]

7 | CONCLUSION

We examine the impact of institutional equity-debt dual holdings on firms' ex ante expected crash risk. In taking advantage of the mergers between institutional investors and lenders of the same firm as an exogenous shock to shareholder–creditor conflicts and employing a DiD regression framework, we document that firms' ex ante expected crash risk falls after shareholder–creditor mergers. Our findings are consistent with the alternative that these managers constrain information suppression and run against the alternative that these managers increase information suppression. Overall, our findings indicate that mergers reduce managers' incentive to opportunistically hoard bad news.

Evidence from a dynamic effects analysis implies that the parallel trends assumption that underlies our DiD research design is satisfied in our setting. Cross-sectional tests show that the negative impact of mergers on firms' expected crash risk is higher when the stakes held by institutional investors or lenders are larger. Suggesting that our main findings work through a decrease in shareholder–creditor conflicts after these mergers, we find that the reduction in expected crash risk is stronger when the agency conflicts between shareholders and creditors are apt to be exacerbated. Consistent with the alternative that managers constrain information suppression, we find that the expected crash risk declines more for firms experiencing worse information environments. We also provide direct evidence that there is an increase in bad news disclosure after shareholder–creditor mergers. Furthermore, empirically validating the enhanced monitoring channel, we find that the negative impact of dual holdings on perceived crash risk is magnified for the mergers in which the merging lender is a lead arranger or a non-commercial bank, and for firms suffering from poor governance structures.

Collectively, our results suggest that dual holdings reduce shareholder–creditor conflicts, which, in turn, constrains firms from hoarding negative information. Our evidence implies that option market participants value the dual holder's monitoring which disciplines managers against opportunistically withholding bad news. By showing that the dual holders play an integral role in curtailing managers' bad news hoarding activities, we contribute to prior work on the determinants of ex ante stock price crash risk (An & Zhang, 2013; DeFond et al., 2014; J. B. Kim & Zhang, 2016).

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[15]In Appendix S5 (Table SA5), we perform regression analyses that mirror our main analyses to investigate the impact of strictly creditor or strictly shareholder mergers on expected crash risk.

DATA AVAILABILITY STATEMENT

Data are available from the public sources cited in the text.

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REFERENCES

Abbott, L. J., Parker, S., & Peters, G. F. (2004). Audit committee characteristics and restatements. *Auditing: A Journal of Practice and Theory*, *23*(1), 69–87.

Ak, B. K., Rossi, S., Sloan, R., & Tracy, S. (2016). Navigating stock price crashes. *The Journal of Portfolio Management*, *42*(4), 28–37.

Altman, E. I. (1968). Financial ratios, discriminant analysis and the prediction of corporate bankruptcy. *The Journal of Finance*, *23*(4), 589–609.

An, H., & Zhang, T. (2013). Stock price synchronicity, crash risk, and institutional investors. *Journal of Corporate Finance*, *21*, 1–15.

Armstrong, C. S., Guay, W. R., & Weber, J. P. (2010). The role of information and financial reporting in corporate governance and debt contracting. *Journal of Accounting and Economics*, *50*(2–3), 179–234.

Baginski, S. P., Campbell, J. L., Hinson, L. A., & Koo, D. S. (2018). Do career concerns affect the delay of bad news disclosure? *The Accounting Review*, *93*(2), 61–95.

Bates, D. S. (2000). Post-'87 crash fears in the S&P 500 futures option market. *Journal of Econometrics*, *94*(1), 181–238.

Beaver, W. H., McNichols, M. F., & Rhie, J. W. (2005). Have financial statements become less informative? Evidence from the ability of financial ratios to predict bankruptcy. *Review of Accounting Studies*, *10*(1), 93–122.

Bertrand, M., & Mullainathan, S. (2003). Enjoying the quiet life? Corporate governance and managerial preferences. *Journal of Political Economy*, *111*(5), 1043–1075.

Bharath, S. T., Jayaraman, S., & Nagar, V. (2013). Exit as governance: An empirical analysis. *The Journal of Finance*, *68*(6), 2515–2547.

Bollen, N. P. B., & Whaley, R. E. (2004). Does net buying pressure affect the shape of implied volatility functions? *The Journal of Finance*, *59*(2), 711–753.

Boot, A. (2000). Relationship banking: What do we know? *Journal of Financial Intermediation*, *9*(1), 7–25.

Bourveau, T., Lou, Y., & Wang, R. (2018). Shareholder litigation and corporate disclosure: Evidence from derivative lawsuits. *Journal of Accounting Research*, *56*(3), 797–842.

Cain, M. D., McKeon, S. B., & Solomon, S. D. (2017). Do takeover laws matter? Evidence from five decades of hostile takeovers. *Journal of Financial Economics*, *124*(3), 464–485.

Callen, J. L., & Fang, X. (2013). Institutional investor stability and crash risk: Monitoring versus short-termism? *Journal of Banking and Finance*, *37*(8), 3047–3063.

Callen, J. L., & Fang, X. (2015). Religion and stock price crash risk. *Journal of Financial and Quantitative Analysis*, *50*(1–2), 169–195.

Carcello, J. V., & Nagy, A. L. (2004). Client size, auditor specialization and fraudulent financial reporting. *Managerial Auditing Journal*, *19*(5), 651–668.

Chava, S., Wang, R., & Zou, H. (2019). Covenants, creditors' simultaneous equity holdings, and firm investment policies. *Journal of Financial and Quantitative Analysis*, *54*(2), 481–512.

Chen, J., Hong, H., & Stein, J. C. (2001). Forecasting crashes: Trading volume, past returns, and conditional skewness in stock prices. *Journal of Financial Economics*, *61*(3), 345–381.

Chen, S., Chen, X., & Cheng, Q. (2008). Do family firms provide more or less voluntary disclosure? *Journal of Accounting Research*, *46*(3), 499–536.

Chu, Y. (2018). Shareholder-creditor conflict and payout policy: Evidence from mergers between lenders and shareholders. *The Review of Financial Studies*, *31*(8), 3098–3121.

Dass, N., & Massa, M. (2011). The impact of a strong bank-firm relationship on the borrowing firm. *The Review of Financial Studies*, *24*(4), 1204–1260.

DeFond, M. L., Hung, M., Li, S., & Li, Y. (2014). Does mandatory IFRS adoption affect crash risk? *The Accounting Review*, *90*(1), 265–299.

Del Guercio, D., & Hawkins, J. (1999). The motivation and impact of pension fund activism. *Journal of Financial Economics*, *52*(3), 293–340.

Dennis, P., & Mayhew, S. (2002). Risk-neutral skewness: Evidence from stock options. *Journal of Financial and Quantitative Analysis*, *37*(3), 471–493.

Diamond, D. W. (1984). Financial intermediation and delegated monitoring. *The Review of Economic Studies*, *51*(3), 393–414.

Duan, J. C., & Wei, J. (2009). Systematic risk and the price structure of individual equity options. *The Review of Financial Studies*, *22*(5), 1981–2006.
Edmans, A., & Manso, G. (2011). Governance through trading and intervention: A theory of multiple blockholders. *The Review of Financial Studies*, *24*(7), 2395–2428.
Ferreira, M., & Matos, P. (2012). Universal banks and corporate control: Evidence from the global syndicated loan market. *The Review of Financial Studies*, *25*(9), 2703–2744.
Gallagher, D. R., Gardner, P. A., & Swan, P. L. (2013). Governance through trading: Institutional swing trades and subsequent firm performance. *Journal of Financial and Quantitative Analysis*, *48*(2), 427–458.
Gao, X., Jia, Y., Krupa, N. R., & Tucker, J. W. (2022). The corroboration role of management earnings forecasts in private loan markets. *Journal of Accounting, Auditing & Finance*, *39*(3), 903–930.
Gilje, E. P. (2016). Do firms engage in risk-shifting? Empirical evidence. *The Review of Financial Studies*, *29*(11), 2925–2954.
Glosten, L. R., & Milgrom, P. R. (1985). Bid, ask and transaction prices in a specialist market with heterogeneously informed traders. *Journal of Financial Economics*, *14*(1), 71–100.
Harvey, C. R., & Siddique, A. (2000). Conditional skewness in asset pricing tests. *The Journal of Finance*, *55*(3), 1263–1295.
Heider, F., & Ljungqvist, A. (2015). As certain as debt and taxes: Estimating the tax sensitivity of leverage from state tax changes. *Journal of Financial Economics*, *118*(3), 684–712.
Hoberg, G., & Phillips, G. (2010). Product market synergies and competition in mergers and acquisitions: A text-based analysis. *The Review of Financial Studies*, *23*(10), 3773–3811.
Hoberg, G., & Phillips, G. (2016). Text-based network industries and endogenous product differentiation. *Journal of Political Economy*, *124*(5), 1423–1465.
Holmstrom, B., & Tirole, J. (1997). Financial intermediation, loanable funds, and the real sector. *The Quarterly Journal of Economics*, *112*(3), 663–691.
Hong, H., & Stein, J. C. (2003). Differences of opinion, short-sales constraints, and market crashes. *The Review of Financial Studies*, *16*(2), 487–525.
Hutton, A. P., Marcus, A. J., & Tehranian, H. (2009). Opaque financial reports, R2, and crash risk. *Journal of Financial Economics*, *94*(1), 67–86.
Ivashina, V. (2009). Asymmetric information effects on loan spreads. *Journal of Financial Economics*, *92*(2), 300–319.
Jackwerth, J. C., & Rubinstein, M. (1996). Recovering probability distributions from option prices. *The Journal of Finance*, *51*(5), 1611–1631.
Jayaraman, S., & Milbourn, T. (2015). CEO equity incentives and financial misreporting: The role of auditor expertise. *The Accounting Review*, *90*(1), 321–350.
Jensen, M. C., & Meckling, W. H. (1976). Theory of the firm: Managerial behavior, agency costs and ownership structure. *Journal of Financial Economics*, *3*(4), 305–360.
Jiang, W., Li, K., & Shao, P. (2010). When shareholders are creditors: Effects of the simultaneous holding of equity and debt by non-commercial banking institutions. *The Review of Financial Studies*, *23*(10), 3595–3637.
Jin, L., & Myers, S. C. (2006). R2 around the world: New theory and new tests. *Journal of Financial Economics*, *79*(2), 257–292.
Kim, J. B., Li, L., Lu, L. Y., & Yu, Y. (2016). Financial statement comparability and expected crash risk. *Journal of Accounting and Economics*, *61*(2–3), 294–312.
Kim, J. B., Li, Y., & Zhang, L. (2011). Corporate tax avoidance and stock price crash risk: Firm-level analysis. *Journal of Financial Economics*, *100*(3), 639–662.
Kim, J. B., Lu, L. Y., & Yu, Y. (2019). Analyst coverage and expected crash risk: Evidence from exogenous changes in analyst coverage. *The Accounting Review*, *94*(4), 345–364.
Kim, J. B., & Zhang, L. (2014). Financial reporting opacity and expected crash risk: Evidence from implied volatility smirks. *Contemporary Accounting Research*, *31*(3), 851–875.
Kim, J. B., & Zhang, L. (2016). Accounting conservatism and stock price crash risk: Firm-level evidence. *Contemporary Accounting Research*, *33*(1), 412–441.
Kim, O. (1993). Disagreements among shareholders over a firm's disclosure policy. *Journal of Finance*, *48*(2), 747–760.
Kyle, A. S. (1985). Continuous auctions and insider trading. *Econometrica*, *53*(6), 1315–1335.
Leland, H. E. (1994). Corporate debt value, bond covenants, and optimal capital structure. *The Journal of Finance*, *49*(4), 1213–1252.
Li, Q., Ni, X., Yeung, P. E., & Yin, D. (2022). *The information advantage of industry common blockholders and its stabilizing effect on stock price crash risk*. Working paper, Wuhan University, Xiamen University, Cornell University, and Miami University of Ohio.
Lim, J., Minton, B. A., & Weisbach, M. S. (2014). Syndicated loan spreads and the composition of the syndicate. *Journal of Financial Economics*, *111*(1), 45–69.
Maffett, M. (2012). Financial reporting opacity and informed trading by international institutional investors. *Journal of Accounting and Economics*, *54*(2–3), 201–220.
Masulis, R. W., Wang, C., & Xie, F. (2007). Corporate governance and acquirer returns. *The Journal of Finance*, *62*(4), 1851–1889.

McCahery, J. A., Sautner, Z., & Starks, L. T. (2016). Behind the scenes: The corporate governance preferences of institutional investors. *The Journal of Finance*, *71*(6), 2905–2932.
Myers, S. C. (1977). Determinants of corporate borrowing. *Journal of Financial Economics*, *5*(2), 147–175.
Pan, J. (2002). The jump-risk premia implicit in options: Evidence from an integrated time-series study. *Journal of Financial Economics*, *63*(1), 3–50.
Park, J., Sani, J., Shroff, N., & White, H. (2019). Disclosure incentives when competing firms have common ownership. *Journal of Accounting and Economics*, *67*(2–3), 387–415.
Pastor, L., & Pietro, V. (2003). Stock valuation and learning about profitability. *The Journal of Finance*, *58*(5), 1749–1789.
Petersen, M. A. (2009). Estimating standard errors in finance panel data sets: Comparing approaches. *The Review of Financial Studies*, *22*(1), 435–480.
Peyravan, L. (2020). Financial reporting quality and dual-holding of debt and equity. *The Accounting Review*, *95*(5), 351–371.
Peyravan, L., & Wittenberg-Moerman, R. (2022). Institutional dual-holders and managers' earnings disclosure. *The Accounting Review*, *97*(3), 343–371.
Rajan, R. G. (1992). Insiders and outsiders: The choice between relationship and arm's-length debt. *Journal of Finance*, *47*(4), 1367–1400.
Ramalingegowda, S., Utke, S., & Yu, Y. (2021). Common institutional ownership and earnings management. *Contemporary Accounting Research*, *38*(1), 208–241.
Roberts, M., & Whited, T. (2013). Endogeneity in corporate finance. In G. Constantinides, M. Harris, & R. M. Stulz (Eds.), *Handbook of the economics of finance* (Vol. 2A, pp. 493–572). Elsevier.
Santa-Clara, P., & Yan, S. (2010). Crashes, volatility, and the equity premium: Lessons from S&P 500 options. *The Review of Economics and Statistics*, *92*(2), 435–451.
Sharpe, S. A. (1990). Asymmetric information, bank lending, and implicit contracts: A stylized model of customer relationships. *Journal of Finance*, *45*(4), 1069–1087.
Shleifer, A., & Vishny, R. W. (1986). Large shareholders and corporate control. *Journal of Political Economy*, *94*(3), 461–488.
Sufi, A. (2007). Information asymmetry and financing arrangements: Evidence from syndicated loans. *The Journal of Finance*, *62*(2), 629–668.
Thompson, S. B. (2011). Simple formulas for standard errors that cluster by both firm and time. *Journal of Financial Economics*, *99*(1), 1–10.
Van Buskirk, A. (2011). *Volatility skew, earnings announcements, and the predictability of crashes*. Working paper, Ohio State University.
Vashishtha, R. (2014). The role of bank monitoring in borrowers' discretionary disclosure: Evidence from covenant violations. *Journal of Accounting and Economics*, *57*(2–3), 176–195.
White, H. (1980). A heteroskedasticity-consistent covariance matrix estimator and a direct test for heteroskedasticity. *Econometrica*, *48*(4), 817–838.
Xing, Y., Zhang, X., & Zhao, R. (2010). What does the individual option volatility smirk tell us about future equity returns? *Journal of Financial and Quantitative Analysis*, *45*(3), 641–662.
Yan, S. (2011). Jump risk, stock returns, and slope of implied volatility smile. *Journal of Financial Economics*, *99*(1), 216–233.
Yang, H. (2021). Institutional dual holdings and risk-shifting: Evidence from corporate innovation. *Journal of Corporate Finance*, *70*, 102088.
Zhang, Y., Guan, Y., & Kim, J. B. (2019). XBRL adoption and expected crash risk. *Journal of Accounting and Public Policy*, *38*(1), 31–52.
Zhao, Y., & Chen, K. H. (2008). Staggered boards and earnings management. *The Accounting Review*, *83*(5), 1347–1381.

SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

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APPENDIX: VARIABLE DEFINITIONS

Variable	Definition
Measure of ex ante stock price crash risk	
IV_SKEW	Average daily implied volatility skew over the fiscal year, where the daily implied volatility skew is the difference between the implied volatility of OTM put options and that of ATM call options. The OTM puts are defined as put option contracts with a delta between −0.375 and − 0.125, and the ATM calls are defined as call option contracts with a delta between 0.375 and 0.625. The daily implied volatilities of OTM puts (ATM calls) are the open interest-weighted average of all OTM puts (ATM calls) traded during the day
Variables of interest in the DiD analysis	
Treatment	Dummy variable that equals one if the firm is a treatment firm affected by a merger, and zero otherwise
Post	Dummy variable that equals one if the year is after the merger for the treatment firm or its matched control firm, and zero otherwise
Control variables	
INSTOWN	Percentage institutional ownership obtained from Thomson Reuters 13F database
LEV	Total long-term debt (DLTT) divided by total assets (AT)
SIZE	Natural logarithm of the market value of equity (PRCC_F × CSHO)
MB	Market value of equity (CEQ) divided by book value of equity (PRCC_F × CSHO)
ROA	Income before extraordinary items (IB) divided by lagged total assets (AT)
CASHFLOW	Operating cash flow (OANCF) divided by lagged total assets (AT)
ATM_IV	Average daily implied volatility of ATM options over the fiscal year. An ATM call option is defined as a call option with a delta between 0.375 and 0.625. The daily implied volatility is calculated as an open interest-weighted average of the implied volatility for all ATM call options traded during the day
CASHFLOW_VOL	Standard deviation of operating cash flows (OANCF) (scaled by lagged total assets (AT)) over the past 5 years
EARNINGS_VOL	Standard deviation of earnings before extraordinary items (IB) (scaled by lagged total assets (AT)) over the past 5 years
SALES_VOL	Standard deviation of sales revenue (SALE) (scaled by lagged total assets (AT)) over the past 5 years
STOCK_RET	Raw stock return over the fiscal year
STOCK_TURN	Average monthly share turnover over the fiscal year
BETA	Market beta for the firm, estimated using daily stock and market returns over the fiscal year period
IDOSY_VOL	Standard deviation of firm-specific weekly returns over the fiscal year
TOTAL_VOL	Standard deviation of weekly stock returns over the fiscal year
NCSKEW	Negative skewness of firm-specific weekly returns over the fiscal year
ACCM	Prior 3-year moving sum of the absolute value of discretionary accruals estimated using modified Jones model
COMMON_DUM	Dummy variable that equals one if the firm has at least one same-industry firm that is co-owned with the focal firm in at least one of the four quarters of the fiscal year, and zero otherwise. We focus on the common ownership of blockholders that have at least 5% ownership in each firm. We define industry classification based on the 300-industry grouping from Hoberg and Phillips (2010, 2016)

(Continues)

APPENDIX (Continued)

Variable	Definition
Variables in additional analyses	
Shareholder stake	Ratio of shares owned by the merging shareholder divided by the shares owned by all institutional shareholders
Lender stake	Merging lender's loan size (the total amount of the loan allocated to the lender) scaled by the firm's long-term debt
Z-Score	Financial distress score calculated based on Altman's (1968) *Z*-score model
SPREAD	Average of daily bid-ask spread scaled by mid-point of bid and ask prices over the fiscal year
DISP	12-month average of the standard deviation of individual analyst earnings forecasts scaled by the stock price as of the fiscal year-end
FREQ_8K	Number of 8-Ks filed during the fiscal year
MF	Number of management forecasts issued during the year
MF_BAD	Number of management forecasts that are lower than the prior analyst consensus issued during the year
MF_GOOD	Number of management forecasts that are higher than prior analyst consensus issued during the year
Lead arranger	Dummy variable that equals one if the merging lender is a lead arranger of the treatment firm, and zero otherwise
Non-commercial bank	Dummy variable that equals one if the merging lender is a non-commercial bank, and zero otherwise
BDIND	Dummy variable that equals one if the fraction of independent directors in the firm's board is less than two thirds, and zero otherwise
AUDIT_IND	Dummy variable that is equal to one if not all directors in the audit committees are independent directors, and zero otherwise
THREAT	Takeover threat in the market for corporate control, proxied by the takeover index estimated by Cain et al. (2017)