Is Corporate Governance Priced in the Option Market?
Evidence from Shareholder Proposals

Abstract

By exploiting the local randomness in close-call votes on governance-related shareholder proposals, this paper finds a negative effect of passing a governance proposal on firms' ex-ante tail risk measured by the cost of option protection against downside tail risks, which suggests that corporate governance is priced in the option market. In a local regression discontinuity (RD) analysis, firms that narrowly pass the majority threshold show a lower ex-ante tail risk than those that narrowly fail. This effect is stronger for firms with weaker corporate governance and higher information transparency and is attenuated when firms perform better. Evidence from a global RD analysis confirms the external validity of results in the local RD analysis. Overall, this paper observes a causal impact of corporate governance on the option market and sheds new light on the cross-sectional determinants of option prices.

Keywords: Corporate Governance; Shareholder Proposals; Option Prices; Ex-ante Tail Risk
JEL classification: G13; G30

1 Introduction

Understanding how corporate governance affects asset prices is always at the center of finance research. In the extant literature, many works discuss the impact of corporate governance on stock, bond, and credit markets (e.g., Gompers, Ishii, and Metrick (2003), Cremers, Nair, and Wei (2007), Ashbaugh-Skaife, Collins, and LaFond (2006)). However, despite the importance of the option market in financial systems (e.g., Chan, Chung, and Fong (2002)), whether and how corporate governance is priced in the option market are still largely underexplored. By exploiting the locally random assignment of close-call votes on governance-related shareholder proposals around the passing threshold, this paper fills this gap and examines how corporate governance affects firms' ex-ante tail risk implied by option prices.

In the extant literature, managerial discretion (e.g., inefficient investment, earnings manipulation, bad new hoarding, and financial misconduct) is documented to increase firm-specific uncertainty, thus increasing downside tail risk (e.g., Karpoff and Lott (1993), Karpoff, Lee, and Vendrzyk (1999), Hutton, Marcus, and Tehranian (2009), Jensen (1986)). Due to the importance of corporate governance in restricting managerial discretion (e.g., Fama (1980), Shleifer and Vishny (1997), Jensen (1986)), firms with better corporate governance should have lower downside tail risk in the future. Based on these arguments, if the option market provides forward-looking information on firms' future tail risk in an efficient way (e.g., Bakshi, Kapadia, and Madan (2003), Xing, Zhang, and Zhao (2010)), firms with better corporate governance are expected to have a lower ex-ante tail risk implied in the option market.

To test this hypothesis, I use two option market measures to gauge firms' ex-ante tail risk. The first measure, implied volatility skew (*IV_SKEW*), which captures the slope of the implied volatility smirk, is calculated as the difference in implied volatility between out-of-the-money put option (OTM put) and at-the-money call option (ATM call), where implied volatility is estimated by Black-Scholes model (Black and Scholes (1973)). This variable measures the downward pressure of stock price and identifies the downside tail risk in the stock market (Xing, Zhang, and Zhao (2010)). The second measure comes from model-free implied skewness (*MFIS*). Different from *IV_SKEW*, model-free implied skewness does not rely on the Black-Scholes model and includes more information on the option market (e.g., Bakshi, Kapadia, and Madan (2003), Morellec and Zhdanov (2019), Rehman and Vilkov (2012)). Enlighted by Chen, Hong, and Stein (2001), I put a negative sign in front of *MFIS* to have the negative model-free implied volatility (*NMFIS*) as the dependent variable so that an increase in *NMFIS* corresponds to a higher downside tail risk. Both option market measures capture the cost of option protection against downside tail risks, thus providing forward-looking information reflecting investors' expectation on firms' future tail risk (e.g., Ilhan et al. (2021), Kelly, Pástor, and Veronesi (2016)).

Providing shareholders an effective way to counter managerial agency problems, shareholder proposals are usually applied to disagree with the management and seek changes in firms without any change in control (Bebchuk (2005)). Despite the nonbinding nature of shareholder proposals, due to reputation concerns, managers are very likely to implement shareholder proposals that win a majority vote (Ertimur, Ferri, and Stubben (2010)). Based on these arguments, many papers document the nontrivial impact of shareholder proposals on corporate governance (e.g., Ertimur, Ferri, and Stubben (2010), Renneboog and Szilagyi (2011)). Following prior works (e.g., Cuñat, Gine, and Guadalupe (2012), Cuñat, Gine, and Guadalupe (2020), Fan, Radhakrishnan, and Zhang (2020), Lin, Wei, and Xie (2020)), this paper uses a regression discontinuity (RD) design to establish the causality between corporate governance and ex-ante tail risk by exploiting the voting outcomes of contentious governance-related shareholder proposals that pass or fail by a narrow margin.[1]

Using 2,360 governance proposals of S&P 1500 firms, this paper finds a negative effect of corporate governance on firms' ex-ante tail risk. Before the RD analysis, I provide evidence to support the underlying assumptions of the RD design. By testing the vote distribution according to McCrary's (2008) method and the smoothness of firm characteristics around the passing threshold, I confirm the validity of the close-call votes on governance proposals in this sample. In the local RD analysis, firms that narrowly win a governance proposal voting show significantly lower ex-ante tail risk in the following quarter, which supports the main hypothesis. Passing a governance proposal, on average, leads to a decrease in implied volatility skew (*IV_SKEW*) and negative model-free implied skewness (*NMFIS*) by about 23% and 25% of their corresponding sample means, respectively. This effect is robust to different kernels, polynomial orders, lengths of bandwidths, optimal bandwidth selection methods, and alternative option market measures reflecting firms' ex-ante tail risk. To make sure that the decrease of ex-ante tail risk comes not from reasons other than the passage of governance proposals, I further conduct placebo tests based on the Monte Carlo simulation with different artificial cutoffs and find further evidence to support the validity of the RD analysis.

Although the sample passes McCrary's (2008) discontinuity test before the RD analysis, it is still possible that the baseline results may subject to the concern that the voting outcomes are intervened by managers (Bach and Metzger (2019)). To alleviate this concern, I implement tests according to Bach and Metzger (2019). First, Bach and Metzger (2019) suggest researchers to exclude shareholder proposals submitted before 2003 because these proposals are more likely to diminish the power of McCrary tests. Following this suggestion, I find no discontinuity of votes

[1] Following prior works (e.g., Fan, Radhakrishnan, and Zhang (2020), Cuñat, Gine, and Guadalupe (2012)), I use the terms governance-related shareholder proposals and governance proposals interchangeably throughout this paper.

around the passing threshold in a restricted sample excluding proposals before 2003. Together with the evidence that the baseline results still hold in the sample without pre-2003 proposals, it is reasonable to believe that vote manipulation does not bias the RD estimation in the baseline analysis. Besides, Bach and Metzger (2019) introduce a refined version of the RD design that accounts for vote manipulation (Gerard, Rokkanen, and Rothe (2016)). Different from the traditional RD test, this method estimates a treatment bound showing the interval of the local treatment effects. By this method, I find that the estimated treatment bounds are all on the negative side of the number axis, meaning that the baseline results remain even in the presence of vote manipulation.

To lend further credence to the main hypothesis, I implement a variety of subsample tests by variables on other corporate governance mechanisms, firm performance, and information transparency. To investigate how shareholder proposals and other corporate governance mechanisms jointly affect the option market, I examine the cross-sectional effects of governance proposals on ex-ante tail risk across different corporate governance mechanisms. In subsample tests based on internal governance mechanisms, I find a stronger effect of governance proposals when firms suffer from weaker board monitoring, less shareholder engagement, and when firms have a higher level of managerial risk-taking incentives. In tests by external governance mechanisms, firms with a lower level of stock market discipline and fewer threats from the market of corporate control decrease more in ex-ante tail risk after the passage of a governance proposal. These findings suggest an enhancement role of governance proposals in restricting managerial discretion and alleviating firms' future tail risk when other corporate governance mechanisms are less efficient. Further, I test the moderating role of profitability in the effect of governance proposals on ex-ante tail risk. Specifically, I observe that firms performing better in profitability and total sales are less affected in the option market by the passage of governance proposals. Given that shareholders are less likely to challenge well-performed managers (e.g., Jensen and Murphy (1990), Jenter, Lewellen, and Denis (2021)), this evidence supports the hypothesis that corporate governance decreases ex-ante tail risk by restricting managerial discretion. Finally, I examine the role of information transparency in the impact of governance proposals on the option market. I use three measures of information transparency from different sources: (1) analyst dispersion from financial analysts' expectations; (2) earnings volatility from financial statements; (3) stock market liquidity from stock trading. Using these measures in the subsample tests, I observe consistent evidence that the effect of governance proposals on ex-ante tail risk is stronger for firms with higher information transparency, which is consistent with prior findings that information transparency facilitates corporate governance (e.g., Armstrong, Guay, and Weber (2010), Demsetz and Lehn (1985), Coles, Daniel, and Naveen (2008)).

After that, I implement two additional tests. First, I investigate how specific governance proposals affect ex-ante tail risk. In this analysis, I observe that the effect of governance proposals on ex-ante tail risk mainly comes from entrenchment-related and shareholder-related proposals and comes not from compensation-related proposals, which suggests the heterogeneous effects across different types of shareholder proposals. What is more, since the local RD analysis only provides a local treatment effect of governance proposals, it is important to know whether the baseline results can be extended out of the optimal bandwidths. Applying a global RD analysis, I observe that the negative effect of the passage of governance proposals on ex-ante tail risk remains for both option market measures of ex-ante tail risk, which confirms the externality of baseline results.

This paper contributes to three strands of literature. First, this paper extends the literature on corporate governance by showing how corporate governance affects option prices. Prior works document that corporate governance is priced in the stock market (e.g., Gompers, Ishii, and Metrick (2003), Bebchuk, Cohen, and Ferrell (2009), Cuñat, Gine, and Guadalupe (2012)), bond market (e.g., Cremers, Nair, and Wei (2007), Klock, Mansi, and Maxwell (2005), Chen et al. (2020)), and credit market (e.g., Ashbaugh-Skaife, Collins, and LaFond (2006)). By examining the change of option market measures after the passage of shareholder proposals, this paper shows that corporate governance is priced in the option market. What is more, this paper is also related to studies on shareholder proposals. Given that shareholder proposals that pass the majority threshold are very likely to be implemented by managers (e.g., Ertimur, Ferri, and Stubben (2010), Renneboog and Szilagyi (2011)), the passage of these proposals provides an effective method to alleviate agency problems without the change of control (Gillan and Starks (2000)). By exploiting the local randomness of shareholder proposal votes around the passing threshold, many works analyze the causal effect of corporate governance on firm value (Cuñat, Gine, and Guadalupe (2012)), cost of capital (Chen et al. (2020)), corporate financial reporting (Fan, Radhakrishnan, and Zhang (2020), Lin, Wei, and Xie (2020)), and corporate innovation (Chemmanur and Tian (2018)). Based on the same framework, this paper adds to these works by showing a negative effect of shareholder proposals on firms' ex-ante tail risk as reflected in the option market.

Second, this paper contributes to option pricing literature by revealing a cross-sectional determinant of option prices. Compared to the enormous amount of literature analyzing the information role of options in the stock market (e.g., Ge, Lin, and Pearson (2016), Xing, Zhang, and Zhao (2010), Rehman and Vilkov (2012), An et al. (2014)), relatively fewer papers discuss factors that impact option prices. In prior works, option prices are determined by factors including investor sentiment (Han (2008)), short-selling cost (e.g., Atmaz and Basak (2019), Evans et al.

(2009)), product market competition (Morellec and Zhdanov (2019)), political uncertainty (Kelly, Pástor, and Veronesi (2016)), climate regulations (Ilhan et al. (2021)), financial statement comparability (Kim et al. (2016)), analyst coverage (Kim, Lu, and Yu (2019)), and financial reporting opacity (Kim and Zhang (2014)). Different from these works, this paper finds a causal effect of corporate governance on option prices in the RD framework base on shareholder proposals.

Using the cost of option protection against potential downside tail risks to measure firms' expected tail risk, this paper also adds to the literature on corporate uncertainty (e.g., Bloom, Bond, and van Reenen (2007), Hassan et al. (2019), Robert S. Pindyck (1988)). By showing a lower ex-ante tail risk after the passage of governance proposals, this paper suggests a positive role of corporate governance in alleviating investors' subjective expectations on firms' future uncertainty.

The remainder of this paper is organized as follows. Section 2 describes sample selection, variable construction, and empirical strategy. Section 3 reports the main empirical results on the effect of governance proposals on ex-ante tail risk. Section 4 examines the cross-sectional effects of governance proposals across other governance mechanisms, firm performance, and information transparency. Section 5 presents the results of additional tests. Section 6 concludes.

2 Sample selection, variable construction, and empirical strategy

2.1 The sample

This sample comes from multiple sources. We obtain option data from IvyDB OptionMetrics database. The data on shareholder proposals in annual meetings come from ISS Shareholder Proposals database. Financial data and short-selling data come from COMPUSTAT database. Stock market information comes from CRSP database. Analyst forecast data come from I/B/E/S database. Institutional investor holdings data come from Thomson Reuters Institutional (13f)

Holdings database. Board information comes from BoardEx database. Merger data are from SDC database. Managerial compensation data come from Execucomp database. Information on shareholder activism is collected from Audit Analytics Shareholder Activism database.

Each shareholder proposal included in this sample must meet the following requirements: (1) The proposal is identified as governance-related in ISS Shareholder Proposals database; (2) Two measures of ex-ante tail risk are available in the current and following quarters; (3) Basic financial and market data are not missing in the last quarter before the proposal voting; (4) There are no important events (e.g., merger and acquisitions, CEO turnover, SEO and repurchase) happened before voting in the current quarter. For firms with multiple proposals in a quarter, I only include proposals with the maximal voting rate in the quarter into the sample (e.g., Fan, Radhakrishnan, and Zhang (2020)). Measures of ex-ante tail risk are trimmed at the 1% and 99% levels to exclude outliers. Covariates are winsorized at the 1% and 99% levels. Finally, the sample contains 2,360 observations during 1997-2018. Figure 1 plots the number and average vote margin of governance proposals in this sample.

[Insert Figure 1 about here.]

As shown in Figure 1, significantly more shareholder proposals are included in the sample after 2003, which is consistent with prior works (e.g., Lin, Wei, and Xie (2020), Cuñat, Gine, and Guadalupe (2012)). The negative average vote margin in most years suggests that shareholder proposals are more likely to fail due to managerial opposition (Bach and Metzger (2019)).

2.2 Measures of ex-ante tail risk

Following extant literature (e.g., Kelly and Jiang (2014), Ilhan et al. (2021)), I use two measures of ex-ante tail risk from the option market as dependent variables in the baseline analysis. The first measure is the firm-specific implied-volatility skew (*IV_SKEW*) that captures the steepness of the implied volatility smirk. According to Xing, Zhang, and Zhao (2010), firm-specific implied-volatility skew is calculated as:

$$IV\_SKEW = IV^{OTM\,Put} - IV^{ATM\,Call}$$

where $IV^{OTM\,Put}$ denotes the implied volatility measured by Black and Scholes (1973) for out-of-the-money (OTM) put options; $IV^{ATM\,Call}$ denotes the implied volatility (IV) measured by Black and Scholes (1973) for at-the money (ATM) call options. OTM puts are defined as put options with moneyness between 0.80 and 0.95, and ATM calls are defined as call options with moneyness between 0.95 and 1.05. Following prior works (Xing, Zhang, and Zhao (2010), Chan, Ge, and Lin (2015)), I require options to have an expiration period between 10 and 60 days to ensure the market liquidity of options. For firms with multiple satisfied puts (calls) at the same time, I average the puts IV (calls IV) weighted by option's moneyness. Since a higher *IV_SKEW* suggests higher demand of put options than call options (e.g., Bollen and Whaley (2004), Xing, Zhang, and Zhao (2010)), prior literature uses *IV_SKEW* as a proxy for downside tail risk in finance literature (e.g., Xing, Zhang, and Zhao (2010), Chan, Ge, and Lin (2015)). What is more, this variable is also mentioned as ex-ante crash risk in accounting literature (Kim and Zhang (2014), Kim et al. (2016)).

The second measure comes from the model-free implied skewness (*MFIS*) measured according to the methodology of Bakshi, Kapadia, and Madan (2003).[2] Different from *IV_SKEW* that is based on the Black-Scholes model, model-free implied skewness does not rely on any specific option pricing model. According to prior works (e.g., Bakshi, Kapadia, and Madan (2003), Morellec and Zhdanov (2019)), model-free implied skewness as of time *t* measured over the period [*t*, *T*] can be calculated as:[3]

[2] Some papers also name it as risk-neutral skewness (e.g., Bali, Hu, and Murray (2013), Dennis and Mayhew (2002)).
[3] *MFIS* is calculated by the Python code offered on Grigory Vilkov's website (https://vilkov.net/index.html). Detailed information

$$MFIS(t,T) = \frac{e^{r(T-t)}W(t,T) - 3\mu(t,T)e^{r(T-t)}U(t,T) + 2\big(\mu(t,T)\big)^3}{\left(e^{r(T-t)}U(t,T) - \big(\mu(t,T)\big)^2\right)^{3/2}}$$

where $U(t,T), W(t,T)$, and $X(t,T)$ are the prices of volatility, cubic, and quadratic contracts, and $\mu(t,T)$ denotes the risk-neutral expectation of log return of underlying stock:

$$\mu(t,T) = e^{r(T-t)} - 1 - \frac{e^{r(T-t)}}{2}U(t,T) - \frac{e^{r(T-t)}}{6}W(t,T) - \frac{e^{r(T-t)}}{24}X(t,T)$$

There are several benefits of using model-free implied skewness to estimate ex-ante skewness in the option market (Bakshi, Kapadia, and Madan (2003)). First, different from *IV_SKEW* that only includes volatility smile at two points of options, *MFIS* extracts information from all available options, thus containing more information than *IV_SKEW*. Second, since *MFIS* does not rely on any option pricing models, it does not suffer from the potential misspecification of option pricing models.[4] What is more, the calculation of *MFIS* only requires inputs from option prices which are easier to obtain. In the baseline analyses, model-free implied skewness is estimated with a 30-day horizon to make sure that the estimates of *MFIS* can promptly reflect investors' beliefs on ex-ante tail risk in the option market. In the robustness tests, I also use *MFIS* with alternative horizons (e.g., 91 days and 181 days) as dependent variables and get similar results.

Following Chen, Hong, and Stein's (2001) construction of negative conditional skewness (*NCSKEW*), I put a negative sign in front of *MFIS* to have a negative model-free implied volatility (*NMFIS*) as the dependent variable so that an increase in *NMFIS* corresponds to a higher downside tail risk (e.g., have a more left-skewed distribution). In this paper, I use firm-quarter measures of ex-ante tail risk to estimate the reaction of options markets to avoid market noises.[5] In addition, I

on the construction of *MFIS* is provided by Bakshi, Kapadia, and Madan ((2003)) and Morellec and Zhdanov ((2019)).

[4] For example, since the Black-Scholes model calculates the price of European options, using implied volatility based on this model in analyzing U.S. option prices brings a lot of noise.

[5] The results are similar but weaker when firm-month measures are used.

also use the percentiles of *IV_SKEW* and *NMFIS* as dependent variables in the robustness tests to alleviate the concern that the results are driven by extreme values of the two option market measures.

2.3 Shareholder proposals and regression discontinuity design

By exploiting the voting outcomes of contentious shareholder proposals that pass or fail by a narrow margin, I use an RD design to establish the causal link between corporate governance and ex-ante tail risk implied in the option market. Different from management-sponsored proposals, shareholder proposals can not be strategically removed by managers (Listokin (2008)). Therefore, the vote distribution of shareholder proposals is less likely to be affected by managers' manipulation (e.g., Cuñat, Gine, and Guadalupe (2012), Cuñat, Gine, and Guadalupe (2016), Lin, Wei, and Xie (2020)). Together with the difficulty to change the vote share by a small margin around cutoffs (e.g., Cuñat, Gine, and Guadalupe (2012)), this framework provides a locally random assignment for close-call proposals to treatment (passed proposals) or control (failed proposals) groups. Following Cuñat, Gine, and Guadalupe (2012), I only focus on governance-related shareholder proposals identified in ISS voting data to examine the effect of corporate governance.[6] Because unobserved confounding factors can be ruled out as long as their effect is continuous around the threshold (Cuñat, Gine, and Guadalupe (2012)) and the passage of shareholder proposals significantly increases the probability of proposal implementation (Ertimur, Ferri, and Stubben (2010)), votes on governance proposals provide an ideal quasi-natural experiment to identify the effect of corporate governance.

In the additional tests, I investigate the effect of shareholder proposals on ex-ante tail risk across specific types of proposals. Following prior works (e.g., Cuñat, Gine, and Guadalupe (2012),

[6] Some papers also use social-related proposals to investigate the impact of corporate social responsibility on firm performance and competing firms' SRI strategies (Flammer (2015), Cao, Liang, and Zhan (2019)).

Fan, Radhakrishnan, and Zhang (2020), Lin, Wei, and Xie (2020)), I categorized the proposals into entrenchment-related, compensation-related, shareholder-related, and other proposals. A proposal is entrenchment-related if it aims to remove anti-takeover provisions, enhance board independence, and reform voting rules to restrict executive power. A proposal is grouped into shareholder-related proposals if it focuses on firms' dividend payout or stock repurchase. A proposal is identified as compensation-related if it discusses managerial and director compensation. The rest of the governance proposals are identified as other proposals. Appendix Table A2 provides the distribution of proposals by types.

2.4 Empirical strategy

Following prior papers (e.g., Chemmanur and Tian (2018), Lin, Wei, and Xie (2020)), I estimate the local average treatment effect (LATE) of governance proposals on ex-ante tail risk by the estimation model based on the specification as follows:

$$OptVar_{i,t+1} = \beta Pass_{it} + \sum_{j=1}^{P} \gamma_j^{Left} (v_{it} - v^*)^j + \sum_{j=1}^{P} \gamma_j^{Right} (v_{it} - v^*)^j Pass_{it} + \mu_{it} \qquad (1)$$

where *i* indexes firm and *t* indexes quarter; *OptVar* denotes two option market measures (*IV_SKEW* and *NMFIS*); *Pass* is an indicator that equals one if the vote margin (*v*-*v**) for a shareholder proposal is higher than 0, where *v* and *v** denote the voting rate and passing threshold. The results are estimated by regression models with three types of kernels (Triangular kernel, Epanechnikov kernel, and Uniform kernel) and polynomial orders of 1, 2, and 3. I estimate the optimal bandwidth following Imbens and Kalyanaraman (2012). Since a firm may have multiple shareholder proposals during the sample period, standard errors are adjusted for heteroskedasticity and clustered by firm to allow for correlation within a firm.

2.5 Validation tests

The validity of an RD design relies on two assumptions (e.g., Cuñat, Gine, and Guadalupe

(2012), Lee and Lemieux (2010)). First, RD requires that no manipulation exists around the threshold. To test this assumption, I examine the continuity of the vote distribution in this sample according to the method proposed by McCrary (2008). Figure 2 plots the density of the vote margins for governance proposals in this sample. The x-axis shows the vote margin. The y-axis shows the density estimates. Each dot denotes the density estimates of the proposal groups in each 1% local range of the vote margin, as shown on the y-axis. The solid lines show the fitted density function of the percentage of votes with a 95% confidence interval around.

[Insert Figure 2 about here.]

As shown in Figure 2, there is no significant discontinuity at the zero vote margin, suggesting that the votes are not systematically manipulated. This evidence is consistent with the argument that shareholder proposals are less likely to be manipulated (Cuñat, Gine, and Guadalupe (2012)).

Second, RD test requires covariates to be similar between treatment and control groups around the cutoff (Lee and Lemieux (2010)). To test this assumption, I compare the pre-existing differences in firm characteristics between the treated and control firms in a [-10%,10%] bandwidth around the zero vote margin. Following prior works (e.g., Cuñat, Gine, and Guadalupe (2012), Lin, Wei, and Xie (2020), Morellec and Zhdanov (2019)), I include the following firm characteristics as covariates: book-to-market ratio (*BM*), market value of equity (*MVE*), book leverage (*LEV*), investment (*INV*), tangibility (*TAN*), return of assets (*ROA*), stock return (*RET*), stock volatility (*SIGMA*), analyst dispersion (*DISP*), and analyst coverage (*NAN*). Detailed definitions of these variables are provided in Appendix Table A1. Panel A of Table 1 shows the summary statistics of dependent variables and firm characteristics.

[Insert Table 1 about here.]

From Panel A of Table 1, I find that the sample means of both option market measures are positive during the sample period (0.0417 for *IV_SKEW* and 0.5571 for *NMFIS*). Given a higher value of option market measures is correspondent to higher ex-ante tail risk, this evidence suggests that the return distributions of individual stocks are, on average, left-skewed, which is consistent with prior works (e.g., Conrad, Dittmar, and Ghysels (2013), Xing, Zhang, and Zhao (2010)). Panel B of Table 1 shows the pre-existing differences in covariates between the treated and control firms in the [-10%,10%] bandwidth. Panel C of Table 1 shows the pre-existing differences in dependent variables between the treated and control firms in the [-10%,10%] bandwidth. Since there is no significant difference in both firm characteristics and option market measures between treatment and control groups before the shareholder proposal voting, this sample satisfies the smoothness assumption. Overall, these results together provide evidence to support the validity of this RD design.

3 Main results

3.1 Graphical analysis

Before RD analysis, I first plot the raw data to visually examine whether there is a discontinuity in option market measures around the passing threshold. Figure 3 reports regression discontinuity plots on two option market measures using a fitted quadratic polynomial estimate with a 95% confidence interval around the fitted value. The x-axis shows the percentage of votes. The y-axis shows the value of option measures one quarter after the voting of shareholder proposals. Panels A and B show the results for implied volatility skew (*IV_SKEW*) and negative model-free implied skewness (*NMFIS*), respectively.

[Insert Figure 3 about here.]

Figure 3 shows a significant discontinuity in *IV_SKEW* and *NMFIS* at the threshold in the following quarter after the vote on governance proposals, which provides preliminary results on the effect of governance on option market measures.

3.2 Baseline results

After a basic graphical examination on the effect of governance proposals, I move on to more rigorous RD tests based on Equation (1).

[Insert Table 2 about here.]

In Columns (1)-(3) in panels of Table 2, where the dependent variable is *IV_SKEW*, the coefficient estimates of *Pass* are all negative and statistically significant across different kernels and polynomial orders. In terms of economic magnitude, firms that narrowly pass a governance proposal have a 0.0091 lower value of *IV_SKEW* in the following quarter than those that narrowly fail. Since this magnitude is about 20% of the sample mean of *IV_SKEW*, the coefficient on *Pass* is both statistically significant and economically meaningful. Similarly, in Columns (4)-(6) in panels of Table 2, where the dependent variable is *NMFIS*, the coefficient estimates of *Pass* are also negatively significant and economically meaningful. These findings suggest a negative impact of corporate governance on ex-ante tail risk reflected in the options markets, which supports the main hypothesis.

3.3 Robustness tests

Next, I conduct a series of tests to examine the robustness of the baseline results. First, I estimate the local average treatment effects of shareholder voting outcomes when adopting different lengths of optimal bandwidth based on asymptotic mean squared error optimal bandwidth selection method across different kernel functions with linear polynomials. Panel A of Table 3 shows the results.

[Insert Table 3 about here.]

As shown in Panel A of Table 3, the coefficients of interest remain across different kernels and different lengths of optimal bandwidth. To provide further evidence that the baseline results are not driven by the selection of optimal bandwidth, I follow prior works (e.g., Bradley, Kim, and Tian (2017)) and repeat the RD regression for alternative bandwidths around the passing threshold. Figure 4 reports RD estimates with a spectrum of bandwidths using local linear regressions with the choice of optimal bandwidth based on Imbens and Kalyanaraman (2012). In all these tests, I reestimate Equation (1) with linear polynomial and triangular kernel.

[Insert Figure 4 about here.]

From Figure 4, I find that the negative coefficients remain over the spectrum of bandwidth choices, which further suggests that the baseline results are robust to different lengths of IK optimal bandwidth.

Second, I test whether the baseline results are driven by specific bandwidth selection methods. Specifically, I apply asymmetric mean square error (*AsyMSE*) in Imbens and Kalyanaraman (2012), symmetric coverage error rate (*CER*), and asymmetric coverage error rate (*AsymCSR*) in Calonico, Cattaneo, and Titiunik (2014) as alternative selection methods of optimal bandwidth. Panel B of Table 3 reports the local average treatment effects when using alternative bandwidth selection methods across different order polynomials with the triangular kernel. As shown in Panel B of Table 3, the baseline results are robust to different bandwidth selection methods. Taken results shown in Panels A and B together, the baseline results are robust to bandwidth selections.

What is more, I use alternative option-implied measures as dependent variables. To make sure that the baseline results are not driven by extreme values, I use percentile measures of *IV_SKEW* and *NMFIS* as dependent variables. For convenience, the percentile measures are scaled by 100. Panel C of Table 3 shows the results. Further, I test whether the results for *NMFIS* are robust to different estimation horizons and show the results in Panel D of Table 3. *NMFIS_91*, *NMFIS_181* denote the negative model-free implied skewness estimated in the 91-day and 181-day horizons, respectively. In Panels C and D, the coefficients of interest are all negatively significant across these dependent variables, which further confirms the robustness of baseline results.

3.4 Placebo tests

To make sure that the decrease in *IV_SKEW* and *NMFIS* comes not from reasons other than the passage of governance proposals, I implement 400 replications using different artificial cutoffs between [-20%, 20%] interval of vote margin by a 0.001 step length. Figure 5 shows the histogram of the pseudo estimates.

[Insert Figure 5 about here.]

From Figure 5, I observe that the actual estimate for *IV_SKEW* (denoted by the vertical line in Panel A of Figure 5) is lower than the 5% percentile of the distribution of the pseudo estimates. Together with similar results for *NMFIS*, these findings suggest that the baseline results are less likely to happen because of reasons other than the passage of a governance proposal.

3.5 Vote manipulation concern

According to Bach and Metzger (2019), the effect of proposals may subject to the concern that the voting outcomes are not randomly drawn due to managerial intervention, which invalidates the RD design. Following Bach and Metzger's (2019) suggestions, I conduct two tests to examine whether proposals in the sample are systematically manipulated or not and whether the baseline results still hold after considering vote manipulation.

First, according to Bach and Metzger (2019), the inclusion of proposals before 2003 may diminish the power of McCrary tests because there is no significant discontinuity in the density of these proposals. Therefore, I exclude proposals before 2003 to see whether there is systematic vote manipulation among proposals after 2003. In the McCrary plot shown in Figure 6, there is no significant discontinuity around the cutoff in the restricted sample with proposals after 2003, meaning that proposals in the sample are less likely to suffer from vote manipulation.

[Insert Figure 6 about here.]

Then, I reestimate Equation (1) in the restricted sample to see whether the baseline results are driven by proposals before 2003. As shown in Panel A of Table 4, the coefficient estimates of *Pass* remain significant, suggesting that the baseline results are not biased due to the inclusion of pre-2003 proposals.

[Insert Table 4 about here.]

After showing that the sample is less likely to suffer from vote manipulation according to the McCrary test, I further implement a refined method to estimate the treatment effect of proposals as suggested by Bach and Metzger (2019). By estimating the bounds of treatment effects, a refined RD analysis proposed by Gerard, Rokkanen, and Rothe (2016) provides credibly causal but less powerful estimations of the treatment effect when accounting for vote manipulation. The confidence interval is estimated by a bootstrap method for 500 times, and the Triangular kernel is used as the estimating kernel. Panel B of Table 4 shows the results. The treatment bounds and 90% confidence interval on bounds shown in Panel B indicate that our baseline results remain even when vote manipulation is considered.

By doing the above tests, I further confirm the validity of this RD setting and support the main hypothesis.

4 Cross-sectional effects

To lend further credence to the main hypothesis, I implement a variety of subsample tests by variables on other corporate governance mechanisms, firm performance, and information transparency. If corporate governance decreases ex-ante tail risk by restricting managerial discretion, the effect of governance proposals should be higher when firms suffer from weakened corporate governance (e.g., Shleifer and Vishny (1997)), when agency conflicts are alleviated by better firm performance (e.g., Graham, Harvey, and Rajgopal (2005)), and when higher information transparency facilitates corporate governance (e.g., Demsetz and Lehn (1985)).

4.1 Corporate governance mechanisms

If corporate governance decreases firms' tail risk through restricting managerial discretion, passing a proposal is expected to result in a greater impact on options markets when firms suffer from more severe agency problems. To examine this prediction, I investigate the cross-sectional effects of governance proposals on ex-ante tail risk measures across different governance mechanisms.

4.1.1 Internal governance mechanisms

First, I examine the cross-sectional effects of shareholder proposals on ex-ante tail risk across alternative internal governance mechanisms such as board governance, managerial incentives, and shareholder governance.

Board governance. Since the board of directors can exert a monitoring effect on managers, managers are less likely to deviate from shareholders' interests under greater pressure from directors (e.g., Fama and Jensen (1983)). Based on this argument, the passage of governance proposals will exert a greater impact on firms' ex-ante tail risk for firms with worse board monitoring. Since a board with more co-opted directors who are appointed after the CEO's appointment is more connected with the manager (Coles, Daniel, and Naveen (2014)), firms with more co-opted directors will suffer from weakened board governance, which in turn increases managerial discretion. Therefore, I test this prediction by using subsample tests based on the rate of co-opted directors. This rate ranges between 0 and 1, with an increase in its value indicating a decrease in board monitoring.

[Insert Table 5 about here.]

From Table 5, the coefficient estimates of *Pass* are larger in magnitude and more significant in the High co-opted rate group than those in the Low co-opted rate group, meaning that passing a governance proposal triggers a higher decrease in firms' ex-ante tail risk for firms with weaker monitoring power of boards. This evidence is consistent with the above prediction and suggests a moderating role of board governance in this analysis.

Managerial incentives. According to Core and Guay (2002), firms with higher managerial risk-taking incentives are prone to make more risky investments and increase firms' uncertainty in the future, which finally intensifies the cost of managerial discretion. Therefore, if the passage of governance proposals decreases firms' tail risk by restricting managerial discretion, the effect of governance proposals would be more powerful for firms with higher managerial risk-taking incentives. Table 6 presents the results of subsample tests based on managerial risk-taking incentives measured by the executive-average *Vega* (e.g., Core and Guay (2002), Coles, Daniel, and Naveen (2006)).

[Insert Table 6 about here.]

In Panel A of Table 6, the coefficient estimates of *Pass* are significant across both option market measures. However, in Panel B, the coefficient estimates of *Pass* do not show any significance. Besides, the coefficient estimates on *Pass* are larger in Panel A than those in Panel B. Therefore, these findings are consistent with the above prediction and support the main hypothesis.

Shareholder governance. Institutional investors play one of the most important roles in corporate governance (e.g., Shleifer and Vishny (1986), Shleifer and Vishny (1997)). Since firms under greater monitoring of institutional investors should have less managerial discretion, the impact of shareholder proposals is expected to be stronger when firms suffer from weaker monitoring of institutional investors. To test this prediction, I use three measures to capture different aspects of shareholder governance. First, I implement a subsample analysis based on institutional blockholder ownership, where blockholders are defined as 13F investors holding over 5% of firms' shares outstanding. Second, breadth of ownership is used as the separating variable (Chen, Hong, and Stein (2002)). Based on the evidence that firms experiencing shareholder campaigns receive greater monitoring pressure from shareholders, I further test the moderating effect of shareholder activism by splitting the sample into two groups based on whether the firm experience at least one shareholder campaign in the past 3 years before the proposal voting (Brav et al. (2008), Klein and Zur (2009)). Following prior works (e.g., Brav et al. (2008), Klein and Zur (2009)), a shareholder campaign is defined as the submission of Schedule 13D filings from investors to the SEC. Table 7 shows the results.

[Insert Table 7 about here.]

In Panels A and B of Table 7, the coefficient estimates of *Pass* are higher for firms with lower blockholder ownership than those with higher blockholder ownership, suggesting that the effect of passing a governance proposal is stronger when firms suffer from weaker blockholder monitoring. Panels C and D show that firms with lower breadth of block ownership decrease more in ex-ante tail risk, which provides consistent results as those in Panels A and B. In the rest panels of Table 7, the coefficient estimates of *Pass* are negative and significant in Panel E, while those in Panel F does not show any significant results, which suggests a moderating role of institutional activists in the effect of passing a governance proposal on firms' ex-ante tail risk. Overall, from different aspects of shareholder governance, the results of the three subsample tests consistently support the prediction that passing a governance proposal has a greater impact on firms' ex-ante tail risk when firms suffer from weaker monitoring of shareholders.

4.1.2 External governance mechanisms

Next, I investigate the cross-sectional effects of governance proposals on ex-ante tail risk across different external governance mechanisms such as the stock market (e.g., Massa, Zhang, and Zhang (2015)) and the market of corporate control (e.g., Manne (1965), Jensen and Ruback (1983)).

Stock market discipline. According to prior literature, short selling has a disciplinary effect on managers' behavior, such as earnings management and M&A decisions (Massa, Zhang, and Zhang (2015), Chang, Lin, and Ma (2019)). If short selling restricts managerial discretion, firms with less pressure from short selling should experience a larger decrease in ex-ante tail risk after the passage of governance proposals. To investigate the stock market discipline through short-selling, I apply a subsample test based on short-selling exposure measured as short interest ratio. Following prior literature (e.g., Massa, Zhang, and Zhang (2015)), a higher short interest ratio, which is defined as the short interest divided by the share outstanding, indicates an increase of short-selling exposure. Panels A and B of Table 8 show the results.

[Insert Table 8 about here.]

As shown in Panels A-B, the coefficient estimates of *Pass* are larger in magnitude and more significant for firms with lower short-selling exposure, which suggests that the effect of governance proposals on ex-ante tail risk is stronger for firms that have weaker stock market discipline from short selling.

Market of corporate control. The market of corporate control has long been regarded as an effective governance mechanism to restrict managerial opportunism (Manne (1965), Jensen and Ruback (1983)). Therefore, firms facing fewer threats from the market of corporate control are expected to suffer more from managerial discretion and have a larger decrease in ex-ante tail risk after the passage of governance proposals. To test this prediction, I perform a subsample test based on splitting the sample based on the median value of takeover risk measure used in the extant literature (e.g., Cremers, Nair, and John (2009), He and Tian (2013)) that proxies for threats from the market of corporate control.

Panels C and D of Table 8 present the results of subsample tests based on threats from the market of corporate control. In these panels, the coefficient estimates for both *IV_SKEW* and *NMFIS* are higher in magnitude and more significant for firms in the Low takeover risk group than those in the High takeover risk group, which implies that the effect of passing a governance proposal on ex-ante tail risk is stronger when firms receive less effective governance from the market of corporate control.

To sum up, by testing cross-sectional effects of the passage of a governance proposal on firms' ex-ante tail risk across different internal and external governance mechanisms, this paper suggests a stronger effect of corporate governance on firms' ex-ante tail risk when firms suffer from weaker corporate governance, which usually indicates greater managerial discretion.

4.2 Firm Performance

As implied in prior works (e.g., Graham, Harvey, and Rajgopal (2005), Jensen and Murphy (1990), Jenter, Lewellen, and Denis (2021)), shareholders exert fewer engagements to managers when firms perform well. Therefore, if the effect of passing a governance proposal on ex-ante tail risk comes from restricting managerial discretion, the option market's response to the passage of governance proposals will be less intensive for firms with better performance. To test this prediction, I first conduct a subsample test based on firms' profitability, which is measured as the firm's return of assets (*ROA*) in the last quarter.

[Insert Table 9 about here.]

As shown in Panels A and B Table 9, firms with higher *ROA* have a smaller decrease in *IV_SKEW* and *NMFIS* in the following quarter, which suggests a weaker negative impact of corporate governance on firms' ex-ante tail risk when firms' profitability is higher and support the above prediction. Further, I conduct another subsample test based on total sales measured by a firm's total sales scaled by total assets. As shown in Panels C and D of Table 9, the coefficient estimates are lower in absolute value and less significant for firms with higher sales, thus suggesting a weaker impact of governance proposals on ex-ante tail risk when firms perform well in sales. Taken together, these findings suggest a moderating role of firms' performance in the effect of corporate governance on ex-ante tail risk and further support the positive role of corporate governance in decreasing firms' downside uncertainty as reflected in the option market.

4.3 Information transparency

Finally, I examine the role of information transparency in the impact of the passage of a governance proposal on firms' ex-ante tail risk by conducting subsample tests based on different measures on information transparency. Since higher information transparency decreases the cost of monitoring (e.g., Armstrong, Guay, and Weber (2010), Demsetz and Lehn (1985), Coles, Daniel, and Naveen (2008)), firms with higher information transparency are expected to have lower ex-ante tail risk after the passage of governance proposals. To provide a comprehensive analysis of information transparency, I use three measures from different sources: (1) analyst dispersion from analysts' expectations; (2) earnings volatility from financial statements; and (3) stock market liquidity from stock trading. Analyst dispersion is measured as the standard deviation of individual analysts' earnings forecasts scaled by the stock price at the end of the fiscal year; Earnings volatility is measured as the standard deviation of the ROAs in the past 5 years; Stock market liquidity is measured as the negative value of the bid-ask spread. According to prior literature, lower analyst dispersion, lower earnings volatility, and higher stock market liquidity indicate higher information transparency (e.g., Boone and White (2015), Leuz, Nanda, and Wysocki (2003)).

[Insert Table 10 about here.]

From Table 10, I find a larger magnitude and higher significance in coefficient estimates of *Pass* for both *IV_SKEW* and *NMFIS* in Low analyst dispersion, Low earnings volatility, and High market liquidity groups. These findings suggest that information transparency facilitates corporate governance in decreasing firms' ex-ante risk.

5 Additional Tests

5.1 Specific types of proposals

After testing the effect of passing a governance proposal on firms' ex-ante tail risk, I further examine how the passage of types of proposals affects option-measured ex-ante tail risk. Governance proposals in this sample are separating according to Section 3.3. Table 11 shows the results for entrenchment-related, compensation-related, and shareholder-related proposals.

[Insert Table 11 about here.]

In Panel A of Table 11, the coefficient estimates of *Pass* are negative and significant for both *IV_SKEW* and *NMFIS*, meaning that the removal of managerial entrenchment alleviates firms' ex-ante tail risk. In terms of shareholder-related proposals (e.g., share repurchase, dividend payout), Panel B shows negative and significant coefficient estimates on *Pass*, which means that the option market response more intensively to governance proposals more closed to shareholders direct benefits.[7] However, in Panel C, the coefficient estimates of *Pass* are all insignificant across both

[7] I also observe that the magnitude of estimates for shareholder-related proposal is larger than that for entrenchment-related proposals. However, this observation is not sufficient to conclude that the passage of shareholder-related proposals leads to greater

option market measures, which suggests that the passage of compensation-related proposals does not have any significant impact on firms' ex-ante tail risk. Overall, I find significant effects of entrenchment-related proposals and shareholder-related proposals on firms' ex-ante tail risk but no significant effect of compensation-related proposals, which suggests the heterogeneous effects of different types of shareholder proposals on the option market.

5.2 External validity: Global regression discontinuity design

Since results in local RD analyses only estimate the local average treatment effect of shareholder proposals around the cutoff, it is unknown whether the baseline results are still valid outside of the optimal bandwidth. Following extant literature (e.g., Cuñat, Gine, and Guadalupe (2012), Fan, Radhakrishnan, and Zhang (2020)), I implement a global RD analysis in the global interval based on the following regression specification:

$$OptVar_{i,\,t+1} = \beta Pass_{it} + \sum_{j=1}^{P} \gamma_j^{Left} (v_{it} - v^*)^j + \sum_{j=1}^{P} \gamma_j^{Right} (v_{it} - v^*)^j \, Pass_{it} + \gamma Controls_{it} + Year\ FE + Industry\ FE + \varepsilon_{it} \tag{2}$$

where *Pass* is an indicator that equals one if the vote margin (v-v*) for a shareholder proposal is higher than 0, where v and v* denote the voting rate and passing threshold. The model is estimated by regression models with polynomial orders of 1, 2, and 3. Year and industry fixed effects are included to control for year- and industry- invariant factors. Industries are classified by Fama-French 12 Classification (Fama and French (1997)). Control variables are covariates shown in Table 1. Standard errors are adjusted for heteroskedasticity and clustered by firm. Table 12 reports the results.

reaction from the option market because the tests in Panel B may be intervened by the fewer observations of shareholder-related proposals, which may suffer from selection bias.

[Insert Table 12 about here.]

From Panel A of Table 12, when the dependent variable is *IV_SKEW*, the coefficient estimates of *Pass* are negative and significant at 1% level across different polynomial orders and whether control variables are included. In terms of economic magnitude, firms passing governance proposals, on average, have a 0.004 decrease in *IV_SKEW*, which is smaller than that in the local RD analysis due to the intervention outside of the optimal bandwidth. Nevertheless, these coefficients are still statistically significant and economically meaningful considering the sample mean of *IV_SKEW* (0.0417). Similarly, as shown in Panel B of Table 12, when the dependent variable is *NMFIS*, the coefficient estimates of *Pass* are also statistically significant and economically meaningful. Therefore, the results in the global RD analysis support the external validity of the negative and significant impact of passing a governance proposal on ex-ante tail risk measured by option prices.

6 Conclusion

By exploiting the local randomness of shareholder proposal votes around the passing threshold, this paper finds a negative effect of corporate governance on ex-ante tail risk implied by option prices and documents that corporate governance is priced in the option market. In cross-sectional tests, this effect is stronger for firms with weaker corporate governance in different mechanisms (i.e., board, shareholder, stock market, and the market of corporate control) and is weaker when firms perform well in profitability and total sales. Also, I observe an amplifying role of information transparency in the effect of governance proposals on ex-ante tail risk, which is consistent with prior works documenting the role of information in facilitating corporate governance (e.g., Armstrong, Guay, and Weber (2010), Demsetz and Lehn (1985), Coles, Daniel, and Naveen (2008)). Entrenchment-related proposals and shareholder-related proposals are observed to have a significantly negative effect on ex-ante tail risk, while compensation-related proposals do not show any effect. Finally, the global RD analysis provides further evidence to confirm the external validity of the baseline results. Overall, this paper contributes to the literature by establishing a causal link between corporate governance and option prices. By showing that corporate governance decreases firms' ex-ante tail risk, this paper suggests a positive role of corporate governance to shareholders in alleviating firm-specific uncertainty, which extends our understanding of how corporate governance benefits shareholders.

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Figure 1
Governance-Related Shareholder Proposals in the Sample

This figure plots the number and average vote margin of governance-related shareholder proposals in this sample. The data on shareholder proposals come from ISS Shareholder Proposals database. The shareholder proposals included in this sample must meet the following requirements: (1) The proposal has the maximal voting rate in the quarter; (2) Basic financial and market data are not missing in the last quarter before the proposal; (3) Two option market measures are available in the current and following quarters; (4) There are no important events (e.g., merger and acquisitions, CEO turnover, SEO and repurchase) happened in the following quarter. Option market measures on ex-ante tail risk are trimmed at 1% and 99% levels. Finally, the sample contains 2,360 observations during 1997-2018.

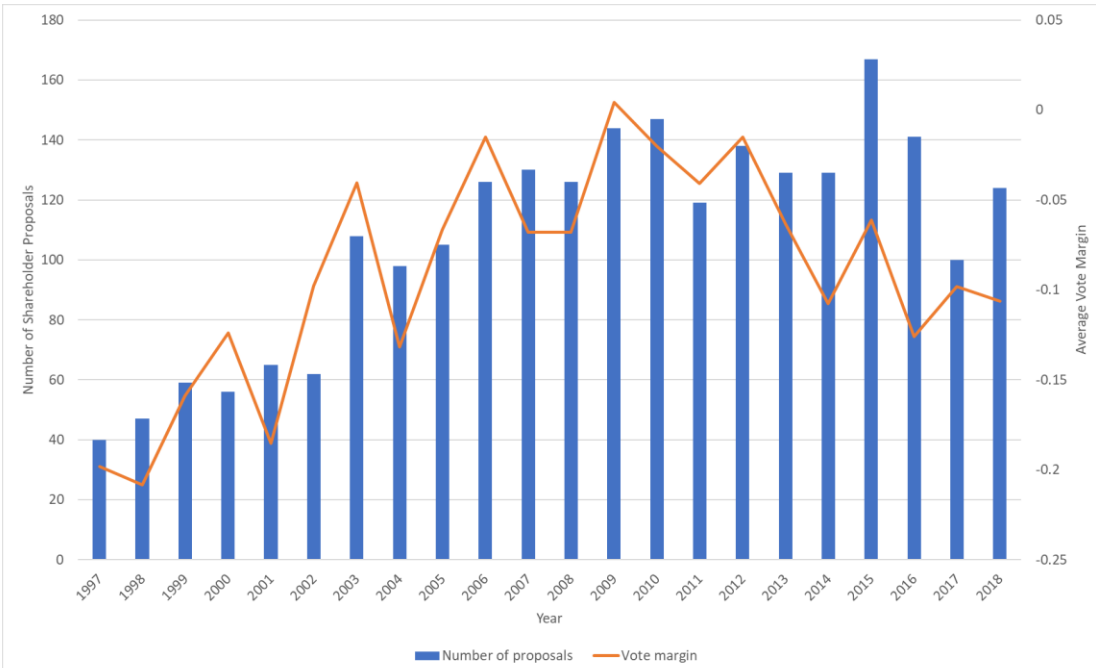


Figure 2
Density of Vote Margins for Governance-related Shareholder Proposals

This figure plots the density of the vote margins for governance-related shareholder proposals in this sample, following the method proposed by McCrary (2008). The x-axis shows the vote margin. The y-axis shows the density estimates. Each dot denotes the density estimates of the proposal groups in each 1% local range of the vote margin as shown on the y-axis. The solid lines show the fitted density function of the percentage of votes with a 95% confidence interval around. The x-axis ranges from -50% to 50%.

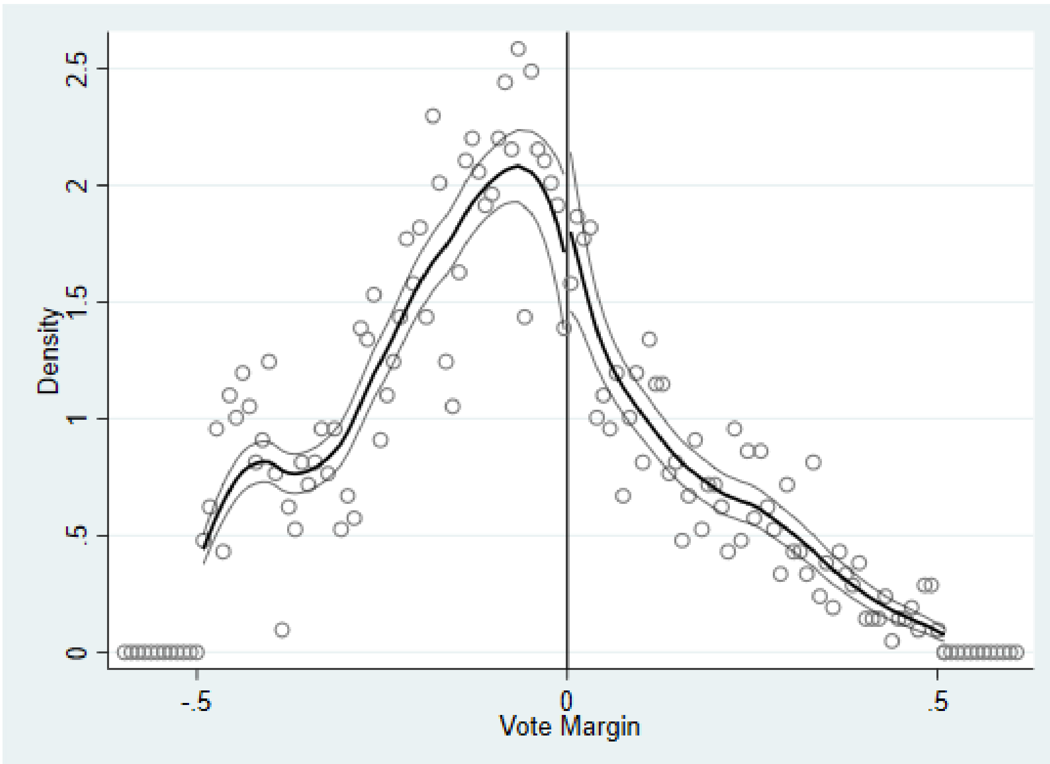
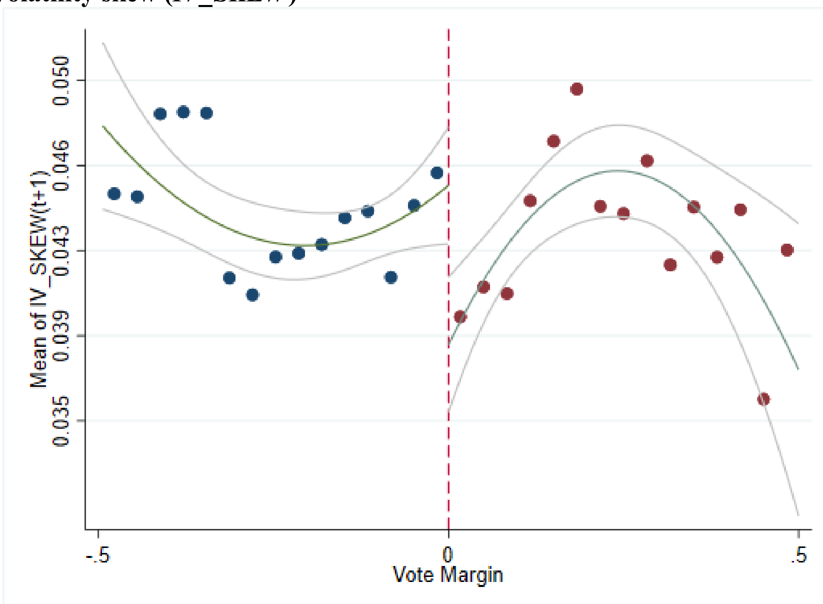


Figure 3
Regression Discontinuity Plot on Option Market Measures

This figure reports regression discontinuity plots on option market measures using a fitted quadratic polynomial estimate with a 95% confidence interval around the fitted value. The x-axis shows the percentage of votes. The y-axis shows the value of option measures one quarter after the voting of shareholder proposals. Panel A shows the results for implied volatility skew (*IV_SKEW*). Panel B shows the results for negative model-free implied skewness (*NMFIS*).

Panel A: Implied volatility skew (*IV_SKEW*)



Panel B: Negative model-free implied skewness (*NMFIS*)

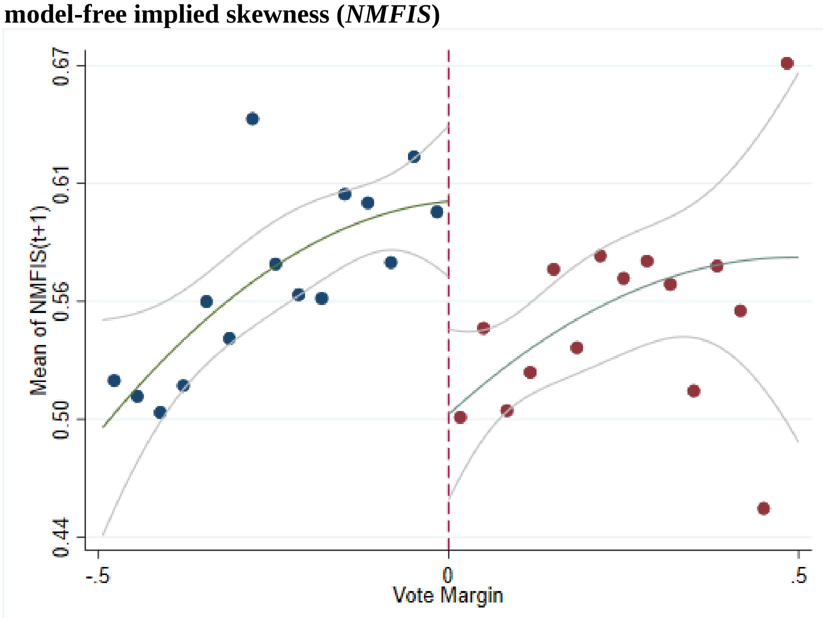
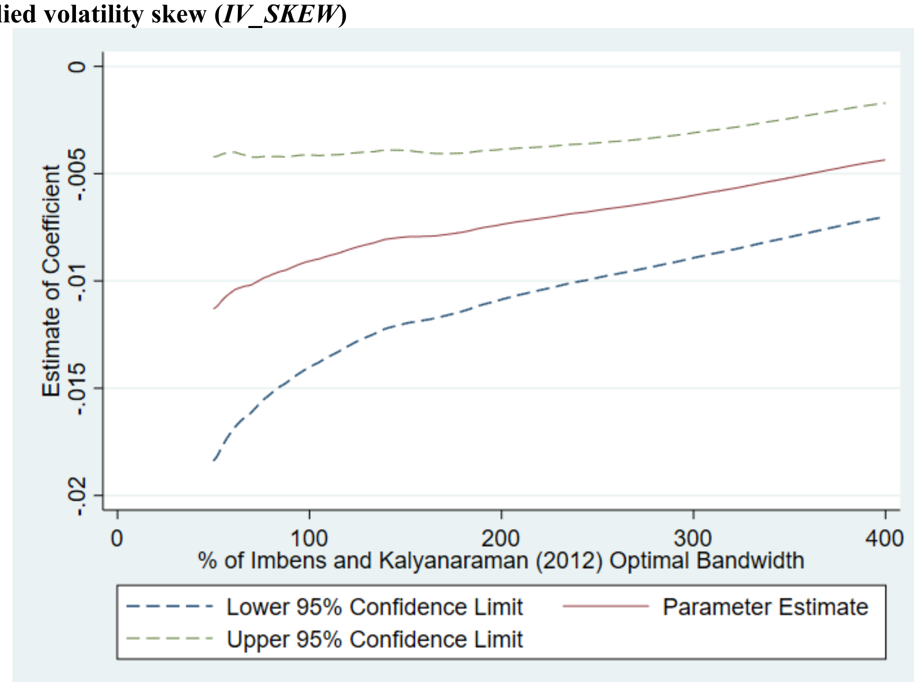


Figure 4
Regression Discontinuity Design Bandwidths

This figure reports RDD estimates with alternative bandwidths using local linear regressions with the choice of optimal bandwidth based on Imbens and Kalyanaraman (2012). The x-axis represents the percentage of IK optimal bandwidth. The y-axis shows the estimation results. In all the tests, we estimate the model with polynomial order is 1 and the triangular kernel. Panel A shows the results for implied volatility skew (*IV_SKEW*). Panel B shows the results for negative model-free implied skewness (*NMFIS*).

Panel A: Implied volatility skew (*IV_SKEW*)



Panel B: Negative model-free implied skewness (*NMFIS*)

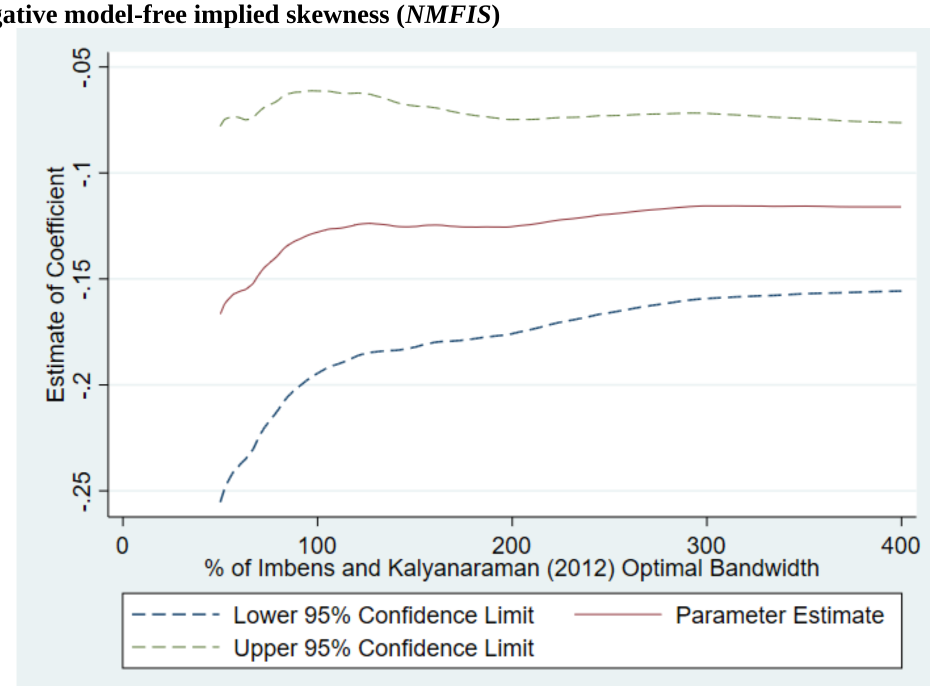
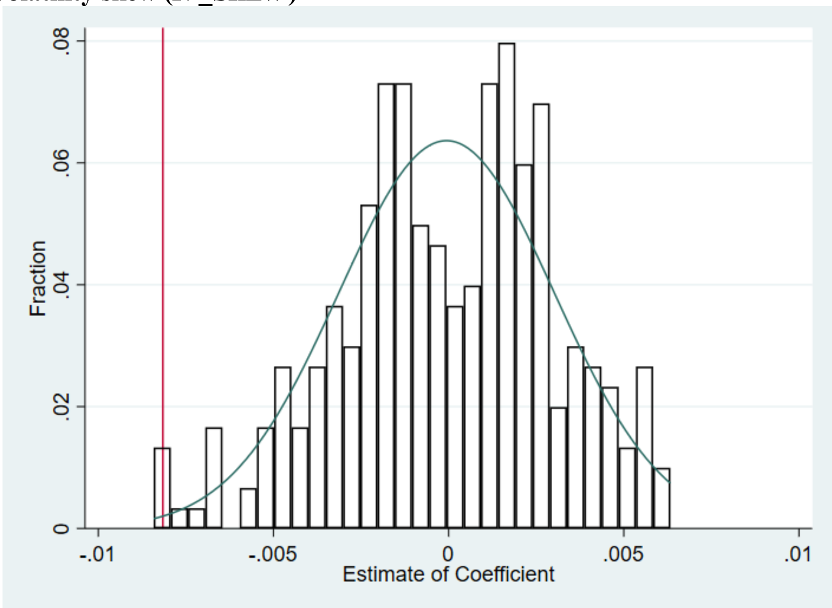


Figure 5
Placebo Tests

This figure reports the histogram of RDD estimates with alternative cutoffs. The x-axis represents the RDD estimates from a placebo test under an artificial cutoff between [-20%, 20%]. The y-axis shows the fraction of the estimates. In all the tests, we estimate the model with polynomial order is 1 and the triangular kernel. The vertical line shows the actual value in the baseline regressions. Panel A shows the results for implied volatility skew (*IV_SKEW*). Panel B shows the results for negative model-free implied skewness (*NMFIS*).

Panel A: Implied volatility skew (*IV_SKEW*)



Panel B: Negative model-free implied skewness (*NMFIS*)

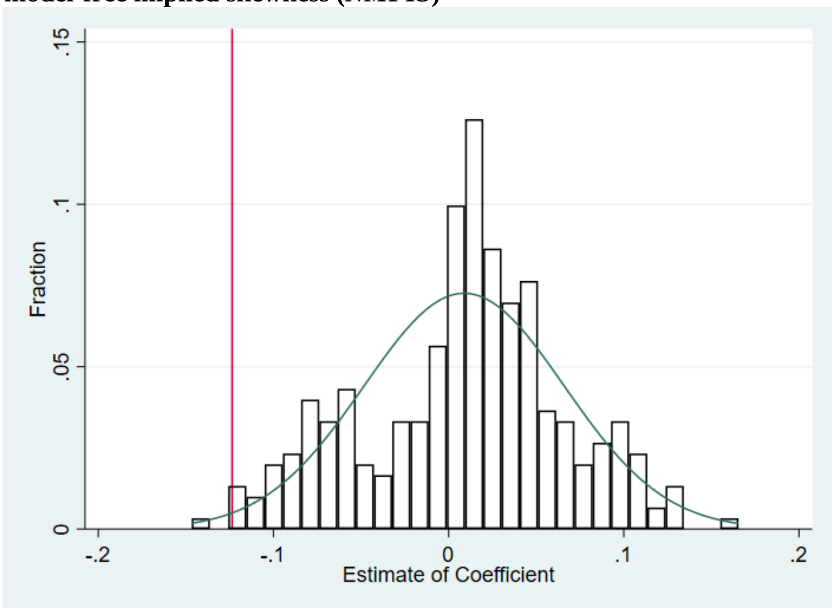


Figure 6
Density of Vote Margins for Governance-related Shareholder Proposals: After 2003

This figure plots the density of the vote margins for governance-related shareholder proposals, following the method proposed by McCrary (2008), in a restricted sample excluding proposals before 2003. The x-axis shows the vote margin. The y-axis shows the density estimates. Each dot denotes the density estimates of the proposal groups in each 1% local range of the vote margin as shown on the y-axis. The solid lines show the fitted density function of the percentage of votes with a 95% confidence interval around. The x-axis ranges from -50% to 50%.

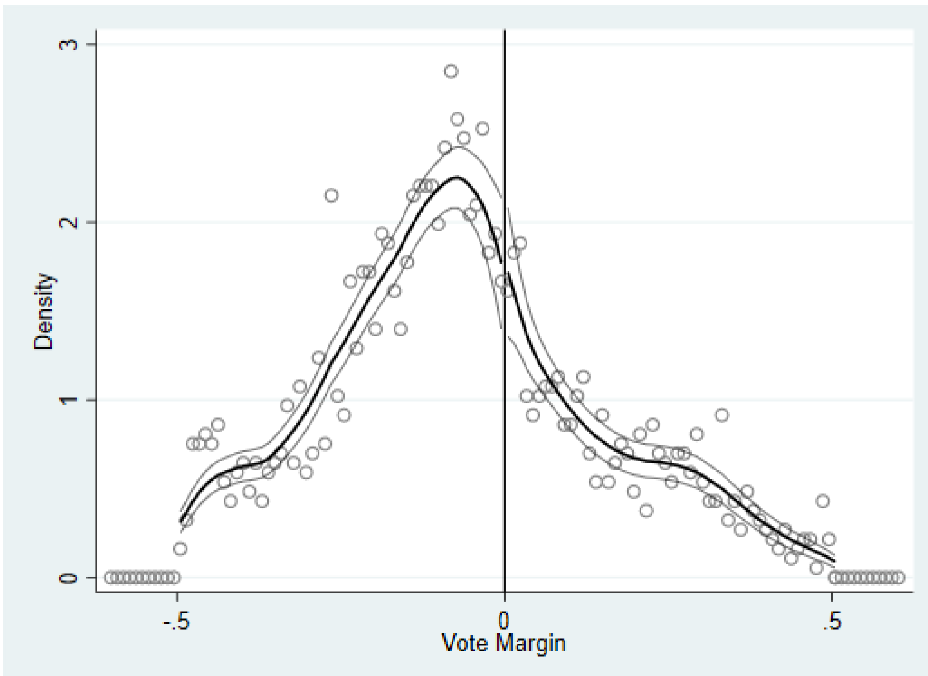


Table 1
Summary Statistics and Pre-existing Differences between the Treated and Control Firms

This table shows the summary statistics of dependent variables and firm characteristics and the pre-existing differences of firm characteristics between treated and control firms. The dependent variables are quarterly-level implied volatility skew (*IV_SKEW*), which is measured as the difference between the implied volatility of OTM put options and that of ATM call options, and negative model-free implied skewness, which is the negative value of model-free implied skewness proposed by Bakshi, Kapadia, and Madan (2003). The firm characteristics include Book-to-market ratio (*BM*), Market value of equity (*MVE*), Book leverage (*LEV*), Investment (*INV*), Tangibility (*TAN*), return of assets (*ROA*), stock return (*RET*), stock volatility (*SIGMA*), analyst dispersion (*DISP*), and analyst coverage (*NAN*). Panel A shows the summary statistics of dependent variables and firm characteristics. Panel B shows the pre-existing differences in firm characteristics between the treated and control firms in the [-10%,10%] bandwidth. Panel C shows the pre-existing differences between in option market measures the treated and control firms in the [-10%,10%] bandwidth. The z-statistics are shown in the parentheses.

Panel A: Summary statistics of dependent variables and firm characteristics

	N	Mean	St.Dev	p25	Median	p75
IV SKEW	2,360	0.0417	0.0217	0.0298	0.0385	0.0494
NMFIS	2,360	0.5571	0.2870	0.3762	0.5326	0.7162
BM	2,360	0.4046	0.2948	0.2046	0.3361	0.5404
MVE	2,360	16.6140	0.7973	16.1024	16.8634	17.3252
LEV	2,360	1.5098	2.5776	0.3131	0.6185	1.3732
INV	2,360	0.0483	0.0899	0.0032	0.0289	0.0712
TAN	2,360	0.4318	0.1342	0.3445	0.4362	0.5172
ROA	2,360	0.0155	0.0158	0.0059	0.0139	0.0241
RET	2,360	0.0107	0.0451	-0.0160	0.0106	0.0349
SIGMA	2,360	0.0177	0.0092	0.0115	0.0153	0.0208
DISP	2,360	0.0743	0.1618	0.0147	0.0264	0.0576
NAN	2,360	2.9296	0.3831	2.7300	2.9957	3.2055
INSTO	2,360	0.6948	0.2272	0.6202	0.7389	0.8350

Panel B: Local smoothness tests on firm characteristics

	MVE	*BM*	*LEV*	*INV*	*TANG*	*ROA*	*RET*	*SIGMA*	*DISP*	*NAN*	*INSTO*
Difference	-0.1973	0.0062	-0.5028	0.0123	-0.0063	-0.0026	0.0060	0.0019	0.0058	-0.0576	-0.0188
	(-1.64)	(0.15)	(-1.26)	(0.98)	(-0.26)	(-1.09)	(1.07)	(1.33)	(0.23)	(-1.03)	(-0.56)
Bandwidth	[-0.1,0.1]	[-0.1,0.1]	[-0.1,0.1]	[-0.1,0.1]	[-0.1,0.1]	[-0.1,0.1]	[-0.1,0.1]	[-0.1,0.1]	[-0.1,0.1]	[-0.1,0.1]	[-0.1,0.1]
Eff. Left N	496	496	496	496	496	496	496	496	496	496	496
Eff. Right N	300	300	300	300	300	300	300	300	300	300	300
N	2,360	2,360	2,360	2,360	2,360	2,360	2,360	2,360	2,360	2,360	2,360

Panel C: Local smoothness tests on option market measures

	IV_SKEW	*NMFIS*
Difference	0.0002	-0.0555
	(0.05)	(-1.45)
Bandwidth	[-0.1,0.1]	[-0.1,0.1]
Effective Left N	496	496
Effective Right N	300	300
N	2,360	2,360

Table 2
Shareholder Voting and Option Market Measures on Ex-ante Tail Risk

This table reports the local average treatment effect of passing a governance proposal on option market measures on ex-ante tail risk. The estimation model is based on the specification as follows:

$$OptVar_{i,t+1} = \beta Pass_{it} + \sum_{j=1}^{P} \gamma_j^{Left} (v_{it} - v^*)^j + \sum_{j=1}^{P} \gamma_j^{Right} (v_{it} - v^*)^j Pass_{it} + \mu_{it}$$

where *OptVar* denotes the two option market measures on ex-ante tail risk (*IV_SKEW* and *NMFIS*); *Pass* is an indicator that equals one if the vote margin (*v*-*v**) for a shareholder proposal is higher than 0, where *v* and *v** denote the vote rate and threshold. I estimate the results using regression models with three types of kernels (Triangular kernel, Epanechnikov kernel, and Uniform kernel) and polynomial orders of 1, 2, and 3. I estimate the optimal bandwidth following Imbens and Kalyanaraman (2012). The corresponding results when using Triangular kernel, Epanechnikov kernel, and Uniform kernel as the estimating kernel are shown in Panels A, B, and C, respectively. Standard errors are adjusted for heteroskedasticity and clustered by firm. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively. The z-statistics are shown in the parentheses.

Panel A: Kernel=Triangular

	(1)	(2)	(3)	(4)	(5)	(6)
		IV_SKEW_{t+1}			$NMFIS_{t+1}$	
Pass	-0.0091***	-0.0106***	-0.0120***	-0.1274***	-0.1639***	-0.2007***
	(-3.54)	(-3.23)	(-3.00)	(-3.42)	(-3.40)	(-3.48)
Polynomial Order	1	2	3	1	2	3
Kernel	Triangular	Triangular	Triangular	Triangular	Triangular	Triangular
Bandwidth	IK	IK	IK	IK	IK	IK
Range of Vote Margin	[-0.1143, 0.1143]	[-0.1496, 0.1496]	[-0.1744, 0.1744]	[-0.1369, 0.1369]	[-0.1411, 0.1411]	[-0.1568, 0.1568]
Effective Observations: Left	556	721	806	661	692	738
Effective Observations: Right	340	412	458	393	405	431
Observations	2,360	2,360	2,360	2,360	2,360	2,360

Panel B: Kernel= Epanechnikov

	(1)	(2)	(3)	(4)	(5)	(6)
		IV_SKEW$_{t+1}$			*NMFIS* $_{t+1}$	
Pass	-0.0087***	-0.0106***	-0.0119***	-0.1208***	-0.1482***	-0.1974***
	(-3.52)	(-3.16)	(-3.01)	(-3.31)	(-3.16)	(-3.42)
Polynomial Order	1	2	3	1	2	3
Kernel	Epanechnikov	Epanechnikov	Epanechnikov	Epanechnikov	Epanechnikov	Epanechnikov
Bandwidth	IK	IK	IK	IK	IK	IK
Range of Vote Margin	[-0.1139, 0.1139]	[-0.1382, 0.1382]	[-0.1735, 0.1735]	[-0.1424, 0.1424]	[-0.1517, 0.1517]	[-0.1549, 0.1549]
Effective Observations: Left	554	674	803	693	726	737
Effective Observations: Right	338	395	457	405	424	430
Observations	2,360	2,360	2,360	2,360	2,360	2,360

Panel C: Kernel= Uniform

	(1)	(2)	(3)	(4)	(5)	(6)
		IV_SKEW$_{t+1}$			*NMFIS* $_{t+1}$	
Pass	-0.0084***	-0.0094***	-0.0123***	-0.1232***	-0.1187***	-0.1452***
	(-3.62)	(-2.76)	(-3.25)	(-3.08)	(-2.71)	(-2.82)
Polynomial Order	1	2	3	1	2	3
Kernel	Uniform	Uniform	Uniform	Uniform	Uniform	Uniform
Bandwidth	IK	IK	IK	IK	IK	IK
Range of Vote Margin	[-0.1134, 0.1134]	[-0.1197, 0.1197]	[-0.1739, 0.1739]	[-0.1006, 0.1006]	[-0.182, 0.1820]	[-0.2135, 0.2135]
Effective Observations: Left	554	579	803	496	843	969
Effective Observations: Right	338	353	457	308	474	519
Observations	2,360	2,360	2,360	2,360	2,360	2,360

Table 3
Robustness Tests

This table shows the results in robustness tests of the local RD analysis. Panel A reports the local average treatment effects when adopting different lengths of optimal bandwidth based on asymptotic mean squared error optimal bandwidth selection method across different kernel functions with linear polynomials. Panel B reports the local average treatment effects when using alternative bandwidth selection methods across different order polynomials with triangular kernel. The selection methods include asymmetric mean square error (*AsyMSE*) in Imbens and Kalyanaraman (2012), symmetric coverage error rate (*CER*), and asymmetric coverage error rate (*AsymCSR*) in Calonico, Cattaneo, and Titiunik (2014). Panel C shows the results when the dependent variables are percentile option-implied skewness. The percentile measures are scaled by 100 for convenience. Panel D shows the results when different estimation windows are used in calculating *NMFIS*. *NMFIS_91* denotes the negative model-free implied skewness estimated with a 91-day horizon. *NMFIS_181* denotes the negative model-free implied skewness estimated with a 181-day horizon. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively. The z-statistics are shown in the parentheses.

Panel A: Different lengths of optimal bandwidth (Poly. Order =1)

Dependent Var.	IV_SKEW_{t+1}				$NMFIS_{t+1}$			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	75%×IK	80%×IK	120%×IK	125%×IK	75%×IK	80%×IK	120%×IK	125%×IK
Triangular	-0.0099***	-0.0097***	-0.0086***	-0.0084***	-0.1415***	-0.1367***	-0.1241***	-0.1238***
	(-3.35)	(-3.39)	(-3.66)	(-3.67)	(-3.48)	(-3.41)	(-3.51)	(-3.53)
Epanechnikov	-0.0096***	-0.0094***	-0.0082***	-0.0081***	-0.1308***	-0.1257***	-0.1200***	-0.1211***
	(-3.34)	(-3.37)	(-3.65)	(-3.66)	(-3.27)	(-3.20)	(-3.45)	(-3.53)
Uniform	-0.0087***	-0.0087***	-0.0073***	-0.0074***	-0.1410***	-0.1471***	-0.1193***	-0.1161***
	(-3.25)	(-3.34)	(-3.45)	(-3.58)	(-3.23)	(-3.47)	(-3.19)	(-3.13)

Panel B: Bandwidths from alternative selection methods (Kernel=Triangular)

	IV_SKEW_{t+1}			$NMFIS_{t+1}$		
	(1)	(2)	(3)	(4)	(5)	(6)
	Poly. Order=1	Poly. Order =2	Poly. Order =3	Poly. Order=1	Poly. Order =2	Poly. Order =3
Asymmetric MSE	-0.0089***	-0.0101***	-0.0134***	-0.1271***	-0.2009***	-0.2248***
	(-3.57)	(-3.09)	(-3.57)	(-3.48)	(-4.19)	(-4.17)
CER	-0.0101***	-0.0117***	-0.0126***	-0.1439***	-0.1939***	-0.2120***
	(-3.33)	(-2.94)	(-2.68)	(-3.50)	(-3.51)	(-3.23)
Asymmetric CER	-0.0100***	-0.0104***	-0.0137***	-0.1420***	-0.2193***	-0.2217***
	(-3.45)	(-2.64)	(-3.11)	(-3.51)	(-3.97)	(-3.60)

Panel C: Alternative option market measures

	(1)	(2)	(3)	(4)	(5)	(6)
		IV_SKEW_PERCENTILES$_{t+1}$			*NMFIS_PERCENTILES* $_{t+1}$	
Pass	-0.1319***	-0.1564***	-0.1871***	-0.1338***	-0.1739***	-0.2209***
	(-3.51)	(-3.16)	(-3.03)	(-3.15)	(-3.18)	(-3.39)
Polynomial Order	1	2	3	1	2	3
Kernel	Triangular	Triangular	Triangular	Triangular	Triangular	Triangular
Bandwidth	IK	IK	IK	IK	IK	IK
Range of Vote Margin	[-0.1426, 0.1426]	[-0.1715, 0.1715]	[-0.1822, 0.1822]	[-0.1175, 0.1175]	[-0.1371, 0.1371]	[-0.1546, 0.1546]
Effective Observations: Left	693	797	848	567	668	737
Effective Observations: Right	405	453	474	349	394	430
Observations	2,360	2,360	2,360	2,360	2,360	2,360

Panel D: Alternative estimation windows of negative model-free implied skewness

	(1)	(2)	(3)	(4)	(5)	(6)
		NMFIS_91 $_{t+1}$			*NMFIS_181* $_{t+1}$	
Pass	-0.1436***	-0.1555***	-0.1949***	-0.1246**	-0.1256**	-0.1272**
	(-3.18)	(-2.88)	(-2.92)	(-2.57)	(-2.16)	(-2.02)
Polynomial Order	1	2	3	1	2	3
Kernel	Triangular	Triangular	Triangular	Triangular	Triangular	Triangular
Bandwidth	IK	IK	IK	IK	IK	IK
Range of Vote Margin	[-0.1213, 0.1213]	[-0.1615, 0.1615]	[-0.1722, 0.1722]	[-0.1092, 0.1092]	[-0.1481, 0.1481]	[-0.2125, 0.2125]
Effective Observations: Left	596	755	801	528	720	965
Effective Observations: Right	363	439	456	319	410	519
Observations	2,360	2,360	2,360	2,360	2,360	2,360

Table 4
Vote Manipulation Concern

This table reports the effect of governance proposals on ex-ante tail risk accounting for vote manipulation concern. Panel A shows the results when shareholder proposals before 2003 are excluded in the sample. Panel B shows the results when the estimation method accounting for vote manipulation is used. The effect of the passage of governance proposals on ex-ante tail risk is estimated as treatment bounds using the method suggested by Gerard, Rokkanen, and Rothe (2016). The treatment bounds and 90% confidence interval on bounds are shown in the table. The confidence interval is estimated by a bootstrap method for 500 times. Triangular kernel is used as the estimating kernel.

Panel A: Excluding shareholder proposals before 2003

	(1)	(2)	(3)	(4)	(5)	(6)
		IV_SKEW_{t+1}			$NMFIS_{t+1}$	
Pass	-0.0085***	-0.0096***	-0.0115***	-0.1484***	-0.2089***	-0.2513***
	(-3.65)	(-3.31)	(-2.92)	(-3.63)	(-4.03)	(-4.18)
Polynomial Order	1	2	3	1	2	3
Kernel	Triangular	Triangular	Triangular	Triangular	Triangular	Triangular
Bandwidth	IK	IK	IK	IK	IK	IK
Range of Vote Margin	[-0.136, 0.1360]	[-0.1874, 0.1874]	[-0.1712, 0.1712]	[-0.1112, 0.1112]	[-0.122, 0.1220]	[-0.1456, 0.1456]
Effective Observations: Left	582	759	698	476	529	620
Effective Observations: Right	303	371	345	259	283	311
Observations	1,923	1,923	1,923	1,923	1,923	1,923

Panel B: Estimating treatment bounds accounting for vote manipulation

	(1)	(2)	(3)	(4)
	IV_SKEW_{t+1}		$NMFIS_{t+1}$	
Treatment bounds	[-0.0125, -0.0124]	[-0.0096, -0.0096]	[-0.1933, -0.1928]	[-0.2594, -0.2594]
90% CI on bounds	[-0.0200, -0.0053]	[-0.0224, -0.0011]	[-0.2764, -0.1134]	[-0.4679, -0.1651]
Polynomial Order	1	2	1	2
Kernel	Triangular	Triangular	Triangular	Triangular
Observations	2,360	2,360	2,360	2,360

Table 5
Internal Governance: Board Governance

This table presents the results of subsample tests based on board governance. Board corporate governance is measured as the rate of co-opted directors who are appointed after the CEO assumed office (Coles, Daniel, and Naveen (2014)). Cases are grouped into Low (High) group for firms with characteristics lower (higher) than the median value. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively. The z-statistics are shown in the parentheses.

Panel A: High rate of co-opted directors

	IV_SKEW_{t+1}			$NMFIS_{t+1}$		
Dependent Variable=	(1)	(2)	(3)	(4)	(5)	(6)
Pass	-0.0095***	-0.0111**	-0.0144**	-0.1789***	-0.2246***	-0.2331***
	(-2.60)	(-2.43)	(-2.56)	(-3.46)	(-3.29)	(-3.27)
Polynomial Order	1	2	3	1	2	3
Kernel	Triangular	Triangular	Triangular	Triangular	Triangular	Triangular
Vote Range	[-0.1170, 0.1170]	[-0.1613, 0.1613]	[-0.1696, 0.1696]	[-0.1375, 0.1375]	[-0.1468, 0.1468]	[-0.238, 0.2380]
Effective Observations: Left	320	426	434	377	404	581
Effective Observations: Right	173	216	219	195	201	275
Observations	1,223	1,223	1,223	1,223	1,223	1,223

Panel B: Low rate of co-opted directors

	IV_SKEW_{t+1}			$NMFIS_{t+1}$		
Dependent Variable=	(1)	(2)	(3)	(4)	(5)	(6)
Pass	-0.0081**	-0.0095**	-0.0105*	-0.0669	-0.0634	-0.1665**
	(-2.50)	(-2.14)	(-1.92)	(-1.37)	(-1.11)	(-2.21)
Polynomial Order	1	2	3	1	2	3
Kernel	Triangular	Triangular	Triangular	Triangular	Triangular	Triangular
Vote Range	[-0.1306, 0.1306]	[-0.1567, 0.1567]	[-0.1908, 0.1908]	[-0.1343, 0.1343]	[-0.1929, 0.1929]	[-0.1431, 0.1431]
Effective Observations: Left	280	322	395	286	396	300
Effective Observations: Right	196	219	246	197	246	205
Observations	1,137	1,137	1,137	1,137	1,137	1,137

Table 6
Internal Governance: Managerial Incentives

This table presents the results of subsample tests based on risk-taking incentives. Panels A and B report results of subsample analysis based on managerial risk-taking incentives, which is measured as executive-average *Vega* defined as prior works (e.g., Core and Guay (2002), Coles, Daniel, and Naveen (2006)). Information on managerial compensation comes from Execucomp database. Cases are grouped into Low (High) group for firms with characteristics lower (higher) than the median value. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively. The z-statistics are shown in the parentheses.

Panel A: High managerial risk-taking incentives

	IV_SKEW_{t+1}			$NMFIS_{t+1}$		
Dependent Variable=	(1)	(2)	(3)	(4)	(5)	(6)
Pass	-0.0125***	-0.0140***	-0.0150***	-0.1721***	-0.2326***	-0.2497***
	(-3.80)	(-3.38)	(-3.06)	(-3.39)	(-3.31)	(-3.17)
Polynomial Order	1	2	3	1	2	3
Kernel	Triangular	Triangular	Triangular	Triangular	Triangular	Triangular
Vote Range	[-0.1102, 0.1102]	[-0.1524, 0.1524]	[-0.1968, 0.1968]	[-0.1249, 0.1249]	[-0.1313, 0.1313]	[-0.1773, 0.1773]
Effective Observations: Left	318	438	543	360	383	488
Effective Observations: Right	163	206	230	181	192	220
Observations	1,267	1,267	1,267	1,267	1,267	1,267

Panel B: Low managerial risk-taking incentives

	IV_SKEW_{t+1}			$NMFIS_{t+1}$		
Dependent Variable=	(1)	(2)	(3)	(4)	(5)	(6)
Pass	-0.0055	-0.0052	-0.0076	-0.0864	-0.0838	-0.1114
	(-1.43)	(-1.09)	(-1.21)	(-1.55)	(-1.26)	(-1.48)
Polynomial Order	1	2	3	1	2	3
Kernel	Triangular	Triangular	Triangular	Triangular	Triangular	Triangular
Vote Range	[-0.1247, 0.1247]	[-0.1827, 0.1827]	[-0.1785, 0.1785]	[-0.1304, 0.1304]	[-0.1558, 0.1558]	[-0.1949, 0.1949]
Effective Observations: Left	243	340	330	257	296	356
Effective Observations: Right	186	251	245	197	223	261
Observations	1,093	1,093	1,093	1,093	1,093	1,093

Table 7
Internal Governance: Shareholder Governance

This table presents the results of subsample tests based on shareholder governance. Panels A and B report results of subsample analysis based on institutional blockholder ownership. Blockholders are defined as 13F investors holding over 5% of firms' shares outstanding. Panels C and D report results of subsample analysis based on the breadth of block ownership. Blockholder holding data come from Thomson Reuters Institutional (13F) Holdings database. Cases are grouped into Low (High) group for firms with characteristics lower (higher) than the median value. Panels E and F report results of subsample analysis based on whether the firm experienced shareholder activism events in the past 3 years before the proposal voting. Activism events, defined as the submission of Schedule 13D filings, are collected from Audit Analytics Shareholder Activism database. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively. The z-statistics are shown in the parentheses.

Panel A: High blockholder ownership

	IV_SKEW_{t+1}			$NMFIS_{t+1}$		
Dependent Variable=	(1)	(2)	(3)	(4)	(5)	(6)
Pass	-0.0058	-0.0053	-0.0056	-0.0830	-0.0901	-0.0974
	(-1.61)	(-1.30)	(-1.10)	(-1.49)	(-1.36)	(-1.35)
Polynomial Order	1	2	3	1	2	3
Kernel	Triangular	Triangular	Triangular	Triangular	Triangular	Triangular
Vote Range	[-0.101, 0.1010]	[-0.1646, 0.1646]	[-0.1805, 0.1805]	[-0.1317, 0.1317]	[-0.1693, 0.1693]	[-0.2297, 0.2297]
Effective Observations: Left	274	431	472	353	438	583
Effective Observations: Right	137	202	214	175	203	243
Observations	1,180	1,180	1,180	1,180	1,180	1,180

Panel B: Low blockholder ownership

	IV_SKEW_{t+1}			$NMFIS_{t+1}$		
Dependent Variable=	(1)	(2)	(3)	(4)	(5)	(6)
Pass	-0.0138***	-0.0202***	-0.0208***	-0.1611***	-0.2188***	-0.2398***
	(-3.49)	(-3.46)	(-3.51)	(-3.50)	(-3.27)	(-2.85)
Polynomial Order	1	2	3	1	2	3
Kernel	Triangular	Triangular	Triangular	Triangular	Triangular	Triangular
Vote Range	[-0.1144, 0.1144]	[-0.1213, 0.1213]	[-0.2092, 0.2092]	[-0.1647, 0.1647]	[-0.1414, 0.1414]	[-0.158, 0.1580]
Effective Observations: Left	248	265	407	333	306	325
Effective Observations: Right	187	202	284	241	225	237
Observations	1,180	1,180	1,180	1,180	1,180	1,180

Panel C: High breadth of block ownership

Dependent Variable=	IV_SKEW_{t+1} (1)	(2)	(3)	$NMFIS_{t+1}$ (4)	(5)	(6)
Pass	-0.0088**	-0.0095*	-0.0109	0.0244	-0.0909	-0.1738*
	(-1.99)	(-1.74)	(-1.49)	(0.37)	(-1.11)	(-1.79)
Polynomial Order	1	2	3	1	2	3
Kernel	Triangular	Triangular	Triangular	Triangular	Triangular	Triangular
Vote Range	[-0.1251, 0.1251]	[-0.1798, 0.1798]	[-0.1773, 0.1773]	[-0.121, 0.1210]	[-0.1217, 0.1217]	[-0.1349, 0.1349]
Effective Observations: Left	204	296	291	201	202	222
Effective Observations: Right	124	157	157	123	123	134
Observations	831	831	831	831	831	831

Panel D: Low breadth of block ownership

Dependent Variable=	IV_SKEW_{t+1} (1)	(2)	(3)	$NMFIS_{t+1}$ (4)	(5)	(6)
Pass	-0.0088***	-0.0118***	-0.0126***	-0.1990***	-0.2175***	-0.2242***
	(-3.01)	(-2.78)	(-2.78)	(-4.82)	(-4.49)	(-3.67)
Polynomial Order	1	2	3	1	2	3
Kernel	Triangular	Triangular	Triangular	Triangular	Triangular	Triangular
Vote Range	[-0.1263, 0.1263]	[-0.1283, 0.1283]	[-0.1961, 0.1961]	[-0.1509, 0.1509]	[-0.208, 0.2080]	[-0.2126, 0.2126]
Effective Observations: Left	404	408	578	471	606	621
Effective Observations: Right	244	246	326	279	339	343
Observations	1,529	1,529	1,529	1,529	1,529	1,529

Panel E: Experience shareholder activism events in the past 3 years

	IV_SKEW_{t+1}			$NMFIS_{t+1}$		
Dependent Variable=	(1)	(2)	(3)	(4)	(5)	(6)
Pass	0.0038	0.0041	-0.0057	-0.0064	-0.2865	-0.3003
	(0.44)	(0.36)	(-0.58)	(-0.04)	(-1.43)	(-1.46)
Polynomial Order	1	2	3	1	2	3
Kernel	Triangular	Triangular	Triangular	Triangular	Triangular	Triangular
Vote Range	[-0.1524, 0.1524]	[-0.2045, 0.2045]	[-0.1793, 0.1793]	[-0.1766, 0.1766]	[-0.1443, 0.1443]	[-0.1965, 0.1965]
Effective Observations: Left	17	24	21	21	17	23
Effective Observations: Right	24	32	28	28	22	31
Observations	105	105	105	105	105	105

Panel F: Not experience shareholder activism events in the past 3 years

	IV_SKEW_{t+1}			$NMFIS_{t+1}$		
Dependent Variable=	(1)	(2)	(3)	(4)	(5)	(6)
Pass	-0.0093***	-0.0105***	-0.0117***	-0.1298***	-0.1541***	-0.1788***
	(-3.53)	(-3.21)	(-3.00)	(-3.40)	(-3.22)	(-3.15)
Polynomial Order	1	2	3	1	2	3
Kernel	Triangular	Triangular	Triangular	Triangular	Triangular	Triangular
Vote Range	[-0.1106, 0.1106]	[-0.1533, 0.1533]	[-0.1847, 0.1847]	[-0.1366, 0.1366]	[-0.1483, 0.1483]	[-0.1682, 0.1682]
Effective Observations: Left	526	718	840	647	703	753
Effective Observations: Right	319	405	447	372	387	421
Observations	2,255	2,255	2,255	2,255	2,255	2,255

Table 8
External Governance: Stock Market Discipline and Market of Corporate Control

This table presents the results of subsample tests based on external governance mechanisms, including stock market discipline and market of corporate control. Panels A and B show the results of subsample analysis based on short-selling exposure measured as short interest ratio. The short interest ratio is calculated as the short interest divided by the share outstanding. Panels C and D present the results of subsample tests based on treats from the market of corporate control measured as firms' takeover risk. The takeover risk is measured according to Cremers, Nair, and John (2009) and He and Tian (2013). Cases are grouped into Low (High) group for firms with characteristics lower (higher) than the median value. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively. The z-statistics are shown in the parentheses.

Panel A: High short-selling exposure

	IV_SKEW_{t+1}			$NMFIS_{t+1}$		
Dependent Variable=	(1)	(2)	(3)	(4)	(5)	(6)
Pass	-0.0066**	-0.0090**	-0.0104*	-0.0820*	-0.1039	-0.1334*
	(-2.10)	(-1.97)	(-1.91)	(-1.71)	(-1.60)	(-1.78)
Polynomial Order	1	2	3	1	2	3
Kernel	Triangular	Triangular	Triangular	Triangular	Triangular	Triangular
Vote Range	[-0.1576, 0.1576]	[-0.1635, 0.1635]	[-0.194, 0.1940]	[-0.1449, 0.1449]	[-0.1471, 0.1471]	[-0.1659, 0.1659]
Effective Observations: Left	325	334	403	305	312	338
Effective Observations: Right	228	237	265	211	213	240
Observations	1,180	1,180	1,180	1,180	1,180	1,180

Panel B: Low short-selling exposure

	IV_SKEW_{t+1}			$NMFIS_{t+1}$		
Dependent Variable=	(1)	(2)	(3)	(4)	(5)	(6)
Pass	-0.0111***	-0.0124**	-0.0141**	-0.1685***	-0.2167***	-0.2900***
	(-2.84)	(-2.57)	(-2.43)	(-3.11)	(-3.01)	(-3.03)
Polynomial Order	1	2	3	1	2	3
Kernel	Triangular	Triangular	Triangular	Triangular	Triangular	Triangular
Vote Range	[-0.0979, 0.0979]	[-0.1425, 0.1425]	[-0.1648, 0.1648]	[-0.1472, 0.1472]	[-0.1537, 0.1537]	[-0.1539, 0.1539]
Effective Observations: Left	268	393	430	406	413	413
Effective Observations: Right	143	194	205	195	202	202
Observations	1,180	1,180	1,180	1,180	1,180	1,180

Panel C: High takeover risk

Dependent Variable=	IV_SKEW_{t+1} (1)	(2)	(3)	$NMFIS_{t+1}$ (4)	(5)	(6)
Pass	-0.0079**	-0.0080**	-0.0104*	-0.1231***	-0.1206**	-0.1355*
	(-2.29)	(-2.19)	(-1.88)	(-3.01)	(-2.11)	(-1.82)
Polynomial Order	1	2	3	1	2	3
Kernel	Triangular	Triangular	Triangular	Triangular	Triangular	Triangular
Vote Range	[-0.106, 0.1060]	[-0.2065, 0.2065]	[-0.174, 0.1740]	[-0.1687, 0.1687]	[-0.1759, 0.1759]	[-0.1692, 0.1692]
Effective Observations: Left	295	509	448	440	450	441
Effective Observations: Right	173	286	255	250	259	251
Observations	1,289	1,289	1,289	1,289	1,289	1,289

Panel D: Low takeover risk

Dependent Variable=	IV_SKEW_{t+1} (1)	(2)	(3)	$NMFIS_{t+1}$ (4)	(5)	(6)
Pass	-0.0097***	-0.0126**	-0.0120**	-0.1548**	-0.2351***	-0.2544***
	(-2.91)	(-2.54)	(-2.28)	(-2.44)	(-2.99)	(-3.11)
Polynomial Order	1	2	3	1	2	3
Kernel	Triangular	Triangular	Triangular	Triangular	Triangular	Triangular
Vote Range	[-0.1592, 0.1592]	[-0.1428, 0.1428]	[-0.2189, 0.2189]	[-0.1118, 0.1118]	[-0.1246, 0.1246]	[-0.193, 0.1930]
Effective Observations: Left	324	299	453	235	260	404
Effective Observations: Right	192	177	230	149	161	213
Observations	1,071	1,071	1,071	1,071	1,071	1,071

Table 9
Firm Performance

This table presents the results of subsample tests based on firm performance. Panels A and B show the results of subsample analysis based on firm profitability. Profitability is measured as a firm's quarterly return of assets (*ROA*). Panels C and D show the results of subsample analysis based on firms' quarterly total sales scaled by total assets. Cases are grouped into Low (High) group for firms with characteristics lower (higher) than the median value. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively. The z-statistics are shown in the parentheses.

Panel A: High profitability

	IV_SKEW_{t+1}			$NMFIS_{t+1}$		
Dependent Variable=	(1)	(2)	(3)	(4)	(5)	(6)
Pass	-0.0063**	-0.0062	-0.0063	-0.1317***	-0.1317**	-0.1845**
	(-2.19)	(-1.60)	(-1.19)	(-2.85)	(-2.27)	(-2.45)
Polynomial Order	1	2	3	1	2	3
Kernel	Triangular	Triangular	Triangular	Triangular	Triangular	Triangular
Vote Range	[-0.1717, 0.1717]	[-0.194, 0.1940]	[-0.1685, 0.1685]	[-0.179, 0.1790]	[-0.2075, 0.2075]	[-0.1738, 0.1738]
Effective Observations: Left	406	449	396	416	476	410
Effective Observations: Right	230	247	226	238	261	233
Observations	1,180	1,180	1,180	1,180	1,180	1,180

Panel B: Low profitability

	IV_SKEW_{t+1}			$NMFIS_{t+1}$		
Dependent Variable=	(1)	(2)	(3)	(4)	(5)	(6)
Pass	-0.0150***	-0.0180***	-0.0167***	-0.1372**	-0.1868**	-0.2099**
	(-3.40)	(-3.30)	(-3.13)	(-2.47)	(-2.51)	(-2.54)
Polynomial Order	1	2	3	1	2	3
Kernel	Triangular	Triangular	Triangular	Triangular	Triangular	Triangular
Vote Range	[-0.0815, 0.0815]	[-0.1156, 0.1156]	[-0.2164, 0.2164]	[-0.1188, 0.1188]	[-0.1271, 0.1271]	[-0.1779, 0.1779]
Effective Observations: Left	190	272	484	278	298	403
Effective Observations: Right	117	159	258	162	178	227
Observations	1,180	1,180	1,180	1,180	1,180	1,180

Panel C: High total sales

Dependent Variable=	IV_SKEW_{t+1} (1)	(2)	(3)	$NMFIS_{t+1}$ (4)	(5)	(6)
Pass	-0.0060	-0.0063	-0.0059	-0.1203**	-0.1079*	-0.1390
	(-1.57)	(-1.54)	(-0.98)	(-2.41)	(-1.73)	(-1.63)
Polynomial Order	1	2	3	1	2	3
Kernel	Triangular	Triangular	Triangular	Triangular	Triangular	Triangular
Vote Range	[-0.1132, 0.1132]	[-0.2082, 0.2082]	[-0.1813, 0.1813]	[-0.1824, 0.1824]	[-0.2146, 0.2146]	[-0.1692, 0.1692]
Effective Observations: Left	277	464	416	419	479	386
Effective Observations: Right	192	291	269	269	294	255
Observations	1,199	1,199	1,199	1,199	1,199	1,199

Panel D: Low total sales

Dependent Variable=	IV_SKEW_{t+1} (1)	(2)	(3)	$NMFIS_{t+1}$ (4)	(5)	(6)
Pass	-0.0114***	-0.0155***	-0.0161***	-0.1765***	-0.2138***	-0.2426***
	(-3.51)	(-3.44)	(-3.19)	(-3.13)	(-3.21)	(-3.36)
Polynomial Order	1	2	3	1	2	3
Kernel	Triangular	Triangular	Triangular	Triangular	Triangular	Triangular
Vote Range	[-0.1358, 0.1358]	[-0.1442, 0.1442]	[-0.2082, 0.2082]	[-0.0947, 0.0947]	[-0.1316, 0.1316]	[-0.186, 0.1860]
Effective Observations: Left	323	347	480	230	318	437
Effective Observations: Right	172	175	224	128	171	209
Observations	1,161	1,161	1,161	1,161	1,161	1,161

Table 10
Information Transparency

This table presents the results of subsample tests based on information transparency. Three transparency measures from different sources (analyst dispersion, earnings volatility, and market liquidity) are used in this analysis. Panels A and B show the results of subsample analysis based on analyst dispersion. Analyst dispersion is measured as the standard deviation of individual analysts' earnings forecasts scaled by the stock price at the end of the fiscal year. Panels C and D show the results of subsample analysis based on earnings volatility. Earnings volatility is measured as the standard deviation of the ROAs in the past 5 years. Panels E and F show the results of subsample analysis based on stock market liquidity. Stock market liquidity is measured as the negative value of the bid-ask spread. Cases are grouped into Low (High) group for firms with characteristics lower (higher) than the median value. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively. The z-statistics are shown in the parentheses.

Panel A: High analyst dispersion

	IV_SKEW_{t+1}			$NMFIS_{t+1}$		
Dependent Variable=	(1)	(2)	(3)	(4)	(5)	(6)
Pass	-0.0064*	-0.0072	-0.0080	-0.0553	-0.1110*	-0.1368*
	(-1.67)	(-1.40)	(-1.33)	(-1.17)	(-1.71)	(-1.85)
Polynomial Order	1	2	3	1	2	3
Kernel	Triangular	Triangular	Triangular	Triangular	Triangular	Triangular
Vote Range	[-0.1253, 0.1253]	[-0.1464, 0.1464]	[-0.1849, 0.1849]	[-0.1404, 0.1404]	[-0.1333, 0.1333]	[-0.1708, 0.1708]
Effective Observations: Left	278	327	408	313	293	365
Effective Observations: Right	194	212	250	211	206	242
Observations	1,180	1,180	1,180	1,180	1,180	1,180

Panel B: Low analyst dispersion

	IV_SKEW_{t+1}			$NMFIS_{t+1}$		
Dependent Variable=	(1)	(2)	(3)	(4)	(5)	(6)
Pass	-0.0131***	-0.0142***	-0.0178***	-0.2158***	-0.2203***	-0.2584***
	(-3.84)	(-3.73)	(-3.46)	(-3.77)	(-3.59)	(-3.22)
Polynomial Order	1	2	3	1	2	3
Kernel	Triangular	Triangular	Triangular	Triangular	Triangular	Triangular
Vote Range	[-0.0977, 0.0977]	[-0.1729, 0.1729]	[-0.164, 0.1640]	[-0.1153, 0.1153]	[-0.2151, 0.2151]	[-0.1752, 0.1752]
Effective Observations: Left	258	431	412	302	508	436
Effective Observations: Right	140	214	207	160	249	216
Observations	1,180	1,180	1,180	1,180	1,180	1,180

Panel C: High earnings volatility

Dependent Variable=	IV_SKEW_{t+1} (1)	(2)	(3)	$NMFIS_{t+1}$ (4)	(5)	(6)
Pass	-0.0046	-0.0037	-0.0063	-0.0858*	-0.0828	-0.1149
	(-1.32)	(-0.89)	(-1.15)	(-1.76)	(-1.49)	(-1.52)
Polynomial Order	1	2	3	1	2	3
Kernel	Triangular	Triangular	Triangular	Triangular	Triangular	Triangular
Vote Range	[-0.1214, 0.1214]	[-0.1822, 0.1822]	[-0.1883, 0.1883]	[-0.1446, 0.1446]	[-0.2206, 0.2206]	[-0.1706, 0.1706]
Effective Observations: Left	292	405	421	341	483	379
Effective Observations: Right	205	265	270	226	289	253
Observations	1,184	1,184	1,184	1,184	1,184	1,184

Panel D: Low earnings volatility

Dependent Variable=	IV_SKEW_{t+1} (1)	(2)	(3)	$NMFIS_{t+1}$ (4)	(5)	(6)
Pass	-0.0150***	-0.0179***	-0.0187***	-0.1727***	-0.2254***	-0.2582***
	(-4.16)	(-3.84)	(-3.50)	(-2.94)	(-3.00)	(-2.97)
Polynomial Order	1	2	3	1	2	3
Kernel	Triangular	Triangular	Triangular	Triangular	Triangular	Triangular
Vote Range	[-0.1047, 0.1047]	[-0.1356, 0.1356]	[-0.1811, 0.1811]	[-0.1212, 0.1212]	[-0.1456, 0.1456]	[-0.177, 0.1770]
Effective Observations: Left	258	338	441	304	360	422
Effective Observations: Right	139	172	209	158	180	207
Observations	1,176	1,176	1,176	1,176	1,176	1,176

Panel E: High liquidity

Dependent Variable=	*IV_SKEW*$_{t+1}$ (1)	(2)	(3)	*NMFIS* $_{t+1}$ (4)	(5)	(6)
Pass	-0.0109***	-0.0151***	-0.0184***	-0.2496***	-0.3372***	-0.3759***
	(-3.41)	(-3.48)	(-3.61)	(-4.33)	(-4.89)	(-4.91)
Polynomial Order	1	2	3	1	2	3
Kernel	Triangular	Triangular	Triangular	Triangular	Triangular	Triangular
Vote Range	[-0.1298, 0.1298]	[-0.1467, 0.1467]	[-0.1754, 0.1754]	[-0.1094, 0.1094]	[-0.1259, 0.1259]	[-0.1589, 0.1589]
Effective Observations: Left	359	408	464	297	350	429
Effective Observations: Right	162	173	191	136	158	180
Observations	1,180	1,180	1,180	1,180	1,180	1,180

Panel F: Low liquidity

Dependent Variable=	*IV_SKEW*$_{t+1}$ (1)	(2)	(3)	*NMFIS* $_{t+1}$ (4)	(5)	(6)
Pass	-0.0071*	-0.0074	-0.0066	-0.0304	-0.0112	0.0036
	(-1.93)	(-1.52)	(-1.10)	(-0.65)	(-0.21)	(0.05)
Polynomial Order	1	2	3	1	2	3
Kernel	Triangular	Triangular	Triangular	Triangular	Triangular	Triangular
Vote Range	[-0.1268, 0.1268]	[-0.1609, 0.1609]	[-0.1829, 0.1829]	[-0.1326, 0.1326]	[-0.1924, 0.1924]	[-0.1699, 0.1699]
Effective Observations: Left	257	321	371	275	393	329
Effective Observations: Right	210	258	277	222	287	263
Observations	1,180	1,180	1,180	1,180	1,180	1,180

Table 11
Specific Types of Proposals

This table reports the effect of shareholder voting in specific types of governance-related shareholder proposals. The shareholder proposals are categorized as shown in Appendix Table A2. Panels A-C show the impact of passing entrenchment-related, shareholder-related, and compensation-related shareholder proposals, respectively. A proposal is entrenchment-related if it aims to remove anti-takeover provisions, enhance board independence, and reform voting rules to restrict executive power. A proposal is grouped into shareholder-related proposals if it focuses on firms' dividend payout or stock repurchase. A proposal is identified as compensation-related if it discusses managerial and director compensation. The rest of governance proposals are identified as other proposals. Appendix Table A2 provides the distribution of proposals by types. The model specification is the same as in Table 2. The model specification is the same as Table 2. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively. The z-statistics are shown in the parentheses.

Panel A: Entrenchment-related proposals

Dependent Variable	(1)	(2)	(3)	(4)	(5)	(6)
		IV_SKEW_{t+1}			$NMFIS_{t+1}$	
Pass	-0.0092***	-0.0093***	-0.0103**	-0.1525***	-0.1652***	-0.2012***
	(-2.72)	(-2.58)	(-2.09)	(-3.34)	(-3.08)	(-3.02)
Polynomial Order	1	2	3	1	2	3
Kernel	Triangular	Triangular	Triangular	Triangular	Triangular	Triangular
Bandwidth	IK	IK	IK	IK	IK	IK
Range of Vote Margin	[-0.1145, 0.1145]	[-0.2193, 0.2193]	[-0.1969, 0.1969]	[-0.1515, 0.1515]	[-0.2196, 0.2196]	[-0.1822, 0.1822]
Effective Observations: Left	338	584	542	429	584	509
Effective Observations: Right	242	392	366	307	392	351
Observations	1,498	1,498	1,498	1,498	1,498	1,498

Panel B: Shareholder-related proposals

Dependent Variable	(1)	(2)	(3)	(4)	(5)	(6)
		IV_SKEW_{t+1}			$NMFIS_{t+1}$	
Pass	-0.0197***	-0.0248***	-0.0292***	-0.3062**	-0.3281*	-0.3933*
	(-3.55)	(-4.12)	(-4.54)	(-2.18)	(-1.93)	(-1.90)
Polynomial Order	1	2	3	1	2	3
Kernel	Triangular	Triangular	Triangular	Triangular	Triangular	Triangular
Bandwidth	IK	IK	IK	IK	IK	IK
Range of Vote Margin	[-0.0616, 0.0616]	[-0.0761, 0.0761]	[-0.093, 0.0930]	[-0.067, 0.0670]	[-0.0922, 0.0922]	[-0.1032, 0.1032]
Effective Observations: Left	41	53	64	46	64	74
Effective Observations: Right	24	27	28	25	28	28
Observations	166	166	166	166	166	166

Panel C: Compensation-related proposals

Dependent Variable	(1)	(2)	(3)	(4)	(5)	(6)
		IV_SKEW_{t+1}			$NMFIS_{t+1}$	
Pass	-0.0110	-0.0143	-0.0123	0.0078	-0.0203	-0.0922
	(-1.27)	(-1.13)	(-0.98)	(0.09)	(-0.18)	(-0.63)
Polynomial Order	1	2	3	1	2	3
Kernel	Triangular	Triangular	Triangular	Triangular	Triangular	Triangular
Bandwidth	IK	IK	IK	IK	IK	IK
Range of Vote Margin	[-0.136, 0.1360]	[-0.1874, 0.1874]	[-0.1712, 0.1712]	[-0.1112, 0.1112]	[-0.122, 0.1220]	[-0.1456, 0.1456]
Effective Observations: Left	80	110	194	73	111	117
Effective Observations: Right	45	51	66	45	53	53
Observations	528	528	528	528	528	528

Table 12
External Validity: Global Regression Discontinuity Design

This table reports the results in the regression discontinuity design.

$$OptVar_{i,t+1} = \beta Pass_{it} + \sum_{j=1}^{P} \gamma_j^{Left} (v_{it} - v^*)^j + \sum_{j=1}^{P} \gamma_j^{Right} (v_{it} - v^*)^j Pass_{it} + \gamma Controls_{it} + Year\ FE + Industry\ FE + \varepsilon_{it}$$

where *Pass* is an indicator that equals one if the vote margin (*v*-*v**) for a shareholder proposal is higher than 0, where *v* and *v** denote the voting rate and threshold. The model is estimated by regression models with polynomial orders of 1, 2, and 3. Year and industry fixed effects are included in the regression models. Industries are classified by Fama-French 12 Classification (Fama and French (1997)). Control variables are shown in Table 1. Panels A shows the results of global parametric RDD for *IV_SKEW*. Panels C shows the results of global parametric RDD for *NMFIS*. Standard errors are adjusted for heteroskedasticity and clustered by firm. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively. Standard errors are shown in the parentheses.

Panel A: Global regression discontinuity design (*IV_SKEW*)

	(1)	(2)	(3)	(4)	(5)	(6)
Variables			Dependent Variable=IV_SKEW_{t+1}			
Pass	-0.0034**	-0.0046***	-0.0041***	-0.0048***	-0.0052***	-0.0063***
	(0.0014)	(0.0014)	(0.0014)	(0.0014)	(0.0016)	(0.0016)
Constant	0.0451***	0.1203***	0.0449***	0.1199***	0.0456***	0.1215***
	(0.0008)	(0.0131)	(0.0008)	(0.0131)	(0.0010)	(0.0131)
Controls	No	Yes	No	Yes	No	Yes
Bandwidth	Global	Global	Global	Global	Global	Global
Poly. Order	1	1	2	2	3	3
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	2,360	2,360	2,360	2,360	2,360	2,360
R-squared	0.2180	0.2672	0.2189	0.2672	0.2194	0.2681

Panel B: Global regression discontinuity design (*NMFIS*)

Variables	(1)	(2)	(3)	(4)	(5)	(6)
	Dependent Variable= $NMFIS_{t+1}$					
Pass	-0.0564***	-0.0494***	-0.0531***	-0.0489***	-0.0607***	-0.0524**
	(0.0185)	(0.0175)	(0.0189)	(0.0180)	(0.0224)	(0.0210)
Constant	0.5866***	0.2278	0.5876***	0.2289	0.5921***	0.2326
	(0.0115)	(0.1764)	(0.0119)	(0.1773)	(0.0139)	(0.1768)
Controls	No	Yes	No	Yes	No	Yes
Bandwidth	Global	Global	Global	Global	Global	Global
Poly. Order	1	1	2	2	3	3
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	2,360	2,360	2,360	2,360	2,360	2,360
R-squared	0.2740	0.3288	0.2741	0.3288	0.2743	0.3288

Appendix

Table A1
Definitions of Variables

Variable	Definition	Source
Implied volatility skew (*IV_SKEW*)	Implied volatility skew measured as the difference between implied volatility of out-of-the-money (OTM) put option and implied volatility of at-the-money (ATM) call option, where OTM put options are defined as put options with moneyness (stock price/strike price) between 0.80 and 0.95 and ATM call options are defined as call options with moneyness between 0.95 and 1.05. For stock with multiple option contracts, we calculate the weighted average of the implied volatility for the options by option open interest. Finally, we average the daily implied volatility skew over the quarter.	IvyDB OptionMetrics
Negative model-free implied skewness (*NMFIS*)	The negative value of model-free implied skewness proposed by Bakshi, Kapadia, and Madan (2003).	IvyDB OptionMetrics
Market value (*MVE*)	The logarithm of market equity (*#PRCC_FQ* × *#CSHOQ*).	CRSP
Book-to-market ratio (*BM*)	The ratio of book value (*#ATQ*) to market value, where market value is defined as total assets (*#ATQ*) minus common equity (*#CEQQ*) and deferred taxes (*#TXDBQ*) plus the market equity (*#PRCC_FQ* × *#CSHOQ*).	COMPUSTAT/CRSP
Leverage (*LEV*)	Long-term debt (*#DLTTQ*) and debt in current liabilities (*#DLCQ*) scaled by total assets (*#ATQ*).	COMPUSTAT
Investment (*INV*)	The sum of annual change in gross property, plant, and equipment (*#PPEGTQ*) + annual change in inventories (*#INVTQ*) scaled by lagged total assets (*#ATQ*).	COMPUSTAT
Tangibility (*TANG*)	Tangibility measured according to Almeida and Campello (2007): Cash holdings (*#CHEQ*)+Receivables (*#RECTQ*)*0.715+ Inventory (*#INVTQ*)*0.547+Net property, plant, and equipment (*#PPENTQ*)*0.535)/(*#ATQ*).	COMPUSTAT
Return of assets (*ROA*)	Return of assets measured as operating income before depreciation (*#OIBDPQ*) scaled by the book value of total assets (*#ATQ*).	COMPUSTAT
Stock market return (*RET*)	Monthly stock return of the firm in the last month.	CRSP

Stock market volatility (*SIGMA*)	Monthly stock volatility of the firm in the last month.	CRSP
Analyst dispersion (*DISP*)	Standard deviation of analyst forecasts in month prior to the proposal voting divided by the absolute value of the mean forecast. *DISP* is set to zero if the mean forecast is 0.	I\B\E\S
Analyst coverage (*NAN*)	The logarithm of one plus the number of analysts following the firm in the latest quarter.	I\B\E\S
Institutional ownership (*INSTO*)	Percentage of shares held by institutional investors who are defined as 13F investors.	Thomson Reuters Institutional (13f) Holdings
Rate of co-opted directors	The percentage of directors appointed after CEO assumed office (Coles, Daniel, and Naveen (2014)).	BoardEx
Managerial risk-taking incentives	Executive average *Vega* calculated as Coles, Daniel, and Naveen (2006) and Core and Guay (2002).	Execucomp
Blockholder ownership	Percentage of shares held by blockholders who are defined as 13F investors holding over 5% of firms' shares outstanding.	Thomson Reuters Institutional (13f) Holdings
Breadth of block ownership	Number of blockholders who are defined as 13F investors holding over 5% of firms' shares outstanding.	Thomson Reuters Institutional (13f) Holdings
Short interest ratio	Short interest divided by the share outstanding.	COMPUSTAT/CRSP
Stock market liquidity	Negative value of bid-ask spread.	CRSP
Shareholder activism (indicator)	An indicator that equals one if the firm has at least one shareholder activism event in the year. Shareholder activism is defined as the submission of SC 13D filings.	Audit Analytics Shareholder Activism
Takeover risk	Takeover risk measured as Cremers, Nair, and John (2009) and He and Tian (2013).	COMPUSTAT/SDC
Total sales	Firms' quarterly sales (*#SALEQ*) scaled by total assets (*#ATQ*).	COMPUSTAT

Table A2
Distribution of Governance-Related Shareholder Proposals across Types

This table shows the distribution of governance-related shareholder proposals across types. Following prior works (e.g., Cuñat, Gine, and Guadalupe (2012), Lin, Wei, and Xie (2020)), I categorized the proposals into entrenchment-related, compensation-related, shareholder-related, and other proposals. The shareholder proposals included in this sample must meet the following requirements: (1) The proposal has the maximal voting rate in the quarter; (2) Basic financial and market data are not missing in the quarter of the proposal; (3) Implied volatility skew data in the future quarter are available. Following prior works, implied volatility skew is trimmed at 1% and 99% levels. Finally, the sample contains 2,593 observations during 1997-2018.

Resolution Type		Number of Proposals
Entrenchment Related		
Antitakeover		599
Board		499
Voting		440
	Entrenchment Related Total	**1,685**
Compensation Related		**528**
Shareholder Related		**166**
Others		
Audit		14
Employee		20
Transparency		27
Others		107
	Others Total	**184**
Total		**2,360**

Table A3
Additional Tests on the Role of Information Transparency

This table presents the results of additional tests on the role of information transparency. Panels A and B show the results of subsample analysis based on readability of firms' MD&A in 10-K filings. Dale-Chall readability score is used to measure readability. Cases are grouped into Low (High) group for firms with characteristics lower (higher) than the median value. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively. The z-statistics are shown in the parentheses.

Panel A: High readability

	IV_SKEW$_{t+1}$			*NMFIS* $_{t+1}$		
Dependent Variable=	(1)	(2)	(3)	(4)	(5)	(6)
Pass	-0.0118***	-0.0132***	-0.0148***	-0.1680***	-0.1831***	-0.2186***
	(-3.70)	(-3.33)	(-2.96)	(-4.05)	(-3.48)	(-3.42)
Polynomial Order	1	2	3	1	2	3
Kernel	Triangular	Triangular	Triangular	Triangular	Triangular	Triangular
Vote Range	[-0.1168, 0.1168]	[-0.164, 0.1640]	[-0.1752, 0.1752]	[-0.1769, 0.1769]	[-0.1796, 0.1796]	[-0.1635, 0.1635]
Effective Observations: Left	383	517	552	554	560	517
Effective Observations: Right	235	305	318	320	320	305
Observations	1,596	1,596	1,596	1,596	1,596	1,596

Panel B: Low readability

	IV_SKEW$_{t+1}$			*NMFIS* $_{t+1}$		
Dependent Variable=	(1)	(2)	(3)	(4)	(5)	(6)
Pass	-0.0024	-0.0033	-0.0029	-0.0358	-0.0750	-0.1181
	(-0.63)	(-0.65)	(-0.53)	(-0.52)	(-0.83)	(-1.11)
Polynomial Order	1	2	3	1	2	3
Kernel	Triangular	Triangular	Triangular	Triangular	Triangular	Triangular
Vote Range	[-0.1315, 0.1315]	[-0.1635, 0.1635]	[-0.2347, 0.2347]	[-0.1274, 0.1274]	[-0.1523, 0.1523]	[-0.1914, 0.1914]
Effective Observations: Left	204	246	338	194	235	283
Effective Observations: Right	121	136	182	119	129	155
Observations	764	764	764	764	764	764