Analyst coverage, executive compensation and corporate risk-taking: Evidence from property–casualty insurance firms

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Analyst Coverage, Executive Compensation and Corporate Risk-Taking: Evidence from Property-Casualty Insurance Firms*

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Abstract

Using an exogenous drop in analyst coverage introduced by broker closures and mergers, we test for the causal impact of analyst coverage on corporate risk-taking, in an opaque industry. We document an increase in risk using several book-based and market-based risk measures, including tail and default risk measures. The increase in risk is stronger in more opaque firms, and it is due to managerial risk-taking actions, such as investing firm assets in higher-risk bonds. Results are driven by firms with stronger managerial risk-taking compensation incentives. Our study highlights the importance of stock analysts in discouraging excessive corporate risk-taking, especially in the presence of stronger managerial, compensation risk-taking incentives.

JEL classification: G22, G32.
Keywords: Analyst coverage, Risk-taking, Compensation incentives, Insurance.

1. Introduction

Information intermediaries in financial markets transform the abundance of public and private information about the firms they follow into an easily comprehensible signal for investors, customers, and regulators. Popular examples of information intermediaries are stock analysts, who serve shareholders and potential investors primarily, and credit rating agencies, who also inform customers and regulators.[1] In addition to their information production role, which plays an indirect monitoring role on the firm, information intermediaries also directly monitor firm operations (e.g., Chen, Harford, and Lin, 2015). While prior literature documents that various firm stakeholders, such as banks and bondholders, can detect and deter corporate risk-taking, the role played by information intermediaries receives little attention.[2]

Although the direct monitoring role and the information production role by analysts appear to influence risk-taking, the potential endogeneity issues tied to this research question have led to limited research on the topic.[3] This study fills this gap in the literature by focusing on stock analysts as our representative information intermediary to examine their impact on firm risk. To address these potential endogeneity issues, we use two natural experiments that directly affect firms' analyst coverage but are not directly related to firms' risk-taking: brokerage

[1] However, information intermediaries are not problem free. See, for instance, the potential conflicts of interest present in the ratings industry (e.g., Beaver, Shakespeare, and Soliman, 2006; Berwart, Guidolin, and Milidonis, 2019) and the long literature on bias present in analysts' forecasts (Das, Levine, and Sivaramakrishnan, 1998).

[2] A case in point about the important role of analysts, is Meredith Whitney, who was an analyst at the brokerage house Oppenheimer in 2007. She issued a particularly pessimistic, but accurate, research report on Citigroup on October 31, 2007, arguing that Citibank might go bankrupt as a result of its subprime mortgage holdings. The industry took note, and Fortune listed Whitney as one of the "50 Most Powerful Women in Business." https://money.cnn.com/magazines/fortune/most-powerful-women/2011/snapshots/48.html

[3] The first concern is reverse causality. Risk-taking might influence firms' information environment and, thus, analyst coverage. For instance, McNichols and O'Brien (1997) reveal the presence of a self-selection bias in analysts' ratings: higher (lower) ratings assigned to newly covered (dropped) stocks are associated with fundamental information about the stocks. The second potential concern relates to omitted variables. Unobservable corporate investment opportunities could drive both analyst coverage and risk-taking.

closures (Kelly and Ljungqvist, 2012) and broker mergers (Hong and Kacperczyk, 2010).[4] These events disrupt the information production process, while not being directly related to firms' risk level. The identification strategy of using the drop in analyst coverage because of broker exits, allows us to draw causal inferences about their impact on firm risk.

Analyst coverage can affect firm risk through the following channels. First, analysts can directly affect corporate governance through their monitoring role (Chen, Harford, and Lin, 2015), and eventually firm risk and value. According to the asset substitution literature, shareholders prefer more risk than debtholders (e.g., Jensen and Meckling, 1976). On the other hand, firm managers are considered risk-averse and undiversified with respect to their firm-dependent wealth. Moreover, managers face several different mechanisms to suppress risk (such as credit rating agencies, regulators, and policyholder monitoring). Recognizing this situation, shareholders offer managers incentive contracts that reward risk-taking (Garen, 1994). If designed optimally, such contracts would provide managers with incentives to increase firm risk at levels desired by shareholders.

Managers are typically shown to respond to such compensation risk-taking incentives (e.g., Guay, 1999; Cohen, Hall, and Viceira, 2000; Coles, Daniel, and Naveen, 2006; Low, 2009), except when managerial career concerns are present (Milidonis and Stathopoulos, 2014).[5] In the case of the insurance industry, managers responding to compensation risk-taking incentives might lead firm risk to excessive levels (Milidonis and Stathopoulos, 2011). Such excessive risk levels can increase firm default risk, thus increasing the probability of bankruptcy,

[4] See, for example, Kelly and Ljungqvist (2012), who provide supporting evidence that the brokerage closures are not motivated by negative information about individual stocks.
[5] We address the case of career concerns in subsection 4.3.2.

inducing regulatory costs, and harming investors. Consequently, we expect that analyst coverage will encourage a decrease in firm risk. On the other hand, in cases where managerial incentives are weak or absent due to shareholders' effort to reduce the agency cost of debt (John and John, 1993) or perhaps because of weak corporate governance (Chen, Harford, and Lin, 2015), analyst coverage might have a different effect.

A second channel through which analysts affect firm risk is through their informational role. Analysts gather, process, and analyze not only an abundance of public information but also non-public information from meetings with firms, thus contributing to the production of new information about these firms. This information production role acts as an indirect monitoring mechanism that increases corporate transparency, thus making it possible for outside stakeholders to exercise proper monitoring. As documented by Kim, Lu and Yu (2019), analyst coverage decreases ex-ante market perceptions of firms' crash risk, which suggests that analyst coverage helps suppress firm risk.

We focus our study on the U.S. publicly traded property and casualty (PC) insurance industry for two reasons. First, the risk-shifting problem in the insurance industry is more involved because of the presence of policyholders in addition to debtholders. Moreover, the presence of government guarantees in some lines of the insurance business directly impacts the strength of policyholder monitoring. For example, Epermanis and Harrington (2006) find that companies writing more commercial than personal insurance businesses, are more sensitive to firm risk, because personal lines are covered to a larger extent by insurance guarantee funds than commercial lines. Hence, we can test for the impact of the exogenous drop in analyst

coverage on firm risk, using the cross-sectional variation in compensation risk-taking incentives, and also in the degree of policyholder monitoring within the PC insurance industry.

Second, PC insurers are more opaque than other (non-financial) firms (Chiang, Kim, and Niehaus, 2022; Epermanis and Harrington, 2006; Morgan, 2002). Insurers' opaqueness is largely a result of the complexity of insurance assets (e.g., holdings of bonds and stocks) and liabilities (e.g., the underwriting for homeowners, motor, and liability insurance, among others), and the risk associated with these assets and liabilities. Since opaqueness also varies within the industry, we expect that the risk-reducing effect that analyst coverage has through its informational role (Kim, Lu and Yu, 2019) will be larger in more opaque firms.

Using a set of market-based and book-based risk measures, we find that higher analyst coverage is correlated to lower firm risk. We then examine the causal impact of the exogenous drop in analyst coverage on the same risk measures, using a multiple-shock, difference-in-differences (DID), and panel regression model. Our sample comprises seven broker closures and mergers to the PC insurance industry that meet our non-overlapping requirement from 2001–2017. Our DID results document an increase in firm risk as perceived by investors and reflected in the measures of systematic and unsystematic risk and measures of excessive risk (such as tail and default risk) that we use.

We then test our prediction that more opaque insurance firms will experience a larger increase in risk after the exogenous drop in analyst coverage, if the information role of analysts is taking effect. We do this by partitioning the sample into subsamples of high and low firm opaqueness using insurers' opaqueness measures from the literature (Zhang, Cox, and Van Ness,

2009; Wade, Liebenberg, and Blau, 2016). Our results confirm our prediction.

Next, we focus on a major risk-taking mechanism provided by shareholders to managers. We proxy for the strength of compensation risk-taking incentives, by constructing compensation vega, the sensitivity of CEO compensation to changes in the volatility of the firm's stock return volatility (Guay, 1999). We split our sample into subsamples of high and low vega (based on the median vega) and re-estimate the DID model. We find that the overall increase in risk is driven by the subsample of high vega. This result is consistent with our expectation that analysts help monitor firm risk when managers are provided with relatively stronger compensation risk-taking incentives.

To understand if policyholder monitoring also helps mitigate firm risk, we condition our sample on the strength of policyholder monitoring, based on the percentage of business written on commercial vs. personal lines of insurance (Epermanis and Harrington, 2006). The DID analysis shows that the increase in firm risk after the exogenous drop in analyst coverage, is driven by the subsample with low policyholder monitoring. This result suggests that policyholder monitoring and analyst coverage might be complementary mechanisms to monitor insurance firm risk.

To disentangle the documented risk-mitigating role that both analyst coverage and policyholder monitoring might have on the risk-shifting problem by shareholders, we double sort our sample on the median vega and the median policyholder monitoring measure, to produce four subsamples. We observe that risk increases in the subsamples with high vega, regardless of the level of policyholder monitoring. This result suggests that analyst coverage

mitigates firm risk when managers are offered high vega, since risk increases even when policyholder monitoring is high. On the other hand, while we do not observe an increase in risk in subsamples with low vega and high policyholder monitoring, we note that in the case of low vega and low monitoring, one of the book measures of risk exhibits an increase in risk, potentially hinting that analysts might have a broader risk-mitigating role to play, in the insurance industry.

Finally, since we focus on an opaque industry, we show that the increase in firm risk is not only a matter of market perception but one of firm risk-taking actions. Specifically, we show that managers invest more assets in relatively worse-rated bonds, when analyst coverage drops. This happens more in more opaque firms, firms with low initial analyst coverage, stronger managerial compensation vega and weaker policyholder monitoring. We also find an increase in risk in book measures of risk that are likely to reflect a firm's choice of risk (Bildersee, 1975; Ljungqvist, Zhang, and Zuo, 2017), such as the volatility of the return on assets.

Our results are robust to several specifications. In addition to tests for the parallel trends assumption in the DID regressions and additional tests related to staggered DID regressions, we use other risk measures to those presented in the paper. Moreover, results are robust to controls for liquidity risk (Kelly and Ljungqvist, 2012), the degree of analyst coverage (number of analysts and dispersion of their forecasts), additional CEO compensation incentives (such as delta and inside debt), and firm controls related to the type of business underwritten. Finally, we exclude the crisis period, and the results remain robust.

We contribute to the literature in the following ways. First, we contribute to the literature

investigating the consequences of security analyst coverage, specifically the growing body of research using broker house mergers and closures as exogenous shocks to the information environment. This research documents that security analyst coverage affects earnings forecasting bias (Hong and Kacperczyk, 2010), market liquidity (Kelly and Ljungqvist, 2012), cost of financing (Derrien and Kecskes, 2013; Kelly and Ljungqvist, 2012), credit analysts' bias (Fong, Hong, Kacperczyk, and Kubik, 2014), firm investment (Derrien and Kecskes, 2013), innovation (He and Tian, 2013), disclosure (Irani and Oesch, 2013), tax aggressiveness (Chen and Lin, 2017), corporate governance (Chen, Harford, and Lin, 2015) and ex-ante, expected crash risk (Kim, Lu and Yu, 2019). Our paper is the first study to provide evidence that security analyst coverage affects firm risk, using a wide set of realized risk measures such as systematic, unsystematic, and book-based risk measures, but also additional excessive risk measures, such as tail and default risk measures. Moreover, we highlight the risk-reducing effect associated with the information role of analyst coverage by documenting a stronger increase in risk for more opaque firms, in our DID analysis.

Second, our study shows a mechanism through which risk increases. We find that the increase in risk is driven primarily by firms that provide stronger compensation risk-taking incentives to their managers. In the presence of compensation risk-taking incentives, analysts are likely to focus on potential excessive risk-taking by managers; hence when analyst coverage drops exogenously, the risk mitigation role of analysts is reduced and managers can respond more to compensation risk-taking incentives.

Third, our study adds a new dimension to the literature on insurer risk-taking by identifying

analyst coverage as an important mechanism through which risk is reduced. Prior literature documents that corporate governance (Eling and Marek, 2014; Ho, Lai, and Lee, 2013), CEO compensation (Milidonis, Nishikawa, and Shim, 2019; Milidonis and Stathopoulos, 2011), market structure (Shim, 2017), institutional ownership (Cheng, Elyasiani, and Jia, 2011), solvency regulations (Chen, Goh, Kamiya, and Lou, 2019), and organizational forms (Lu, Lai, and Ma, 2017; Mayers and Smith, 1994) are important for risk-taking. We document that analyst coverage helps suppress firm risk in insurance firms. This decrease in risk is stronger when shareholders offer stronger compensation risk-taking incentives to their managers and also when insurance firms are more opaque. We show that firm risk-taking takes place through at least one channel, that is, investments in relatively riskier bonds.

The rest of the paper is organized as follows. In section 2, we summarize the related literature and develop our hypotheses. Section 3 describes the identification strategy, sample construction, and descriptive statistics. We describe the empirical methodology and discuss the results in section 4. Section 5 provides direct evidence of managerial risk-increasing actions. In section 6, we conduct robustness tests, and section 7 concludes.

2. Literature review and hypothesis development

2.1. Analysts' direct monitoring role

Analysts monitor firm performance by raising questions about firms' investments, managerial compensation design, and internal risk control in conference calls. Analyst coverage is documented to detect misconduct of firms they cover, for example, firms' earnings management (Yu, 2008), tax avoidance (Chen and Lin, 2017), managerial empire building

(Chen, Harford, and Lin, 2015), and improper choice of accounting policy (Christensen, Gomez, Ma, and Pan, 2021). For instance, Dyck, Morse, and Zingales (2010) find that compared with the U.S. Securities and Exchange Commission and auditors, analysts play a larger role in detecting corporate fraud (e.g., in cases such as Compaq, Gateway and Motorola).

Based on the above literature, we argue analysts can directly monitor firms' risk levels. Anecdotal evidence supports this perspective. Analysts pose questions in earnings conference calls related to insurance firms' risk. For example, Thomas George Gallagher (Evercore ISI Institutional Equities, Research Division) asked Lincoln National Corporation on May 2, 2019:9 "First question, just on the net income volatility you saw this quarter, and I think you referenced that was related to the reinsurance transaction. Can you comment whether you would expect that to remain higher level of volatility going forward? Or should we expect that to come down over time?"[6]

Chen, Harford, and Lin (2015) find that analysts' monitoring role improves corporate governance, in the sense that they enhance managerial actions to be more aligned with shareholders' interests, thus affecting shareholder value. By monitoring managerial actions with respect to firm risk, analysts, who primarily serve shareholders and potential investors, could identify cases where managers deviate from optimal firm risk.

2.2. Firm risk and executive compensation

The seminal study by Jensen and Meckling (1976) points out that limited liability incentivizes shareholders to expropriate wealth from bondholders by increasing risk. In the

[6] https://nz.news.yahoo.com/lincoln-national-lnc-q1-2019-042347218.html

insurance industry, government guarantees increase the risk-shifting problem (Brewer III, Mondschean, and Strahan, 1997), especially for companies writing more business in personal lines that are covered to a larger extent by such guarantees, than commercial lines of insurance (Epermanis and Harrington, 2006).

Managers, on the other hand, are risk averse and undiversified with respect to their wealth dependent on the firm they manage.[7] Moreover, they face several mechanisms that mitigate risk, such as rating agencies, insurance regulators' oversight, and policyholder monitoring. To encourage managers to take more risk, shareholders offer them compensation incentives that reward risk-taking. Such incentives generally work, since compensation vega is shown to have a positive relation to firm risk in non-financial firms (e.g., Guay, 1999; Cohen, Hall, and Viceira, 2000; Coles, Daniel, and Naveen, 2006; Low, 2009). Exceptions however exist, such as when managers face career concerns (Milidonis and Stathopoulos, 2014).

In the insurance industry, several studies use vega (or variations of vega) as a control variable in other research questions they pose (e.g., Cheng et al., 2011). However, some literature suggests a link between equity-based compensation and firm risk (Grace, 2004). More recently, Yun, Carson, and Eckles (2022) report higher compensation vega values for the insurance industry relative to non-financial firms and also show that vega is negatively related to a firm's hedging activities. With respect to excessive risk, Milidonis and Stathopoulos (2011) show that option-based, managerial compensation is linked to higher default risk for insurance firms. Hence, in their effort to increase firm risk, managers might take excessive risk, which

[7] In some industries, managers show preference for a "quiet life" (Bertrand and Mullainathan, 2003), suggesting that managers may not want to take unnecessary risk.

could adversely impact shareholders through regulatory costs or, even bankruptcy.

But how does analyst coverage affect managerial risk-taking? In line with their monitoring role that enhances corporate governance (Chen, Harford, and Lin, 2015), in the case described above where managers respond to managerial risk-taking incentives, we expect analysts to suppress firm risk, to avoid situations where risk increases excessively (Milidonis and Stathopoulos, 2011). In the case of costly financial distress or even default due to excessive firm risk, investors stand to lose significantly. In addition, analysts might be impacted adversely. Harford et al., (2019) argue that analysts have limited time available, and they aim to maximize their own utility function by taking into consideration their own time constraints and also career concerns. Hence, in the case that the firm they cover goes through financial distress or default, analysts might experience a decrease in the demand for their services related to the underlying firm. Moreover, it might be costlier for them in terms of time and effort to specialize on a new firm, than continuing to cover an existing firm that avoids default.

While compensation risk-taking incentives appear to be more prevalent in the financial services industry than in manufacturing industries (Yun, Carson, and Eckles, 2022),[8] it is possible that compensation incentives are weak or even absent. One reason might be because of weak corporate governance, where shareholders do not provide optimal, managerial compensation packages. Another reason, might be because of shareholders' efforts to alleviate

[8] DeYoung, Peng, and Yan (2013) show that during 1994–2006, the total compensation paid to the CEO at the largest U.S. banks differs little from that of large U.S. industrial corporations; however, bank CEO's vega diverged permanently and substantially from that of the non-bank CEOs around 2000. Moreover, the authors find that banks with higher vega increase their risk-taking and that the boards of large banks, which are considered to be "too big to fail," even set high vega compensation to reinforce CEO's incentives in taking risk.

debtholders' concerns related to the risk-shifting problem, in their effort to gain from lower agency costs of debt (John and John, 1993). Hence, analysts may have a different impact on firm risk in these cases, where the direction of the relation might not be monotonic.[9]

2.3. Analysts' information production role

Analyst coverage can produce information and facilitate the decisions of corporate stakeholders. With analyst coverage, outsiders can gain more knowledge about internal firm operations, such as insurers' investment policies, compensation, and internal controls.

Analysts contribute to information production through at least two important dimensions: First, they reinterpret publicly available information in ways that only specialists (like themselves) can. Second, they undertake activities, such as site visits or conference calls, related to non-public information acquisition. For example, Klein, Li, and Zhang (2020) show that, by accessing FDA factory inspection reports, sell-side health care analysts gain information about the factory inspections and medical device applications of their covered firm and therefore make more accurate buy (sell) recommendations. Moreover, Han, Kong, and Liu (2018) find that company visits significantly enhance the accuracy of analysts' earnings forecasts for the companies they visit.

Firm stakeholders that are "outsiders," such as credit rating agencies, customers, and regulators, are primarily concerned about the risk that insurance companies undertake. For example, customers (e.g., Epermanis and Harrington, 2006) and regulators (e.g., Klein, 1995; Harrington, 2009) care about the financial soundness of insurance companies; in particular,

[9] We thank an anonymous referee for this point.

they want to see future insurance claims be paid without significant constraints on the financial strength of the insurance company. Hence, these stakeholders prefer lower firm risk. Analysts' information role improves transparency and facilitates the direct and indirect monitoring role of outsiders who monitor the management of insurance companies in containing risk-taking.

According to the literature on contract theory (Armstrong, Guay, and Weber, 2010), the more transparent information environment helps to increase the observability of the risk choice by managers and helps to curb the risk-shifting problem, e.g., the incentive of levered stockholders to choose risky, negative net-present-value investment. Therefore, the information produced by analysts may help to reduce the information asymmetry between stockholder and debtholders. In the insurance industry, Eling (2012) offers a survey and documents there is a consensus in the literature that transparent information environments could lead to less risk-taking through market discipline.

The information role could even suppress risk from the perspective of shareholders. Managers have been found to either delay (Hong, Kim, and Welker, 2017; Kothari, Shu, and Wysocki, 2009) or hide (Hutton, Marcus, and Tehranian, 2009) bad news about the firm, thus giving rise to a future downward correction in the firm's stock price (Kim, Lu and Yu, 2019). Kim, Lu, and Yu (2019) propose that analyst coverage helps investors ascertain the likelihood of future crashes, as analysts help with the diffusion of bad news, and through their information intermediary role, analysts help identify firm risks that are opaque to their clients. The authors find that after an exogenous drop in analyst coverage, expected firm crash risk, as measured using option implied volatility smirks, increases.

2.4. Hypothesis development

We start by testing the unconditional impact of the exogenous drop in analyst coverage on firm risk. As a result of analysts' monitoring role (subsection 2.1), its impact on corporate governance, and the presence of stronger compensation risk-taking incentives in the insurance industry than other industries (Yun, Carson, and Eckles, 2022) that have been linked to an increase in default risk (Milidonis and Stathopoulos, 2011), we expect that analyst coverage helps firms only take risks for which the expected returns outweigh the costs associated with the risks. Moreover, analysts' informational role (subsection 2.3), which also serves as an indirect monitoring mechanism as it facilitates the decisions of shareholders, potential investors and other stakeholders, provides more transparency, reduces agency costs and information gaps between managers and outside stakeholders, especially linked to bad, firm-specific news (Kim, Lu and Yu, 2019). Analyst coverage also helps reduce the information asymmetry between bondholders and shareholders thus reducing the risk-shifting problem (e.g., facilitate market discipline). Hence we expect that through their information role, analyst coverage encourages risk mitigation.

Taken together, analysts' monitoring and information role, especially in the insurance industry that is relatively more opaque than non-financial industries (Morgan, 2002), lead us to the following hypothesis:

H1: The drop in analyst coverage leads to a higher level of firm risk.

An alternative point of view, is that there is a dark side to analyst coverage, as it puts pressure on managers to meet short-term goals (He and Tian, 2013). To do so, managers are

willing to sacrifice investments in innovative projects, which are by definition long-term, risky and potentially unpredictable.[10] Even if this alternative point of view is present (that analyst coverage might increase long-term risk), we expect that it will have a moderating effect on hypothesis 1. This unexpected disruption in the risk dynamics that managers face is expected to be short-lived, as the exogenous decrease in the supply of analysts is expected to be reversed soon after the exogenous shock (Chen, Harford, and Lin, 2015).

Our next hypothesis exploits the richness of the insurance industry with respect to firm opaqueness. Analysts' information production helps improve corporate transparency and facilitates the indirect monitoring of the firm. Hence, we expect more opaque insurance firms to experience a higher increase in risk than less opaque ones. We use the variation in opaqueness within the insurance industry (Zhang, Cox, and Van Ness, 2009; Wade, Liebenberg, and Blau, 2016) to test our second hypothesis:

H2: The drop in analyst coverage leads to a greater increase in firm risk for more opaque than less opaque insurers.

To understand the mechanism through which firm risk might change, we focus on the managerial compensation literature. In the absence of significant equity-based compensation, managers are expected to lower risk than the risk desired by shareholders, since CEOs are themselves risk-averse and undiversified with respect to their firm-dependent wealth (Pratt, 1964; Smith and Stulz, 1985; Guay, 1999; Carpenter, 2000; Ju et al., 2002; Ross, 2004; Lewellen, 2006). Moreover, CEOs face additional scrutiny by regulators, rating agencies,

[10] In the case of insurers, managers might understate reserves to meet short-term earnings' goals, thus potentially increasing long-term risk (Beaver, McNichols, and Nelson, 2003).

policyholders and analysts (Kim, Lu and Yu, 2019) with respect to excessive downside risks that might materialize, since such risks might jeopardize the future claims on the firm by policyholders, debtholders and other stakeholders.

Shareholders recognize all of the above and offer equity-based, compensation incentives to their CEOs, to bend the pressure CEOs face to suppress risk. In the absence of career concerns (Milidonis and Stathopoulos, 2014), CEOs are shown to respond to compensation risk-taking incentives (Guay, 1999; Cohen et al., 2000; Coles et al., 2006; Low, 2009). However, in the insurance literature, such risk-taking actions lead to excessive risk, as firm default risk increases (Milidonis and Stathopoulos, 2011).

Given the exogenous drop in analyst coverage, we expect that the monitoring and information role of analysts will be weakened, hence, in the presence of strong risk-taking incentives, managers will increase firm risk. Therefore, we expect that managers will increase risk in the year after the drop in analyst coverage, depending on the strength of the risk-taking incentives their compensation contracts include:

H3: The drop in analyst coverage leads to a larger increase in firm risk for insurers with stronger CEO risk-increasing incentives than those with weaker CEO risk-increasing incentives.

On the other hand, if compensation risk-taking incentives are weaker, then managers are more likely not to attain the level or risk preferred by shareholders and the impact of analyst coverage remains an empirical question. This is because, in their effort to enhance shareholder value, analysts might nudge managers to take some risk, which will contradict the risk

mitigating effect arising from analysts' monitoring and informational role.

We do not expect that career concerns will affect our hypothesis above. Milidonis and Stathopoulos (2014) proxy the sample of firms whose managers might have career concerns, using firms that have high leverage or close to default, among other conditions. Since the leverage of insurers and non-financial firms is not comparable, we compare the distance to default (D2D) of our sample and theirs. Insurers appear safer than their sample of non-financial firms, as the median D2D in our sample is 9.7 vs. 7.7 in their sample. The distribution of insurers' financial strength ratings confirms the relative safety of insurers. We observe that 77% of our sample is rated as "A-" or above and only 6% is below this threshold (the rest of the sample is not rated). Hence, we do not expect that career concerns will impact our analysis.[11]

Mechanisms suppressing firm risk could complement each other. Hence when one mechanism (e.g., analyst coverage) weakens, perhaps the monitoring mechanism by insurance policyholders can still prevent risk from increasing. We follow Epermanis and Harrington (2006) to separate firms into those with high and low policyholder monitoring mechanisms.[12] High policyholder monitoring is expected from firms with relatively more business written on commercial lines than personal lines. Hence we expect that when analyst coverage drops, firm risk will increase more in companies with low policyholder monitoring:

H4: The drop in analyst coverage leads to a larger increase in firm risk for insurers with low policyholder monitoring.

[11] We err on the side of caution by confirming this expectation in subsection 4.3.2.

[12] We do not develop any hypotheses for the other two monitoring mechanisms of insurance firms (rating agencies and the regulator) since we expect to see less variation in their monitoring intensity than the policyholder monitoring mechanism and the exogenous drop in analyst coverage. We do however condition our analysis on the capital adequacy of our sample that might relate to the attention paid by rating agencies and regulators.

3. Identification, data, and sample

3.1. Identification strategy

We use two different natural experiments for our identification strategy. The first natural experiment is brokerage closures. As argued by Kelly and Ljungqvist (2012), broker closures provide an ideal source of exogenous shocks to analyst coverage because closures are mostly driven by the business strategy considerations of the brokers themselves and are not correlated with firm-specific characteristics. Therefore, closures should affect a firm's risk only through changes in the number of analysts covering the firm. The second natural experiment is broker mergers, first adopted by Hong and Kacperczyk (2010) in their study of how competition affects earnings forecast bias. As documented by Wu and Zang (2009), when two brokerage firms merge, they typically fire analysts because of redundancy or cultural clashes. Consequently, broker mergers also provide exogenous variations in analyst coverage.

To identify broker closures, we use the IBES database to procure a list of brokers who disappear from the database between 2001 and 2017, and we then search Factiva to confirm that the exit is due to closure. A list of brokerage closures provided by Kelly and Ljungqvist (2012) complements our sample. The construction of the broker merger sample follows that of Hong and Kacperczyk (2010). We first collect broker merger events using the Thomson Reuters SDC M&A database, searching for both the acquirer and target primary Standard Industrial Classification (SIC) code 6211 or 6282. We consider only completed deals and deals for which 100% of the target is acquired. Then we manually match all of the acquirers and targets with the names of brokerage houses in the IBES database. Together, we have 82 broker

exits during the years 2001 to 2017. Specifically, we have 39 broker exits from years 2001 to 2010. This number is similar to the combined numbers of Kelly and Ljungqvist (2012) and Hong and Kacperczyk (2010).

To obtain a sample of affected firms, we merge our final sample of broker exits with the IBES-unadjusted historical details data set. For broker closures, we need the covered firms to remain in the IBES sample in year $t + 1$. For broker mergers, we restrict the firms to those covered by both the acquiring and target houses before the merger and continue to be followed by the broker after the merger. Following recent studies (Chen, Harford, and Lin, 2015; Chen and Lin, 2017; Derrien and Kecskes, 2013; Irani and Oesch, 2013), we drop the shocked firm-year observations in year t, when broker exits occur.

We find that 11 of 82 broker house mergers and closures identified above during the years 2001 to 2017 are related to insurance companies. As we will discuss later in subsection 3.2, we require a four-year event window, $[t - 2, t + 1]$, for the treated firms. Therefore, the shocks we use are limited to the years 2004–2017. Table 1 presents the distribution of the seven remaining broker mergers and closures from 2004 to 2017 in our sample. Overall, we do not observe clustering in these events over time.[13]

3.2. Sample construction

The financial and stock price information required to construct our sample comes from the following sources: the National Association of Insurance Commissioners (NAIC), Compustat,

[13] Some prior studies have used a 3-year period in their analysis (Chen, Harford, and Lin, 2015; Irani and Oesch, 2013) to investigate the consequences of losing analyst coverage, because the effect of losing analyst coverage is transitory (Chen, Harford, and Lin, 2015). To mitigate concerns about using a short window in testing the parallel trend, we use a 4-year event window $[t - 2, t + 1]$. We find consistent results using a 3-year event window $[t - 1, t + 1]$ as well.

and the Center for Research in Security Price (CRSP). We begin with the PC segments of NAIC annual statements. Since the data in Compustat and CRSP represent an entire insurance group (i.e., the publicly traded entity), we follow Eckles and Halek (2010) by utilizing consolidated data for each insurance group based on the aggregation of individual insurers within each group. We then manually match the insurance groups from the NAIC database to Compustat data by company name. In this way, we only include group and unaffiliated single PC insurance companies, resulting in 1,597 firm-year observations.

We then merge the NAIC-Compustat sample with CRSP data to obtain the stock price information, which we use to construct the market-based risk measures, giving us 1,376 firm-year observations. We further merge this sample with the IBES database and keep observations that appear in both databases. This leaves us with 1,233 firm-year observations.

We then identify the treated group. As we discussed above, for broker closures, we need the covered firms to remain in the IBES sample in year $t + 1$. For broker mergers, we restrict the firms to those covered by both the acquiring and target houses before the merger and those that continue to be followed by the remaining broker after the merger. We also drop firm-year observations that experience consecutive shocks, to ensure no overlaps in the window $[t - 3, t + 1]$ we will examine.[14] The final sample for the treated firm has 42 firm-year observations.

Other firm-year observations outside the window $[t - 3, t + 1]$ are categorized as control groups. Applying these constraints and requiring the inclusion of dependent and explanatory variables, our final sample consists of 760 firm-year observations with 114 unique insurance

[14] Note we have a four-year event window $[t - 2, t + 1]$ in our regression, but for the sample construction, we use the window $[t - 3, t + 1]$. The year $t - 3$ is the base year for regression; thus, its estimation is omitted in the regression model.

companies, representing about 42% of the total value of PC premiums in the United States over the sample period. We collect information on CEO compensation from Execucomp and manually from the insurance companies' proxy statements. This manual search allows increasing the sample available from Execucomp from 411 to 724.

3.3. Variable construction

We use 9 alternative measures for firm risk. Our main dependent variables are seven market-based risk measures and two book-based risk measures. Market-based measures reflect the market's understanding and pricing of risk undertaken by firms.[15] The two book-based risk measures signal managerial risk-taking. For example, Ljungqvist, Zhang, and Zuo (2017) recommend a preference for ". . . the earnings-based risk measures because they more likely reflect a firm's choice of risk (stock returns not being under the firm's control)." Moreover, Bildersee (1975) explains that corporate accounting data summarize the outcome of corporate events and decisions, including the measurement of total firm risk.

Book measures: The two book-based risk measures are constructed by firm performance volatility (e.g., Cole et al., 2011; Ho, Lai, and Lee, 2013; Milidonis, Nishikawa, and Shim, 2019). As the shocks we examine are transient, the annual book-based measures are constructed based on quarterly data. These are ROA volatility (*ROA vol*) and comprehensive ROA volatility (*CROA vol*). We include comprehensive income because it captures unrealized capital gains

[15] Bernile, Bhagwat, and Rau (2017) argue that corporate policies are linked to risk-taking and stock return volatility. Specifically, corporate policies signal ex-ante firm risk-taking, while equity returns and their realized volatility capture the market's perceptions of CEOs' risk-taking behavior.

and losses from insurers' investment and therefore reflects current investment risk.[16]

Equity-based risk measures: These are based on equity return volatility: firms' equity risk (*Return vol*), systematic risk (*beta*), and idiosyncratic risk (e.g., Cheng, Elyasiani, and Jia, 2011; Milidonis and Stathopoulos, 2014). The impact on the firm's beta will give us an idea of the impact on the firm's cost of equity. Also, we estimate another measure of the firm's systematic risk (*Systematic risk Carhart*) and unsystematic risk (*Idiosyncratic risk Carhart*) using the Carhart four-factor model (Carhart, 1997).[17]

Tail-risk measures: we use two realized risk measures focused on the tail of the stock return distribution to proxy for excessive risk: the Value at Risk (*VaR 95*) and Expected Shortfall (*ES 95*), both at the 95% level. Value at Risk (*VaR*) is commonly used by financial institutions and regulators in establishing and regulating capital requirements for risk exposure. To address the limitations of *VaR 95*, such as not accurately capturing statistical properties of losses beyond the 95th percentile, by using the *ES 95,* which contains information about the average loss taking place, conditional on a tail event taking place.

Default Risk measure: Another proxy for excessive risk that we use is default risk as proxied by the Expected Default Frequency (*EDF*) measure. *EDF* measures the likelihood of default, that is, the likelihood that firm value will be less than the face value of debt (Merton, 1974).

Independent Variables: to quantify firm opaqueness (*Opaque*), we follow Wade, Liebenberg, and Blau, (2016) and Zhang, Cox, and Van Ness (2009). To measure the level of firm

[16] One concern about these measures is the seasonality of some businesses. As a robustness test, we follow Ljungqvist, Zhang, and Zuo (2017) by seasonally adjusting *ROA vol.* and *CROA vol.* into *ROA vol. adj.* and *CROA vol. adj.*, respectively (details provided in the Data Appendix). Another book measure we use as an alternative dependent variable is *FirmSigma* (Shim, 2010). Table OA-1 in the Online Appendix (OA) reports the results. Table OA-2 reports the parallel trend tests of these measures.

[17] As a robustness check, we also perform an alternative calculation of systematic risk and unsystematic risk using the Fama and French (2015) model (Table OA-1). The results are qualitatively the same.

asymmetric information, we use the bid-ask spread of stock returns (*Spread*). To proxy for the policyholder monitoring level, we use the proportion of business written in commercial lines of insurance (*Policyholder Monitoring*).

To evaluate the strength of the compensation risk-taking incentives provided to the CEO, we use the CEO compensation *vega*. We also construct variables for CEO compensation delta (Core and Guay, 2002) and debt-like compensation (*RelativeDebt*) to capture the effect of inside debt (Wei and Yermack, 2011; Sundaram and Yermack, 2007).

Following prior literature, we identify important determinants of firm risk, to reduce the heterogeneity in corporate risk profiles (Ellul, Jotikasthira, and Lundblad, 2011; Cheng and Weiss, 2012; Lin, Lai, and Powers, 2014). These include firm size, leverage ratio, business concentration, geographic concentration, the share of long-tail business, the growth in direct premiums written, and the share of reinsurance in the gross premium written (Data Appendix).

3.4. Summary statistics

Table 2 reports the pooled descriptive statistics for our sample. All continuous variables are winsorized at the 1st and 99th percentiles. About 5.5% of the observations experience a shock in analyst coverage in our sample. The average observation in our sample has 8.5 analysts following it. The descriptive statistics provided below are consistent with those published in previous studies on the insurance industry.

In terms of the firm risk measures used, the mean (median) of *ROA volatility* is 0.93% (0.58%), and the average (median) *CROA volatility* is 1.07% (0.75%). We note an average *VaR* at the 95% level of 3.0% and an *ES* of 4.3%. The average Carhart (1997) systematic risk, is

1.1%, and the average firm *Beta* is 0.98.

Regarding firm opaqueness, we note that 19.25% of the average observation in our sample has its assets in relatively opaque forms (*Opaque*). For the policyholder monitoring measure, the average observation has 72.49% of *DPW* written in commercial lines.

For the firm compensation measures, the mean value of total compensation after the natural logarithm transformation is 8.03. The mean value of *delta* and *vega* after the natural logarithm transformation is 5.08 and 2.68, respectively,[18] and the mean of *RelativeDebt* is 1.40.

In terms of firm-level control variables, the average growth of (median) direct premiums written (*DPW growth*) is 3.8% (4.1%), and the average (median) gross premiums written to reinsurers (*Reinsurance*) is 25.8% (14.6%). The natural logarithm of the average (median) asset value is 14.8 (14.9), and the average leverage ratio (*Leverage*) is 59.7%. We also control for heterogeneity in the location and business mix in our sample using the geographic Herfindahl-Hirschman index (*Geo Herfindahl*) with an average value of 0.19 and the line of business (LOB) Herfindahl-Hirschman index (*Lob Herfindahl*) with an average value of 0.41. Furthermore, we note that an average of 60.0% of direct premiums written are in long-tailed LOBs (*Longtail*). In terms of the asymmetric information measure, the average firm has a bid-ask spread of 2.60% based on the daily closing bid and ask prices (*Spread*) of firms.

4. Empirical methodology and results

4.1. OLS regression

We first test for a correlation between analyst coverage and firm risk using an ordinary

[18] The unit of total compensation, delta, vega, and admitted assets is in thousands before the natural logarithm transformation. The mean value of total compensation, delta, and vega before the natural logarithm transformation is $4,859.3, $707.3, and $72.8 ($000), respectively.

least squares (OLS) regression model based on all insurer-year observations with available data.[19] The OLS regression comprises 1,149 observations over the years 2001–2017. The results show that generally there is a negative relationship between analyst coverage and firm risk (Table 3). For example, results for the seven market-based risk measures reported in columns 3 to 9 document a consistent negative relationship between the number of analysts and firm risk. In the case of the two accounting-based risk measures (columns 1 and 2), we observe a weaker correlation for the volatility of firms' comprehensive ROA only.

Focusing on market-based measures, we document a consistent negative relationship (*p*-value < 0.01) between the number of analysts and measures of firms' total risk (column 3), systematic risk (columns 6 and 8), idiosyncratic risk (column 7), and tail-risk measures, such as VaR and ES (columns 4 and 5). We also document a negative coefficient in the number of analysts with the default risk measure (*EDF*) in column 9.

4.2. Difference-in-differences regression model

4.2.1. Empirical methodology

To test how insurance companies react to a shock to their information environment, we use a DID model. We employ the multiple-shock DID panel regression following Chang et al. (2019) and Gao, Zhang, and Zhang (2018):

$$Risk\ \ Measure_{it} = \alpha_0 + \alpha_i + \alpha_t + \beta_1 TreatPost_{it} + \beta_2 Treat_{it} + \gamma_x X_{it} + \varepsilon_{it}, \qquad (1)$$

where α_0, α_i, and α_t represent a constant, firm *i*'s fixed effect, and the year *t* fixed effect, respectively. ε_{it} is the error term. Vector X_{it} comprises control variables for firm *i* by year *t*.

[19] In univariate tests, we also find that analyst coverage is negatively related to firm risk (Table OA-3).

TreatPost is our main variable of interest and equals one in year $t + 1$ after a broker house merger or closure in year t for firms that experience broker house shocks in year t and zero in other years. The definition of *TreatPost* ensures that we capture only the direct effects of the drop in analyst coverage, consistent with prior studies utilizing such shocks (e.g., Chen, Harford, and Lin, 2015; Derrien and Kecskes, 2013; Hong and Kacperczyk, 2010).The parameter β_1 captures the change in the affected insurers' risk relative to the change in nonaffected insurers' risk. *Treat* is a dummy variable equal to one during the years $t - 3$ to $t + 1$ if the insurer experienced a drop in analyst coverage in year t.[20]

Over the long run, the entry of other brokers could make up for the gap created in analyst coverage, while it also could be the case that terminated analysts find a new job in another brokerage house (Chen, Harford, and Lin, 2015). Therefore, the exogenous drop in analyst coverage enables us to make good use in our analysis of short-term deviations from the equilibrium of how analyst coverage affects insurers' risk-taking behavior.[21]

4.2.2. Main results

Table 4 reports our baseline results, estimated by Equation (1) to test our first hypothesis. We find consistent results for an increase in firm risk following the shock to treatment groups compared to control firms. Starting from column 1, where we measure insurers' risk-taking

[20] In a typical DID model, the treatment variable will not vary over time for a specific firm and thus can be absorbed by the firm fixed effects. In our paper, insurers can experience multiple shocks during the sample period. Following prior literature (Chen and Lin, 2017; Irani and Oesch, 2016), if firm i experiences a shock in year t, we categorize the firm-year observations during the window $[t - 3, t + 1]$ into the treatment group and into the control group otherwise. It is possible that firm i has overlapping five-year windows. For example, firm i receives a shock in year t and again in year t+4; thus, the corresponding windows are $[t - 3, t + 1]$ and $[t + 1, t + 5]$. The two 5-year windows remain overlapped. We only keep the firm-year observations in the first window if such a case occurs. In addition, as the year $t - 3$ is the base year, its estimation would be omitted in the regression; thus, only the results for the four-year event window $[t - 2, t + 1]$ can be estimated.

[21] It is important to study short-term changes in firm risk, as they relate to the myopic behavior of managers documented in the literature (e.g., Call, Chen, Miao, and Tong, 2014; Kolasinski and Yang, 2018) to meet short-term goals (e.g., earnings; option exercise).

using *ROA volatility*, the coefficient for *TreatPost* is positive and significant. This finding implies that the volatility of the reported quarterly earnings increases more in the year after the analyst coverage shock, compared to insurers that do not experience such a shock over the same year. We also find a consistent result in column 2, where we measure insurers' risk-taking using insurers' *CROA volatility*. The coefficients for *TreatPost* for *ROA volatility* and *CROA volatility* imply that the treated firms increase these volatility measures by 0.66 and 0.69 percentage points, relative to the control group. These coefficients correspond to 70.9% and 64.3% of their mean values, respectively, suggesting an economically significant increase in firm risk due to the exogenous drop in analyst coverage. These significant and positive coefficients reported in columns 1 and 2 (p-value < 0.05) alleviate any potential concerns of the weak correlation results in the OLS regression in Table 3.

In columns 3 to 9, we evaluate the impact of the exogenous drop in analyst coverage on market-based risk measures. We first measure firm risk using stock return volatility in column 3, which implies a post-treatment increase of the return volatility by 0.60 percentage points, corresponding to 29.8% of its mean value. The second set of market-based measures is related to tail risk, measured by VaR and ES. Evaluating the tail-risk measures *VaR* 95 and *ES 95* (columns 4 and 5), we find a post-treatment increase in tail risk by 1.01 and 1.56 percentage points, respectively. These effects are economically significant and correspond to increases of about 34.1% and 36.5% of their mean values. These results provide evidence that analyst coverage plays a role in reducing tail risk. The impact on default risk is obvious in the last column, where we observe a significant increase in *EDF*.

We further investigate the effect of losing analyst coverage on firms' systematic and idiosyncratic risks. The results for these two volatility measures support our argument that a drop in analyst coverage causes an increase in firm risk. We also measure the impact on firm beta, which serves as an alternative measure for systematic risk, but it also signals changes in the pricing of risk by equity markets. Results show that treated firms experience an increase in beta after the shock compared to the control groups. The increase in systematic risk confirms the presence of undiversifiable risk, which information risk could potentially explain (e.g., Easley and O'hara, 2004). Yet, we also find a sizable increase in diversifiable risk.

The estimated coefficients of the control variables are generally consistent with prior research. We find that a higher risk level is positively associated with geographic concentration in business (e.g., Shim, 2017), business written in long-tailed lines, and leverage. It is important to note that the positive and significant coefficient β_1 shows the marginal post-treatment effect, which cannot be captured by the effect of risk-related control variables (e.g., leverage ratio). To check the influence of the control variables on our findings, we repeat the regressions but include only firm size as a control. We find that the coefficients for *TreatPost* are unaffected by excluding other control variables.[22]

4.3. Subsample tests

We proceed with a series of subsample tests to test the remaining hypotheses. We first investigate the information channel of analyst coverage by partitioning the sample into less versus more opaque subsamples. We then focus on the mechanism driving the increase in firm

[22] The results for the regressions without control variables are available on request.

risk as we examine the compensation risk-taking incentives provided by firms to their CEOs, by splitting the sample into subsamples of low versus high compensation vega. Furthermore, we investigate the role of policyholder monitoring by splitting the sample into high or low monitoring groups. Lastly, we double sort our sample on the level of compensation vega and the level of policyholder monitoring to understand if the impact of analyst coverage and policyholder monitoring can be separated, especially when managerial incentives are stronger.

4.3.1. High vs. Low firm opaqueness

The information production channel posits that firms with a less transparent information environment would lose more from a loss of analyst coverage. Therefore, we expect the relationship between analyst coverage and risk to be stronger for more opaque insurers (our second hypothesis). Following Irani and Oesch (2013), we split our sample into two groups, high initial opaqueness versus low opaqueness, depending on whether opaqueness measure in the year prior to the shock is above or below the sample median. We then estimate our baseline model for each group separately.

Table 5 reports the results. The high (low) initial analyst coverage subsample includes 22 (20) shocked observations; thus, the treated observations are generally equally distributed in these two subsamples. Its upper (lower) panel presents the regression results for the high (low) opaqueness subsample. We find that the effect of analyst coverage loss on firm risk is mainly driven by insurers holding more opaque assets, since all nine risk measures for the more opaque sample document a significant increase in risk.[23] The sizes of these post-treatment effects are

[23] Only in the case of the comprehensive ROA volatility we also observe an increase for relatively transparent firms.

much larger than the average effect reported in Table 4. For instance, columns 1 and 2 report that the treated firms increase their ROA volatility and CROA volatility by 1.19 and 0.89 percentage points, relative to the control group. The results are consistent with our second hypothesis and suggest that the increase in firm risk is more concentrated in insurers with a more opaque environment.[24]

4.3.2. High vs. Low CEO compensation risk-taking incentives

We test the mechanism through which firm risk increases when analyst coverage drops, by focusing on the cross-sectional variation in CEO risk-taking incentives in our sample. Therefore, we partition our sample into subsamples based on the median value of the CEO's compensation vega the year before the shock. The high (low) vega subsample includes 25 (15) treated firm-year observations.[25]

The upper and lower panels of Table 6 show the results for subsamples with high and low CEO vega, respectively. We document positive and statistically significant results for the book measures of risk but also market-based, tail, and default risk measures, when compensation risk-taking incentives are stronger. Consistent with our third hypothesis, we document that the increase in firm risk documented in Table 4, is driven by the sub-sample of high vega.

We test whether managers who potentially face career concerns might behave differently. Even through our insurance sample is further away from default compared to the non-financial firms' sample of Milidonis and Stathopoulos (2014), hence less likely for career concerns to be

[24] We also confirm the results of Hong and Kacperczyk (2010) who find that the effect of losing an analyst is more pronounced for stocks with smaller than those with larger analyst coverage (online appendix section B and Table OA-B1).
[25] We further control other CEO compensation variables (namely CEO delta, total compensation, and relative debt), and the results remain robust. Table OA-4 reports the results.

present, we re-estimate the analysis on firms that have a financial strength rating equal to or less than the critical threshold of "A-." The number of treated firms in this sample is 10.[26] Results are generally not statistically significant, with a few exceptions with positive coefficients (Table OA-5).

Collectively, these results suggest that when analyst coverage drops, firm risk increases in cases where the compensation risk-taking incentives are stronger. Not only do we document an increase in risk in all measures of risk, but the increase in risk is large enough to impact the firm's default risk (*EDF*). The increase in *EDF* echoes the results of Milidonis and Stathopoulos (2011) suggesting that compensation incentives in the insurance industry might need to be re-optimized. Notably, we do not observe any change in risk when compensation, risk-taking incentives are weaker ("Low" subsample).

4.3.3. High vs. Low policyholder monitoring mechanism

To test whether policyholder monitoring impacts firm risk (our fourth hypothesis), we split our sample into companies of high and low monitoring (with 24 and 18 treated observations, respectively) and re-estimate the DID model.[27] When analyst coverage drops, we expect that firms in the high monitoring sample (namely observations with *DPW* in commercial lines above the sample median) will face more pressure from their policyholders to suppress risk.

The results in Table 7 are consistent with our fourth hypothesis. We observe that the

[26] We test the sample at the bottom end of the distribution. Given the small sample size (45 firm-year observations) of firms with ratings below "A-," we also include those with an "A-" (another 137 observations), with the rationale that managers of these firms might be worried about the reputational impact on their future career if their firms lose the "A-" rating. Only beta shows a statistically significant (1%) increase in risk, which weakens to a 10% significance when the systematic Carhart factor is used. All other risk measures are not significant.

[27] We confirm that policyholder monitoring (measured by business in commercial lines) and compensation incentives (delta, vega, and relative debt) do not change significantly before and after the exogenous drop in analyst coverage.

increase in risk is driven by the subsample of low policyholder monitoring, and this happens in the majority of risk measures we use. Results suggest that when analyst coverage drops, the subsequent increase in firm risk appears concentrated in firms with a weak policyholder monitoring mechanism, thus suggesting that the monitoring role of policyholders also contributes to the mechanisms that a manager faces to suppress risk. We note, however, that there is no increase in default risk, even when policyholder monitoring is low.

Since policyholders are closely linked to the liability side of the firm, we conduct another test to examine if underwriting risk is also affected differently in the subsamples of high and low policyholder monitoring. We use the annual standard deviation of quarterly underwriting gain, *Uwgain vol*, to proxy for underwriting risk. Our results show that underwriting risk increases only in the low-monitoring subsample. As another book measure of risk directly related to firm actions, this test provides further evidence consistent with an increase in firm risk-taking, when analyst coverage drops, and when policyholder monitoring is low.[28]

4.3.4. Compensation incentives vs. policyholder monitoring (double sorting)

We next attempt to disentangle the mitigating impact that analysts have on the risk-shifting problem (Table 6) from the mitigating impact that policyholder monitoring has (Table 7). We do this by double sorting our sample on vega and policyholder monitoring, creating four subsamples, reported in Table 8 (full models available in Table OA-7). Panel A (B) shows the subsample of high vega and high (low) monitoring. Panel C (D) shows the subsample of low vega and high (low) monitoring.

[28] Results are reported in Table OA-6. The proxy for underwriting risk qualifies for a DID regression model. We would like to thank an anonymous reviewer for this suggestion.

We observe an increase in several risk measures almost exclusively in Panels A and B. The first general result we observe is that risk increases when risk-taking incentives are strong, both when monitoring is high and low (the number of treated observations is 11 and 14, respectively). While differences in the statistical significance of the *TreatPost* coefficients are recorded in the two panels, we cannot clearly conclude their relative significance. From this result, it seems that analyst coverage is important in mitigating risk, since this applies regardless of the level of policyholder monitoring.

The second result of this analysis is that when risk-taking incentives are low, there is, generally, no increase in risk. While this is expected since managers do not have strong incentives to take risk, hence the monitoring role of analysts might not be binding, the exception of a statistically significant result when both vega and policyholder monitoring is low (Panel D; *ROA Vol*), hints that analysts might have a broader risk-mitigating role to play, beyond the case where shareholders provide strong risk-taking incentives.

5. Firm risk and risk-taking actions

Our results already provide some evidence that the increase in firm risk documented above is not only a result of market perception but also a result of changes in firms' risk-taking actions, through the two book measures, which are more likely to reflect a firm's choice of risk (Ljungqvist, Zhang, and Zuo, 2017). Moreover, we have shown that when analyst coverage drops, underwriting risk increases when policyholder monitoring is low.

To test another potential channel through which risk-taking actions might increase risk, we conduct a test based on firm's investment decisions related to firm assets. Specifically,

following Ge and Weisbach (2021), we study managerial risk-taking by examining insurers' investments in worse-rated bonds. Using data on the individual bonds held by each insurer, the regression model is specified as follows (Ge and Weisbach, 2021):

$$\begin{aligned} Holding\ \ of\ \ Bonds_{ijt} = {} & \alpha_0 + \alpha_i + \alpha_j + \alpha_t + \beta_1 TreatPost_{it} * \\ & Bond\ \ WorseRated_{jt} + \beta_2 TreatPost_{it} + \beta_3 Treat_{it} + \beta_4 Treat * \\ & Bond\ \ WorseRated_{jt} + \beta_5 Post_t * Bond\ \ WorseRated_{jt} + \\ & \beta_6 Bond\ \ WorseRated_{jt} + \gamma_x X_{it} + \theta_x Bond\ \ Controls_{jt} + \varepsilon_{ijt}, \end{aligned} \tag{2}$$

where the dependent variable *Holding of Bond*$_{ijt}$ is insurer *i*'s holdings of a specific corporate bond *j* in year *t* as a percentage of the total market value of all bonds insurer *i* holds in year *t*. α_0, α_i, α_j, and α_t represent a constant, firm *i*'s fixed effect, bond *j*'s fixed effect, and the year *t* fixed effect, respectively.

Following Ge and Weisbach (2021), our sample includes all investment-grade corporate bonds held by insurers during our sample period, 2001–2017. We transform different rating agencies' bond ratings to numeric values and take the lowest rating across different rating agencies. *Bond WorseRated* equals 1 for bonds rated AAA and increases to 10 for bonds rated BBB−. The variable of interest is the interaction term *Treatpost*Bond WorseRated*. Its coefficient β_1 indicates how affected insurers differ in their bond investments with lower ratings after the shock, compared to the control firms. A positive sign of the coefficient implies that treated firms increase their holdings in relatively riskier bonds after the shock compared to the control insurers. We also include other interaction terms as controls.

We control for insurer-level characteristics X_{it} as before and also include bond characteristic controls, such as coupon rate (*Coupon*) and maturity (*Maturity*). Standard errors are corrected for clustering at the bond CUSIP-year level. We conduct the analysis for the entire sample and also based on the four dimensions along which we conducted the sub-sample analysis above (opaqueness, number of analysts, vega and policyholder monitoring).

Table 9 reports the results.[29] Starting from column 1, we observe that the coefficient of *Treatpost*Bond WorseRated* is positive and significant, implying that insurers exogenously losing analyst coverage increase their holdings in bonds with a lower rating after the shock, compared to control insurers. Results are consistent in the remaining columns. We observe a positive and significant coefficient (5% level) in the subsample of high opaqueness (column 2), low analyst coverage (column 5), high risk-taking incentives (vega; column 6), and low policyholder monitoring (column 9).

6. Robustness tests

6.1 The pretreatment trends and DID validity test

We conduct all tests related to the DID model. First, we verify that the parallel trends assumption is not violated (online appendix section C and Table OA-C1). Second, we verify our results using a falsification analysis (online appendix section C and Table OA-C2). Third, we confirm that our results are robust to recent advances in econometric theory (e.g., Callaway and Sant'Anna, 2021; Sun and Abraham, 2021) taking into consideration the potential bias introduced by asynchronous events (online appendix section C and Table OA-C3).

[29] We also conduct the parallel-trend test and ensure that our DID results are valid. The results are reported in Table OA-8.

6.2 Controlling for additional analyst characteristics

We control for analyst characteristics that may affect firms' risk-taking behavior. Specifically, we control for the dispersion in analysts' forecasts (Avramov, Chordia, Jostova, and Philipov, 2009) and the number of analysts. Even though the sample size decreases by about 15% by adding these controls, our results remain robust (Table OA-9, panel A). Specifically, the coefficients of *TreatPost* for all of the 9 risk variables used are significant (*p*-value < 0.05 or better) and are of similar magnitude to the coefficients in Table 4.

6.3 Controlling for additional managerial compensation incentives

We re-do the analysis in Table 4 by controlling for compensation variables (delta, vega, relative debt, and total compensation). CEO delta is measured as the sensitivity of the CEO's stock and option portfolios to a 1% change in stock prices. Delta encourages the CEO to work towards increasing the stock price of the firm. CEO vega is measured as the sensitivity of the CEO's stock and option portfolios to a 0.01 change in the standard deviation of the firm's return. We then use CEO's compensation debt ratio relative to the firm's debt ratio (*RelativeDebt*), calculated as the CEO's compensation debt-to-equity ratio divided by the firm's debt-to-equity ratio (Milidonis et al., 2019; Wei and Yermack, 2011). Inside debt compensation (pensions and deferred compensation), which is characterized by a deferral component, negatively affects firm risk-taking (Milidonis et al., 2019). The final set of variables measures managers' general compensation features. *Total compensation* is the sum of the CEO's salary, bonus, equity awards, option awards, nonequity incentive compensation, and other compensation. We use the one-year lag of the natural logarithm of CEO delta, vega,

relative debt, and total compensation in our model.

Table OA-9, Panels B and C, presents the results. In Panel B, we re-estimate the regressions reported in Table 4, except we now include the prevailing control variables for compensation risk-taking incentives, the CEO vega (*ln(1+vega)*). In Panel C, we enhance the model in Panel B (at the expense of losing additional observations) by also controlling for the CEO compensation delta and CEO relative debt. The number of observations is reduced because of data availability for relative debt which starts after 2007.

6.4 Crisis period and the effect of a single event

We also address the potential concern that our results might be affected by the 2008 financial crisis, potentially affecting broker closures and firm risk. Table 1 shows that broker closure in the year 2009 affected 17 insurers. Hence, we drop the treated firms affected by the financial crisis in our sample (i.e., experiencing analyst coverage shocks in 2008 and 2009) and repeat our analysis. Panel D of Table OA-9 shows the results. Again, we consistently find a significant post-treatment effect in all specifications after dropping the recession period and the single event. Thus, the crisis does not drive our results.

6.5 Controls for firm underwriting business and risky assets investment

We further control for insurers' underwriting across business lines and their business in hurricane-prone areas. As the level of business share in these lines and geographic regions may affect the liability side of firm risk, we use the share of DPW in each line of business and the share of DPW in hurricane-prone states (*HurricaneShare*) as controls. Panel E of Table OA-9

shows the results, which remain robust to this specification.[30]

6.6 Alternative channel

Because of analysts' information role, the loss of analyst coverage may lead to more information asymmetry, a lower stock price (Kelly and Ljungqvist, 2012), and higher cost of capital, all of which may contaminate our results using systemic risk measures, such as stock beta. Therefore, we add controls for asymmetric information. Specifically, we add contemporaneous stock price spread to our baseline model. We find that treated insurers still experience an increase in both accounting- and marketing-based risks after we control for asymmetric information (Table OA-9, Panels F and G), suggesting the results we find are above and beyond this alternative channel.

7. Discussions and conclusion

In this study, we document a causal relationship between an exogenous drop in analyst coverage of insurance firms and an increase in corporate risk. We show this relationship using book-based measures of risk (arguably related to managers' risk-taking behavior) and several market-based measures of risk (that mostly represent the way that markets perceive risk). We separate the typical measures of market risk used in the literature (such as equity return volatility, systematic risk, and unsystematic risk) from excessive risk measures such as tail-risk measures (such as VaR and ES) and default risk measures (*EDF*). Our results confirm analysts' monitoring role and informational role in financial markets. We perform a battery of robustness checks related to the number of analysts following, their consensus, and other control variables,

[30] We also use the lagged value of these business controls. Our results remain qualitatively the same.

including the removal of crisis periods.

We further document that insurers with a higher level of opaqueness, smaller initial analyst coverage, less policyholder monitoring, and stronger managerial compensation risk-taking schemes experience a larger increase in risk after losing analyst coverage. A comparison of subsamples double sorted on the compensation risk-taking incentives and policyholder monitoring suggests that managers respond to risk-taking incentives regardless of policyholder monitoring. We also show that the increase in risk is not only perceived by the market but also documented in managerial risk-taking actions. We provide evidence that managers of treated firms invest more in relatively worse-rated bonds.

This study raises a number of questions for future research. Given that market competition can enhance external monitoring or increase firm risk-taking incentives, does market competition complement or substitute for the analysts' role? In addition, as the information production role can facilitate the monitoring of firm outsiders, is there any change in the effectiveness of market discipline after the shock? Do insurers have enough time to change their pricing or reserving strategies given this transitory shock?

Overall, our results suggest that stock analysts affect insurers' risk levels. Our study highlights that stock analysts play an important role in detecting and deterring firm risk, as documented primarily in insurance firms with strong managerial risk-raking incentives, where not only firm risk increases, but also tail risk, such as default risk. These results are informative for shareholders making decisions on managerial compensation incentives but also for regulators, given the documented increase in insurance tail risk.

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Data Appendix

Variable	Description	Source(s)
Risk measures		
ROA vol	The Standard Deviation (SD) of pure ROA within the year	NAIC
CROA vol	The SD of comprehensive ROA (CROA) within the examined year. Comprehensive ROA is the sum of net income and change in net unrealized capital gains or (losses) less capital gains tax, scaled by the firm's admitted assets	NAIC
Return vol	The SD of the stock return within the year	CRSP
VaR 95	Value at risk at the 95% level in the year, namely, the maximum expected losses that could occur over a year at 95% level	CRSP
ES 95	Expected Shortfall for VaR at 95% level in the year	CRSP
Systematic risk Carhart	The SD of predicted value from Carhart four-factor model ran on the firm's daily stock return over the year examined	CRSP; Kenneth R. French's Data Library
Idiosyncratic risk Carhart	The SD of predicted residual from Carhart four-factor model ran on the firm's daily stock return over the year examined	CRSP; Kenneth R. French's Data Library
Beta	The coefficient of market excess return from the market model ran on the firm's daily stock return over the year examined	CRSP
D2D	The Merton-KMV distance-to-default measure of credit risk. It is calculated using the code from Bharath and Shumway (2008)	CRSP Compustat
EDF	The market-implied default probability using the Merton-KMV model. It is calculated using the code from Bharath and Shumway (2008)	CRSP Compustat
Independent variables		
DPW growth	Growth of direct premiums written (DPW)	NAIC
Reinsurance	Percentage of reinsurance in gross premiums written	NAIC
ln(Assets)	Natural logarithm of total assets	NAIC
Leverage	Leverage ratio of total liabilities to assets	NAIC
Geo Herfindahl	Herfindahl index measuring insurer's geographic concentration	NAIC
Lob Herfindahl	Herfindahl index measuring insurer's business line concentration	NAIC
Longtail	Percentage of DPWs in long-tail business	NAIC
Event-related variables		
TreatPost	A dummy variable equal to one in year t+1 after a broker house merger or closure in year t, for a firm that experiences broker house shocks in year t and zero otherwise	IBES; SDC M&A; Factiva; Kelly and Ljungqvist 2012; Hong and Kacperczyk 2010
Treat	A dummy variable equal to one from years $t - 3$ to $t + 1$ for firms that experience broker house shocks in year t and zero otherwise	IBES; SDC M&A; Factiva; Kelly and Ljungqvist 2012;

		Hong and Kacperczyk 2010
No. analysts	Number of analysts following the firm	IBES
Opaque	The share of relatively opaque assets in insurers' total admitted assets. Following Zhang, Cox, and Van Ness (2009) and Wade, Liebenberg, and Blau (2016), relatively opaque assets consist of mortgage loans, real estate investment, private placement loans and bonds, premium notes, premiums receivable, other invested assets (item 8 on p. 2 of insurers' NAIC statutory annual report) and reinsurance recoverable (items 16.1–16.3 on p. 2)	NAIC
Vega	The sensitivity of the CEO's stock and option portfolios to a 0.01 change in the standard deviation of the firm return (Core and Guay, 2002) (in $000s)	Execucomp
Policyholder Monitoring	The proportion of direct premiums written in commercial lines. Personal lines include homeowners, farmowners, earthquake, personal automobile liability and automobile physical damage. All other lines are considered commercial lines.	NAIC
Robustness tests		
Dispersion	Dispersion is computed as the standard deviation across analysts' EPS forecasts for the next fiscal year divided by the absolute value of the mean EPS forecast	IBES
Total compensation	The sum of salary, bonus, equity awards, option awards, nonequity incentive compensation, and other compensation	Execucomp
Delta	Sensitivity of the CEO's stock and option portfolios to a 1% change in stock price (in $000s; Core and Guay, 2002)	Execucomp
InsideDebt	CEO debt-like compensation (sum of pension total amount and deferred total balance amount) divided by CEO equity compensation (sum of equity holding and the value of stock options)	Execucomp
RelativeDebt	*InsideDebt* divided by firm leverage (sum of the current portion of long-term debt and total long-term debt divided by market capitalization of equity)	Execucomp; Compustat
Lob control	The share of direct premiums written in each line of business	NAIC
HurricaneShare	The proportion of direct premiums written for property lines in coastal states. The coastal states included are Texas, Louisiana, Alabama, Mississippi, Florida, Georgia, South Carolina, North Carolina, Virginia, Washington, DC, Delaware, Maryland, New Jersey, New York, Connecticut, Rhode Island, Massachusetts, New Hampshire, and Maine (Milidonis, Nishikawa, and Shim, 2019)	NAIC
Spread	The mean during the year of the daily ask price minus the bid price all divided by the mean of the ask price and bid price	CRSP
Risk-taking in bond investment		
MV(ijt)	The market value of corporate bonds *j* held by insurer	NAIC

	i in year *t*	
Bond WorseRated	We transform different rating agencies' bond ratings to numeric values and take the lowest rating across different rating agencies. *Bond WorseRated* is 1 for bonds rated AAA, and increases to 10 for bonds rated BBB-	NAIC; FISD
Maturity	The remaining year of maturities of the bond	FISD
Coupon	The coupon rate of the bond	FISD
Additional risk measures used in the Online Appendix		
ROA vol adj	Seasonally adjusted quarterly ROA. It is the SD of the difference between quarterly ROA and ROA for the same quarter of the previous year, computed over the year examined	NAIC
CROA vol adj	Seasonally adjusted quarterly CROA. It is the SD of the difference between quarterly CROA and CROA for the same quarter of the previous year, computed over the year examined	NAIC
FirmSigma	The volatility of the insurers' asset-to-liability ratio, (i.e., *Risk 1*), defined by Shim (2010). It incorporates the covariance between asset and liability portfolios as well as the volatilities of both asset returns and insurance underwriting returns (liability side)	NAIC; Bloomberg
Uwgain Vol	Calculated as the SD of quarterly underwriting gain within the examined year. Quarterly underwriting gain is calculated as the underwriting income scaled by firm assets.	NAIC

Table 1. The trend of brokerage exits and affected firms

The table presents the annual and total number of brokerage exits and the number of affected insurers from 2004 to 2017 for our sample.

Year	Number of brokerage exits	Number of affected firms
2004	0	0
2005	1	4
2006	1	7
2007	2	6
2008	1	2
2009	1	17
2010	0	0
2011	0	0
2012	0	0
2013	0	0
2014	0	0
2015	1	6
2016	0	0
2017	0	0
Total	7	42

Table 2. Descriptive statistics

This table presents pooled descriptive statistics for the variables used in our regressions. The sample period covers years 2001-2017. It includes 760 firm-year observations, 114 unique firms. All continuous variables are winsorized at the 1st and 99th percentiles.

	Count	Mean	Median	SD	Min	Max
Risk measures						
ROA vol	760	0.0093	0.0058	0.0101	0.0006	0.0605
CROA vol	760	0.0107	0.0075	0.0099	0.0008	0.0516
Return vol	760	0.0201	0.0164	0.0120	0.0080	0.0766
VaR 95	760	0.0296	0.0242	0.0176	0.0120	0.1178
ES 95	760	0.0427	0.0346	0.0271	0.0168	0.1674
Systematic risk Carhart	760	0.0111	0.0087	0.0081	0.0021	0.0504
Idiosyncratic risk Carhart	760	0.0146	0.0128	0.0066	0.0060	0.0373
Beta	760	0.9776	0.9015	0.4502	-0.2225	3.1646
EDF	706	4.33%	0.00%	16.45%	0.00%	99.87%
D2D	706	10.0142	9.7371	6.2179	-3.0177	41.0541
MV(ijt)/MV of all bonds held(it) (%)	169,797	0.1186	0.0573	0.2209	0	0.9110
Event related						
TreatPost	760	0.0553	0	0.2286	0	1
No. analysts	760	8.4539	6	7.2013	1	34
Dispersion	656	0.3101	0.1064	0.6299	0.0120	4.4455
Subsample test						
Opaque	760	0.1925	0.1773	0.0995	0	0.6682
ln(1+Vega)	724	2.6832	2.9343	2.1252	0	6.6034
Policyholder Monitoring	760	72.49%	89.84%	34.02%	0.00%	100.00%
Controls						
DPW growth	760	0.0384	0.0409	0.2108	-1.1082	0.7021
Reinsurance	760	0.2580	0.1456	0.3635	-0.0057	2.4815
ln(Assets)	760	14.7700	14.9100	1.6288	8.6648	18.7343
Leverage	760	0.5969	0.6106	0.1143	0.1565	0.7853
Geo Herfindahl	760	0.1925	0.0831	0.2390	0.0350	1
Lob Herfindahl	760	0.4080	0.3049	0.2927	0.0981	1
Longtail	760	0.6002	0.6813	0.2968	0	1
Spread	760	0.0259	0.0218	0.0148	0.0096	0.1733
ln(Total compensation)	720	8.0289	8.0830	1.0322	5.982704	10.0053
ln(1+Delta)	724	5.0826	5.0259	1.8477	0	10.3262
RelativeDebt	605	1.4025	0	4.5087	0	31.8705

Table 3. OLS regression model: Number of analysts and firm risk

This table reports the coefficients estimated from the panel OLS regression on the relationship between the number of analysts covered and firm risk. The sample consists of all insurers in the database with nonmissing control variables. It includes 1,149 insurer-year observations from 2001 to 2017. The dependent variables are alternative risk measures. We include firm and year fixed effects. All continuous variables are winsorized at the 1st and 99th percentiles. Robust standard errors, which are clustered at the insurer level, are reported in parentheses. The Data Appendix defines all variables. *$p < 0.1$; **$p < 0.05$; ***$p < 0.01$.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Variables	ROA vol	CROA vol	Return vol	VaR 95	ES 95	Systematic risk Carhart	Idiosyncratic risk Carhart	Beta	EDF
No. analysts	0.0000	-0.0002*	-0.0010***	-0.0012***	-0.0016***	-0.0003***	-0.0005***	-0.0193***	-0.0070**
	(0.0001)	(0.0001)	(0.0002)	(0.0003)	(0.0004)	(0.0001)	(0.0001)	(0.0062)	(0.0028)
DPW growth	-0.0048**	-0.0022	-0.0086***	-0.0099***	-0.0166***	-0.0021*	-0.0035***	-0.0322	-0.0730**
	(0.0024)	(0.0021)	(0.0021)	(0.0027)	(0.0047)	(0.0011)	(0.0010)	(0.0756)	(0.0357)
Reinsurance	-0.0005	0.0001	-0.0004	-0.0004	0.0008	-0.0017*	0.0000	-0.1136*	-0.0042
	(0.0015)	(0.0019)	(0.0023)	(0.0038)	(0.0060)	(0.0010)	(0.0011)	(0.0585)	(0.0309)
ln(Assets)	-0.0013	0.0008	0.0009	-0.0001	0.0022	0.0007	-0.0006	0.0117	0.0247
	(0.0011)	(0.0012)	(0.0014)	(0.0019)	(0.0033)	(0.0008)	(0.0006)	(0.0517)	(0.0174)
Leverage	0.0251***	0.0193*	0.0322***	0.0436***	0.0630***	0.0174***	0.0133***	0.8787***	0.3884***
	(0.0089)	(0.0099)	(0.0078)	(0.0102)	(0.0165)	(0.0040)	(0.0038)	(0.2537)	(0.1131)
Geo Herfindahl	0.0076	0.0092	0.0157**	0.0179*	0.0250*	0.0079**	0.0088**	0.5564***	0.1531
	(0.0061)	(0.0064)	(0.0075)	(0.0092)	(0.0137)	(0.0033)	(0.0041)	(0.2065)	(0.1012)
Lob Herfindahl	-0.0107**	-0.0088**	-0.0007	-0.0013	-0.0021	0.0002	0.0007	0.0964	0.0284

(Continued)

Variables	(1) ROA vol	(2) CROA vol	(3) Return vol	(4) VaR 95	(5) ES 95	(6) Systematic risk Carhart	(7) Idiosyncratic risk Carhart	(8) Beta	(9) EDF
	(0.0043)	(0.0038)	(0.0050)	(0.0059)	(0.0093)	(0.0030)	(0.0028)	(0.2180)	(0.0529)
Longtail	0.0004	0.0011	0.0089**	0.0126**	0.0180**	0.0063***	0.0032	0.2977**	-0.0381
	(0.0028)	(0.0033)	(0.0043)	(0.0052)	(0.0078)	(0.0022)	(0.0020)	(0.1275)	(0.0391)
Constant	0.0166	-0.0096	-0.0087	0.0091	-0.0228	-0.0102	0.0182**	0.1601	-0.5048*
	(0.0150)	(0.0176)	(0.0213)	(0.0289)	(0.0492)	(0.0135)	(0.0085)	(0.7906)	(0.2626)
Observations	1,149	1,149	1,149	1,149	1,149	1,149	1,149	1,149	1,077
Adjusted R^2	0.2669	0.3418	0.6518	0.6873	0.6666	0.7498	0.7081	0.5754	0.3892
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
SE cluster	Firm	Firm	Firm	Firm	Firm	Firm	Firm	Firm	Firm

Table 4. Difference-in-differences (DID): Change in firm risk after the shock in analyst coverage

This table reports the coefficients estimated from the DID regression on the relationship between analyst coverage loss and firm risk. The sample consists of 760 insurer-year observations from 2001 to 2017. Dependent variables comprise book-based and market-based measures of firm risk, as well as tail risk and default risk. *TreatPost* is a dummy variable that takes the value of one in year $t + 1$ after the broker house merger or closure in year t for firms that experience broker house shocks in year t and zero otherwise. *Treat* is a dummy variable equal to one during year $t - 3$ to $t + 1$ if the insurer experienced analyst loss due to a broker house merger or closure in year t and zero otherwise. All continuous variables are winsorized at the 1st and 99th percentiles. Robust standard errors, which are clustered at the insurer level, are reported in parentheses. The Data Appendix defines all variables. *$p < 0.1$; **$p < 0.05$; ***$p < 0.01$.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Variables	ROA vol	CROA vol	Return vol	VaR 95	ES 95	Systematic risk Carhart	Idiosyncratic risk Carhart	Beta	EDF
TreatPost	0.0066**	0.0069***	0.0060***	0.0101***	0.0156***	0.0038***	0.0027***	0.2077***	0.1299**
	(0.0025)	(0.0022)	(0.0020)	(0.0029)	(0.0048)	(0.0011)	(0.0009)	(0.0772)	(0.0568)
Treat	-0.0035**	-0.0033*	-0.0031**	-0.0053***	-0.0067**	-0.0015**	-0.0019**	-0.1131**	-0.0580**
	(0.0017)	(0.0018)	(0.0014)	(0.0020)	(0.0032)	(0.0007)	(0.0008)	(0.0512)	(0.0292)
DPW growth	-0.0029	0.0006	-0.0042**	-0.0043	-0.0067	-0.0008	-0.0013	0.0040	-0.0258
	(0.0032)	(0.0026)	(0.0019)	(0.0028)	(0.0048)	(0.0010)	(0.0008)	(0.0974)	(0.0466)
Reinsurance	0.0004	0.0008	0.0007	0.0010	0.0019	-0.0010	0.0004	-0.0941	-0.0069
	(0.0015)	(0.0016)	(0.0021)	(0.0035)	(0.0052)	(0.0007)	(0.0010)	(0.0569)	(0.0300)
ln(Assets)	-0.0017	-0.0000	0.0000	-0.0009	0.0010	0.0004	-0.0010*	-0.0130	0.0279
	(0.0011)	(0.0012)	(0.0009)	(0.0014)	(0.0025)	(0.0006)	(0.0006)	(0.0434)	(0.0188)
Leverage	0.0214**	0.0090	0.0187***	0.0284***	0.0344**	0.0121***	0.0083**	0.6723**	0.3733***
	(0.0090)	(0.0088)	(0.0066)	(0.0085)	(0.0144)	(0.0031)	(0.0040)	(0.2610)	(0.1205)

(Continued)

Variables	(1) ROA vol	(2) CROA vol	(3) Return vol	(4) VaR 95	(5) ES 95	(6) Systematic risk Carhart	(7) Idiosyncratic risk Carhart	(8) Beta	(9) EDF
Geo									
Herfindahl	0.0081	0.0083	0.0164*	0.0220**	0.0274*	0.0068**	0.0106**	0.4220**	0.2538**
	(0.0061)	(0.0069)	(0.0083)	(0.0108)	(0.0158)	(0.0029)	(0.0048)	(0.2057)	(0.1077)
Lob									
Herfindahl	-0.0082	-0.0054	-0.0032	-0.0032	-0.0036	-0.0027	0.0009	-0.0952	0.1323
	(0.0078)	(0.0066)	(0.0039)	(0.0056)	(0.0085)	(0.0026)	(0.0027)	(0.2369)	(0.1116)
Longtail	0.0024	0.0046	0.0098**	0.0121**	0.0161**	0.0052**	0.0032	0.3208*	-0.0377
	(0.0040)	(0.0043)	(0.0046)	(0.0050)	(0.0068)	(0.0021)	(0.0021)	(0.1626)	(0.0461)
Constant	0.0226	0.0037	0.0010	0.0161	-0.0053	-0.0049	0.0210**	0.5709	-0.6637**
	(0.0162)	(0.0174)	(0.0130)	(0.0195)	(0.0355)	(0.0096)	(0.0080)	(0.6238)	(0.2883)
Observations	760	760	760	760	760	760	760	760	706
Adjusted R^2	0.3239	0.3920	0.6651	0.6939	0.6709	0.7708	0.6958	0.5924	0.4477
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
SE cluster	Firm	Firm	Firm	Firm	Firm	Firm	Firm	Firm	Firm

Table 5. Subsample DID test: Firm risk after the analyst coverage shock, conditional on firm opaqueness

The sample period is from 2001 to 2017. The dependent variables are alternative risk measures. We split the whole sample into two groups based on the firm opaqueness (*Opaque*) before the shock. The high (low) initial opaqueness subsample includes firm-years that have higher (lower) *Opaque* than the median. The upper (lower) panel reports the regression results for the high (low) *Opaque* subsample. *TreatPost* is a dummy variable that takes a value of one for the treated firm in year $t + 1$ after a broker house merger or closure in year t and zero otherwise. There are 22 treated observations in the high subsample and 20 in the low subsample. All continuous variables are winsorized at the 1st and 99th percentiles. Robust standard errors, which are clustered at the insurer level, are reported in parentheses. The Data Appendix defines all variables. $*p < 0.1$; $**p < 0.05$; $***p < 0.01$.

		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Variables	ROA vol	CROA vol	Return vol	VaR 95	ES 95	Systematic risk Carhart	Idiosyncratic risk Carhart	Beta	EDF
High	TreatPost	0.0119**	0.0089**	0.0103***	0.0165***	0.0265***	0.0057***	0.0049***	0.4360***	0.2325***
		(0.0048)	(0.0037)	(0.0036)	(0.0057)	(0.0090)	(0.0021)	(0.0016)	(0.1472)	(0.0851)
	Observations	387	387	387	387	387	387	387	387	355
	Adjusted R^2	0.3157	0.3936	0.6632	0.6842	0.6626	0.7428	0.6693	0.5644	0.5004
Low	TreatPost	0.0022	0.0054**	0.0022	0.0048	0.0072	0.0020	0.0011	-0.0187	0.0576
		(0.0015)	(0.0022)	(0.0025)	(0.0037)	(0.0056)	(0.0014)	(0.0013)	(0.0823)	(0.0613)
	Observations	373	373	373	373	373	373	373	373	351
	Adjusted R^2	0.3835	0.4205	0.6915	0.7388	0.7031	0.7918	0.7730	0.6275	0.4563

Table 6. Subsample DID test: Firm risk after the analyst coverage shock, conditional on CEO vega

The sample period is from 2001 to 2017. The dependent variables are alternative risk measures. We split the whole sample into two groups based on the CEO vega (ln(1+*Vega*)) before the shock. The high (low) CEO vega subsample includes firm-years that have higher (lower) CEO vega than the median. The upper (lower) panel reports the regression results for the high (low) CEO vega subsample. *TreatPost* is a dummy variable that takes a value of one for the treated firm in year *t*+1 after a broker house merger or closure in year *t* and zero otherwise. There are 25 treated observations in the high subsample and 15 in the low subsample. All continuous variables are winsorized at the 1st and 99th percentiles. Robust standard errors, which are clustered at the insurer level, are reported in parentheses. The Data Appendix defines all variables. *$p < 0.1$; **$p < 0.05$; ***$p < 0.01$.

		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Variables	ROA vol	CROA vol	Return vol	VaR 95	ES 95	Systematic risk Carhart	Idiosyncratic risk Carhart	Beta	EDF
High	TreatPost	0.0083**	0.0069**	0.0085***	0.0119***	0.0227***	0.0049***	0.0039**	0.2795**	0.1597**
		(0.0041)	(0.0030)	(0.0031)	(0.0044)	(0.0074)	(0.0014)	(0.0015)	(0.1192)	(0.0701)
	Observations	365	365	365	365	365	365	365	365	359
	Adjusted R^2	0.2841	0.3697	0.7442	0.7563	0.7332	0.8277	0.7488	0.6086	0.5140
Low	TreatPost	0.0022	0.0024	-0.0001	0.0026	0.0010	0.0001	0.0001	-0.0484	-0.0114
		(0.0018)	(0.0021)	(0.0018)	(0.0032)	(0.0041)	(0.0014)	(0.0008)	(0.0857)	(0.0239)
	Observations	359	359	359	359	359	359	359	359	317
	Adjusted R^2	0.4817	0.4929	0.6813	0.6925	0.6682	0.7726	0.7308	0.6585	0.3966

Table 7. Subsample DID test: Firm risk after the analyst coverage shock, conditional on policyholder monitoring.

The sample period is from 2001 to 2017. The dependent variables are alternative risk measures. We split the whole sample into two groups based on the percentage of commercial business written before the shock. The high (low) policyholder monitoring subsample includes firm-years that have higher (lower) proportion of DPW written in commercial lines than the median. The upper (lower) panel reports the regression results for the high (low) policyholder monitoring subsample. *TreatPost* is a dummy variable that takes a value of one for the treated firm in year t+1 after a broker house merger or closure in year t and zero otherwise. There are 24 treated observations in the high subsample and 18 in the low subsample. All continuous variables are winsorized at the 1st and 99th percentiles. Robust standard errors, which are clustered at the insurer level, are reported in parentheses. The Data Appendix defines all variables. *$p < 0.1$; **$p < 0.05$; ***$p < 0.01$.

		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Variables	ROA vol	CROA vol	Return vol	VaR 95	ES 95	Systematic risk Carhart	Idiosyncratic risk Carhart	Beta	EDF
High	TreatPost	0.0021	0.0040	0.0050*	0.0090*	0.0105	0.0029	0.0026*	0.1146	0.1201
		(0.0029)	(0.0025)	(0.0030)	(0.0049)	(0.0068)	(0.0018)	(0.0014)	(0.1009)	(0.0773)
	Observations	381	381	381	381	381	381	381	381	346
	Adjusted R^2	0.4774	0.4642	0.6754	0.6834	0.7017	0.7591	0.7438	0.5573	0.5369
Low	TreatPost	0.0106***	0.0086**	0.0071**	0.0100**	0.0205***	0.0045***	0.0027	0.3072***	0.1190
		(0.0038)	(0.0037)	(0.0031)	(0.0043)	(0.0076)	(0.0016)	(0.0016)	(0.1104)	(0.0910)
	Observations	379	379	379	379	379	379	379	379	360
	Adjusted R^2	0.2380	0.3164	0.6650	0.7119	0.6576	0.7867	0.6662	0.6260	0.4000

Table 8. Subsample DID test: Firm risk after the analyst coverage shock, conditional on CEO vega and policyholder monitoring.

The sample period is from 2001 to 2017. The dependent variables are alternative risk measures. We double sort sample into four groups based on the CEO vega and the level of policyholder monitoring independently. *TreatPost* is a dummy variable that takes a value of one for the treated firm in year t+1 after a broker house merger or closure in year t and zero otherwise. The number of treated observations in Panel A, B, C and D are 11, 14, 6 and 9 respectively. All continuous variables are winsorized at the 1st and 99th percentiles. Robust standard errors, which are clustered at the insurer level, are reported in parentheses. The Data Appendix defines all variables. *$p < 0.1$; **$p < 0.05$; ***$p < 0.01$.

		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
		ROA Vol	CROA Vol	Return Vol	VaR 95	ES 95	Systematic Risk Carhart	Idiosyncratic Risk Carhart	Beta	EDF
Panel A	HIGH Vega & HIGH Monitor									
	TreatPost	0.0056	0.0051**	0.0073*	0.0104*	0.0142*	0.0019	0.0036*	0.0806	0.1699**
		(0.0054)	(0.0020)	(0.0038)	(0.0062)	(0.0076)	(0.0018)	(0.0018)	(0.1434)	(0.0685)
	Observations	169	169	169	169	169	169	169	169	166
	Adjusted R^2	0.3281	0.3477	0.8319	0.8013	0.8406	0.8318	0.8452	0.5607	0.7319
Panel B	HIGH Vega & LOW Monitor									
	TreatPost	0.0106*	0.0066	0.0088*	0.0099*	0.0245**	0.0062***	0.0040*	0.4234***	0.1172
		(0.0053)	(0.0049)	(0.0047)	(0.0055)	(0.0112)	(0.0021)	(0.0023)	(0.1438)	(0.0970)
	Observations	196	196	196	196	196	196	196	196	193
	Adjusted R^2	0.2811	0.4021	0.7169	0.7650	0.6928	0.8456	0.7206	0.6725	0.4440
Panel C	LOW Vega & HIGH Monitor									
	TreatPost	-0.0019	-0.0008	0.0028	0.0077	0.0063	0.0031	0.0007	0.0711	-0.0505
		(0.0036)	(0.0031)	(0.0029)	(0.0054)	(0.0077)	(0.0029)	(0.0012)	(0.1289)	(0.0314)
	Observations	195	195	195	195	195	195	195	195	167
	Adjusted R^2	0.5848	0.5238	0.6812	0.6817	0.6582	0.7795	0.7231	0.6070	0.4428
Panel D	LOW Vega & LOW Monitor									
	TreatPost	0.0051**	0.0035	0.0011	0.0016	0.0041	-0.0007	0.0007	-0.0377	0.0163
		(0.0023)	(0.0040)	(0.0020)	(0.0033)	(0.0049)	(0.0011)	(0.0014)	(0.1032)	(0.0646)
	Observations	164	164	164	164	164	164	164	164	150
	Adjusted R^2	0.3132	0.4651	0.6854	0.7091	0.6655	0.7748	0.7370	0.7060	0.3759

Table 9. DID: Investment in bonds before and after the drop in analyst coverage

This table reports the coefficients estimated from the DID regression on the relationship between the analyst coverage loss and firms' corporate bond holdings at the bond-insurer-year level. We only include bonds in the NAIC 1 and 2 categories. The dependent variable *Holding of Bond*$_{ijt}$, is insurer *i*'s holdings of a specific corporate bond *j* in year *t*, as a percentage of the total market value of all bonds insurer *i* holds in year *t* (i.e., MV(*ijt*)/MV of all bonds held(*it*)) . The bond holding is measured by the market value of P&C insurer *i*'s holdings of a specific corporate bond *j* in year *t* (MV(*ijt*)). We further split the sample into high (low) subsamples based on the firm-level the median of opaqueness of the firm, the number of analysts covered, the CEO vega and policyholder monitoring. Bond characteristic controls include *Bond WorseRated,* coupon rate (*Coupon*), and maturity (*Maturity*). We transform different rating agencies' bond ratings to numeric values and take the lowest rating across different rating agencies. *Bond WorseRated* equals 1 for bonds rated AAA and increases to 10 for bonds rated BBB−. Insurer characteristic variables are the same as in previous models. In each column, we control for bond fixed effects, insurer fixed effects, and year fixed effects. The sample starts in 2001 and ends in 2017. Standard errors are corrected for clustering at the bond CUSIP-year level. The Data Appendix defines all variables. *$p < 0.1$; **$p < 0.05$; ***$p < 0.01$.

	Whole Sample	Opaqueness		Analyst Coverage		Vega		Policyholder Monitoring	
		High	Low	High	Low	High	Low	High	Low
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
TreatPost* Worse-Rated	0.0024***	0.0022**	0.0028	0.0013	0.0054**	0.0055***	-0.0020*	0.0004	0.0031***
	(0.0009)	(0.0009)	(0.0019)	(0.0009)	(0.0025)	(0.0015)	(0.0010)	(0.0015)	(0.0010)
TreatPost	-0.0090	-0.0152**	0.0047	-0.0090	-0.0437**	-0.0288***	0.0274	-0.0059	-0.0043
	(0.0070)	(0.0078)	(0.0133)	(0.0082)	(0.0179)	(0.0107)	(0.0202)	(0.0136)	(0.0084)
Treat* Worse-Rated	-0.0026***	-0.0017***	-0.0066***	-0.0024***	-0.0054***	-0.0019**	-0.0006	-0.0024**	-0.0016***
	(0.0005)	(0.0005)	(0.0013)	(0.0005)	(0.0018)	(0.0010)	(0.0007)	(0.0010)	(0.0006)

Worse-Rated*Post	-0.0000	0.0005	0.0007	0.0002	-0.0004	-0.0016*	0.0013*	0.0019**	-0.0014**
	(0.0005)	(0.0005)	(0.0008)	(0.0006)	(0.0010)	(0.0009)	(0.0008)	(0.0008)	(0.0007)
Worse-Rated	-0.0011**	-0.0009	-0.0010	0.0004	-0.0025**	-0.0029***	-0.0004	-0.0024***	-0.0006
	(0.0005)	(0.0006)	(0.0011)	(0.0006)	(0.0010)	(0.0009)	(0.0008)	(0.0008)	(0.0007)
Treat	0.0272***	0.0230***	0.0476***	0.0197***	0.0519***	0.0270***	0.0011	0.0252***	0.0241***
	(0.0040)	(0.0045)	(0.0093)	(0.0043)	(0.0128)	(0.0075)	(0.0059)	(0.0084)	(0.0049)
DPW Growth	-0.0245**	-0.0437***	-0.0244	-0.0623**	-0.0148*	-0.0196***	-0.0640	-0.0198*	-0.0259***
	(0.0102)	(0.0092)	(0.0271)	(0.0304)	(0.0079)	(0.0067)	(0.0447)	(0.0119)	(0.0092)
Reinsurance	-0.0189***	-0.0100*	-0.0608***	-0.0218***	0.0160*	-0.0028	-0.0366	-0.0393***	0.0057
	(0.0043)	(0.0057)	(0.0109)	(0.0046)	(0.0097)	(0.0059)	(0.0238)	(0.0090)	(0.0065)
Ln (assets)	-0.1029***	-0.0980***	-0.1159***	-0.1319***	-0.0801***	-0.0794***	-0.2060***	-0.0954***	-0.1179***
	(0.0048)	(0.0073)	(0.0109)	(0.0092)	(0.0071)	(0.0057)	(0.0168)	(0.0094)	(0.0079)
Leverage	0.0093	-0.0050	-0.0594	-0.0642	0.0619*	0.0182	-0.0704	0.0424	-0.0350
	(0.0261)	(0.0356)	(0.0634)	(0.0573)	(0.0316)	(0.0292)	(0.0817)	(0.0387)	(0.0312)
Geo Herfindahl	-0.0424**	-0.1802**	0.0464*	-0.1487**	-0.0062	-0.0557***	0.1332*	-0.0602*	-0.0568**
	(0.0184)	(0.0700)	(0.0255)	(0.0583)	(0.0257)	(0.0175)	(0.0777)	(0.0336)	(0.0283)
Lob Herfindahl	0.0749***	0.0947***	0.1571***	0.0592***	0.1761**	0.0949***	-0.0317	0.0879***	-0.0597**
	(0.0173)	(0.0344)	(0.0573)	(0.0180)	(0.0734)	(0.0231)	(0.1314)	(0.0194)	(0.0261)
Longtail	-0.0800***	0.0024	-0.1581***	-0.0322	-0.2162***	-0.1203***	-0.0658	-0.1120**	-0.0585**
	(0.0258)	(0.0354)	(0.0488)	(0.0478)	(0.0360)	(0.0192)	(0.1145)	(0.0493)	(0.0239)
Maturity	-0.0000	-0.0000	0.0000	0.0000	0.0000	0.0000**	0.0000***	0.0000	-0.0000

	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Coupon	-0.0008	0.0038	-0.0036	0.0002	-0.0057	0.0785***	-0.0178***	0.0006	-0.0089
	(0.0055)	(0.0081)	(0.0025)	(0.0015)	(0.0078)	(0.0202)	(0.0045)	(0.0067)	(0.0065)
Constant	1.7975***	1.6717***	2.0478***	2.3036***	1.4679***	1.0535***	3.6457***	1.6510***	2.1397***
	(0.0704)	(0.0957)	(0.1599)	(0.1589)	(0.1017)	(0.1052)	(0.2983)	(0.1443)	(0.1371)
Observations	169,797	96,697	73,100	108,723	61,074	83,595	79,241	80,762	89,035
Adjusted R^2	0.5556	0.6053	0.6321	0.6083	0.5608	0.5293	0.6560	0.6009	0.6097
Bond FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cluster SE	Cusip-Year	Cusip-Year	Cusip-Year	Cusip-Year	Cusip-Year	Cusip-Year	Cusip-Year	Cusip-Year	Cusip-Year

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A. Additional Tests

Table OA-1. Difference-in-Differences: Using additional risk measures.

This table reports the coefficients estimated from the DID regression on the relationship between the analyst coverage loss and firm risk. The sample consists of 760 insurer-year observations from 2001 to 2017. The dependent variables are alternative risk measures defined in the main paper. *TreatPost* is a dummy variable that takes the value of one in year *t*+1 after the broker house merger or closure in year *t*, for firms that experience broker house shocks in year *t* and zero otherwise. *Treat* is a dummy variable equal to one during year *t*-3 to *t*+1 if the insurer experienced analyst loss due to a broker house merger or closure in year *t* and zero otherwise. All regressions include a constant, firm fixed effects, and year fixed effects (not reported). All continuous variables are winsorized at the 1st and 99th percentiles. Robust standard errors, which are clustered at the insurer level, are reported in parentheses. The Data Appendix defines all variables. **p* < 0.1; ***p* < 0.05; ****p* < 0.01.

	(1)	(2)	(3)	(4)	(5)
VARIABLES	FirmSigma	ROA Vol Adj	CROA Vol Adj	Systematic Risk Fama French (2015)	Idiosyncratic Risk Fama French (2015)
TreatPost	0.0077**	0.0060*	0.0079**	0.0038***	0.0044**
	(0.0035)	(0.0033)	(0.0033)	(0.0011)	(0.0018)
Treat	0.0028	-0.0059**	-0.0050**	-0.0016**	-0.0030**
	(0.0032)	(0.0024)	(0.0024)	(0.0007)	(0.0014)
DPW Growth	0.0086**	-0.0072	-0.0036	-0.0009	-0.0041***
	(0.0042)	(0.0048)	(0.0045)	(0.0011)	(0.0015)
Reinsurance	-0.0049	-0.0011	0.0011	-0.0010	0.0010
	(0.0057)	(0.0023)	(0.0027)	(0.0008)	(0.0017)
Ln (assets)	0.0048	-0.0036*	-0.0023	0.0004	0.0001
	(0.0053)	(0.0020)	(0.0019)	(0.0006)	(0.0009)
Leverage	0.0713	0.0350**	0.0262**	0.0122***	0.0150**
	(0.0532)	(0.0142)	(0.0115)	(0.0032)	(0.0064)
Geo Herfindahl	-0.0270	0.0012	0.0068	0.0082**	0.0137*

	(0.0336)	(0.0095)	(0.0105)	(0.0033)	(0.0081)
Lob Herfindahl	0.0294*	-0.0189	-0.0128	-0.0028	-0.0012
	(0.0149)	(0.0115)	(0.0104)	(0.0027)	(0.0041)
Longtail	-0.0215	0.0012	0.0049	0.0052**	0.0078
	(0.0212)	(0.0084)	(0.0064)	(0.0022)	(0.0048)
Constant	-0.0071	0.0530*	0.0347	-0.0048	-0.0002
	(0.1046)	(0.0287)	(0.0291)	(0.0096)	(0.0121)
Observations	760	738	738	760	760
Adjusted R-squared	0.9345	0.3212	0.4383	0.7660	0.5971
Firm FE	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
SE cluster	Firm	Firm	Firm	Firm	Firm

Table OA-2. Difference-in-Differences: Testing the parallel trends assumption using risk measures in OA-1.

This table investigates the pre-treatment trends between the treatment and control groups. The sample consists of 802 insurer-year observations from 2001 to 2017. The shocked firm-year observations are added back. The dependent variables are alternative risk measures. The indicator variables *TreatPre2Y*, *TreatPre1Y*, *TreatPost0Y*, *TreatPost1Y* flag two year before the shock, one year before the shock, the shock year, and one year after the shock. *Treat* is a dummy variable equal to one during year *t*-3 to *t*+1 if the insurer experienced analyst loss due to a broker house merger or closure in year *t* and zero otherwise. All continuous variables are winsorized at the 1st and 99th percentiles. Robust standard errors, which are clustered at the insurer level, are reported in parentheses. The Data Appendix defines all variables. *$p < 0.1$; **$p < 0.05$; ***$p < 0.01$.

	(1)	(2)	(3)	(4)	(5)
VARIABLES	FirmSigma	ROA Vol Adj	CROA Vol Adj	Systematic Risk Fama French (2015)	Idiosyncratic Risk Fama French (2015)
TreatPre2Y	-0.0012	0.0000	-0.0008	0.0009	0.0007
	(0.0018)	(0.0019)	(0.0019)	(0.0007)	(0.0013)
TreatPre1Y	-0.0018	0.0000	-0.0022	0.0005	-0.0003
	(0.0016)	(0.0023)	(0.0027)	(0.0012)	(0.0016)
TreatPost0Y	-0.0013	-0.0019	-0.0004	0.0015	-0.0002
	(0.0021)	(0.0022)	(0.0024)	(0.0014)	(0.0017)
TreatPost1Y	0.0072*	0.0058*	0.0067**	0.0043***	0.0044***
	(0.0037)	(0.0034)	(0.0032)	(0.0012)	(0.0017)
Treat	0.0035	-0.0054***	-0.0037*	-0.0017***	-0.0028**
	(0.0034)	(0.0020)	(0.0020)	(0.0006)	(0.0012)
DPW Growth	0.0097**	-0.0075	-0.0033	-0.0016	-0.0049***
	(0.0044)	(0.0049)	(0.0046)	(0.0013)	(0.0016)
Reinsurance	-0.0039	-0.0019	-0.0008	-0.0016	0.0001
	(0.0057)	(0.0022)	(0.0026)	(0.0011)	(0.0019)
Ln (assets)	0.0045	-0.0036*	-0.0030	0.0004	0.0001
	(0.0051)	(0.0020)	(0.0019)	(0.0006)	(0.0010)
Leverage	0.0726	0.0363**	0.0285**	0.0141***	0.0161**
	(0.0545)	(0.0143)	(0.0124)	(0.0031)	(0.0063)
Geo Herfindahl	-0.0309	0.0028	0.0073	0.0098***	0.0155*

	(0.0367)	(0.0095)	(0.0106)	(0.0036)	(0.0083)
Lob Herfindahl	0.0291*	-0.0170	-0.0098	-0.0025	-0.0011
	(0.0153)	(0.0105)	(0.0100)	(0.0025)	(0.0040)
Longtail	-0.0187	0.0007	0.0044	0.0054**	0.0077
	(0.0226)	(0.0082)	(0.0062)	(0.0021)	(0.0047)
Constant	-0.0044	0.0521*	0.0430	-0.0062	-0.0016
	(0.1021)	(0.0279)	(0.0295)	(0.0090)	(0.0133)
Observations	802	780	780	802	802
Adjusted R-squared	0.9361	0.3199	0.4339	0.7710	0.5981
Firm FE	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
SE cluster	Firm	Firm	Firm	Firm	Firm

Table OA-3. Univariate tests.

This table reports the coefficients estimated from the OLS regression on the relationship between the number of analysts covering the firm and firm risk. The sample consists of all available insurers in the database. The dependent variables are alternative risk measures. Robust standard errors are reported in parentheses. The Data Appendix defines all variables. *$p < 0.1$; **$p < 0.05$; ***$p < 0.01$.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
VARIABLES	ROA Vol	CROA Vol	Return Vol	VaR 95	ES 95	Systematic Risk Carhart	Idiosyncratic Risk Carhart	Beta	EDF
No.Analysts	-0.0001*	-0.0001***	-0.0002***	-0.0003***	-0.0004***	0.0000	-0.0002***	0.0023	-0.0017***
	(0.0000)	(0.0000)	(0.0001)	(0.0001)	(0.0001)	(0.0000)	(0.0000)	(0.0017)	(0.0006)
Constant	0.0104***	0.0126***	0.0241***	0.0355***	0.0511***	0.0120***	0.0180***	0.9436***	0.0583***
	(0.0005)	(0.0005)	(0.0007)	(0.0010)	(0.0014)	(0.0004)	(0.0003)	(0.0211)	(0.0077)
Observations	1,304	1,304	1,269	1,268	1,268	1,269	1,269	1,269	1,183
Adjusted R2	0.0019	0.0061	0.0111	0.0091	0.0080	-0.0000	0.0587	0.0007	0.0055

Table OA-4. Additional DID tests of high vega: further control other CEO compensation incentive

Different from Table 7, we further control additional CEO compensation incentive variables (CEO delta, relative debt, and total compensation).

		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	VARIABLES	ROA Vol	CROA Vol	Return Vol	VaR 95	ES 95	Systematic Risk Carhart	Idiosyncratic Risk Carhart	Beta	EDF
HIGH	TreatPost	0.0057	0.0047**	0.0062**	0.0094**	0.0162**	0.0038***	0.0030*	0.2003*	0.1302*
		(0.0034)	(0.0022)	(0.0028)	(0.0045)	(0.0063)	(0.0012)	(0.0015)	(0.1030)	(0.0722)
	Observations	355	355	355	355	355	355	355	355	355
	Adjusted R-squared	0.3237	0.4076	0.7642	0.7678	0.7617	0.8378	0.7659	0.6267	0.5070
LOW	TreatPost	0.0027	0.0026	-0.0005	0.0014	0.0005	-0.0010	0.0002	-0.1042	-0.0034
		(0.0020)	(0.0024)	(0.0022)	(0.0038)	(0.0048)	(0.0014)	(0.0009)	(0.0929)	(0.0263)
	Observations	280	280	280	280	280	280	280	280	279
	Adjusted R-squared	0.3899	0.4393	0.6728	0.6707	0.6349	0.7510	0.7591	0.6530	0.3679

Table OA-5. Subsample test: by rating

The sample period is from 2001 to 2017. The dependent variables are alternative risk measures. We split the whole sample into two groups based on firm rating. The rating is from AMbest and we use the S&P rating if the AMbest rating is missing. The upper (lower) panel includes firm-years that have ratings below A- (A and above). All continuous variables are winsorized at the 1st and 99th percentiles. Robust standard errors, which are clustered at the insurer level, are reported in parentheses. The Data Appendix defines all variables. *$p < 0.1$; **$p < 0.05$; ***$p < 0.01$.

		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	VARIABLES	ROA Vol	CROA Vol	Return Vol	VaR 95	ES 95	Systematic Risk Carhart	Idiosyncratic Risk Carhart	Beta	EDF
A- and below	TreatPost	0.0069	0.0061	0.0029	0.0063	0.0037	0.0032*	0.0008	0.3354***	-0.0140
		(0.0050)	(0.0038)	(0.0027)	(0.0050)	(0.0062)	(0.0017)	(0.0013)	(0.1218)	(0.0581)
	Observations	182	182	182	182	182	182	182	182	176
	Adjusted R-squared	0.1108	0.3039	0.6081	0.6080	0.5523	0.7323	0.7155	0.6120	0.4881
A and above	TreatPost	0.0012	0.0024*	0.0051**	0.0086**	0.0116**	0.0029**	0.0024**	0.0579	0.0987*
		(0.0015)	(0.0013)	(0.0023)	(0.0035)	(0.0047)	(0.0013)	(0.0009)	(0.0775)	(0.0576)
	Observations	447	447	447	447	447	447	447	447	408
	Adjusted R-squared	0.3018	0.3905	0.6812	0.7146	0.7295	0.8067	0.7169	0.6056	0.5517

Table OA-6. Firm underwriting risk after the analyst coverage shock

This table reports the coefficients estimated from the DID regression on the relationship between analyst coverage loss and firm underwriting risk. The sample consists of 760 insurer-year observations from 2001 to 2017. The dependent variables are underwriting risk measure (*Uwgain Vol*). *Uwgain Vol* is calculated as the SD of quarterly underwriting gain within the examined year. Quarterly underwriting gain is calculated as the underwriting income scaled by firm assets. Panel A reports the DID results. Panel B reports the parallel trend test. Panel C reports the subsample tests split by the level of policyholder monitoring. Robust standard errors, which are clustered at the insurer level, are reported in parentheses. The Data Appendix defines all variables. *$p < 0.1$; **$p < 0.05$; ***$p < 0.01$.

Panel A. DID results.

VARIABLES	Uwgain Vol
TreatPost	0.0043**
	(0.0020)
Treat	-0.0022
	(0.0015)
DPW Growth	0.0010
	(0.0020)
Reinsurance	0.0021
	(0.0019)
Ln (assets)	-0.0019
	(0.0016)
Leverage	0.0233***
	(0.0089)
Geo Herfindahl	0.0120
	(0.0075)
Lob Herfindahl	-0.0091
	(0.0072)
Longtail	0.0075*
	(0.0040)
Constant	0.0194
	(0.0222)
Observations	760
Adjusted R-squared	0.4470
Firm FE	Yes
Year FE	Yes
SE cluster	Firm

Panel B. Parallel trend tests

VARIABLES	Uwgain Vol
TreatPre2Y	0.0010

	(0.0014)
TreatPre1Y	-0.0018
	(0.0012)
TreatPost0Y	-0.0005
	(0.0015)
TreatPost1Y	0.0037*
	(0.0021)
Treat	-0.0018
	(0.0013)
DPW Growth	0.0000
	(0.0022)
Reinsurance	0.0012
	(0.0019)
Ln (assets)	-0.0021
	(0.0016)
Leverage	0.0248***
	(0.0087)
Geo Herfindahl	0.0118
	(0.0075)
Lob Herfindahl	-0.0083
	(0.0061)
Longtail	0.0066*
	(0.0036)
Constant	0.0223
	(0.0215)
Observations	804
Adjusted R-squared	0.4378
Firm FE	Yes
Year FE	Yes
SE cluster	Firm

Panel C. Subsample tests: Split by policyholder monitoring

	VARIABLES	*Uwgain Vol*
HIGH	TreatPost	0.0005
		(0.0011)
	Observations	381
	Adjusted R-squared	0.5494
LOW	TreatPost	0.0082**
		(0.0039)
	Observations	379
	Adjusted R-squared	0.3626

OA-7 Full model

The full estimation results of Table 9 in the main text.

Panel A. High Vega & High Monitor

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(10)
VARIABLES	ROA Vol	CROA Vol	Return Vol	VaR 95	ES 95	Systematic Risk Carhart	Idiosyncratic Risk Carhart	Beta	EDF
TreatPost	0.0056	0.0051**	0.0073*	0.0104*	0.0142*	0.0019	0.0036*	0.0806	0.1699**
	(0.0054)	(0.0020)	(0.0038)	(0.0062)	(0.0076)	(0.0018)	(0.0018)	(0.1434)	(0.0685)
Treat	-0.0070**	-0.0033	-0.0012	-0.0019	0.0002	0.0003	0.0005	0.1100	-0.0560**
	(0.0028)	(0.0042)	(0.0015)	(0.0022)	(0.0035)	(0.0011)	(0.0008)	(0.0899)	(0.0264)
DPW Growth	0.0028	0.0102**	-0.0074*	-0.0178**	-0.0210**	-0.0051*	-0.0019	-0.3131	-0.1697**
	(0.0032)	(0.0050)	(0.0042)	(0.0078)	(0.0089)	(0.0030)	(0.0020)	(0.2328)	(0.0641)
Reinsurance	-0.0045*	-0.0034*	-0.0032	-0.0064**	-0.0078	-0.0010	-0.0010	-0.0195	-0.0536***
	(0.0025)	(0.0017)	(0.0028)	(0.0029)	(0.0060)	(0.0015)	(0.0012)	(0.1015)	(0.0189)
Ln (assets)	-0.0076**	-0.0006	-0.0020	-0.0029	-0.0037	-0.0006	-0.0006	-0.0846	0.0211
	(0.0033)	(0.0047)	(0.0017)	(0.0032)	(0.0038)	(0.0018)	(0.0010)	(0.1301)	(0.0307)
Leverage	0.0575	0.0359	-0.0015	-0.0048	-0.0078	-0.0019	-0.0065	-0.1524	-0.0214
	(0.0358)	(0.0295)	(0.0169)	(0.0228)	(0.0303)	(0.0120)	(0.0076)	(0.8290)	(0.1931)
Geo Herfindahl	-0.0218**	-0.0231*	0.0417***	0.0427***	0.0705***	0.0142*	0.0251***	1.2294*	0.4086*
	(0.0098)	(0.0132)	(0.0099)	(0.0135)	(0.0193)	(0.0072)	(0.0050)	(0.6435)	(0.2371)
Lob Herfindahl	0.0125	0.0032	0.0038	0.0057	0.0024	0.0071	-0.0010	0.4880	-0.0052
	(0.0159)	(0.0094)	(0.0077)	(0.0134)	(0.0193)	(0.0060)	(0.0047)	(0.4350)	(0.1380)
Longtail	0.0096	0.0233	-0.0019	-0.0055	-0.0004	-0.0026	-0.0014	-0.5352	-0.3173
	(0.0206)	(0.0181)	(0.0123)	(0.0208)	(0.0264)	(0.0099)	(0.0067)	(0.9166)	(0.2171)
Constant	0.0857**	-0.0138	0.0444**	0.0715*	0.0892*	0.0190	0.0224**	2.3689	-0.1092
	(0.0338)	(0.0705)	(0.0197)	(0.0379)	(0.0469)	(0.0214)	(0.0106)	(1.6369)	(0.4085)

Observations	169	169	169	169	169	169	169	169	166
Adjusted R-squared	0.3281	0.3477	0.8319	0.8013	0.8406	0.8318	0.8452	0.5607	0.7319
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
SE cluster	Firm	Firm	Firm	Firm	Firm	Firm	Firm	Firm	Firm

Panel B. High Vega & Low Monitor

	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(20)
VARIABLES	ROA Vol	CROA Vol	Return Vol	VaR 95	ES 95	Systematic Risk Carhart	Idiosyncratic Risk Carhart	Beta	EDF
TreatPost	0.0106*	0.0066	0.0088*	0.0099*	0.0245**	0.0062***	0.0040*	0.4234***	0.1172
	(0.0053)	(0.0049)	(0.0047)	(0.0055)	(0.0112)	(0.0021)	(0.0023)	(0.1438)	(0.0970)
Treat	-0.0076**	-0.0093***	-0.0091**	-0.0163***	-0.0239***	-0.0037**	-0.0042**	-0.1911*	-0.1882**
	(0.0035)	(0.0033)	(0.0038)	(0.0050)	(0.0085)	(0.0016)	(0.0017)	(0.1017)	(0.0734)
DPW Growth	-0.0101*	-0.0031	0.0000	0.0019	0.0050	-0.0008	-0.0011	-0.1892	-0.0095
	(0.0058)	(0.0041)	(0.0031)	(0.0044)	(0.0079)	(0.0015)	(0.0018)	(0.1197)	(0.0568)
Reinsurance	-0.0006	0.0069	0.0052	0.0053	0.0051	-0.0012	0.0022	-0.0573	0.0371
	(0.0048)	(0.0053)	(0.0038)	(0.0053)	(0.0093)	(0.0012)	(0.0022)	(0.1080)	(0.0533)
Ln (assets)	-0.0008	-0.0002	-0.0011	-0.0052	-0.0013	-0.0016	-0.0015	-0.2093*	0.0111
	(0.0038)	(0.0043)	(0.0033)	(0.0044)	(0.0081)	(0.0015)	(0.0016)	(0.1135)	(0.0781)
Leverage	0.0249	0.0139	0.0266	0.0399	0.0498	0.0172**	0.0124	0.8639*	0.3174
	(0.0156)	(0.0168)	(0.0213)	(0.0246)	(0.0455)	(0.0070)	(0.0115)	(0.5122)	(0.2628)
Geo Herfindahl	0.0298*	0.0398**	0.0129	0.0228	0.0137	0.0086**	0.0066	0.6122*	0.1975
	(0.0168)	(0.0155)	(0.0115)	(0.0137)	(0.0257)	(0.0040)	(0.0060)	(0.3596)	(0.2612)
Lob Herfindahl	0.0012	0.0026	-0.0204*	-0.0169	-0.0228	-0.0046	-0.0041	-0.3516	-0.1734

	(0.0109)	(0.0107)	(0.0106)	(0.0123)	(0.0233)	(0.0032)	(0.0053)	(0.3001)	(0.1352)
Longtail	-0.0011	0.0101	0.0283***	0.0284**	0.0335*	0.0069*	0.0065	0.2074	0.1211
	(0.0091)	(0.0095)	(0.0100)	(0.0112)	(0.0195)	(0.0038)	(0.0041)	(0.2029)	(0.1237)
Constant	0.0041	-0.0081	0.0154	0.0762	0.0283	0.0228	0.0272	3.5946**	-0.2768
	(0.0540)	(0.0625)	(0.0432)	(0.0569)	(0.1130)	(0.0218)	(0.0211)	(1.7602)	(1.1018)
Observations	196	196	196	196	196	196	196	196	193
Adjusted R-squared	0.2811	0.4021	0.7169	0.7650	0.6928	0.8456	0.7206	0.6725	0.4440
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
SE cluster	Firm	Firm	Firm	Firm	Firm	Firm	Firm	Firm	Firm

Panel C. Low Vega & High Monitor

	(21)	(22)	(23)	(24)	(25)	(26)	(27)	(28)	(30)
VARIABLES	ROA Vol	CROA Vol	Return Vol	VaR 95	ES 95	Systematic Risk Carhart	Idiosyncratic Risk Carhart	Beta	EDF
TreatPost	-0.0019	-0.0008	0.0028	0.0077	0.0063	0.0031	0.0007	0.0711	-0.0505
	(0.0036)	(0.0031)	(0.0029)	(0.0054)	(0.0077)	(0.0029)	(0.0012)	(0.1289)	(0.0314)
Treat	0.0052**	0.0029	0.0019	0.0013	0.0026	0.0005	0.0009	0.0064	0.0498
	(0.0025)	(0.0028)	(0.0019)	(0.0034)	(0.0052)	(0.0014)	(0.0012)	(0.1266)	(0.0462)
DPW Growth	-0.0020	-0.0040	0.0029	0.0062	0.0097	0.0057*	-0.0009	-0.2441	-0.0336
	(0.0050)	(0.0063)	(0.0063)	(0.0103)	(0.0182)	(0.0033)	(0.0050)	(0.2222)	(0.1250)
Reinsurance	0.0121**	0.0161***	-0.0005	0.0070	0.0171*	0.0015	0.0007	-0.1506	-0.2227*
	(0.0048)	(0.0055)	(0.0052)	(0.0077)	(0.0102)	(0.0025)	(0.0043)	(0.1747)	(0.1254)
Ln (assets)	0.0001	0.0006	0.0056	0.0054	0.0106	0.0042*	0.0003	0.3660**	0.0134
	(0.0025)	(0.0038)	(0.0043)	(0.0072)	(0.0117)	(0.0023)	(0.0025)	(0.1540)	(0.0687)

Leverage	0.0141	-0.0058	-0.0159	-0.0196	-0.0273	-0.0114	-0.0077	-1.0551	0.4658**
	(0.0134)	(0.0263)	(0.0167)	(0.0246)	(0.0406)	(0.0086)	(0.0134)	(0.6857)	(0.1790)
Geo Herfindahl	0.0003	0.0122	0.0077	0.0109	0.0144	0.0102	0.0014	-0.4208	0.3913
	(0.0196)	(0.0234)	(0.0158)	(0.0248)	(0.0345)	(0.0136)	(0.0111)	(0.9026)	(0.2855)
Lob Herfindahl	-0.0374	-0.0553	0.0392*	0.0666	0.0501	0.0100	0.0298*	1.7344	1.2157**
	(0.0305)	(0.0337)	(0.0227)	(0.0397)	(0.0626)	(0.0107)	(0.0175)	(1.0510)	(0.5635)
Longtail	0.0131	0.0015	-0.0265	-0.0441	-0.0669	-0.0102	-0.0132	-0.1006	-0.5172
	(0.0145)	(0.0229)	(0.0164)	(0.0313)	(0.0425)	(0.0076)	(0.0118)	(0.5728)	(0.3358)
Constant	-0.0019	0.0143	-0.0477	-0.0316	-0.0714	-0.0435	0.0149	-4.0545*	-0.4947
	(0.0412)	(0.0519)	(0.0638)	(0.1043)	(0.1717)	(0.0354)	(0.0378)	(2.3554)	(1.0350)
Observations	195	195	195	195	195	195	195	195	167
Adjusted R-squared	0.5848	0.5238	0.6812	0.6817	0.6582	0.7795	0.7231	0.6070	0.4428
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
SE cluster	Firm	Firm	Firm	Firm	Firm	Firm	Firm	Firm	Firm

Panel D. Low vega & Low Monitor

	(31)	(32)	(33)	(34)	(35)	(36)	(37)	(38)	(40)
VARIABLES	ROA Vol	CROA Vol	Return Vol	VaR 95	ES 95	Systematic Risk Carhart	Idiosyncratic Risk Carhart	Beta	EDF
TreatPost	0.0051**	0.0035	0.0011	0.0016	0.0041	-0.0007	0.0007	-0.0377	0.0163
	(0.0023)	(0.0040)	(0.0020)	(0.0033)	(0.0049)	(0.0011)	(0.0014)	(0.1032)	(0.0646)
Treat	-0.0000	-0.0023	-0.0021	-0.0045	-0.0039	-0.0002	-0.0014	0.0618	-0.0047
	(0.0023)	(0.0027)	(0.0018)	(0.0031)	(0.0038)	(0.0010)	(0.0010)	(0.1105)	(0.0272)
DPW Growth	-0.0011	-0.0009	-0.0073**	-0.0078	-0.0134*	-0.0017	-0.0015	0.1691	-0.0428

	(0.0067)	(0.0042)	(0.0033)	(0.0055)	(0.0068)	(0.0017)	(0.0016)	(0.1915)	(0.0786)
Reinsurance	-0.0028	-0.0037	0.0023	0.0032	0.0046	0.0004	0.0007	-0.0869	0.0876
	(0.0040)	(0.0034)	(0.0037)	(0.0062)	(0.0082)	(0.0020)	(0.0017)	(0.1445)	(0.0594)
Ln (assets)	-0.0048	-0.0010	0.0019	0.0021	0.0038	0.0006	0.0014	0.0128	-0.0430
	(0.0036)	(0.0022)	(0.0027)	(0.0042)	(0.0066)	(0.0015)	(0.0016)	(0.1415)	(0.0707)
Leverage	0.0241	0.0047	0.0294**	0.0301*	0.0428	0.0195***	0.0147*	1.7797***	-0.0285
	(0.0294)	(0.0119)	(0.0144)	(0.0178)	(0.0343)	(0.0068)	(0.0080)	(0.5648)	(0.4020)
Geo Herfindahl	-0.0013	-0.0054	0.0080	0.0142	0.0183	0.0003	0.0007	-0.0115	0.0139
	(0.0158)	(0.0096)	(0.0158)	(0.0249)	(0.0336)	(0.0063)	(0.0079)	(0.5543)	(0.2978)
Lob Herfindahl	-0.0326*	-0.0162	-0.0126	-0.0086	-0.0213	-0.0066	-0.0064	-0.6621	-0.0884
	(0.0172)	(0.0143)	(0.0120)	(0.0161)	(0.0255)	(0.0071)	(0.0063)	(0.5334)	(0.1974)
Longtail	0.0096	0.0123	0.0063	0.0065	0.0070	0.0049	0.0061	0.8341**	0.0372
	(0.0083)	(0.0080)	(0.0111)	(0.0140)	(0.0229)	(0.0052)	(0.0060)	(0.4062)	(0.1701)
Constant	0.0787	0.0265	-0.0226	-0.0196	-0.0336	-0.0085	-0.0135	-0.3285	0.7211
	(0.0523)	(0.0296)	(0.0458)	(0.0658)	(0.1123)	(0.0254)	(0.0236)	(2.1133)	(1.2886)
Observations	164	164	164	164	164	164	164	164	150
Adjusted R-squared	0.3132	0.4651	0.6854	0.7091	0.6655	0.7748	0.7370	0.7060	0.3759
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
SE cluster	Firm	Firm	Firm	Firm	Firm	Firm	Firm	Firm	Firm

OA-8. Difference-in-Differences: Testing the parallel trends assumption for firm risk-taking behavior

This table investigates the pre-treatment trends between the treatment and control groups at the bond-insurer-year level. The dependent variable *Holding of Bond*$_{ijt}$, is insurer *i*'s holdings of a specific corporate bond *j* in year *t*, as a percentage of the total market value of all bonds insurer *i* holds in year *t* in column (1). The bond holding is measured by the market value of P&C insurer *i*'s holdings of a specific corporate bond *j* in year *t* (*MV(ijt)*). We transform different rating agencies' bond ratings to numeric values and take the lowest rating across different rating agencies. *Bond WorseRated* is 1 for bonds rated AAA, and increases to 10 for bonds rated BBB-. The indicator variables *TreatPre2Y*, *TreatPre1Y*, *TreatPost0Y*, *TreatPost1Y* flag two years before the shock, one year before the shock, the shock year, and one year after the shock. *Treat* is a dummy variable equal to one during year *t*-3 to *t*+1 if the insurer experienced analyst loss due to a broker house merger or closure in year *t* and zero otherwise. All continuous variables are winsorized at the 1st and 99th percentiles. We control for bond-fixed effects, insurer-fixed effects and year-fixed effects. The sample starts in 2001 and ends in 2017. Standard errors are corrected for clustering at the bond CUSIP-year level. The Data Appendix defines all variables. *$p < 0.1$; **$p < 0.05$; ***$p < 0.01$.

VARIABLES	MV(ijt)/MV of All Bonds Held(it)
TreatPre2Y*Worse-Rated	-0.0005
	(0.0004)
TreatPre1Y*Worse-Rated	0.0001
	(0.0009)
TreatPost0Y*Worse-Rated	0.0015*
	(0.0009)
TreatPost1Y*Worse-Rated	0.0027***
	(0.0009)
TreatPost	-0.0023***
	(0.0006)
TreatPre2Y	-0.0035
	(0.0030)
TreatPre1Y	-0.0052
	(0.0071)
TreatPost0Y	-0.0107
	(0.0067)
TreatPost1Y	-0.0157**
	(0.0076)
Pre2Y*Worse-Rated	0.0005
	(0.0004)
Pre1Y*Worse-Rated	-0.0002
	(0.0004)
Post0Y*Worse-Rated	-0.0009**
	(0.0004)
Post1Y*Worse-Rated	-0.0005
	(0.0005)
Worse-Rated	-0.0008
	(0.0006)

Coupon	-0.0000
	(0.0000)
Treat*Worse-Rated	-0.0018
	(0.0048)
Treat	0.0291***
	(0.0049)
DPW Growth	-0.0243**
	(0.0098)
Reinsurance	-0.0173***
	(0.0041)
Ln (assets)	-0.1076***
	(0.0046)
Leverage	0.0192
	(0.0247)
Geo Herfindahl	-0.0578***
	(0.0184)
Lob Herfindahl	0.0689***
	(0.0171)
Longtail	-0.0705***
	(0.0237)
Constant	1.8685***
	(0.0690)
Observations	180,095
Adjusted R-squared	0.5553
Bond FE	Yes
Firm FE	Yes
Year FE	Yes
Cluster SE by Cusip-Year	Yes

Table OA-9. Robustness tests.

This table reports the results from various robustness tests for our DID regressions. In Panel A, we add controls for analyst characteristics. In Panel B, we control for CEO vega in year *t*-1. In panel C, we control for other CEO compensation incentives measures: the natural logarithm of CEO total compensation (*ln (Total compensation)*), the natural logarithm of CEO compensation delta (*ln(1+Delta)*) and the natural logarithm of compensation vega (*ln(1+Vega)*). They are measured in year *t*-1. In Panel D, we drop the recessionary period, namely the shocked observations in years 2008 and 2009. In Panel E, we include controls for the share of direct premiums written (DPW) in each business line, and share of DPW in hurricane-prone areas. In Panel F, we add the control for asymmetric information. In Panel G, we add the control for asymmetric information, analyst related variables, and additional CEO compensation incentive measures.

Panel A. Analyst control

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
VARIABLES	ROA Vol	CROA Vol	Return Vol	VaR 95	ES 95	Systematic Risk Carhart	Idiosyncratic Risk Carhart	Beta	EDF
TreatPost	0.0072**	0.0061***	0.0049**	0.0079***	0.0142***	0.0028**	0.0021**	0.1602*	0.1392**
	(0.0029)	(0.0023)	(0.0022)	(0.0029)	(0.0053)	(0.0011)	(0.0010)	(0.0815)	(0.0608)
Treat	-0.0035*	-0.0030	-0.0020	-0.0040*	-0.0041	-0.0008	-0.0009	-0.0613	-0.0599*
	(0.0019)	(0.0019)	(0.0014)	(0.0020)	(0.0032)	(0.0007)	(0.0008)	(0.0585)	(0.0313)
DPW Growth	-0.0070*	-0.0030	-0.0022	-0.0012	-0.0006	-0.0007	-0.0003	-0.0771	-0.0364
	(0.0041)	(0.0028)	(0.0018)	(0.0025)	(0.0043)	(0.0011)	(0.0009)	(0.0986)	(0.0303)
Reinsurance	0.0006	0.0011	-0.0003	-0.0031	-0.0027	-0.0012*	0.0002	-0.1386*	-0.0354**
	(0.0014)	(0.0016)	(0.0015)	(0.0024)	(0.0035)	(0.0007)	(0.0008)	(0.0719)	(0.0161)
Ln (assets)	-0.0017	-0.0003	0.0005	0.0004	0.0026	0.0005	-0.0005	-0.0007	0.0298*
	(0.0013)	(0.0013)	(0.0011)	(0.0016)	(0.0030)	(0.0006)	(0.0006)	(0.0410)	(0.0151)
Leverage	0.0255**	0.0146	0.0213***	0.0290***	0.0374**	0.0134***	0.0096**	0.7076**	0.1889*
	(0.0115)	(0.0094)	(0.0067)	(0.0077)	(0.0143)	(0.0035)	(0.0037)	(0.2833)	(0.1024)
Geo Herfindahl	0.0115	0.0119	0.0166***	0.0212***	0.0314***	0.0066***	0.0105***	0.4576**	0.2024**
	(0.0070)	(0.0077)	(0.0052)	(0.0063)	(0.0098)	(0.0024)	(0.0032)	(0.1760)	(0.0856)

Lob Herfindahl	-0.0022	0.0012	-0.0020	0.0015	-0.0014	0.0012	-0.0002	0.2505	0.0217
	(0.0098)	(0.0083)	(0.0058)	(0.0080)	(0.0127)	(0.0027)	(0.0036)	(0.2527)	(0.0586)
Longtail	-0.0021	0.0016	0.0112**	0.0115**	0.0160**	0.0043**	0.0041*	0.2553*	-0.0098
	(0.0043)	(0.0047)	(0.0052)	(0.0053)	(0.0072)	(0.0018)	(0.0022)	(0.1310)	(0.0474)
Dispersion	-0.0004	0.0002	0.0021**	0.0027**	0.0037*	0.0011**	0.0011***	0.0704**	0.0061
	(0.0006)	(0.0007)	(0.0008)	(0.0013)	(0.0019)	(0.0005)	(0.0004)	(0.0288)	(0.0125)
No.Analysts	-0.0000	-0.0001	-0.0006***	-0.0007***	-0.0011***	-0.0002**	-0.0004***	-0.0170**	-0.0008
	(0.0002)	(0.0002)	(0.0002)	(0.0002)	(0.0004)	(0.0001)	(0.0001)	(0.0073)	(0.0025)
Constant	0.0203	0.0033	-0.0054	0.0009	-0.0255	-0.0069	0.0148	0.4011	-0.5464**
	(0.0189)	(0.0197)	(0.0168)	(0.0239)	(0.0445)	(0.0100)	(0.0091)	(0.6610)	(0.2340)
Observations	642	642	642	642	642	642	642	642	603
Adjusted R-squared	0.2785	0.3447	0.6902	0.7297	0.6979	0.7931	0.7179	0.5781	0.3799
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
SE cluster	Firm	Firm	Firm	Firm	Firm	Firm	Firm	Firm	Firm

Panel B: Control for vega (lagged by 1 year)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
VARIABLES	ROA Vol	CROA Vol	Return Vol	VaR 95	ES 95	Systematic Risk Carhart	Idiosyncratic Risk Carhart	Beta	EDF
TreatPost	0.0056**	0.0061***	0.0056***	0.0096***	0.0149***	0.0035***	0.0025***	0.1810**	0.1240**
	(0.0023)	(0.0021)	(0.0020)	(0.0029)	(0.0049)	(0.0010)	(0.0009)	(0.0739)	(0.0555)
Treat	-0.0033*	-0.0032*	-0.0029*	-0.0047**	-0.0062*	-0.0011	-0.0015*	-0.0772	-0.0587*
	(0.0017)	(0.0018)	(0.0015)	(0.0022)	(0.0034)	(0.0007)	(0.0008)	(0.0531)	(0.0331)
DPW Growth	-0.0042	-0.0019	-0.0034**	-0.0034	-0.0025	-0.0013	-0.0012	-0.1202	-0.0351
	(0.0031)	(0.0025)	(0.0017)	(0.0023)	(0.0039)	(0.0010)	(0.0008)	(0.0865)	(0.0365)
Reinsurance	0.0022	0.0017	0.0004	-0.0002	0.0013	-0.0007	0.0005	-0.0640	-0.0254
	(0.0021)	(0.0019)	(0.0019)	(0.0030)	(0.0049)	(0.0009)	(0.0010)	(0.0725)	(0.0252)
Ln (assets)	-0.0013	0.0001	0.0001	-0.0010	0.0009	0.0003	-0.0010*	-0.0230	0.0182
	(0.0012)	(0.0013)	(0.0010)	(0.0015)	(0.0028)	(0.0007)	(0.0006)	(0.0447)	(0.0167)
Leverage	0.0235**	0.0129	0.0220***	0.0345***	0.0426**	0.0137***	0.0104**	0.7599**	0.2738**
	(0.0094)	(0.0095)	(0.0078)	(0.0099)	(0.0171)	(0.0037)	(0.0046)	(0.2952)	(0.1278)
Geo Herfindahl	0.0109*	0.0105	0.0136*	0.0154	0.0189	0.0072**	0.0094*	0.4716**	0.1298*
	(0.0058)	(0.0068)	(0.0081)	(0.0102)	(0.0145)	(0.0029)	(0.0048)	(0.1937)	(0.0769)
Lob Herfindahl	0.0027	0.0021	-0.0025	-0.0021	-0.0025	-0.0010	0.0018	0.0819	0.0161
	(0.0081)	(0.0067)	(0.0055)	(0.0078)	(0.0118)	(0.0027)	(0.0034)	(0.2325)	(0.0641)
Longtail	-0.0010	0.0025	0.0093*	0.0104**	0.0139**	0.0043**	0.0018	0.2576	-0.0083
	(0.0042)	(0.0040)	(0.0050)	(0.0050)	(0.0069)	(0.0020)	(0.0019)	(0.1610)	(0.0487)
Lag Ln (1+Vega)	-0.0005*	-0.0004*	-0.0002	-0.0003	-0.0004	-0.0000	-0.0003**	-0.0073	0.0009
	(0.0003)	(0.0002)	(0.0002)	(0.0003)	(0.0005)	(0.0001)	(0.0001)	(0.0103)	(0.0036)
Constant	0.0132	-0.0019	-0.0009	0.0162	-0.0065	-0.0046	0.0206**	0.6433	-0.4122*
	(0.0175)	(0.0189)	(0.0147)	(0.0219)	(0.0400)	(0.0105)	(0.0085)	(0.6788)	(0.2219)

Observations	689	689	689	689	689	689	689	689	640
Adjusted R-squared	0.3307	0.3775	0.6734	0.7099	0.6798	0.7883	0.6917	0.5886	0.4116
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
SE cluster	Firm	Firm	Firm	Firm	Firm	Firm	Firm	Firm	Firm

Panel C: Control for delta, vega and CEO relative debt (lagged by 1 year)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
VARIABLES	ROA Vol	CROA Vol	Return Vol	VaR 95	ES 95	Systematic Risk Carhart	Idiosyncratic Risk Carhart	Beta	EDF
TreatPost	0.0047**	0.0051***	0.0041**	0.0076**	0.0112**	0.0026***	0.0019*	0.1189*	0.1032*
	(0.0022)	(0.0018)	(0.0019)	(0.0031)	(0.0044)	(0.0009)	(0.0009)	(0.0668)	(0.0566)
Treat	-0.0035**	-0.0033*	-0.0027	-0.0045*	-0.0053	-0.0009	-0.0015	-0.0380	-0.0597*
	(0.0017)	(0.0018)	(0.0017)	(0.0025)	(0.0037)	(0.0008)	(0.0009)	(0.0587)	(0.0339)
DPW Growth	-0.0052*	-0.0024	-0.0039**	-0.0040	-0.0037	-0.0019*	-0.0010	-0.1471*	-0.0213
	(0.0030)	(0.0023)	(0.0017)	(0.0024)	(0.0038)	(0.0010)	(0.0008)	(0.0884)	(0.0332)
Reinsurance	0.0027	0.0020	0.0002	-0.0009	0.0006	-0.0011	0.0004	-0.0804	-0.0264
	(0.0022)	(0.0020)	(0.0020)	(0.0032)	(0.0052)	(0.0009)	(0.0010)	(0.0740)	(0.0276)
Ln (assets)	-0.0014	-0.0002	0.0009	0.0006	0.0034	0.0002	-0.0000	-0.0298	0.0337**
	(0.0014)	(0.0014)	(0.0013)	(0.0018)	(0.0035)	(0.0007)	(0.0007)	(0.0451)	(0.0163)
Leverage	0.0218**	0.0092	0.0172*	0.0280**	0.0310	0.0125***	0.0053	0.6049*	0.1894
	(0.0098)	(0.0090)	(0.0088)	(0.0112)	(0.0192)	(0.0040)	(0.0045)	(0.3196)	(0.1348)
Geo Herfindahl	0.0104*	0.0106	0.0121	0.0138	0.0149	0.0075***	0.0083*	0.4959**	0.0835
	(0.0060)	(0.0067)	(0.0083)	(0.0107)	(0.0157)	(0.0029)	(0.0050)	(0.2000)	(0.0732)
Lob Herfindahl	0.0036	0.0024	-0.0038	-0.0043	-0.0057	-0.0012	0.0005	0.0169	-0.0223
	(0.0083)	(0.0067)	(0.0055)	(0.0074)	(0.0115)	(0.0024)	(0.0033)	(0.2134)	(0.0501)
Longtail	-0.0028	0.0016	0.0089*	0.0093*	0.0122*	0.0039*	0.0013	0.2710*	0.0093
	(0.0042)	(0.0038)	(0.0052)	(0.0050)	(0.0070)	(0.0020)	(0.0019)	(0.1613)	(0.0478)
Lag Ln (Total compensation)	-0.0010*	-0.0009*	-0.0006	-0.0011	-0.0022	-0.0003	-0.0005	-0.0379	-0.0141
	(0.0006)	(0.0005)	(0.0008)	(0.0010)	(0.0017)	(0.0005)	(0.0004)	(0.0337)	(0.0095)
Lag Ln (1+Delta)	0.0004	0.0006	-0.0005	-0.0008	-0.0010	-0.0002	-0.0005	-0.0066	0.0019

	(0.0004)	(0.0004)	(0.0005)	(0.0007)	(0.0010)	(0.0003)	(0.0003)	(0.0199)	(0.0073)
Lag Ln (1+Vega)	-0.0005*	-0.0004	0.0000	-0.0000	0.0001	0.0000	-0.0001	-0.0042	0.0028
	(0.0003)	(0.0002)	(0.0003)	(0.0004)	(0.0005)	(0.0001)	(0.0002)	(0.0103)	(0.0041)
Lag RelativeDebt	0.0000	0.0000	-0.0000	-0.0000	-0.0001	-0.0000	-0.0000	-0.0007	-0.0001
	(0.0000)	(0.0001)	(0.0000)	(0.0000)	(0.0001)	(0.0000)	(0.0000)	(0.0011)	(0.0003)
Constant	0.0226	0.0084	-0.0020	0.0106	-0.0125	0.0002	0.0155*	1.2018*	-0.4826**
	(0.0193)	(0.0207)	(0.0162)	(0.0239)	(0.0456)	(0.0106)	(0.0091)	(0.6679)	(0.2028)
Observations	605	605	605	605	605	605	605	605	604
Adjusted R-squared	0.3119	0.3868	0.6822	0.7148	0.6907	0.7928	0.7048	0.5978	0.4111
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
SE cluster	Firm	Firm	Firm	Firm	Firm	Firm	Firm	Firm	Firm

Panel D. Drop the recession

VARIABLES	(1) ROA Vol	(2) CROA Vol	(3) Return Vol	(4) VaR 95	(5) ES 95	(6) Systematic Risk Carhart	(7) Idiosyncratic Risk Carhart	(8) Beta	(9) EDF
TreatPost	0.0068**	0.0065**	0.0063**	0.0098***	0.0166**	0.0044***	0.0028**	0.1825*	0.1167*
	(0.0032)	(0.0025)	(0.0026)	(0.0037)	(0.0065)	(0.0014)	(0.0013)	(0.0962)	(0.0594)
Treat	-0.0046**	-0.0046**	-0.0019	-0.0043**	-0.0042	-0.0011	-0.0016*	-0.0626	-0.0292
	(0.0022)	(0.0022)	(0.0016)	(0.0020)	(0.0032)	(0.0008)	(0.0010)	(0.0696)	(0.0267)
DPW Growth	-0.0042	-0.0000	-0.0042**	-0.0029	-0.0068	-0.0002	-0.0016*	0.0317	-0.0288
	(0.0035)	(0.0028)	(0.0021)	(0.0030)	(0.0054)	(0.0010)	(0.0009)	(0.1140)	(0.0525)
Reinsurance	-0.0002	0.0017	0.0021	0.0043	0.0055	0.0000	0.0011	-0.0961	0.0202
	(0.0017)	(0.0019)	(0.0020)	(0.0032)	(0.0046)	(0.0008)	(0.0008)	(0.0679)	(0.0335)
Ln (assets)	-0.0024*	-0.0004	0.0004	-0.0003	0.0008	0.0011	-0.0012*	0.0049	0.0250
	(0.0014)	(0.0016)	(0.0012)	(0.0018)	(0.0027)	(0.0008)	(0.0007)	(0.0561)	(0.0220)
Leverage	0.0267**	0.0102	0.0150**	0.0223**	0.0275*	0.0100***	0.0075*	0.6719**	0.2690*
	(0.0107)	(0.0106)	(0.0075)	(0.0097)	(0.0156)	(0.0036)	(0.0045)	(0.3117)	(0.1444)
Geo Herfindahl	0.0070	0.0075	0.0233***	0.0284**	0.0393**	0.0085**	0.0139***	0.6238***	0.3125**
	(0.0077)	(0.0086)	(0.0084)	(0.0115)	(0.0163)	(0.0034)	(0.0048)	(0.2319)	(0.1311)
Lob Herfindahl	-0.0097	-0.0053	-0.0035	-0.0034	-0.0044	-0.0038	0.0009	-0.1016	0.1304
	(0.0090)	(0.0071)	(0.0040)	(0.0055)	(0.0086)	(0.0029)	(0.0026)	(0.2524)	(0.0926)
Longtail	0.0029	0.0051	0.0130**	0.0145**	0.0196**	0.0064**	0.0035	0.3335*	-0.0338
	(0.0053)	(0.0051)	(0.0056)	(0.0065)	(0.0089)	(0.0025)	(0.0024)	(0.1767)	(0.0578)
Constant	0.0310	0.0077	-0.0062	0.0058	-0.0062	-0.0152	0.0219***	0.2424	-0.5870*
	(0.0199)	(0.0224)	(0.0152)	(0.0243)	(0.0347)	(0.0119)	(0.0082)	(0.7911)	(0.3173)
Observations	664	664	664	664	664	664	664	664	610

Adjusted R-squared	0.3402	0.4048	0.6519	0.6849	0.6467	0.7519	0.6966	0.5821	0.4110
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
SE cluster	Firm	Firm	Firm	Firm	Firm	Firm	Firm	Firm	Firm

Panel E. Control for business and hurricane-prone business

VARIABLES	(1) ROA Vol	(2) CROA Vol	(3) Return Vol	(4) VaR 95	(5) ES 95	(6) Systematic Risk Carhart	(7) Idiosyncratic Risk Carhart	(8) Beta	(9) EDF
TreatPost	0.0071***	0.0071***	0.0057***	0.0096***	0.0148***	0.0035***	0.0026***	0.1975***	0.1256**
	(0.0025)	(0.0021)	(0.0019)	(0.0028)	(0.0048)	(0.0010)	(0.0009)	(0.0723)	(0.0583)
Treat	-0.0035**	-0.0031*	-0.0027*	-0.0052**	-0.0063*	-0.0013*	-0.0016**	-0.0951*	-0.0475*
	(0.0016)	(0.0016)	(0.0014)	(0.0020)	(0.0032)	(0.0007)	(0.0008)	(0.0537)	(0.0277)
DPW Growth	-0.0009	0.0029	-0.0038*	-0.0043	-0.0057	-0.0001	-0.0011	0.0367	-0.0280
	(0.0036)	(0.0028)	(0.0021)	(0.0032)	(0.0054)	(0.0011)	(0.0009)	(0.0894)	(0.0516)
Reinsurance	-0.0000	0.0017	0.0022	0.0040	0.0059	-0.0001	0.0008	-0.0607	-0.0007
	(0.0026)	(0.0022)	(0.0024)	(0.0038)	(0.0058)	(0.0010)	(0.0012)	(0.0742)	(0.0423)
Ln (assets)	-0.0018	0.0004	0.0006	0.0006	0.0031	0.0008	-0.0009	-0.0032	0.0312
	(0.0012)	(0.0013)	(0.0013)	(0.0019)	(0.0033)	(0.0008)	(0.0008)	(0.0549)	(0.0231)
Leverage	0.0208***	0.0043	0.0160**	0.0246**	0.0292*	0.0103***	0.0066	0.5390*	0.3002**
	(0.0078)	(0.0089)	(0.0075)	(0.0095)	(0.0164)	(0.0034)	(0.0046)	(0.2827)	(0.1269)
Geo Herfindahl	0.0074	0.0069	0.0197**	0.0261*	0.0309	0.0083***	0.0110**	0.3640	0.2072
	(0.0073)	(0.0073)	(0.0094)	(0.0133)	(0.0201)	(0.0031)	(0.0054)	(0.2592)	(0.1587)
Lob Herfindahl	-0.0288***	-0.0187**	-0.0060	-0.0005	-0.0030	-0.0023	0.0006	-0.2797	0.0876
	(0.0098)	(0.0092)	(0.0102)	(0.0125)	(0.0194)	(0.0044)	(0.0054)	(0.3033)	(0.1555)
Longtail	0.1054***	0.0886***	0.0454	0.0538	0.0870	0.0185	0.0212	1.1712	0.8164**
	(0.0384)	(0.0328)	(0.0274)	(0.0332)	(0.0569)	(0.0142)	(0.0153)	(1.2688)	(0.3885)
HurricaneShare	0.0340**	0.0562***	0.0255	0.0258	0.0474	0.0143*	0.0178**	1.1704**	0.4804**
	(0.0171)	(0.0160)	(0.0157)	(0.0208)	(0.0370)	(0.0082)	(0.0079)	(0.5252)	(0.2223)
Constant	0.0442**	0.0164	-0.0166	-0.0124	-0.0369	-0.0183	0.0121	0.0893	-0.9051**
	(0.0220)	(0.0230)	(0.0203)	(0.0296)	(0.0501)	(0.0131)	(0.0115)	(0.8601)	(0.4310)

Observations	760	760	760	760	760	760	760	760	706
Adjusted R-squared	0.3458	0.4230	0.6726	0.7003	0.6728	0.7785	0.7047	0.6009	0.4414
Lob Control	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
SE cluster	Firm	Firm	Firm	Firm	Firm	Firm	Firm	Firm	Firm

Panel F: Control for asymmetric information (spread)

VARIABLES	(1) ROA Vol	(2) CROA Vol	(3) Return Vol	(4) VaR 95	(5) ES 95	(6) Systematic Risk Carhart	(7) Idiosyncratic Risk Carhart	(8) Beta	(9) EDF
TreatPost	0.0068***	0.0070***	0.0056***	0.0095***	0.0148***	0.0038***	0.0025***	0.2061***	0.1222**
	(0.0025)	(0.0022)	(0.0020)	(0.0029)	(0.0048)	(0.0011)	(0.0009)	(0.0765)	(0.0561)
Treat	-0.0034**	-0.0032*	-0.0032**	-0.0054***	-0.0069**	-0.0015**	-0.0020**	-0.1134**	-0.0593**
	(0.0017)	(0.0018)	(0.0014)	(0.0020)	(0.0032)	(0.0007)	(0.0008)	(0.0512)	(0.0285)
DPW Growth	-0.0032	0.0005	-0.0036**	-0.0035	-0.0054	-0.0008	-0.0009	0.0066	-0.0153
	(0.0033)	(0.0025)	(0.0017)	(0.0025)	(0.0044)	(0.0010)	(0.0007)	(0.0969)	(0.0415)
Reinsurance	0.0002	0.0007	0.0009	0.0013	0.0025	-0.0010	0.0006	-0.0929	-0.0020
	(0.0014)	(0.0016)	(0.0019)	(0.0034)	(0.0050)	(0.0007)	(0.0010)	(0.0572)	(0.0267)
Ln (assets)	-0.0021*	-0.0003	0.0009	0.0002	0.0026	0.0004	-0.0005	-0.0097	0.0436**
	(0.0011)	(0.0012)	(0.0010)	(0.0015)	(0.0026)	(0.0007)	(0.0006)	(0.0436)	(0.0172)
Leverage	0.0229**	0.0099	0.0155**	0.0242***	0.0282**	0.0121***	0.0061	0.6597**	0.3193***
	(0.0091)	(0.0089)	(0.0064)	(0.0082)	(0.0139)	(0.0031)	(0.0037)	(0.2617)	(0.1132)
Geo Herfindahl	0.0097*	0.0092	0.0130*	0.0174*	0.0206	0.0069**	0.0083*	0.4084**	0.1942**
	(0.0057)	(0.0067)	(0.0077)	(0.0098)	(0.0141)	(0.0029)	(0.0046)	(0.2037)	(0.0767)
Lob Herfindahl	-0.0087	-0.0057	-0.0021	-0.0017	-0.0014	-0.0027	0.0017	-0.0908	0.1567
	(0.0078)	(0.0066)	(0.0036)	(0.0054)	(0.0081)	(0.0027)	(0.0024)	(0.2402)	(0.1018)
Longtail	0.0021	0.0045	0.0104**	0.0128***	0.0171**	0.0052**	0.0036*	0.3229**	-0.0308
	(0.0040)	(0.0043)	(0.0045)	(0.0048)	(0.0066)	(0.0021)	(0.0020)	(0.1619)	(0.0425)
Spread	-0.3755*	-0.2220	0.8124***	1.0866**	1.6134**	-0.0124	0.5666***	3.2411	15.1674***
	(0.2015)	(0.2153)	(0.2896)	(0.4208)	(0.6431)	(0.1796)	(0.1596)	(10.2367)	(4.2478)
Constant	0.0286*	0.0072	-0.0120	-0.0013	-0.0311	-0.0047	0.0119	0.5191	-0.9121***
	(0.0164)	(0.0176)	(0.0137)	(0.0208)	(0.0372)	(0.0102)	(0.0074)	(0.6315)	(0.2816)

Observations	760	760	760	760	760	760	760	760	706
Adjusted R-squared	0.3276	0.3928	0.6803	0.7064	0.6826	0.7704	0.7204	0.5919	0.4759
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
SE cluster	Firm	Firm	Firm	Firm	Firm	Firm	Firm	Firm	Firm

Panel G. Control for spread, analysts and CEO compensation

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
VARIABLES	ROA Vol	CROA Vol	Return Vol	VaR 95	ES 95	Systematic Risk Carhart	Idiosyncratic Risk Carhart	Beta	EDF
TreatPost	0.0071**	0.0060***	0.0042*	0.0072**	0.0130**	0.0028**	0.0016*	0.1566*	0.1333**
	(0.0029)	(0.0022)	(0.0022)	(0.0029)	(0.0052)	(0.0011)	(0.0009)	(0.0810)	(0.0617)
Treat	-0.0036*	-0.0029	-0.0017	-0.0036*	-0.0033	-0.0007	-0.0006	-0.0528	-0.0620*
	(0.0019)	(0.0019)	(0.0015)	(0.0021)	(0.0033)	(0.0008)	(0.0008)	(0.0608)	(0.0330)
DPW Growth	-0.0067*	-0.0030	-0.0019	-0.0008	0.0000	-0.0008	-0.0001	-0.0838	-0.0339
	(0.0039)	(0.0028)	(0.0017)	(0.0024)	(0.0041)	(0.0011)	(0.0007)	(0.0977)	(0.0297)
Reinsurance	0.0004	0.0009	-0.0004	-0.0034	-0.0032	-0.0013*	-0.0000	-0.1421*	-0.0371***
	(0.0014)	(0.0016)	(0.0014)	(0.0023)	(0.0033)	(0.0007)	(0.0008)	(0.0722)	(0.0141)
Ln (assets)	-0.0017	-0.0002	0.0013	0.0014	0.0048	0.0004	0.0003	-0.0028	0.0361**
	(0.0014)	(0.0015)	(0.0012)	(0.0017)	(0.0034)	(0.0007)	(0.0006)	(0.0446)	(0.0171)
Leverage	0.0278**	0.0160	0.0190***	0.0260***	0.0305**	0.0140***	0.0074**	0.7739**	0.1717
	(0.0124)	(0.0097)	(0.0072)	(0.0081)	(0.0153)	(0.0035)	(0.0036)	(0.2962)	(0.1304)
Geo Herfindahl	0.0109	0.0112	0.0148***	0.0183***	0.0257***	0.0068**	0.0085***	0.4617**	0.1755**

	(0.0069)	(0.0077)	(0.0050)	(0.0064)	(0.0090)	(0.0026)	(0.0028)	(0.1852)	(0.0703)
Lob Herfindahl	-0.0022	0.0007	-0.0022	0.0013	-0.0014	0.0008	-0.0002	0.2221	0.0318
	(0.0106)	(0.0086)	(0.0054)	(0.0074)	(0.0117)	(0.0027)	(0.0031)	(0.2517)	(0.0591)
Longtail	-0.0026	0.0013	0.0108**	0.0108**	0.0137**	0.0044**	0.0033*	0.2461*	-0.0165
	(0.0046)	(0.0050)	(0.0052)	(0.0052)	(0.0069)	(0.0019)	(0.0020)	(0.1334)	(0.0516)
Spread	-0.2270	-0.1563	0.6738**	0.9346**	1.6070**	-0.0567	0.5417***	-2.5720	9.7690**
	(0.2679)	(0.2315)	(0.3200)	(0.4149)	(0.6361)	(0.1729)	(0.1772)	(12.4865)	(3.7950)
No.Analysts	0.0000	-0.0000	-0.0005***	-0.0006***	-0.0009**	-0.0002***	-0.0003***	-0.0156**	-0.0009
	(0.0002)	(0.0002)	(0.0002)	(0.0002)	(0.0004)	(0.0001)	(0.0001)	(0.0070)	(0.0027)
Dispersion	-0.0008	-0.0000	0.0023***	0.0030**	0.0040**	0.0012**	0.0013***	0.0674**	0.0048
	(0.0007)	(0.0008)	(0.0008)	(0.0013)	(0.0020)	(0.0005)	(0.0004)	(0.0319)	(0.0140)
Lag Ln (Total compensation)	-0.0000	-0.0001	-0.0002	-0.0004	-0.0008	-0.0001	-0.0003*	-0.0047	-0.0001
	(0.0004)	(0.0004)	(0.0004)	(0.0006)	(0.0010)	(0.0003)	(0.0002)	(0.0226)	(0.0059)
Lag Ln (1+Delta)	-0.0005	-0.0004	0.0001	0.0001	0.0001	0.0001	-0.0001	-0.0026	0.0027
	(0.0003)	(0.0003)	(0.0002)	(0.0003)	(0.0005)	(0.0001)	(0.0001)	(0.0117)	(0.0044)
Lag Ln (1+Vega)	0.0273	0.0074	-0.0158	-0.0128	-0.0482	-0.0064	0.0063	0.4983	-0.6060***
	(0.0198)	(0.0209)	(0.0169)	(0.0240)	(0.0456)	(0.0102)	(0.0088)	(0.6776)	(0.2238)
Constant									
	642	642	642	642	642	642	642	642	605
	0.2770	0.3443	0.6962	0.7332	0.7041	0.7898	0.7430	0.5791	0.3803
Observations	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R-squared	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Firm	Firm	Firm	Firm	Firm	Firm	Firm	Firm	Firm
Year FE	0.0071**	0.0060***	0.0042*	0.0072**	0.0130**	0.0028**	0.0016*	0.1566*	0.1333**
SE cluster	(0.0029)	(0.0022)	(0.0022)	(0.0029)	(0.0052)	(0.0011)	(0.0009)	(0.0810)	(0.0617)

B. Subsample Tests: High vs. Low Initial Analyst Coverage

We expect that the incremental contribution of analysts' direct and indirect monitoring to firms' risk-taking decreases as the number of analysts covering the firm increases. For instance, a loss of one analyst when initial analyst coverage is low, should have a larger effect than a loss of one analyst when the initial analyst coverage is high, all other things being equal (see, e.g., Hong and Kacperczyk 2010; Chen et al. 2015). Following Irani and Oesch (2013), we split our sample into two groups, high initial coverage versus low initial coverage, depending on whether the number of analysts covering the firm in the year prior to the shock is above or below the sample median. We then estimate our baseline model for each group separately.

Table OA-B1 reports the results. The high (low) initial analyst coverage subsample includes 25 (17) shocked observations; thus, the treated observations are generally equally distributed in these two subsamples. Its upper (lower) panel presents the regression results for the high (low) initial coverage subsample. In the high initial coverage subsample, most of the coefficients for *TreatPost* are insignificant. We take this to mean that there is little treatment effect in insurers with a large number of analysts following. In contrast, all coefficients for *TreatPost* are positive and significant in the lower initial coverage sample. The size of these post-treatment effects is much larger than the average effect reported in Table 4. Similar results are obtained for the market-based risk measures of total, systematic, and unsystematic risk. The results for the tail-risk measures *VaR* and *ES*, and for the default risk measure *EDF* also show an increase for the low-coverage sample. The results confirm our expectations that insurers with smaller analyst coverage mainly drive the treatment effect and echo the findings of Hong and Kacperczyk (2010), who find that the effect of losing an analyst is more pronounced for stocks with smaller than those with larger analyst coverage, in their analysis of competition and bias related to stock analysts.

Table OA-B1. Subsample DID test: Firm risk after the analyst coverage shock, conditional on initial analyst coverage

The sample period is from 2001 to 2017. The dependent variables are alternative risk measures. We split the whole sample into two groups based on the number of analysts the year before the shock. The high (low) initial coverage subsample includes firm-years that have higher (lower) analyst coverage than the median. The upper (lower) panel reports the regression results for the high (low) initial coverage subsample. *TreatPost* is a dummy variable that takes a value of one for the treated firm in year $t + 1$ after a broker house merger or closure in year t and zero otherwise. There are 25 treated observations in the high subsample and 17 in the low subsample. All continuous variables are winsorized at the 1st and 99th percentiles. Robust standard errors, which are clustered at the insurer level, are reported in parentheses. The Data Appendix defines all variables. *$p < 0.1$; **$p < 0.05$; ***$p < 0.01$.

		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Variables	ROA vol	CROA vol	Return vol	VaR 95	ES 95	Systematic risk Carhart	Idiosyncratic risk Carhart	Beta	EDF
High	TreatPost	-0.0002	0.0026	0.0033	0.0047	0.0084**	0.0013	0.0015*	-0.0215	0.0753
		(0.0021)	(0.0021)	(0.0022)	(0.0032)	(0.0042)	(0.0011)	(0.0009)	(0.0801)	(0.0563)
	Observations	389	389	389	389	389	389	389	389	381
	Adjusted R^2	0.2710	0.4087	0.7085	0.7555	0.7312	0.8145	0.7085	0.6072	0.5182
Low	TreatPost	0.0123**	0.0109***	0.0076**	0.0135***	0.0209**	0.0055***	0.0031*	0.3674***	0.1864*
		(0.0047)	(0.0040)	(0.0036)	(0.0047)	(0.0096)	(0.0018)	(0.0017)	(0.1122)	(0.1016)
	Observations	371	371	371	371	371	371	371	371	325
	Adjusted R^2	0.4234	0.4527	0.6923	0.6972	0.6563	0.7707	0.7099	0.6369	0.4922

C. The pre-treatment trends and DID validity test

C.1. The pre-treatment trends

The validity of the DID estimation depends on the following parallel trends assumption: in the absence of mergers or closures, treated firms' risk levels would have evolved in a manner similar to that of control firms. Following the method of Gao, Zhang, and Zhang (2018), we investigate the pre-treatment trend between the treatment and control groups. Particularly, we estimate the following regression:

$$Risk\ \ Measure_{it} = \alpha_0 + \alpha_i + \alpha_t + \beta_1 TreatPre2Y_{it} + \beta_2 TreatPre1Y_{it} +$$
$$\beta_3 TreatPost0Y_{it} + \beta_4 TreatPost1Y_{it} + \beta_5 Treat_{it} + \gamma X_{it} + \varepsilon_{it}.$$

A difference from the regression model (1) in the main text is that *TreatPost* is replaced with four dummy variables, *TreatPre2Y*, *TreatPre1Y*, *TreatPost0Y*, and *TreatPost1Y*, all of which equal one in the two years before the shock, one in the year prior to the shock, one in the shock year, and one in the year after the shock, respectively. These variables are zero in other years. The main objective of this specification is to confirm that there are no differences in the risk trend between the treatment and control groups prior to the shocks.

To include the variable *TreatPost0Y*, we re-add the shocked firm-year observations in the regression model (2). Doing so increases our sample to 802 firm-year observations. We choose the four-year event window for two reasons. First, following the literature, we regard the broker shock as transient. Second, a longer window increases the cases in which the insurer experiences multiple shocks within a window.

We report the results in the Online Appendix C (Table OA-C1). As expected, we observe that the coefficients for variables *TreatPre2Y*, *TreatPre1Y*, and *TreatPost0Y* are close to zero and statistically insignificant. The impact is positive from the year following the shock (*TreatPost1Y*),

consistent with the results reported in Table 4. The results show that the treatment and control groups shared a similar trend in the risk level prior to the impact of broker house shocks, suggesting that the parallel trends assumption of the DID approach is not violated.

C.2. The placebo test

Following Irani and Oesch (2013), we further confirm the validity of our empirical design by conducting a falsification analysis. We do this by repeating our baseline analysis from Table 4, but mechanically shifting each event date by a year backward (Panel A of Table OA-C2) or forward (Panel B). If our results hold, that is, that firms' risk-taking reacts to the exogenous loss of coverage and their behavior is not simply the result of an overall trend, then this test should yield coefficients for *TreatPost* that are not statistically significant.

We observe in Panel A of Table OA-C2 that the coefficients for *TreatPost* are statistically insignificant. In Panel B of Table OA-C2, all coefficients are also insignificant. Thus, the results of the relation between a drop in analyst coverage and firm risk are not driven by an overall trend, but the increase in risk-taking in the treatment sample takes place around our event dates only.

C.3. Robustness of staggered DID estimates

It is noted that although the staggered DID method is prevalently used in the prior literature, recent advances in econometric theory suggest that the estimation from staggered DID could be biased if the treatment effects can change over time (e.g., Callaway and Sant'Anna, 2021; Sun and Abraham, 2021). To mitigate this concern, we provide an assessment of the potential bias and apply the estimation method suggested by Callaway and Sant'Anna (2021). Their method applies to our research setting as it allows for covariates (i.e., we assume conditional parallel trends instead of unconditional parallel trends in our setting). In Table OA-

C3, we use the method from Callaway and Sant'Anna (2021) to address concerns about treatment effect heterogeneity across groups and over time. Their method works by comparing treated units to never-treated or not-yet-treated units.[1] We can observe from Panel A of Table OA-C3 that firm risk increases more for treatment firms after the shock. This method yields a big-picture finding similar to our previous DID results.

We also present our main event-study results using Sun and Abraham (2021)'s estimator in Panel B of OA-C3, which is designed to identify dynamic treatment effects in staggered rollout designs when there is heterogeneity in treatment effects. We plot the 95% confidence intervals for the coefficient estimations. Using their method, we consistently find an increase in all risk measures after the broker shocks, with no pre-trends.

[1] Note that the methods suggested by Callaway and Sant'Anna cannot work with unbalanced samples. Therefore, we use a balanced sample, and the number of observations and DID estimate differ from our baseline results.

Table OA-C1. Difference-in-Differences: Testing the parallel trends assumption

This table investigates the pre-treatment trends between the treatment and control groups. The sample consists of 802 insurer-year observations from 2001 to 2017. The shocked firm-year observations are added back. The dependent variables are alternative risk measures. The indicator variables *TreatPre2Y*, *TreatPre1Y*, *TreatPost0Y*, *TreatPost1Y* flag two year before the shock, one year before the shock, the shock year, and one year after the shock. *Treat* is a dummy variable equal to one during year *t*-3 to *t*+1 if the insurer experienced analyst loss due to a broker house merger or closure in year *t* and zero otherwise. All continuous variables are winsorized at the 1st and 99th percentiles. Robust standard errors, which are clustered at the insurer level, are reported in parentheses. The Data Appendix defines all variables. **p* < 0.1; ***p* < 0.05; ****p* < 0.01.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
VARIABLES	ROA Vol	CROA Vol	Return Vol	VaR 95	ES 95	Systematic Risk Carhart	Idiosyncratic Risk Carhart	Beta	EDF
TreatPre2Y	0.0017	0.0019	0.0012	0.0013	0.0024	0.0010	0.0003	0.0932	0.0045
	(0.0015)	(0.0015)	(0.0014)	(0.0018)	(0.0034)	(0.0007)	(0.0007)	(0.0600)	(0.0245)
TreatPre1Y	-0.0004	-0.0017	0.0004	-0.0009	0.0015	0.0006	-0.0002	0.0966	-0.0239
	(0.0014)	(0.0013)	(0.0019)	(0.0029)	(0.0042)	(0.0011)	(0.0010)	(0.0799)	(0.0317)
TreatPost0Y	0.0008	0.0009	0.0010	0.0027	0.0030	0.0016	0.0004	0.1699*	-0.0338
	(0.0013)	(0.0017)	(0.0022)	(0.0031)	(0.0043)	(0.0014)	(0.0011)	(0.0963)	(0.0236)
TreatPost1Y	0.0064***	0.0069***	0.0064***	0.0101***	0.0167***	0.0044***	0.0027***	0.2724***	0.1252**
	(0.0022)	(0.0023)	(0.0019)	(0.0028)	(0.0045)	(0.0012)	(0.0010)	(0.0915)	(0.0505)
Treat	-0.0034***	-0.0033**	-0.0032**	-0.0047***	-0.0069**	-0.0018***	-0.0017*	-0.1613***	-0.0515**
	(0.0012)	(0.0015)	(0.0013)	(0.0018)	(0.0029)	(0.0006)	(0.0009)	(0.0563)	(0.0224)
DPW Growth	-0.0029	-0.0001	-0.0055***	-0.0068**	-0.0100*	-0.0015	-0.0019**	-0.0257	-0.0284
	(0.0030)	(0.0027)	(0.0021)	(0.0033)	(0.0051)	(0.0012)	(0.0009)	(0.0984)	(0.0449)
Reinsurance	0.0002	-0.0003	-0.0005	-0.0007	-0.0005	-0.0016	-0.0000	-0.1143*	-0.0009
	(0.0015)	(0.0017)	(0.0024)	(0.0041)	(0.0059)	(0.0010)	(0.0011)	(0.0611)	(0.0308)
Ln (assets)	-0.0021*	-0.0005	0.0001	-0.0009	0.0012	0.0004	-0.0010	-0.0089	0.0270
	(0.0011)	(0.0012)	(0.0011)	(0.0015)	(0.0029)	(0.0006)	(0.0007)	(0.0423)	(0.0179)
Leverage	0.0205**	0.0101	0.0209***	0.0319***	0.0390***	0.0139***	0.0090**	0.7753***	0.3642***

	(0.0078)	(0.0091)	(0.0066)	(0.0088)	(0.0149)	(0.0030)	(0.0041)	(0.2570)	(0.1157)
Geo									
Herfindahl	0.0074	0.0078	0.0190**	0.0255**	0.0330**	0.0085***	0.0119**	0.5380**	0.2857**
	(0.0060)	(0.0067)	(0.0086)	(0.0114)	(0.0161)	(0.0032)	(0.0051)	(0.2237)	(0.1095)
Lob									
Herfindahl	-0.0066	-0.0050	-0.0029	-0.0032	-0.0036	-0.0024	0.0009	-0.0610	0.1147
	(0.0069)	(0.0062)	(0.0040)	(0.0057)	(0.0087)	(0.0024)	(0.0026)	(0.2123)	(0.0777)
Longtail	0.0022	0.0035	0.0099**	0.0114**	0.0158**	0.0054***	0.0033	0.3258**	-0.0409
	(0.0038)	(0.0041)	(0.0046)	(0.0051)	(0.0072)	(0.0020)	(0.0021)	(0.1566)	(0.0428)
Constant	0.0284*	0.0111	-0.0011	0.0147	-0.0113	-0.0064	0.0198**	0.4240	-0.6381**
	(0.0158)	(0.0170)	(0.0144)	(0.0208)	(0.0394)	(0.0089)	(0.0092)	(0.6033)	(0.2785)
Observations	802	802	802	802	802	802	802	802	746
Adjusted R-squared	0.3402	0.3944	0.6679	0.6982	0.6760	0.7752	0.6937	0.5883	0.4474
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
SE cluster	Firm	Firm	Firm	Firm	Firm	Firm	Firm	Firm	Firm

Table OA-C2. Validity of the natural experiment: Placebo test

This table reports results from estimating the panel regression in Equation (1). The dependent variables are alternative risk measures. In Panel A, we shift the event year by one year into the future. In Panel B, we shift the event year by one year into the past. *TreatPost* is a dummy variable that takes the value of one for the treated firm in year $t + 1$ after a broker house merger or closure in year t and zero otherwise. *Treat* is a dummy variable equal to one during year $t - 3$ to $t + 1$ if the insurer experienced analyst loss due to a broker house merger or closure in year t and zero otherwise. All continuous variables are winsorized at the 1st and 99th percentiles. Robust standard errors, which are clustered at the insurer level, are reported in parentheses. The Data Appendix defines all variables. *$p < 0.1$; **$p < 0.05$; ***$p < 0.01$.

Panel A. Event date shift one year backward

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
VARIABLES	ROA Vol	CROA Vol	Return Vol	VaR 95	ES 95	Systematic Risk Carhart	Idiosyncratic Risk Carhart	Beta	EDF
TreatPost	-0.0000	-0.0005	0.0003	0.0015	0.0011	0.0007	0.0001	0.0751	-0.0269
	(0.0011)	(0.0014)	(0.0017)	(0.0024)	(0.0038)	(0.0011)	(0.0008)	(0.0844)	(0.0212)
Treat	-0.0042***	-0.0017	-0.0031**	-0.0041**	-0.0075**	-0.0014*	-0.0019**	-0.1333**	-0.0698**
	(0.0015)	(0.0017)	(0.0013)	(0.0019)	(0.0029)	(0.0007)	(0.0008)	(0.0611)	(0.0318)
DPW Growth	-0.0044	-0.0011	-0.0052**	-0.0045	-0.0110**	-0.0008	-0.0018	-0.0642	-0.0103
	(0.0030)	(0.0025)	(0.0022)	(0.0030)	(0.0054)	(0.0011)	(0.0011)	(0.0997)	(0.0412)
Reinsurance	0.0000	0.0001	0.0010	0.0025	0.0040	-0.0006	0.0007	-0.1196*	0.0112
	(0.0018)	(0.0020)	(0.0022)	(0.0033)	(0.0054)	(0.0008)	(0.0011)	(0.0669)	(0.0348)
Ln (assets)	-0.0012	0.0004	-0.0014	-0.0020	-0.0023	0.0008	-0.0021**	0.0260	0.0128
	(0.0015)	(0.0017)	(0.0013)	(0.0018)	(0.0028)	(0.0007)	(0.0009)	(0.0555)	(0.0220)
Leverage	0.0165**	0.0089	0.0212***	0.0263***	0.0410**	0.0103***	0.0112**	0.9650***	0.2340**
	(0.0074)	(0.0093)	(0.0074)	(0.0091)	(0.0161)	(0.0031)	(0.0047)	(0.2784)	(0.1079)
Geo Herfindahl	0.0050	0.0059	0.0138**	0.0171**	0.0246**	0.0067***	0.0088**	0.5229***	0.1732**
	(0.0052)	(0.0062)	(0.0062)	(0.0072)	(0.0108)	(0.0020)	(0.0042)	(0.1544)	(0.0809)
Lob Herfindahl	-0.0140**	-0.0079	-0.0040	-0.0062	-0.0071	-0.0026	-0.0006	-0.1344	0.0189
	(0.0060)	(0.0060)	(0.0052)	(0.0070)	(0.0112)	(0.0032)	(0.0034)	(0.2720)	(0.0663)
Longtail	-0.0053	-0.0031	0.0107**	0.0131**	0.0172**	0.0059***	0.0039	0.2427	-0.0246

	(0.0044)	(0.0046)	(0.0041)	(0.0052)	(0.0080)	(0.0020)	(0.0024)	(0.1549)	(0.0420)
Constant	0.0260	0.0044	0.0216	0.0350	0.0414	-0.0105	0.0356***	-0.1245	-0.3060
	(0.0212)	(0.0234)	(0.0168)	(0.0241)	(0.0366)	(0.0088)	(0.0122)	(0.7180)	(0.3401)
Observations	810	810	810	810	810	810	810	810	751
Adjusted R-squared	0.3349	0.3960	0.6421	0.6837	0.6360	0.7419	0.6800	0.5952	0.4545
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
SE cluster	Firm	Firm	Firm	Firm	Firm	Firm	Firm	Firm	Firm

Panel B Event date shift one year forward

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
VARIABLES	ROA Vol	CROA Vol	Return Vol	VaR 95	ES 95	Systematic Risk Carhart	Idiosyncratic Risk Carhart	Beta	EDF
TreatPost	0.0022	0.0020	0.0025	0.0048	0.0063	0.0009	0.0014	0.0323	0.0735
	(0.0020)	(0.0020)	(0.0026)	(0.0047)	(0.0066)	(0.0015)	(0.0012)	(0.0785)	(0.0475)
Treat	-0.0028	-0.0022	-0.0016	-0.0027	-0.0026	0.0001	-0.0015	0.0430	-0.0323
	(0.0017)	(0.0017)	(0.0020)	(0.0032)	(0.0046)	(0.0011)	(0.0010)	(0.0656)	(0.0277)
DPW Growth	-0.0040	-0.0014	-0.0062**	-0.0080**	-0.0145**	-0.0014	-0.0020*	-0.0050	-0.0270
	(0.0031)	(0.0026)	(0.0024)	(0.0040)	(0.0064)	(0.0014)	(0.0011)	(0.1141)	(0.0536)
Reinsurance	-0.0010	-0.0017	-0.0020	-0.0031	-0.0056	-0.0022**	-0.0006	-0.1639***	-0.0266
	(0.0017)	(0.0017)	(0.0021)	(0.0041)	(0.0058)	(0.0009)	(0.0009)	(0.0558)	(0.0307)
Ln (assets)	-0.0028**	-0.0010	0.0004	0.0006	0.0025	0.0004	-0.0006	-0.0118	0.0299**
	(0.0011)	(0.0013)	(0.0010)	(0.0015)	(0.0030)	(0.0006)	(0.0006)	(0.0421)	(0.0147)
Leverage	0.0162*	0.0075	0.0185**	0.0288***	0.0318*	0.0134***	0.0074	0.6487**	0.2454*
	(0.0093)	(0.0096)	(0.0071)	(0.0095)	(0.0163)	(0.0036)	(0.0046)	(0.2911)	(0.1406)
Geo Herfindahl	0.0039	0.0075	0.0282***	0.0482***	0.0646***	0.0131**	0.0158***	0.8067**	0.4694***
	(0.0078)	(0.0084)	(0.0101)	(0.0148)	(0.0211)	(0.0050)	(0.0052)	(0.3373)	(0.1653)

Lob Herfindahl	-0.0087	-0.0036	0.0006	0.0015	0.0036	0.0005	0.0019	0.1136	0.1310
	(0.0063)	(0.0069)	(0.0037)	(0.0058)	(0.0086)	(0.0031)	(0.0025)	(0.2469)	(0.0867)
Longtail	0.0082*	0.0056	0.0039	0.0049	0.0060	0.0030	0.0024	0.1546	-0.1274**
	(0.0046)	(0.0052)	(0.0041)	(0.0068)	(0.0100)	(0.0028)	(0.0027)	(0.2147)	(0.0600)
Constant	0.0401**	0.0186	-0.0045	-0.0071	-0.0274	-0.0069	0.0151*	0.5086	-0.6020**
	(0.0159)	(0.0182)	(0.0146)	(0.0229)	(0.0421)	(0.0100)	(0.0081)	(0.6139)	(0.2587)
Observations	713	713	713	713	713	713	713	713	663
Adjusted R-squared	0.4113	0.4280	0.6726	0.6856	0.6776	0.7597	0.7104	0.5633	0.4096
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
SE cluster	Firm	Firm	Firm	Firm	Firm	Firm	Firm	Firm	Firm

OA-C3. New DID results.

This table presents the effect of analyst coverage on firm risk using the new DID methods. Panel A reports the average treatment effects using the method of Callaway and Sant'Anna (2021). In Panel B, plotted are coefficients from the event-time estimates using the method from Sun and Abraham (2021) and simultaneous 95% confidence intervals. Their method works by only comparing treated units with never-treated units. It illustrates the effect of analyst coverage on firm risk θ years before (or after) its shock year t_0. Standard errors are reported in parentheses.

Panel A. Average treatment effects.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
VARIABLES	ROA Vol	CROA Vol	Return Vol	VaR 95	ES 95	Systematic Risk Carhart	Idiosyncratic Risk Carhart	Beta	EDF
ATT	0.0193**	0.0213***	0.0129**	0.0259***	0.0464**	0.0115***	0.0067**	0.9202**	0.4089**
	(0.0093)	(0.0074)	(0.0065)	(0.0100)	(0.0184)	(0.0042)	(0.0029)	(0.4328)	(0.2027)
Observations	500	500	500	500	500	500	500	500	500

Panel B. Event-time estimates of [Sun and Abraham (2021)]

