

Does Shareholder Litigation Risk Cause Public Firms to Delist? Evidence from Securities Class Action Lawsuits

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ABSTRACT

The number of listed firms in the U.S. has fallen by half since the late 1990s. Our paper examines whether and to what extent the costs of shareholder litigation have contributed to this trend. We find that higher litigation threat induce firms to delist from stock exchanges. The effect remains robust to controlling for the endogeneity problem between litigation risk and delisting probability. The litigation effect exacerbates for firms with severe information asymmetry and lightens for firms with high capital requirements. We also show that reduced litigation threat, triggered by the Ninth Circuit Ruling event does not prompt excessive managerial engagement of earning management. Instead, we observe a positive stock price reaction to the event for firms with high institutional ownership. Taken together, our findings suggest that the pressure imposed by shareholder litigation may partially explain for the recent fading attractiveness of the US public stock market.

Keywords: Shareholder litigation, Securities class action lawsuit, Stock market listing, Delisting.

JEL Classification: D04, D22, G30, K22

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*“The solution to the competitive problem of U.S. capital markets lies, on the one hand,
in reducing the burden of litigation”
Zingales (2006)*

1. Introduction

Stock market plays a pivotal role in promoting economic development. It fosters capital formation, provides liquidity to investors and ensures efficient allocation of resources among market participants (Levine, 1991). It also serves as an economic powerhouse and barometer for the health of the whole economy at large. Moreover, the thriving growth of the stock market influences the competitiveness of the US economy and defines the global economic leadership of the U.S (Zingales, 2006). However, the number of publicly-traded firms in the U.S. has systematically declined since the turn of the 21st century. In the mid-1990s, more than 8,000 companies were listed on a U.S. stock exchange; by 2016, the total had dropped by over 50 percent to just 3,627 firms (Dojidge, Karolyi, and Stulz, 2017). This recent shrinkage of the stock market has garnered considerable attention from policymakers, media, and academics to identify potential obstacles of public firms in the stock market.¹

In this paper, we contribute to this effort by investigating whether the costs associated with shareholder litigation can explain for this trend. While shareholder litigation is an important governance mechanism to discipline managers and mitigate agency problems in corporations (La Porta *et al.*, 1998), it can impose significant costs on firms. The Chamber Report (2017) estimates the direct costs to settle each frivolous shareholder lawsuit to be around \$12 million, wasting nearly 1% of an average firm’s total assets. Even though part of these costs can be financially covered by Directors and officers (D&O) liability insurance,² a frivolous lawsuit

¹ ‘The Stock Market Is Shrinking. That’s a Problem for Everyone’, *The New York Times*, 4 August 2018.

² Directors and officers (D&O) in most of large listed companies are protected by liability insurance to cover legal settlement costs. However, D&O insurance cannot cover misconducts due to dishonesty or intentional fraud commission (Ferris et al. 2007). In addition, even if firm’s managers do not need to personally pay the settlement fees, they will still face consequences of reputation damages in the labor market (Fich and Shivdasani 2007).

can drain corporate resources, distract managers' attention, and harms the company's reputation and public image (Cumming, Haslem, and Knill, 2017; Lin, Liu, and Manso, 2019). Specifically, shareholders may become less tolerant of failure and abuse their option to litigate, where 'a strike suit can be filed within days or even hours of a company's announcement of adverse news' (Seligman, 1994, p. 442). This puts enormous pressure on managers and undermines their ability to manage the company effectively. Litigation threat may also constrain managers from experimenting with new ideas and investing in long-term projects that potentially maximise shareholder value (Lin *et al.*, 2019; Romano, 1991).

Therefore, we hypothesise that the burdens of shareholder litigation heighten listing costs of public firms and can make public corporations an inefficient form of organisation, consequently motivating firms to delist. A case in point is Tesla, Inc., which is renowned for producing electric vehicles. As a public firm, Tesla receives constant attention from investors and general public. Given such levels of scrutiny, even a small production failure could attract widespread criticisms from investors and result in a lawsuit. For instance, in 2013, the Tesla Model S experienced multiple battery fires, which caused a drop in Tesla's share prices and immediately triggered many lawsuits against Tesla's management. The threat of shareholder lawsuit, according to CEO Elon Musk, is 'a major distraction for everyone working at Tesla' and 'puts enormous pressure on Tesla to make decisions that may be right for a given quarter, but not necessarily right for the long-term'. Consequently, Musk expressed his intention to take Tesla private so that he could effectively manage the firm.³

Using the sample of 72,825 firm year observations with 3,951 lawsuits for the period from 1996 to 2016, we find that firms are more likely to delist after experiencing a security class action (SCA) suit. In our tightest model, a litigation event is associated with an approximately

³ See: <https://www.cnbc.com/2018/08/07/why-elon-musk-wants-tesla-to-go-private.html>.

2.8% increase in delisting probability. This effect is economically substantial. For comparison, a firm doubling in size is found to be 1.3% less likely to delist. All regression specifications control for important factors that could affect a firm's delisting likelihood, including firm size, age, profitability, growth opportunities, and asset tangibility. We also incorporate industry-year fixed effects which controls for the impact of industry competition (Kahle and Stulz, 2017), merger waves (Cartwright and Cooper, 1990; Doidge *et al.*, 2017), venture capital financing cycles (Ljungqvist *et al.*, 2018) on a firm's delisting rate.

Additionally, the litigation effect remains quantitatively unchanged using various estimation models including probit and Cox hazard models, and under alternative subsamples that exclude extreme events such as IT bubble in 2001 and financial crisis in 2008. Our baseline effect remains robust when we take into account only voluntary delistings or differentiate between dismissed and settled litigation suits.

When undertaking a benefit and cost analysis in firm's delisting choice, we show that the litigation effect weakens for firms with intense external capital requirements and strengthens for firms with high information opacity problems. While enhanced capital access is the primary advantage for firms in the stock market, information asymmetry arising from the segregation between ownership and control exacerbates the agency problems of public firms. The results suggest that firms take into account the cost of litigation threat in tandem with capital access benefits and potential agency costs in their delisting choice.

One important concern of our main finding is that litigation suits can signal on-going underperformance problems of defendant firms. Poorly performing firms could be susceptible to higher risk of shareholder litigation and concurrently more likely to delist. We address this important concerns by adopting the ruling on Silicon Graphics case from the Ninth Circuit Court of Appeals on July 7, 1999 as a natural experiment to establish the causal link between

litigation threat and delisting propensity. The ruling in 1999 significantly tightened the pleading standards to initiate a securities class action lawsuit, thereby mitigating litigation risks for firms locating in Ninth Circuit area.⁴ We show that this decision resulted in a 30% drop in the number class action suits in the Ninth Circuit area. Our result remains robust to this alternative specification. The stringent pleading standards for initiating a SCA suit in Ninth Circuit area reduce the delisting propensity by 2%.

Next, we show that lower litigation threat, attributed to the Ninth Circuit ruling, does not induce stronger managerial incentives to manage earnings, including the intensity of using discretionary accruals, abnormal discretionary expenses or the number of accounting misconducts.

Finally, we evaluate the stock market reaction to the event of the Ninth Circuit Ruling on July 7, 1999. While the litigation system can be served as an important mechanism for shareholder to resolve any governance dispute, it can also be exploited as a mean for frivolous rent extraction. Given the controversial merits of the securities class action litigation system, how investors react to the Ninth Circuit ruling is not empirically evident.

We conjecture that the stock market reaction would be positive for firms with high institutional holdings. Since institutional investors can resort to alternative ways to voice their opinions, or credibly threaten to exist to influence corporate governance, they would welcome the ruling that minimize the frequency of meritless lawsuits. In contrast, non-institutional investors would value litigation rights as their sole and powerful mean to discipline management, they, therefore, may not view the event favourably.

⁴ Cox et al. (2009) show that 85% of the securities fraud class actions are filed in the home circuit of the defendant firm. They also report that the circuits' pleading standards do not affect plaintiffs' choice of court venue.

Consistent with our prediction, we show that stock market reacts positively for firms in Ninth Circuit area with high institutional ownership. Whereas we do not observe statistical significant difference between Ninth Circuit and other areas for firms with low institutional holdings. The result on differential effects of investors towards the event underscores the challenge of SCA legal system on balancing potential benefits and costs of SCA lawsuits on public firms.

Our paper makes two primary contributions. First, we contribute to the literature on the impact of the U.S. class action litigation system on the stock market. Zingales (2006) argues that the class action litigation system in the U.S. leads to a loss of competitiveness of U.S. public equity markets. Spiess and Tkac (1997) and Johnson, Kasznik, and Nelson (2000) show that upon the enactment of Private Securities Litigation Reform Act (PSLRA), firms that are prone to meritless class action lawsuits increase market values. Romano (1991), and Gande and Lewis (2009) examine share price reaction to SCA suits. We extend this stream of research by investigating the link between securities litigation risk and firm's delisting choice, contributing to the understanding of how legal environments can shape a firm's decision to remain listed in public capital market.

Second, we contribute on the emerging strand of studies identifying the explanations for the shrinkage of the U.S. stock market (Doidge, Kahle, Karolyi and Stulz, 2018). Doidge, Karolyi and Stulz (2017) report an increasing trend of US firms' delisting and the reason is due to the decreasing net benefit of a listing for U.S. firms. Prior studies argue that the decision to delist is influenced by the trade-off between the costs and benefits for relevant economic parties (Cumming *et al.*, 2018; Kim and Weisbach, 2008; Pagano, Panetta, and Zingales, 1998). Leuz, Triantis and Wang (2008) show that the enactment of Sarbanes-Oxley Act enable firms going dark to protect private control benefits and decrease outside scrutiny.

Taken together, our paper highlights that the legal rules governing the U.S. public market plays an important role on the competitiveness of public markets. Our findings suggest that excessive costs from legal system can potentially deteriorate the attractiveness of stock market on U.S. firms. Seeking a proper balance between the benefits of the mechanism of protecting shareholder rights and its potential costs on public firms' operation would be crucial to foster the thriving growth of the stock market.

2. Literature review and institutional background

2.1 Corporate delistings

The literature on why firms go public focuses on the associated benefits and costs. Being a public corporation has many economic benefits, including better access to finance (Saunders and Steffen, 2011), lower cost of capital (Hail and Leuz, 2006), less information asymmetry with other market participants (Easley, Hvidkjaer, and O'Hara, 2002), higher liquidity, and a larger investor base (Merton, 1987; Riahi-Belkaoui and Pavlik, 1991).

However, there are also several costs of being public. For instance, public firms must comply with strict reporting and disclosure requirements. Compliance costs, such as the fees for hiring and retaining outside auditors, directors, and lawyers, can be substantial for many firms (Pagano *et al.*, 1998; Ritter, 1987). Engel, Hayes, and Wang (2007) find that the frequency of firms going private increases after the passage of SOX, suggesting that the enactment of the Sarbanes-Oxley Act (SOX) increases compliance costs. Furthermore, changes in a firm's competitive environment could increase the proprietary costs of disclosing valuable information to competitors (Campbell, 1979; Healy and Palepu, 2001). Alternatively, as investment projects become more complex and ambiguous, information asymmetry between shareholders and managers aggravates, actuating more litigation suits against management.

Given this cost-benefit trade-off, why a public firm delists remains an open question. This question is also economically relevant, as delisting explains up to 46% of the recent drop in listed firms in the U.S. (Doidge *et al.*, 2017). Djama, Martinez, and Serve (2014) contend that a firm will consider delisting when the benefits (costs) of being public decrease (increase) to a point where the listing costs exceed its benefits.

Our study focuses on the costs associated with shareholder litigation and examines whether and to what extent these costs explain a firm's propensity to delist. Shareholder litigation is a governance device to discipline managers and mitigate agency problems in corporations (La Porta *et al.*, 1998). Specifically, shareholders are entitled to file a lawsuit against the firm's managers and directors if they believe them to be engaging in behaviour that harms the firm. However, a large proportion of shareholder lawsuits tend to be frivolous (Katz, 1990; Kempf and Spalt, 2019). Thus, shareholder litigation could impose significant direct costs (the legal expenses to settle a lawsuit) and indirect costs (the resulting pressure on managers to meet shareholders' expectations and thus avoid lawsuits). We, therefore, hypothesise that the burdens of shareholder litigation can make public corporations an inefficient form of organisation and motivate firms to delist.

Hypothesis: The costs associated with shareholder litigation incentivise firms to delist.

2.2 Shareholder class action suits and related legislative reforms

In December 1995, Congress enacted the Private Securities Litigation Reform Act (PSLRA) as an effort to protect corporations from abusive, frivolous securities litigation. However, the pleading standard of the law was interpreted differently by various US circuit courts. The Ninth Circuit's interpretation in the Silicon Graphics case on July 2, 1999 is the most stringent. In order to allege facts, plaintiffs are required to establish evidence that the defendants acted with "deliberately recklessness". The ruling disproportionately affected firms located in the Ninth

Circuit (including (Alaska, Washington, Oregon, Idaho, Montana, California, Nevada, Arizona, and Hawaii) more than other firms.⁵

The Ninth Circuit ruling is plausibly exogenous to affected firms' delisting propensity. As discussed Crane and Koch (2016), the Ninth Circuit ruling was determined by judges that have life-long appointment and hence do not face re-election risk. Their decisions are formed based on their own views of legislation, precedent and the constitution, and importantly less likely on the standpoints of stock market participants such as owners, managers, or other stakeholders in their circuit.⁶ Second, Johnson et al. (2000) report evidence that following the ruling, high-technology firms locating in the Ninth Circuit enjoyed a positive and statistically significant announcement return, suggesting that the ruling was unexpected. Therefore, the 1999 Ninth Circuit Court ruling offers a plausibly exogenous experiment to evaluate the effect of litigation risk on delisting propensity.

3. Data, variables, and empirical model

3.1 Data

Our primary sample comprises U.S.-incorporated public firms in the CRSP-Compustat database between 1996 and 2016. We begin from the year of 1996 based on the year of data availability of securities class action suits. We exclude financial (SIC 4900-4999), utility (SIC 6000-6999), and unclassified firms (SIC 9900-9999) from the sample. All continuous variables are winsorised at the 1st and 99th percentile. The final sample comprises 72,825 firm-year observations.

⁵ Even though SCA litigation can be filed in any of the federal circuit courts because shareholders are often geographically dispersed, Cox et al. (2009) show that 85% of the securities fraud class actions are filed in the home circuit of the defendant firm. They also report that the circuits' pleading standards do not affect plaintiffs' choice of court venue.

⁶ See Crane and Koch (2016) for detailed discussion.

Data of SCA lawsuit filings is obtained from the Stanford Securities Class Action Clearinghouse (SCAC) database. The SCAC covers all securities class action lawsuits filed in federal courts in the United States since the enactment of the Private Securities Litigation Reform Act (PSLRA), starting in 1996. The database provides filing dates for each lawsuit and all related court filings.

Panel A of Table 1 displays the yearly distribution of shareholder class action suits and litigation rate in our sample. On average, the litigation rate is 4.13%. The litigation rate declined from 6.65% in 2001 to 2.88% in 2008 and picked up again to 9.49% in 2016.

Panel B of Table 2 shows the distribution of SCA litigations across one-digit SIC industries. Agriculture, Forestry and Fishing industry has the lowest litigation rate of 0.99% while Manufacturing, Retail Trade and Services are among the three industries with the highest rate of 4.16%, 1.23% and 5.57%, respectively.

Insert Table 1 here

We obtain delisting information from CRSP. Following Doidge *et al.* (2017), we consider a firm to delist in the year when it deregisters and is dropped from CRSP. Historical data on firm's headquarter and incorporation states are extracted from firms' 10-K reports in the Securities and Exchange Commission's EDGAR database and available from Bill McDonald's website.⁷

Panel A of Table 2 reports the number of delisting registrations, the total number of listed firms, and the annual delisting rate for our sample firms between 1996 and 2016. Consistent with Doidge *et al.* (2017), Panel A shows that the number of public firms increased steadily

⁷ These are available on Bill McDonald's website: <https://sraf.nd.edu/data/augmented-10-x-header-data/>. We cannot use Compustat's state of incorporation variable as it only contains information on a firm's current state of incorporation.

from 1996 and peaked in 2000, then declining to the year 2013. The delisting rate fluctuated significantly over the study period, with significant increases during the Internet bubble (1998-2001) and at the onset of the financial crisis (2006-2007). The increase in delistings during these periods could be driven by weak firm performance that could prompt firms to fail listing requirements of the firm's stock exchange.

Panel B of Table 2 shows the distribution of delisting registrations across one-digit SIC industries. Overall, there is reasonable representation across all industry groups. Service industry has the highest average delisting rate of 9.76%, while Mining industry has the lowest rate of 5.43%. This significant gap can reflect the fact that Service industry has lower entrance cost than do its counterparts in Mining industry and therefore exists at a higher rate. To capture this potential reason for delisting across industries, we include asset tangibility as one of our control variable in our empirical analysis.

Insert Table 2 here

Our sample of non-security lawsuits obtained from Audit Analytics spans from 1996 to 2016 and consists of 4,396 firm-year observations (firms that were sued at least once in a given fiscal year). The most common types of corporate lawsuits are product liability, copyright, patent, antitrust, and trade regulation lawsuits. Audit Analytics collects information from corporate disclosures, corporate newswires, and from legal 10 disclosures, registrations and legal opinions filed with the SEC. Audit Analytics reports details related to the specific litigation, including the type of lawsuits, the original date of filing, and if available, the settlement amount.

3.2 Empirical model

To estimate the effect of SCA suits on delisting likelihood, we employ the following estimation model:

$$y_{ijt} = \alpha + \beta \times DSCA_{it-1} + \delta_{jt} + \gamma_t + \pi_{it} + \varepsilon_{ijt} \quad (1)$$

where i indexes firms, j indexes industries and t indexes years. The dependent variable y_{it} is a dummy variable that equals 1 if firm i delists in year t , and 0 otherwise. $DSCA_{it-1}$ is an indicator variable that equals 1 when firm i experiences a SCA suit in year $t-1$. δ_{jt} represents industry-year fixed effects and γ_t represents year fixed effects. The industry is based on Fama and French's (1997) 49-industry classification. The vector π_{it} includes time-varying firm characteristics that could affect delisting propensity.

The main coefficient of interest is β . We hypothesize that β is positive, reflecting that firms are more likely to delist after experiencing SCA suits. Despite the binary nature of the dependent variable, we estimate our specifications using ordinary least squares (OLS): because we have a large number of fixed effects along several dimensions, using maximum likelihood estimators such as logit or probit could produce an incidental parameters problem (Lancaster, 2000; Neyman and Scott, 1948). Incorporating flexible controls, our OLS specification allows us to consistently estimate coefficients, even with multiple fixed effects (Dinardo and Johnston, 1996). We obtain similar results using a probit or Cox duration model.

Our tightest specification includes both year fixed effects (γ_t) and industry-year fixed effects (δ_{jt}). These fixed effects respectively absorb all variables that do not vary within a given year and a given industry and year, such as industry-wide investment opportunities, economy-wide business cycles. The inclusion of industry-year fixed effects controls for industry competition (Kahle and Stulz, 2017), merger waves (Cartwright and Cooper, 1990; Doidge *et al.*, 2017), venture capital financing cycles (Ljungqvist *et al.*, 2018), which could affect a firm's delisting probability. Thus, our estimates compare changes in delisting

propensity between firms before and after SCA suits while controlling for any unobserved heterogeneity that varies across industries and years over time.

We include several covariates known to affect a firm's delisting propensity (c.f., Doidge *et al.*, 2017; Leuz, Triantis, and Wang, 2008; Pour and Lasfer, 2013). To account for the fact that young firms are more likely to delist if they cannot achieve the anticipated potentials as a public company, we include firm age, measured as the natural logarithm of the number of years since the firm's IPO (Mehran and Peristiani, 2011) or the earliest year of the firm's financial data in Compustat database.

We use $\ln(\text{Assets})$ to control for firm size and the *Market-to-book* ratio to control for a firm's growth opportunities. The effects of firm size and growth on delisting likelihood are unclear *ex ante*. On the one hand, large and high-growth firms tend to receive more attention from investors, and thus face higher litigation risk (Kim and Skinner, 2002). Therefore, the costs of staying public could be higher for these firms, which could incentivise delisting. On the other hand, small and low-growth firms could be more likely to delist as they are less able to utilise the liquidity advantage of public markets relative to private markets (Bolton and von Thadden, 1998; Doidge *et al.*, 2017; Mehran and Peristiani, 2011).

We use *Leverage* (total debt divided by total assets) and *Cashflow volatility* (five-year rolling standard deviation of operating income before depreciation divided by total assets) to control for firm risk, as financial distress may prompt firms to delist. In addition, we control for *Asset tangibility*, measured as property, plant, and equipment (PPE) divided by total assets. This accounts for the fact that investors tend to mischaracterise firms that undertake complex and ambiguous investment projects, which may disincentivise these firms from staying public. In addition, it can control for the gap of delisting rates between Mining and Service industries, as discussed above. Industries with high entrance costs (proxied by high level of asset

tangibility) has lower delisting rate. Finally, we control for a firm's profitability (*ROA*) since performance is one of the most important listing requirements of a firm's stock exchange.

3.3 Summary statistics

Table 3 reports the summary statistics of all key variables. The average delisting rate is 7.3%, which is largely similar to those reported by Doidge *et al.* (2017). On average, firms size (log of total assets) is 5.8, a leverage ratio of 22.1%, asset tangibility (PPE over total assets) of 26.9%, and a market-to-book ratio of 2.01. These statistics are comparable to the data reported in earlier studies.

Insert Table 3 here

4. Shareholder class action lawsuits and delisting propensity

4.1 Baseline results

We begin by examining the effect of the SCA suits on the corporate delisting rate. All *t-statistics* are computed based on robust standard errors clustered at industry level. The results are reported in Table 4. Model specifications vary across columns in terms of the included set of fixed effects and control variables. We start with a basic model including only industry-year and year fixed effects (Column (1)). In Column (2), we only include time-varying firm-level control variables. From Column (3) to (5), we include control variables and alternatively add industry-year, year and both fixed effects, respectively. In Panel A, we use an indicator, *DSCA*, equal one a firm experiences a shareholder class action suit in the prior year, and zero otherwise. In Panel B, the variable of interest, *NSCA*, is the number of shareholder class action suits that a firm experiences in the prior year.

We find that following litigation events, firms are more likely to delist from stock exchange. Across all specifications in the Table, the coefficients on *DSCA* and *NSCA* are positive and statistically significant well below the 1% level. The effect is also economically large. For

example, in the model including the full set of fixed effects (Column (5)), a litigation event is associated with an approximately 2.8% increase in delisting probability. This effect is large in magnitude in comparison to other included covariates. For instance, a 100% increase in firm size is associated with a reduction of 1.35% in delisting probability.

Our findings hold under different sets of fixed effects. The full set of fixed effects in Column (5) includes both industry-year and year fixed effects, which control for time-varying heterogeneity across different industry-years and years such as economy-wide cycles or the movement of venture capital or merger waves in an industry. Furthermore, the magnitude of the coefficient estimates on *DSCA* remains highly stable as we progressively introduce more fixed effects into the model. This implies that omitted variables at the industry level or aggregate business cycles are unlikely to threaten our inferences.

The coefficients on all the control variables have the expected signs. Firms that are smaller, less profitable, higher leverage ratio are more likely to delist (Leuz *et al.*, 2008; Mehran and Peristiani, 2011). Overall, the results suggest that, when firms are more likely to be sued by shareholders through SCA lawsuits, they become more incentivised to delist from the stock market.

Insert Table 4 here

4.2 Other robustness tests

In Table 5, we conduct other robustness checks to rule out alternative explanations. In Panel A, instead of using OLS estimation approach, we estimate a duration and probit model, respectively. In Columns (1) and (2), the dependent variable is the hazard ratio for the Cox regression ($_t$), the probability that a firm will delist in the next unit of time. The advantage of using survival models is that they could account for both event occurrence and the time to event (Fama and French, 2004; Jain and Kini, 2000; Hensler *et al.*, 1997). Furthermore, survival

approach is useful to examine censored data and time-series data with different time horizons (LeClere, 2000; Shumway, 2001). In Column (1), we do not include year and industry-year fixed effects. In Column (2), we instead incorporate the variables of industry sale growth rate and Real GDP growth rate to control for industry's business conditions and economy-wide effects. Consistent with the OLS estimate, the hazard ratio is significantly and positively related to delisting propensity. Thus, the probability of delisting elevates following SCA lawsuits.

In Column (3) and (4), we alternatively employ a probit model instead of OLS. In Column (3), we do not include year and industry-year fixed effects. In Column (4), we instead incorporate the variables of industry sale growth rate and Real GDP growth rate to control for industry's business conditions and economy-wide effects. The coefficient of *DSCA* remains robust to this alternative model specification.

In Panel B, we are concerned about the potential confounding effect of the financial crisis and the bursting of IT bubble periods. During these crisis periods, we can easily observe the correlation between litigation likelihood and delisting rates. Our baseline model addresses this by incorporating the year and industry-year fixed effects. In Panel B, we alternatively examine whether the results are robust to the exclusion of these periods. In Column (1), we restrict our sample to the period before the crisis in 2007. In column (2), we remove years 2001 and 2002 with IT crisis. In column (3), we remove the recent crisis period from 2007-2009. In column (4), we remove both the IT and financial crisis. As shown in Panel B, we find consistent positive coefficient of *DSCA* on delisting rate, indicating the positive relationship between litigation involvement and the propensity of firms deregister from stock market.

Insert Table 5 here

In conclusion, regardless of the approach we use to estimate litigation risk, our results consistently show a significant positive relation between litigation threat and firm delisting choices.

4.3 Forced vs. voluntary delisting

Firms can choose to delist voluntarily when they perceive listing costs outweigh benefits of being a public firm or when they decide to be acquired by another firm. Being a stand-alone public firm can be too costly than being affiliated with other corporation. Second, a firm can be forced to delist by the exchange because it fails to satisfy listing requirements such as profitability or market capitalization.

We expect that if litigation threats, rather than worsening business performance or outlook, are the main reason to explain for firm's delisting, we should observe a stronger effect on voluntary rather than forced delistings. To conduct this test, we restrict our sample into voluntary and forced delists. The results are reported in Table 6.

We obtain delisting codes from CRSP. We classify voluntary delisting when CRSP delist code is either within the codes from 200 to 299, or the codes of 570 or 573. In Fama and French (2004) and Doidge, Karolyi and Stultz (2016), these codes are categorized as delist for causes and delist due to mergers. Forced delists include codes from 300 and above and exclude codes of 570 or 573.

In column (1) and (3), we only include the observations of voluntary delisting. In column (2) and (4), we include the observations of forced delisting. As we can observe, the magnitude of the effect of DSCA and NSCA on voluntary delisting are almost four times larger than the one in forced delisting. If firms get delisted due to poor performance problems, our control variables including returns on assets, leverage and cash flow volatility or even industry-year fixed effects should capture the majority of this influence. As expected, the litigation suits,

representing undue pressures of firms from litigation, have stronger explanatory power, in terms of magnitude and statistical significance for choices of voluntary delisting than forced decisions. The evidence offers further support on the detrimental impact of excessive litigation suits on firm decision to remain in stock market.

Insert Table 6 here

4.4 Quality of SCA suits

In this section, we evaluate how the quality of SCA suits affect firm's delisting choice. SCA suits, in essence, are served as legal mean for shareholders to deter managerial wrongdoing. However, in fact, meritless cases are documented to be highly prevalent. The widespread propagation of frivolous cases motivated the passage of the Private Securities Litigation Reform Act (PSLRA) in 1995 and has again triggered the continuing effort to enact Lawsuit Abuse Reduction Act (LARA) of 2017. Meritless cases drain corporate resources, burden managers with unnecessary pressures, and waste their time in a long-lasting legal dispute. We expect that the effect of these ungrounded suits would exert a stronger influence that induce firms delist from the stock market.

We use the case status whether it is dismissed or settled as a proxy for case merit. This classification is based on an assumption that a judge is more likely to dismiss a case when it is likely meritless or of low quality. This approach to use dismissal as proxy for cases without merit is frequently adopted in prior literature such as Deng, Willis and Xu (2014) or Kempf and Spalt (2019). We report the results on Table 7.

In Columns (1) and (3), we consider the effects of dismissed SCA. We take into account the settled cases in Column (2) and (4). We report the results for the SCA indicator and number of respective cases in Columns (1) and (2); and (3) and (4), respectively. As expected, the

coefficients of dismissed cases are larger in magnitude and statistical significance. The intensity of frivolous cases impose a stronger influence on firm's delisting choice.

Insert Table 7 here

5. Benefit and cost analysis

In this section, we undertake a benefit and cost analysis in firm's delisting choice.

5.1 Degree of capital requirements

A paramount advantage of public firms, as compared to private counterparts, is capital access. Since public firms are more transparent, relative to private firms, and the ownership of their stocks are easily transferable and its market is highly liquid, their access to equity financing, are greatly facilitated. As a result, the degree of capital requirement of a firm can moderate the effect of litigation threat from firm's delisting decision.

In Table 8, we augment our baseline specification with proxies for the degree of external equity dependence. We follow Duchin, Ozbas and Sensoy (2010) to construct a proxy for external equity dependence based on the ratio of net amount of equity issued to capital expenditures. Column (1) and (2) report the results in the absolute level and indicator of the equity capital requirement, respectively. The interaction effect between DSCA and *External equity dependence* at level or indicator are both negative and statistically significant. The finding indicates that the effect of litigation threats on delisting choices weakens for firms with high demand of capital investment. In this case, firms will trade-off the cost of litigation with the benefits of capital market. The coefficients of *External equity dependence* (both level and indicator) variables have expected signs. The coefficients are negative, suggesting that firms with high equity capital demand are less likely to delist from the stock market.

Insert Table 8 here

5.2 The impact of information asymmetry

One distinguishing feature of public firms, relative to private firms, is the segregation between ownership and control. This separation between two important functions help to mobilize idle capital from investors without management expertise and simultaneously offer talents without wealth opportunities to successfully run a business. This separation serves a catalyst for the rapid growth of capital markets. Nevertheless, one of the crucial impediment arisen from this segregation is the level of information asymmetry between shareholders and managers. This information opacity can exacerbate the agency costs of between shareholders and managers and consequently can discourage firms from being public.

To conduct this test, we additionally include an interaction effect of DSCA with proxies of a firm's information transparency, including number of ratings, number of analysts and number of analyst's estimates, and the proxy itself. The results are presented in Panel A of Table 9. The interaction effect of DSCA and proxies of firm's transparency is negative and statistically significant. It indicates that the effect of litigation suits is smaller for firms with high transparency. In other words, firms with information opacity problems are more likely delist following litigation threat. In this cases, associated costs of being a public firm heighten.

5.3 Sarbanes-Oxley Act

In Panel B, we consider another information-related costs – heightened disclosure costs following the enactment of Sarbanes-Oxley Act in 2002. SOX requires firms to fulfil a majority of independent board, fully independent audit and nomination committees, and obliges the CEO to personally sign-off on the firm's accounts. These changes significantly increase the listing costs and demands stronger information disclosures.

We add the interaction effect between our main variable of interest, DSCA, with SOX indicator and the SOX indicator itself. SOX is an indicator equal one for the years from 2002

onward. This indicator represents the level of disclosure costs for public firms (Leuz et al., 2007). Since SOX is a yearly variable, we exclude year fixed effects for our modified model.

As expected, the interaction effect between DSCA and SOX is positive, indicating that the higher disclosure costs elevates the total costs of public firms, together with litigation threat. The combination of these two costs elevates the likelihood of firms being delisted.

Insert Table 9 here

6. Ninth Circuit Ruling

6.1 The effect of the ruling on delisting propensity

Identifying the effect of shareholder litigation risk on a firm's delisting propensity faces classic endogeneity problems (Abdallah, Goergen, and O'Sullivan, 2015). For instance, underperforming firms could be concurrently more likely to delist and susceptible to higher risk of shareholder litigation. The main challenge that we need to show that firms deregister due to heightened litigation threats and not triggered by deteriorating performance or burdens of direct and indirect litigation costs arisen from litigation suits.

To address these potential endogeneity issues, in our baseline model, we sufficiently control for firm's profitability, financial leverage, cash flow volatility and all time-varying unobservable industry business conditions. Nevertheless, in this section, we continue to provide further analysis to account for this potential problem of omitted variables that can explain both the likelihood of litigation and delisting propensity.

In this section, we employ the event of Ninth Circuit Ruling in 1999 as a natural experiment to establish the causal link between litigation threat and delisting propensity. We restrict the sample period to 1996 to 2002, which includes the three years before and after the 1999 Ninth Circuit ruling. As discussed in section 2.2 above, the ruling in 1999 significantly tightened the pleading standards to initiate a securities law suit, thereby mitigate litigation risks for firms

locating in Ninth Circuit area. We conduct propensity score matching over a large set of control variables to construct a matched sample. In particular, we estimate the propensity of a delisting firm based on a set of covariates as in our baseline Table 4⁸ over the three years prior to the ruling period. We then match the treated and control firms based on the nearest propensity score with replacement. In an untabulated table, our treated and control firms are comparable in all of these pre-ruling characteristics. Based on this matched sample, we implement the following difference-in-differences model.

$$y_{ijt} = \alpha + \beta \times Ninth\ Circuit_i \times Post1999_t + Ninth\ Circuit_i + \delta_{jt} + \gamma_t + \pi_{it} + \varepsilon_{ijt}$$

Ninth Circuit_i differentiates the treatment and control firms, equal to one for firm located in the Ninth Circuit Court of Appeals including Alaska, Arizona, California, Hawaii, Idaho, Montana, Nevada, Oregon, and Washington. *Post1999_t* is the year dummy equal to one when the fiscal year is after 1999 and zero otherwise. We do not need to include *Post1999_t* as it is subsumed by the inclusion of year fixed effects.

The results of the analysis is reported in Table 10. We take into account all types of delists in columns (1) and (2). We consider voluntary (forced) delists in the pair of columns (3) and (4) ((5) and (6)). As we observe, the interaction effect of Ninth Circuit Ruling and Post 1999 indicators are negative and statistically significant in all specifications. Since the Ninth Circuit Ruling in 1999 significantly curtailed the number of SCA suits and lowered litigation risks, delisting rate for treated firms in Ninth Circuit area after the year 1999 is effectively reduced. The coefficient of *Ninth Circuit Ruling* is positive indicating that the delisting rate is higher for

⁸, The variables include firm size, leverage, market to book ratio, returns on assets, cash flow volatility, firm age and asset tangibility.

firms in this area. The result is consistent with the premise on disproportionately higher delisting rates for high-tech companies in California, a state in Ninth Circuit area.

In conclusion, our baseline result remains robust controlling for the endogeneity issue between litigation suits and delisting probability. Firms are more (less) likely to delist when litigation threat heightens (weakens).

Insert Table 10 here

In Table 11, we conduct a falsification test. We define placebo events in one and two years before the Ninth Circuit ruling year, 1999. The results show no significant effect on delisting rate for firms in Ninth Circuit area.

Insert Table 11 here

6.2 Probability of SCA suits

In this section, we conduct a formal test to examine the difference-in-differences effect of the ruling on the probability of SCA suits and the number of filing cases in the Ninth Circuit Court relative to the other courts of appeals. The result is presented in Table 12.

Panel A reports the estimates on a firm's propensity to experience a SCA suits at firm-level. In columns (1) and (2), we include all types of suits. In columns (3) and (4) ((5) and (6)), we take into accounting the propensity of dismissed (settled) suits. In addition to firm or year fixed effects, we include headquarter state fixed effects in even columns. Panel B present the estimates on the frequency of filing cases at state level, measured as the natural logarithm of one plus the number of SCA suits in a circuit-year. In all four specifications, the coefficient of the interaction term, *Ninth Circuit X Post 1999*, is significantly negative, indicating a relative decline in the propensity of SCA suits in the Ninth Circuit area versus the other circuit courts after the ruling. The result evidences the reduction of litigation threat for firms in Ninth Circuit area.

Insert Table 12 here

6.3 Effects on earning management

We continue to investigate if the reduction in litigation threat prompts managers to excessively engage in earning management activities. Following prior literature (e.g., Ali and Zhang, 2015), we take into account the degree of discretionary accruals, abnormal discretionary expenses and the number of accounting misconducts as proxies for earning management.

Discretionary accruals is estimated as the residual of the cross-sectional model of accrual in McNichols (2002) which combines the models of Jones (1991) and Dechow and Dichev (2002). The model predicts the degree of normal accruals based on cash flow from operations, revenue ratio and asset tangibility. The gap between this predicted value and actual accrual amount is attributed to management discretion. Abnormal discretionary expenses is estimated as the residual of the cross-sectional model of discretionary expense, proposed in Roychowdhury (2006). Discretionary expenses are defined as sum of R&D, advertising, and selling, general and administrative expenses. The model is a function of total assets and sale ratio. The two models are estimated at two-digit SIC industry-year group with at least ten observations.

In addition, we also take into account the propensity of a firm's accounting misstatements, reported in Accounting and Auditing Enforcement Releases (AAER) as instances of earnings management.

The results are presented in Table 13. Across three models, we observe that the interaction effect between Ninth Circuit X Post 1999 is indistinguishably different from zero. The finding indicates that there is no sufficient evidence that the mitigated litigation risks from the Ninth Circuit ruling induce managers to take advantage of lower threats to misstate their earnings.

The results appear plausible since the ruling just attenuates instead of entirely eliminating shareholder litigation threats.

Insert Table 13 here

6.4 Stock market reaction to the Ninth Circuit ruling

In this section, we examine the stock market reaction in response to the Ninth Circuit ruling on July 7, 1999. As discussed in the introduction, there is a heated debate on up and downsides of the SCA legal system. It can simultaneously be served as an important governance mechanism and frivolously abused for minority benefits. Given this controversy, the stock market reaction towards the Ninth Circuit ruling is empirically ambiguous.

We conjecture that the stock market reaction would be dependent on the degree of institutional holdings. Since institutional investors can utilize various effective ways to intervene and influence a firm's governance, they would highly value the ruling that heightens the standards to prevent meritless lawsuits. Whereas non-institutional investors are constrained with limited choices to raise their opinions and influence corporate governance, they may react negatively to the event.

We employ a standard event-study methodology, using the Fama-French three factor model to calculate cumulative abnormal returns (CAR). Our event date is July 7, 1999. The three factor parameters are estimated based on the period from 120 to 12 trading days before the event date. After estimating CARs for the event window of individual firms, we calculate equal-weighted average CARs of all stocks with high (low) institutional ownership and in the Ninth Circuit, and other areas. The results are reported in Table 14.

The results show that there is no significant difference in CARs between firms in Ninth Circuit and other areas for the groups of firms with low institutional ownership. In fact, the CARs of firms in other areas are slightly higher than the one in Ninth Circuit. In contrast, we

notice firms with high institutional holdings and locate in Ninth Circuit area experience a significant higher CARs than firms locating in other areas. The effect is relatively consistent for eight out of nine different event windows. The findings are consistent with our prediction that the stock price reaction in response to the event depends on the extent of institutional ownership. This differential effect highlights the nature of controversial views of shareholders on SCA legislation.

Insert Table 14 here

7. Conclusion

This paper empirically examined whether and to what extent the costs associated with shareholder litigation incentivise firms to delist from public markets. We found that firms become significantly more likely to delist following a SCA suit. This effect is statistically significant and economically meaningful. The litigation effect becomes stronger for firms subject to information opacity and weaker for firms with high capital requirements. The effect remains robust to controlling for endogeneity problem by employing the Ninth Circuit Ruling in 1999 as a natural experiment. The effect remains unchanged when we modify various regression models and apply to alternative subsample period of time.

We also show that there is no conclusive evidence that managers excessively engage in earning management to take advantage of reduced litigation threat from the Ninth Circuit ruling. In addition, firms with high institutional holdings experience a positive stock price reaction towards the events while firms with low institutional holdings do not.

Overall, our results suggest that frivolous shareholder litigation can exacerbate the shrinkage problem of the US stock market. Seeking for a balance approach between the governance benefits of litigation suits and potential costs of excessive litigation taxes on firm's outcomes would be desirable. The paper highlights potential implications of the current litigation system on the thriving operation of the US stock market.

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Table 1: Distribution of shareholder class action suits

Panel A reports the yearly frequency of shareholder class action suits and total number of public firms for the period from 1996 to 2016. Data of shareholder class action (SCA) suits is obtained from Securities Class Action Clearinghouse (SCAC). *Litigation rate* equals the number of suits divided by the total number of firms. Panel B reports the distribution of SCA suits across industry segments (1 digit-SIC). *Litigation rate* equals the number of SCA suits in an industry divided by the total number of firms in that industry.

Panel A: Shareholder class action suits over years

Year	Number of SCA litigations	No. of firms	Litigation rate
1996	123	6,362	1.93%
1997	173	6,527	2.65%
1998	187	6,246	2.99%
1999	181	5,946	3.04%
2000	360	5,816	6.19%
2001	348	5,234	6.65%
2002	195	4,835	4.03%
2003	197	4,502	4.38%
2004	186	4,470	4.16%
2005	149	4,373	3.41%
2006	130	4,298	3.02%
2007	126	4,180	3.01%
2008	114	3,959	2.88%
2009	124	3,747	3.31%
2010	133	3,676	3.62%
2011	118	3,586	3.29%
2012	147	3,536	4.16%
2013	169	3,587	4.71%
2014	197	3,716	5.30%
2015	260	3,681	7.06%
2016	343	3,614	9.49%
Total	3,951	95,664	4.13%

Panel B: Shareholder class action suits across industries

Sector	Number of litigations	Number of firms	Litigation rate
Agriculture, Forestry and Fishing	4	406	0.99%
Construction	36	1,325	2.72%
Manufacturing	1,984	47,713	4.16%
Mining	128	6,376	2.01%
Retail Trade	293	6,919	4.23%
Services	1,168	20,984	5.57%
Transportation & Communications	240	8,134	2.95%
Wholesale Trade	98	3,807	2.57%
Total	3,951	95,664	4.13%

Table 2: Distributions of delistings

Panel A reports the yearly frequency of delisting firms and total number of public firms. Data for delists come from CRSP for the period between 1996 and 2016. *Delisting rate* equals the number of delists divided by the total number of firms. Panel B reports the distribution of delists across industry segments (1 digit-SIC). *Delisting rate* equals the number of delists in an industry divided by the total number of firms in that industry.

Panel A: Number of delisting over years

Year	Number of delists	Number of firms	Delisting rate
1996	479	6,362	7.53%
1997	653	6,527	10.00%
1998	729	6,246	11.67%
1999	648	5,946	10.90%
2000	664	5,816	11.42%
2001	402	5,234	7.68%
2002	384	4,835	7.94%
2003	250	4,502	5.55%
2004	264	4,470	5.91%
2005	276	4,373	6.31%
2006	292	4,298	6.79%
2007	282	4,180	6.75%
2008	246	3,959	6.21%
2009	231	3,747	6.16%
2010	205	3,676	5.58%
2011	178	3,586	4.96%
2012	159	3,536	4.50%
2013	164	3,587	4.57%
2014	193	3,716	5.19%
2015	220	3,681	5.98%
2016	242	3,614	6.70%
Total	7,141	95,664	7.46%

Panel B: Industry distributions

Industry sector	Number of delists	Number of firms	Delisting rate
Agriculture, Forestry and Fishing	29	406	7.14%
Construction	72	1,325	5.43%
Manufacturing	3,167	47,713	6.64%
Mining	372	6,376	5.83%
Retail Trade	542	6,919	7.83%
Services	2,048	20,984	9.76%
Transportation & Communications	595	8,134	7.31%
Wholesale Trade	316	3,807	8.30%
Total	7,141	95,664	7.46%

Table 3: Summary statistics

The table presents the summary statistics of the main variables used in the study. The sample period is from 1996 to 2016. Financial, utility and unclassified firms are excluded. Definitions of all variables are included in Table A1. Continuous variables are winsorized at the 1% level. Non-ratio variables are reported in CPI-adjusted 2010 dollars.

	#Obs. (1)	Mean (2)	S.D. (3)	25 th percentile (4)	50 th percentile (5)	75 th percentile (6)
Firm characteristics						
Firm size	72825	5.813	2.174	4.195	5.728	7.341
Leverage	72825	0.221	0.219	0.014	0.179	0.349
Returns on assets	72825	0.039	0.247	0.016	0.101	0.161
Cash flow volatility	72825	0.093	0.113	0.029	0.054	0.105
Firm age	72825	17.947	13.612	8.000	13.000	24.000
Market to book ratio	72825	2.014	1.633	1.070	1.468	2.267
Asset tangibility	72825	0.269	0.241	0.078	0.188	0.399
Firm age (log)	72825	2.707	0.692	2.197	2.639	3.219
Cash flow volatility	72825	0.093	0.113	0.029	0.054	0.105
SCA suits						
DSCA	72825	0.038	0.191	0.000	0.000	0.000
NSCA	72825	0.039	0.196	0.000	0.000	0.000
Dismissed DSCA	71514	0.019	0.137	0.000	0.000	0.000
Settled DSCA	71453	0.018	0.134	0.000	0.000	0.000
Dismissed NSCA	72825	0.019	0.139	0.000	0.000	0.000
Settled NSCA	72825	0.018	0.135	0.000	0.000	0.000
Industry SCA suits	72825	1.965	1.163	1.099	1.946	2.890
Delisting						
Delist indicator	72825	0.073	0.260	0.000	0.000	0.000
Voluntary delist indicator	70727	0.046	0.209	0.000	0.000	0.000
Forced delist indicator	69592	0.030	0.171	0.000	0.000	0.000

Table 4: Effect of shareholder class action suits on firm delisting rate

This table reports the OLS results that estimate the effect of shareholder class action suits on a firm's propensity to delist for the period from 1996 to 2002. The dependent variable is *Delist*, a dummy variable that equals one when a firm deregisters from the stock exchange. In Panel A, *DSCA* is a dummy variable that equals one if a firm experiences a shareholder class action suit in the prior year, and zero otherwise. In Panel B, *NSCA* is the number of shareholder class action suits that a firm experiences in the prior year. Control variables are defined in Table A1. Standard errors are clustered by industry and are reported in parentheses. Significance at 1%, 5%, and 10% levels are indicated by ***, **, and * respectively.

Panel A: Shareholder class action suit indicator

	(1) FEs without controls	(2) No FE	(3) Industry-yr FE	(4) Year FE	(5) FEs with controls
DSCA	0.025*** (6.506)	0.028*** (5.999)	0.028*** (5.715)	0.030*** (5.925)	0.028*** (5.714)
Market to book ratio		-0.009*** (-9.058)	-0.009*** (-10.528)	-0.010*** (-11.324)	-0.009*** (-10.526)
Firm size		-0.015*** (-16.527)	-0.013*** (-15.414)	-0.014*** (-15.180)	-0.013*** (-15.412)
Leverage		0.126*** (15.577)	0.119*** (17.835)	0.120*** (16.065)	0.119*** (17.833)
Returns on Assets		-0.094*** (-3.431)	-0.114*** (-4.530)	-0.099*** (-3.700)	-0.114*** (-4.529)
Cash flow volatility		-0.037* (-2.001)	-0.021 (-1.595)	-0.026 (-1.443)	-0.021 (-1.595)
Firm age		-0.005** (-2.420)	0.002 (0.961)	-0.002 (-0.726)	0.002 (0.961)
Asset tangibility		-0.016 (-1.591)	-0.019** (-2.660)	-0.019* (-1.872)	-0.019** (-2.660)
Year FE	Yes	No	No	Yes	Yes
Industry-year FE	Yes	No	Yes	No	Yes
Observations	82968	72825	72825	72825	72825
Adjusted R ²	0.012	0.037	0.043	0.040	0.042

Panel B: Shareholder class action suit intensity

	(1) FEs without controls	(2) No FE	(3) Industry-yr FE	(4) Year FE	(5) FEs with controls
L.NSCA	0.025*** (7.051)	0.029*** (6.169)	0.029*** (5.648)	0.031*** (6.063)	0.029*** (5.647)
Market to book ratio		-0.009** (-9.042)	-0.009*** (-10.511)	-0.010*** (-11.308)	-0.009*** (-10.509)
Firm size		-0.015*** (-16.597)	-0.013*** (-15.508)	-0.014*** (-15.243)	-0.013*** (-15.506)
Leverage		0.126*** (15.576)	0.119*** (17.837)	0.120*** (16.062)	0.119*** (17.834)
Returns on Assets		-0.094*** (-3.429)	-0.114*** (-4.527)	-0.099*** (-3.697)	-0.114*** (-4.527)
Cash flow volatility		-0.037* (-2.005)	-0.021 (-1.599)	-0.026 (-1.447)	-0.021 (-1.599)
Firm age		-0.005** (-2.400)	0.002 (0.969)	-0.002 (-0.713)	0.002 (0.969)
Asset tangibility		-0.016 (-1.583)	-0.019** (-2.659)	-0.019* (-1.864)	-0.019** (-2.658)
Year FE	Yes	No	No	Yes	Yes
Industry-year FE	Yes	No	Yes	No	Yes
Observations	82968	72825	72825	72825	72825
Adjusted R ²	0.012	0.037	0.043	0.040	0.043

Table 5: Other robustness tests

This table reports the estimated effect of shareholder class action suits on a firm's propensity to delist. The dependent variable is *Delist*, a dummy variable that equals one when a firm deregisters from the stock exchange. In Panel A, we employ Cox and Probit models. In Panel B, we run the regressions on various subsample periods. In column (1), we remove years after 2007. In column (2), we remove years 2001 and 2002 with IT crisis. In column (3), we remove the recent crisis period from 2007-2009. In column (4), we remove both the IT and financial crisis. *DSCA* is a dummy variable that equals one if a firm experiences a shareholder class action suit in the prior year, and zero otherwise. Control variables are defined in Table A1. Standard errors are clustered by industry and are reported in parentheses. Significance at 1%, 5%, and 10% levels are indicated by ***, **, and * respectively.

Panel A: Cox and Probit models				
	(1)	(2)	(3)	(4)
	Cox model		Probit model	
DSCA	0.359*** (7.510)	0.364*** (7.694)	0.212*** (6.900)	0.216*** (7.113)
Market to book ratio	-0.168*** (-12.180)	-0.171*** (-12.638)	-0.082*** (-11.294)	-0.088*** (-13.309)
Firm size	-0.200*** (-15.796)	-0.200*** (-15.940)	-0.123*** (-18.578)	-0.118*** (-17.851)
Leverage	1.400*** (13.530)	1.399*** (13.557)	0.819*** (14.176)	0.806*** (14.409)
Returns on Assets	-0.855*** (-6.536)	-0.871*** (-6.444)	-0.494*** (-4.391)	-0.531*** (-4.642)
Cash flow volatility	-0.174 (-0.964)	-0.183 (-1.019)	-0.250** (-2.446)	-0.219** (-2.139)
Firm age	-0.055* (-1.902)	-0.047 (-1.624)	-0.055*** (-3.412)	-0.039** (-2.427)
Asset tangibility	-0.300** (-2.411)	-0.299** (-2.413)	-0.134* (-1.874)	-0.148** (-2.047)
Industry sale growth		0.074 (0.374)		0.107 (0.777)
Real GDP growth		3.256* (1.919)		4.690*** (8.155)
Observations	69837	69837	72825	72825
Log pseudolikelihood	-41089.362	-41084.988	-17800.286	-17738.112

Panel B: Other robustness checks				
	(1)	(2)	(3)	(4)
	Before Crisis	Remove IT crisis	Remove financial crisis	Remove both
DSCA	0.026*** (4.313)	0.030** (4.347)	0.033*** (5.696)	0.037*** (4.821)
Market to book ratio	-0.010*** (-7.721)	-0.009*** (-11.408)	-0.009*** (-9.110)	-0.009*** (-9.708)
Firm size	-0.014*** (-11.176)	-0.013*** (-14.240)	-0.013*** (-13.626)	-0.013*** (-12.160)
Leverage	0.132*** (11.458)	0.111*** (17.118)	0.117*** (13.137)	0.107*** (12.217)
Returns on Assets	-0.149*** (-5.641)	-0.099*** (-4.467)	-0.115*** (-4.328)	-0.098*** (-4.138)
Cash flow volatility	-0.032* (-1.951)	-0.015 (-1.068)	-0.031** (-2.218)	-0.025* (-1.740)
Firm age	0.005* (1.843)	0.001 (0.562)	0.002 (0.699)	0.001 (0.236)
Asset tangibility	-0.018* (-1.845)	-0.023*** (-2.906)	-0.020** (-2.608)	-0.025*** (-2.880)
Year FE	Yes	Yes	Yes	Yes
Industry-year FE	Yes	Yes	Yes	Yes
Observations	41883	64358	62856	54389
Adjusted R^2	0.048	0.038	0.042	0.037

Table 6: Voluntary vs. forced delisting

This table reports the OLS results that estimate the effect of shareholder class action suits on a firm's propensity to delist. The dependent variable is *Delist*, a dummy variable that equals one when a firm deregisters from the stock exchange. *DSCA* is a dummy variable that equals one if a firm experiences a shareholder class action suit in the prior year, and zero otherwise. *NSCA* is the number of shareholder class action suits that a firm experiences in the prior year. In column (1) and (3), we include the observations of voluntary delisting. In column (2) and (4), we include the observations of forced delisting. Control variables are defined in Table A1. Standard errors are clustered by industry and are reported in parentheses. Significance at 1%, 5%, and 10% levels are indicated by ***, **, and * respectively.

	(1) Voluntary	(2) Forced	(3) Voluntary	(4) Forced
DSCA	0.023*** (5.849)	0.006* (1.743)		
NSCA			0.023*** (6.417)	0.007* (1.762)
Market to book ratio	-0.005*** (-5.840)	-0.005*** (-5.381)	-0.005*** (-5.837)	-0.005*** (-5.380)
Firm size	-0.005*** (-6.981)	-0.009*** (-13.001)	-0.005*** (-7.023)	-0.009*** (-13.000)
Leverage	0.013** (2.374)	0.117*** (14.539)	0.013** (2.377)	0.117*** (14.536)
Returns on Assets	0.011*** (4.072)	-0.135*** (-5.051)	0.011*** (4.082)	-0.135*** (-5.051)
Cash flow volatility	-0.039*** (-6.211)	0.014 (1.154)	-0.039*** (-6.211)	0.014 (1.151)
Firm age	0.000 (0.148)	0.002* (1.774)	0.000 (0.152)	0.002* (1.781)
Asset tangibility	-0.015** (-2.331)	-0.006 (-1.011)	-0.015** (-2.331)	-0.006 (-1.010)
Year FE	Yes	Yes	Yes	Yes
Industry-year FE	Yes	Yes	Yes	Yes
Observations	70667	69651	70667	69651
Adjusted R^2	0.007	0.084	0.008	0.084

Table 7: Dismissed vs. settled SCA suits

This table reports the OLS results that estimate the effect of shareholder class action suits on a firm's propensity to delist. The dependent variable is *Delist*, a dummy variable that equals one when a firm deregisters from the stock exchange. *Dismissed DSCA* is a dummy variable that equals one if one or all shareholder class action suits get dismissed in the prior year, and zero otherwise. *Settled DSCA* is a dummy variable that equals one if one or all shareholder class action suits get settled in the prior year, and zero otherwise. *Dismissed NSCA* is the number of shareholder class action suits that get dismissed in the prior year. *Settled NSCA* is the number of shareholder class action suits that get settled in the prior year. Control variables are defined in Table A1. Standard errors are clustered by industry and are reported in parentheses. Significance at 1%, 5%, and 10% levels are indicated by ***, **, and * respectively.

	(1) Dismissed	(2) Settled	(3) Dismissed	(4) Settled
Dismissed DSCA	0.031*** (3.886)			
Settled DSCA		0.024*** (2.898)		
Dismissed NSCA			0.033*** (4.174)	
Settled NSCA				0.023** (2.674)
Market to book ratio	-0.009*** (-10.572)	-0.009*** (-10.772)	-0.009*** (-10.567)	-0.009*** (-10.761)
Firm size	-0.013*** (-15.494)	-0.013*** (-15.360)	-0.013*** (-15.527)	-0.013*** (-15.380)
Leverage	0.116*** (16.970)	0.120*** (18.370)	0.116*** (16.963)	0.120*** (18.367)
Returns on Assets	-0.114*** (-4.661)	-0.115*** (-4.569)	-0.114*** (-4.660)	-0.115*** (-4.568)
Cash flow volatility	-0.022 (-1.555)	-0.021 (-1.663)	-0.022 (-1.556)	-0.021 (-1.664)
Firm age	0.002 (0.848)	0.002 (0.926)	0.002 (0.850)	0.002 (0.926)
Asset tangibility	-0.020*** (-2.821)	-0.021*** (-2.848)	-0.020*** (-2.821)	-0.021*** (-2.848)
Year FE	Yes	Yes	Yes	Yes
Industry-year FE	Yes	Yes	Yes	Yes
Observations	71426	71705	71426	71705
Adjusted R^2	0.042	0.043	0.042	0.043

Table 8: External equity dependence

This table reports the OLS results that estimate the effect of shareholder class action suits on a firm's propensity to delist. The dependent variable is *Delist*, a dummy variable that equals one when a firm deregisters from the stock exchange. *DSCA* is a dummy variable that equals one if a firm experiences a shareholder class action suit in the prior year, and zero otherwise. *External equity dependence indicator* is an indicator equal one when a firm's external equity dependence ratio is higher than the sample median. External equity dependence is the ratio of net amount of equity issued to capital expenditures. Control variables are defined in Table A1. Standard errors are clustered by industry and are reported in parentheses. Significance at 1%, 5%, and 10% levels are indicated by ***, **, and * respectively.

	(1) Equity dependence
DSCA	0.042*** (5.880)
DSCA × External equity dependence indicator	-0.024*** (-3.180)
External equity dependence indicator	-0.002 (-0.937)
Market to book ratio	-0.009*** (-10.305)
Firm size	-0.013*** (-15.459)
Leverage	0.119*** (17.694)
Returns on Assets	-0.115*** (-4.489)
Cash flow volatility	-0.021 (-1.675)
Firm age	0.001 (0.562)
Asset tangibility	-0.020*** (-2.776)
Year FE	Yes
Industry-year FE	Yes
Observations	72403
Adjusted R^2	0.042

Table 9: Information-related effect

This table reports the OLS results that estimate the effect of shareholder class action suits on a firm's propensity to delist. The dependent variable is *Delist*, a dummy variable that equals one when a firm deregisters from the stock exchange. *DSCA* is a dummy variable that equals one if a firm experiences a shareholder class action suit in the prior year, and zero otherwise. *Number of ratings* is the number of debt ratings of a firm in a given year. *High number of analysts* is an indicator equal one if the number of analyst followings is higher than its sample median value. *High number of estimates* is an indicator equal one if the number of analyst's PE annual estimates of a firm is higher than its sample median in a given year. *SOX* is an indicator equal one for the years from 2002 onward. Control variables are defined in Table A1. Standard errors are clustered by industry and are reported in parentheses. Significance at 1%, 5%, and 10% levels are indicated by ***, **, and * respectively.

Panel A – Degree of information transparency

	(1) Number of ratings	(2) Number of analyst	(3) Number of estimates
DSCA	0.030*** (6.442)	0.068*** (3.412)	0.068*** (3.412)
DSCA × Number of ratings	-0.005*** (-2.809)		
Number of ratings	0.002*** (2.859)		
DSCA × High number of analysts		-0.048** (-2.132)	
High number of analysts		0.021*** (6.495)	
DSCA × High number of estimates			-0.048** (-2.132)
High number of estimates			0.021*** (6.495)
Market to book ratio	-0.009*** (-10.508)	-0.009*** (-11.102)	-0.009*** (-11.102)
Firm size	-0.014*** (-15.539)	-0.015*** (-18.126)	-0.015*** (-18.126)
Leverage	0.118*** (17.749)	0.122*** (18.279)	0.122*** (18.279)
Returns on Assets	-0.113*** (-4.509)	-0.115*** (-4.479)	-0.115*** (-4.479)
Cash flow volatility	-0.021 (-1.634)	-0.017 (-1.284)	-0.017 (-1.284)
Firm age	0.002 (0.948)	0.003 (1.399)	0.003 (1.399)
Asset tangibility	-0.019** (-2.657)	-0.020*** (-2.708)	-0.020*** (-2.708)
Year FE	Yes	Yes	Yes
Industry-year FE	Yes	Yes	Yes
Observations	72825	72825	72825
Adjusted R ²	0.043	0.044	0.044

Panel B – Disclosure costs - Sarbanes-Oxley Enactment

	(1)
	Sarben Oxely
L.DSCA	0.012 (1.361)
DSCA # SOX	0.022* (1.905)
SOX	-0.025*** (-8.748)
Market to book ratio	-0.008*** (-9.500)
Firm size	-0.014*** (-15.725)
Leverage	0.119*** (17.432)
Returns on Assets	-0.111*** (-4.630)
Cash flow volatility	-0.021 (-1.593)
Firm age	0.001 (0.581)
Asset tangibility	-0.020*** (-2.723)
Industry FE	Yes
Observations	72825
Adjusted R^2	0.042

Table 10: Effect of Ninth Circuit Ruling

This table reports the OLS results that estimate the effect of shareholder class action suits on a firm's propensity to delist for the period from 1996 to 2002. The sample includes treated and control firms that are matched using propensity score matching. The matched variables include all control variables in Table 4. The dependent variable in column (1) and (2) is *Delist*, a dummy variable equal one when a firm deregisters from the stock exchange. The dependent variable in column (3) and (4) is *Voluntary delist*, a dummy variable equal one when a firm voluntarily deregisters from the stock exchange. The dependent variable in column (5) and (6) is *Forced delist*, a dummy variable equal one when a firm is forced to deregister from the stock exchange. *Ninth Circuit* is an indicator equal one for firms whose headquarters are in Ninth Circuit area. *Post 1999* is an indicator equal one for the years after 1999. Control variables are defined in Table A1. Standard errors are clustered by industry and are reported in parentheses. Significance at 1%, 5%, and 10% levels are indicated by ***, **, and * respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
	All delists		Voluntary delist		Forced delists	
Ninth Circuit × Post 1999	-0.042*** (-3.86)	-0.042*** (-3.76)	-0.025*** (-2.91)	-0.024*** (-2.67)	-0.021*** (-2.61)	-0.022*** (-2.76)
Ninth Circuit	0.031*** (6.03)	0.034*** (6.44)	0.027*** (6.89)	0.031*** (7.30)	0.006 (1.61)	0.007* (1.79)
Market to book ratio		-0.011*** (-8.19)		-0.005*** (-4.43)		-0.007*** (-7.62)
Firm size		-0.011*** (-7.53)		-0.000 (-0.22)		-0.011*** (-11.10)
Leverage		0.116*** (10.39)		-0.009 (-1.02)		0.135*** (16.80)
Returns on Assets		-0.180*** (-17.25)		-0.008 (-0.87)		-0.189*** (-25.31)
Cash flow volatility		-0.027 (-1.10)		-0.047** (-2.40)		0.016 (0.90)
Firm age		0.002 (0.63)		-0.000 (-0.13)		0.003 (1.11)
Asset tangibility		-0.011 (-0.82)		-0.002 (-0.16)		-0.010 (-1.06)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry-year FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	18268	17023	17533	16304	17407	16219
Adjusted R ²	0.01	0.05	0.01	0.01	0.01	0.11

Table 11: Placebo events

This table reports the estimated effect of placebo events in the Ninth Circuit area on a firm's propensity to delist for the period from 1996 to 2002. The dependent variable is *Delist*, a dummy variable that equals one when a firm deregisters from the stock exchange. *Ninth Circuit* is an indicator equal one for firms whose headquarters are in Ninth Circuit area. In column (1) and (2), *Placebo event* is an indicator equal one for the years before 1997 and 1998, respectively. Control variables are defined in Table A1. Standard errors are clustered by industry and are reported in parentheses. Significance at 1%, 5%, and 10% levels are indicated by ***, **, and * respectively.

	(1) Placebo 1997	(2) Placebo 1998
Ninth Circuit × Placebo event	-0.02 (-1.30)	-0.01 (-0.64)
Ninth Circuit	0.02 (1.55)	0.01 (1.24)
Market to book ratio	-0.008*** (-4.18)	-0.008*** (-4.15)
Firm size	-0.01*** (-4.91)	-0.01*** (-4.91)
Leverage	0.1*** (8.42)	0.1*** (8.41)
Returns on Assets	-0.2*** (-7.40)	-0.2*** (-7.41)
Cash flow volatility	-0.03 (-1.01)	-0.03 (-1.01)
Firm age	0.01** (2.38)	0.01** (2.38)
Asset tangibility	-0.004 (-0.19)	-0.004 (-0.19)
Year FE	Yes	Yes
Industry-year FE	Yes	Yes
Observations	12712	12712
Adjusted R^2	0.05	0.05

Table 12: Probability of shareholder class action lawsuits

This table reports the estimated effect of the Ninth Circuit Ruling in 1999 on a firm's propensity to experience a shareholder class action lawsuits for the period from 1996 to 2002. Panel A is analyzed at firm level. The sample includes treated and control firms that are matched using propensity score matching. The matched variables include all control variables in Table 4. The dependent variable in columns (1) and (2) is an indicator equal one if firm experiences a SCA lawsuits in a given year. The dependent variable in columns (3) and (4) ((5) and (6) is an indicator equal one if firm experiences a dismissed (settled) SCA lawsuits in a given year. The dependent variable in columns (3) and (4) is the natural logarithm of one plus the number of SCA suits in a circuit-year. Panel B is run at the state level. The dependent variable is the natural logarithm of one plus the number of SCA lawsuits of all firms locating in a given state. *Ninth Circuit* is an indicator equal one for firms whose headquarters are in Ninth Circuit area. *Post 1999* is an indicator equal one for the years after 1999. Control variables are defined in Table A1. Standard errors are clustered by industry and are reported in parentheses. Significance at 1%, 5%, and 10% levels are indicated by ***, **, and * respectively.

Panel A – Firm level

	(1)	(2)	(3)	(4)	(5)	(6)
	All suits		Dimissed suits		Settled suits	
Ninth Circuit × Post 1999	-0.026** (-3.49)	-0.026** (-3.39)	-0.005 (-1.45)	-0.005 (-1.40)	-0.022*** (-3.73)	-0.022** (-3.60)
Ninth Circuit	-0.020* (-2.20)		-0.011 (-1.89)		-0.009 (-1.12)	
Market to book ratio	0.005*** (4.40)	0.005*** (4.29)	0.002* (2.25)	0.002* (2.27)	0.003*** (6.36)	0.003*** (5.59)
Firm size	0.034*** (16.10)	0.033*** (15.32)	0.008*** (6.08)	0.008*** (6.52)	0.026*** (17.98)	0.026*** (18.63)
Leverage	0.001 (0.03)	-0.000 (-0.01)	0.009 (1.37)	0.009 (1.42)	-0.007 (-0.49)	-0.008 (-0.59)
Returns on Assets	-0.028** (-3.16)	-0.027** (-2.77)	-0.003 (-1.35)	-0.004 (-1.32)	-0.025** (-2.94)	-0.023** (-2.56)
Cash flow volatility	-0.006 (-0.15)	-0.011 (-0.29)	0.012 (0.58)	0.014 (0.68)	-0.018 (-0.70)	-0.026 (-1.06)
Firm age	-0.044* (-2.44)	-0.046** (-2.70)	-0.030*** (-4.18)	-0.030*** (-3.87)	-0.016 (-1.13)	-0.018 (-1.38)
Asset tangibility	0.039** (2.81)	0.038** (3.08)	0.008 (1.13)	0.011 (1.35)	0.030 (1.74)	0.027 (1.58)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Headquarter FE	No	Yes	No	Yes	No	Yes
Observations	16838	16838	16503	16503	16640	16640
Adjusted R ²	0.224	0.225	0.221	0.221	0.223	0.226

Table 10: Probability of shareholder class action lawsuits (Con't)**Panel B – State level**

	(1)	(2)
	State level	
Ninth Circuit Ruling # Post 1999	-0.271** (-2.50)	-0.256** (-2.48)
Post 1999	0.028 (0.24)	
Public firm presence	0.114 (0.61)	0.265 (1.67)
Real state GDP per capita	0.787*** (4.00)	1.150 (1.04)
State GDP growth	-1.999 (-1.29)	-1.393 (-0.88)
Year FE	No	Yes
Headquarter FE	Yes	Yes
Observations	357	357
Adjusted R^2	0.81	0.81

Table 13: Evidence on earning management

This table reports the estimated effect of Ninth Circuit Ruling in 1999 on a firm's propensity to manage earnings. In column (1), the dependent variable is *Discretionary accruals* which is estimated as the residual of the accrual model, proposed in McNichols (2002). In column (2), the dependent variable is *Abnormal discretionary accruals* which is estimated as the residual of the discretionary expense model, proposed in Roychowdhury (2006). In column (3), the dependent variable is an indicator equal to one if a firm commits an accounting misconduct, reported in AAER dataset. *Ninth Circuit* is an indicator equal one for firms whose headquarters are in Ninth Circuit area. *Post 1999* is an indicator equal one for the years after 1999. Control variables are defined in Table A1. Standard errors are clustered by industry and are reported in parentheses. Significance at 1%, 5%, and 10% levels are indicated by ***, **, and * respectively.

	(1) Discretionary accruals	(2) Abnormal discretionary expenses	(3) Accounting restatements
Ninth Circuit × Post 1999	0.005 (0.51)	0.001 (0.05)	-0.001 (-0.22)
Ninth Circuit	-0.004 (-0.88)	0.047*** (3.62)	-0.005 (-1.54)
Market to book ratio	-0.004** (-2.23)	0.055*** (7.71)	0.002** (2.16)
Firm size	-0.005*** (-2.72)	0.011*** (2.74)	0.008*** (4.79)
Leverage	-0.028** (-2.49)	-0.096* (-1.99)	0.009 (1.57)
Returns on Assets	0.026 (0.72)	-0.310*** (-6.71)	-0.005 (-0.96)
Cash flow volatility	0.047 (0.70)	0.757*** (4.26)	-0.016 (-1.63)
Firm age	0.007* (1.91)	-0.019* (-1.93)	-0.007*** (-2.75)
Asset tangibility	0.055 (1.45)	-0.032 (-0.68)	-0.029** (-2.59)
Year FE	Yes	Yes	Yes
Industry-year FE	Yes	Yes	Yes
Observations	15571	6962	17092
Adjusted R^2	0.01	0.27	0.01

Table 14: Stock market reaction to Ninth Circuit ruling

This table reports the estimated stock market reaction to the Ninth Circuit Ruling event on July 7, 1999. CAR is estimated based on the three factor Fama and French model. Columns (1) and (5) presents the CAR for firms locating in other areas outside the Ninth Circuit area. Columns (2) and (6) presents the CAR for firms in the Ninth Circuit area. Columns (1)-(4) and (5)-(8) present the CAR for firms that have low and high institutional ownership, respectively. Significance at 1%, 5%, and 10% levels are indicated by ***, **, and * respectively.

Window	Institutional ownership							
	Low				High			
	Other area	Ninth circuit	Diff	t-stat	Other area	Ninth circuit	Diff	t-stat
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
(-1,1)	1.11%	0.89%	0.22%	0.335	0.53%	1.25%	-0.72%	-1.797**
(-2,2)	1.17%	1.23%	-0.07%	-0.081	0.47%	1.26%	-0.78%	-1.603*
(-3,3)	0.81%	0.39%	0.42%	0.442	0.55%	1.11%	-0.56%	-0.963
(-4,4)	0.24%	0.20%	0.04%	0.038	0.04%	1.08%	-1.04%	-1.532*
(-5,5)	0.46%	0.10%	0.36%	0.299	0.13%	0.98%	-0.86%	-1.155
(-2,3)	0.95%	0.59%	0.35%	0.404	0.40%	1.30%	-0.90%	-1.629*
(-2,4)	0.78%	1.10%	-0.32%	-0.330	0.40%	1.40%	-1.00%	-1.673**
(-2,5)	1.09%	0.80%	0.29%	0.222	0.30%	1.17%	-0.87%	-1.326*

Appendix

Variable description

Variable	Definition	Source
Litigation variables		
DSCA	An indicator that equals one if a firm experiences a shareholder class action suit in a year, and zero otherwise.	Stanford SCA database
NSCA	Number of shareholder class action suits that a firm experiences in a year.	As above
Industry SCA suits – indicator	An indicator equal to one there is at least one SCA suit in a given year in an industry.	As above
Industry SCA suits	Natural logarithm of one plus the total number of SCA suits in an industry in a year.	As above
Dismissed DSCA	An indicator that equals one if one or all shareholder class action suits get dismissed in a year, and zero otherwise.	As above
Settled DSCA	An indicator that equals one if one or all shareholder class action suits get settled in a year, and zero otherwise.	As above
Dismissed NSCA	Number of shareholder class action suits that get dismissed in a year.	As above
Settled NSCA	Number of shareholder class action suits that get settled in a year.	As above
Legal changes		
Ninth Circuit	An indicator variable equal to one if a firm is located in the states of the Ninth Circuit Court of Appeals, including Alaska, Arizona, California, Hawaii, Idaho, Montana, Nevada, Oregon, and Washington.	SEC filings and Compustat
Post 1999	An indicator equal one for years from 2000 to 2016.	
Firm controls		
Market-to-book ratio	Market value of equity divided by book value of equity.	Merged Compustat & CRSP
Firm size	Natural logarithm of total assets.	As above
Leverage	Total debt divided by total assets.	As above
ROA	Earnings before interest and taxes (EBIT) over total assets.	As above
Cashflow volatility	The standard deviation of operating income before depreciation divided by total assets over the five years.	As above
Firm age	Natural logarithm of the number of years since the firm's IPO. If the IPO year is missing, then we use the earliest year when Compustat data is available.	As above
Sale growth	The difference of sales value year t minus sales value year $t-1$ divided by sales value year $t-1$.	As above
Asset tangibility	Property, Plant and Equipment (PPE) divided by total assets.	As above
Number of ratings	Number of debt ratings of a firm in a given year.	As above

Variable	Definition	Source
High number of analysts	An indicator equal one if the number of analyst followings is higher than its sample median value.	IBES
High number of estimates	An indicator equal one if the number of analyst's PE annual estimates of a firm is higher than its sample median in a given year.	IBES
High sale growth	An indicator that equals one when a firm's sale growth rate is higher than the median rate of the annual sample	Compustat & CRSP merged