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Shareholder wealth effects of corporate fraud: Evidence from Taiwan's securities investor and futures trader protection act☆

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ABSTRACT

We examine the shareholder wealth effects of Taiwanese firms accused of corporate fraud, and we find evidence that shareholders benefited from the passage of Taiwan's Securities Investor and Futures Trader Protection Act. We not only examine the shareholder wealth effects at different stages of the corporate fraud violation cycle, but we also find evidence of a filing effect and an industry spillover effect. We conclude that shareholders can benefit from external monitoring of the firm's managers, particularly in cases when firms operate in environments with weaker internal governance mechanisms.

1. Introduction

Our study examines the shareholder wealth effects associated with allegations of corporate fraud brought against Taiwanese firms both before and after the passage of the Securities Investor and Futures Trader Protection Act (SFIPA), which became effective on January 1, 2003. As discussed by Arena and Ferris (2017), the study of corporate litigation is important because the trade-off between the cost of litigation, and the potential reduction in a firm's agency costs due to litigation risk, is unclear. A number of studies examine this issue for U. S. firms, but we are not aware of any study that examines the wealth effects for Taiwanese shareholders across the cycle of corporate fraud.[1] However, Taiwan is an interesting setting for at least four reasons.

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[1] In fact, Arena and Ferris (2017) argue that one direction for future research is to examine corporate litigation in international settings and to investigate how "national culture might affect both the incidence and the outcomes of business litigation." Relevant studies that examine litigation risk for U. S. firms include Bhagat et al. (1998), who study the shareholder wealth effects of environmental, Securities and Exchange Commission (SEC) and product liability cases, Fich and Shivadasai (2007), who examine Rule 10(b)-5 violations of the SEC Act of 1934, and Karpoff et al. (2008a), who study SEC and Department of Justice (DOJ) enforcement actions. Gande and Lewis (2009) find that shareholder-initiated class action lawsuits not only can reduce the wealth of defendant-firm shareholders, but also the wealth of competitive-firm shareholders (i.e., the industry spillover effect).

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First, the SFIPA established the Securities and Futures Investors Protection Center (IPC), whose mission is to serve as an advocate for investors by initiating class-action lawsuits on shareholders' behalf against allegedly fraudulent firms. While investors initiated only 28 class-action lawsuits alleging civil and criminal misconduct before the passage of the SFIPA, the IPC had initiated 216 class-action lawsuits by the end of 2016. Most of these cases involved insider trading, stock price manipulation, accounting fraud and/or the preparation of misleading financial statements. A study that compares shareholder wealth effects before and after the passage of the SFIPA can shed light on the Act's effectiveness.

Second, the Taiwan stock market differs from other securities markets because outside shareholders generally have relatively weak monitoring power. In Western securities markets the majority of the shares often are held by institutional owners (see, for example, Boone & White, 2015), but in the Taiwanese stock market the majority of the shares are held by family members and outside individual shareholders.[2] Individual stock ownership can make it difficult to initiate legal challenges due to weak monitoring power and large litigation costs.

Third, securities fraud is particularly relevant for Taiwanese shareholders because prior research indicates that firms in high-technology industries, such as those that dominate Taiwan's computer-related industrial sector, may be exposed to higher litigation risk. Francis, Philbrick, and Schipper (1994) identify the biotechnology, computers, electronics, and retail industries as industries with high fraud litigation risk. Johnson, Nelson, and Pritchard (2007) find that high-technology firms also have a greater likelihood of earnings re-statements.

Fourth, there is a cultural factor, which we refer to as *investor courtesy*, that can act to reduce litigation risk in Taiwan. The Chinese culture emphasizes social network relations and the support of local business, which can act to reduce litigation risk. This cultural factor was reinforced during the period in which Taiwan had a totalitarian government, which reduced the likelihood of an individual's taking legal action and going to court (martial law was abolished in 1987). Finally, a corrupt political connection often existed between the Taiwanese government and business during the 1990s and 2000s. As a result, many investors did not expect to receive a fair judgement in court because they feared political interference. The *investor courtesy* factor often resulted in investors' taking a passive approach when faced with fraudulent behavior by corporate managers.

Our study examines four primary issues related to the incidence and shareholder wealth effects of corporate fraud in Taiwan. First, we analyze the determinants of a firm being sued by constructing a logistic regression model and by using a matched-sample approach. Similar to Gande and Lewis (2009) and Kim and Skinner (2012) we find that the likelihood of being sued is related positively to firm size and growth, and related negatively to return on assets. Second, we follow Rogers and Buskirk (2009) to define the violation cycle of corporate fraud, and then examine the change in shareholder wealth at different stages of this cycle. We find that sued-firm shareholders earn lower returns when compared to matching-firm shareholders. Third, we compare the shareholder wealth effects of class-action lawsuits announced before and after the passage of the SFIPA. We find that sued-firm shareholders earned higher returns after the creation of the IPC. Fourth, we measure the filing effect and the spillover effect and find that both effects are important.

The remainder of the paper is organized as follows. Section 2 reviews the legal background. Section 3 summarizes previous research and develops our hypotheses. Section 4 describes our data and method. Section 5 explains our empirical results, Section 6 discusses the robustness tests and Section 7 presents our conclusions.

2. Institutional background

Different legal systems can vary in their provisions for investor protection, burden of proof, disclosure policy, and public enforcement, and these differences can affect managerial decisions (Mishra & Tannous, 2010). For example, a country's legal system can influence managerial decisions regarding a firm's capital structure, dividend policy, ownership structure and pricing of initial public offerings (IPOs).[3] La Prota, Lopez-De-Silanes, Shleifer and Vishny (2002) and Shleifer and Wolfenzon (2002) argue that a well-functioning legal system can reduce agency problems at the firm level, promote capital market efficiency and attract capital.

In contrast to the U. S. legal system, which promotes relatively strong shareholder activism, Taiwan had a relatively weak legal environment before the passage of the SFIPA. The earlier Civil Law provided the substantive law that allowed investors to initiate class-action lawsuits against fraudulent firms, but the enforcement lacked effective procedural law. Substantive laws define rights and obligations, but procedural laws also are needed to govern the mechanics of how a legal case flows through the litigation process. Securities law during the pre-SFIPA period also suffered from a lack of precedent (legal precedence indicates that past judicial decisions can affect the outcome of future cases).

Common law and civil law are two different legal systems. Judges in common law countries, such as the U.S., U.K. or Canada, often consider prior judicial rulings when determining the outcome of a current case. In contrast, judges in a civil law country, such as Germany, Japan, or Taiwan, rely on a clear, codified set of statutes and ordinances to determine the outcome of a case. This distinction is important because the lack of precedent can make it difficult to reach a guilty verdict if the fraudulent activity is not explicitly prohibited by a statute.[4] The SFIPA addressed these issues by strengthening the legal environment for Taiwanese shareholders.

The Sarbanes-Oxley Act in the U.S. and the SFIPA in Taiwan were both passed in 2002, but the two Acts are very different. The

[2] In 2017 individual shareholders held over 60% of the shares of Taiwanese-listed firms (source: Taiwan Stock Exchange Corporation).

[3] See Rajan and Zingales (1998), Demirguc-Kunt and Maksimovic (1998), La Porta, Lopez-De-Silanes, Shleifer, and Vishny (2000), Wurgler (2000), Lowry and Shu (2002), and La Porta, Lopez-De-Silanes, and Shleifer (2006).

[4] However, Chiou, Lee, and Lee (2010) find that the equity risk premium observed in common law countries tends to be higher than the premium observed in civil law countries.

Sarbanes-Oxley Act focuses largely on improving internal corporate governance, but the SFIPA focuses on increasing external monitoring power. The latter is particularly relevant in Taiwan due to the importance of individual, as opposed to institutional, stock ownership.

Institutional owners typically have more power to obtain a board seat or monitor the firm's managers, but this power is limited when the outside shareholders each hold a relatively small ownership stake. For example, Chen, Weng, and Chien (2018) find that qualified foreign institutional investors were subject to ownership ceilings in the pre-deregulation period, but these restrictions were relaxed and finally abolished on October 2, 2003. However, foreign institutional investors still need to pledge that their trading objectives are limited to short-term capital gains rather than managerial control. In addition, although the Taiwanese Company Act allows a minority stockholder to nominate a board candidate, managerial owners usually can reject the nominee.[5] Finally, outside shareholders often suffer from a severe asymmetric-information problem (Kouwenberg & Phunnarungsi, 2013). Many Taiwanese firms are controlled by family members, which can make it difficult to produce criminal evidence of fraudulent behavior. All of these factors can result in the cost of litigation being prohibitive.

The SFIPA addressed these issues by authorizing the IPC to initiate class-action litigation or derivative lawsuits against allegedly fraudulent firms on shareholders' behalf. The IPC also manages a fund to compensate investors in certain circumstances. Fund donors include a number of Taiwanese financial institutions. Moreover, the IPC can waive the referee fees or collateral requirements to reduce the litigation burden on investors.

Legislation can have benefits and costs. Prior research indicates that firm overinvestment and CEO over-optimism often precede cases of securities fraud (Kumar & Langberg, 2009; McTier & Wald, 2011; Pinheiro, 2008), and the threat of litigation can be an effective way to monitor corporate governance when other mechanisms fail (see Ferris, Jandik, Lawless, & Makhija, 2007; Gande & Lewis, 2009; Romano, 1991). On the other hand, making it easier and more profitable for investors to sue can lead to an increase in frivolous lawsuits. The result is a decrease in business efficiency and a waste of judicial resources. In the U.S. an increase in the number of frivolous lawsuits led to the passage of the Private Securities Litigation Reform Act (PSLRA) in 1995 and the Securities Litigation Uniform Standards Act in 1998.

3. Hypotheses development

3.1. The impact of the SFIPA

A number of studies have examined the benefits of internal monitoring of managerial behavior. For example, Murphy, Shrieves, and Tibbs (2009), Chava, Cheng, Huang, and Lobo (2010), Deng, Willis, and Xu (2014) and Yuan and Zhang (2015) find that fraudulent firms often experience lower earnings and higher capital costs as penalties for fraudulent activity. Field, Lowry, and Shu (2005) document a preemption effect: firms with a higher risk of litigation are more likely to announce earnings warnings early to reduce the risk of being sued. Jo, Song, and Tsang (2016) show international evidence that stakeholder-initiated governance can complement weak board governance.

Another stream of research has examined the importance of external monitoring by regulators and legislators. Bhagat, Bizjak, and Coles (1998) and Wei, Xie, and Posthuma (2011) find that a government agency plaintiff with more resources generally will prevail over a defendant firm. Johnson, Kasznik, and Nelson (2000) conclude that the PSLRA plays an important role in balancing the relationship between investor protection and frivolous litigation, and Nagar, Nanda, and Wysocki (2003) show that the PSLRA decreases litigation risk. The latter studies also show that improvements in enforcement have a positive effect on shareholders' wealth.

O'Connor, Kinsella, and O'Sullivan (2014) investigate how legal protections of investors affect security prices in emerging markets. They find that better-governed firms in countries with weaker investor protection experience significantly greater stock price increases upon equity market liberalization. Our study examines the impact of the SFIPA on changes in shareholder wealth following allegations of corporate fraud involving Taiwanese firms. Therefore,

Hypothesis 1. Shareholders should have earned higher returns when corporations were accused of corporate fraud after the passage of the SFIPA (and the formation of the IPC) in 2003.

Although our primary hypothesis examines how the passage of the SFIPA affected the change in shareholder wealth when corporations were accused of corporate fraud, we also examine two related issues. First, we examine the shareholder wealth effects of our sample and matching firms over the cycle of corporate fraud. Second, we examine the shareholder wealth effects after controlling for a firm's litigation risk.

3.2. Shareholder wealth effects

Early studies that examined shareholder wealth effects focused on the litigation announcement date (see, for example, Bhagat, Brickley, and Coles (1994), Bizjak and Coles (1995), Bhagat et al. (1998), Johnson et al. (2000), Karpoff, Lee, and Martin (2008a), and Wei et al. (2011)). The results of these studies generally show a negative stock price reaction to the filing announcement.

Another stream of research examines the industry spillover effect (see, for example, Lang and Stulz (1992), Bittlingmayer and Hazlett

[5] The Taiwan Company Act initially became effective on July 1, 1929. The most recent amendments to the Act became effective on November 1, 2018.

(2000), Ramnath (2002), and Gande and Lewis (2009)). The industry spillover effect suggests that investors will adjust a firm's stock price downward in response to an anticipated increase in litigation risk when peers in the same industry are being sued. As a result, some firms experience a partial anticipation effect in which a portion of the shareholder wealth loss is capitalized in a firm's stock price prior to a litigation filing. Karpoff et al. (2008a) separate the wealth effect from lawsuits alleging financial misrepresentation into three components: 1) a reputation penalty (66.7% of the total wealth loss), 2) a loss reflecting the firm's actual financial situation (24.5%), and 3) court fines (8.8%). Their results suggest that reputational loss, rather than the market or regulators, results in the largest wealth loss. Karpoff, Lee, and Martin (2008b) and Humphery-Jenner (2012) also examine the reputational effects of corporate fraud.

We follow Rogers and Buskirk (2009), who examine shareholder wealth effects during five periods: the pre-damage, damage, revelation, suit-filing and post-filing periods.[6] Their method recognizes that managers behave fraudulently during the damage period, but it takes time for legal authorities to investigate the violation, initiate a lawsuit, conduct their discovery, file motions, and for the trier of fact to hear the case and render a decision. The time interval between the revelation day (i.e., the date that the violation is discovered) and the filing day can be relatively long. We test whether the stock market imposes greater shareholder wealth losses during the revelation period rather than at the filing day. Thus,

Hypothesis 2. When compared to the matching firms, changes in shareholder wealth for the sued firms should be lower during the pre-damage period, higher during the damage period, and lower after the revelation date (which includes the suit-filing and post-filing periods).

3.3. The damage channel of corporate fraud

Aman and Moriyasu (2017) show that the arrival of public information can have an impact on stock prices. They argue that the disclosure of new information tends to increase stock volatility, and continued media coverage tends to reduce stock volatility. However, most studies use an ex-ante litigation risk measure to capture the probability of a firm being sued. The disadvantage of this approach is that it often ignores the arrival of new information, and thus any change in the probability of a firm being sued, over time.

To address this issue we estimate a firm's litigation risk at different points in the corporate fraud cycle by using a logistic regression (see Equation (1) below). We then analyze changes in shareholder wealth over different intervals while controlling for the sued (or matching) firm's likelihood of being sued. Thus,

Hypothesis 3. Changes in stock prices during the corporate fraud cycle (for either a sued or matching firm) should reflect the firm's probability of being sued.

4. Data and method

4.1. The sample of sued firms

The IPC initiated 216 class-action lawsuits related to corporate fraud between 1999 and 2016.[7] We collected our sample fraud cases by examining the IPC annual reports, allegation announcements, indictments, judgments and other public information related to these 216 lawsuits. We eliminated lawsuits that pertained to non-listed firms (54 events), cases that were not prosecuted (13 events), and cases that lacked sufficient data in the Taiwan Economic Journal (TEJ) (65 events). Our final sample ends in 2015 because our study period ends one year after the initial filing. As a result, data for 2017 were not available when we conducted our analysis. Our final sample contains 84 IPC-initiated, class-action lawsuits.

Table 1 (Panel A) shows the annual distribution of lawsuits classified by the stock exchange. Our sample firms are listed either on the Taiwan Stock Exchange (TSE), the Taipei Exchange (TPEx), which is the over-the-counter market, or were delisted during the study period.[8] The number of lawsuits increased beginning in 2008, which is the beginning of the Financial Crisis. Approximately 48% of our sample firms are listed on the TSE and 29% are listed on the TPEx. TSE firms tend to be larger than firms listed on the TPEx.

Table 1 (Panel B) classifies our sample by the type of allegation: insider trading cases (33% of our sample events), stock price manipulation (34%), accounting fraud (27%), and misleading statements (4%). The number of allegations in Panel B (98) is greater than the number of firms in Panel A (84) because several of our sample firms received multiple allegations. In our analysis we treat multiple allegations as a single event. Approximately 46% of our sample lawsuits (39 of 84 cases) involve high-tech firms.

4.2. The sample of matched firms

Following Ferris et al. (2007) we identify a sample of matching firms based on firm size (total assets) and four-digit Standard Industrial Classification (SIC) code. If the best matching firm is also the target of litigation in the same filing year, then we select the next best matching firm. Our matched sample also contains 84 firms.

Table 2 compares selected characteristics of the sued and matching firms. The firm-specific data, which we collect from the TEJ

[6] Lieser and Kolaric (2016) also examine multiple dates and find a statistically significant, larger negative abnormal stock return on the revelation day than on the filing day.

[7] The total includes 28 lawsuits transferred from the Securities and Futures Institute that were initiated between 1999 and 2002.

[8] Zhou, Zhang, Yang, Su, and An (2018) find a positive relation between corporate fraud and a firm's being delisted from a stock exchange.

Table 1
Sample corporate fraud events.

Panel A. Sample by year and exchange					Panel B. Sample by year and allegation type					
Year	TSE	TPEx	Delisted	Total	Insider Trading	stock price manipulation	accounting fraud	misleading statements	Others	Total
1999	2		2	4	1	2	2	1		6
2000			4	4	2	1	2			5
2001	1		1	2		1	1			2
2002				0						0
2003			1	1			1			1
2004	1		1	2	1	1				2
2005			2	2			2	1		3
2006	5		1	6	3	2	2	1		8
2007	5			5	2	2			1	5
2008	4	4	1	9	4	4	2			10
2009	3	4	4	11	9	1	3			13
2010	6	3	3	12	4	1	6	1	1	13
2011	7	4		11	2	8	1			11
2012				0						0
2013	3	3		6	1	4	2			7
2014	3	2		5	3	2	2		1	8
2015		4		4		4				4
Total	40	24	20	84	32	33	26	4	3	98

Panel A of Table 1 reports the number of IPC-initiated, class-action lawsuits by year and exchange. Firms listed on the Taiwan Stock Exchange (TSE) belong to a centralized trading market; firms traded on the over-the-counter market belong to the Taipei Exchange (TPEx). Delisted refers to firms that currently are delisted from either the TSE or TPEx. Panel B reports the number of IPC-initiated, class-action lawsuits by allegation type. Both panels list the lawsuits by their filing year. The sample period is 1999–2015.

database, is measured at the end of the quarter immediately preceding the start of a firm's damage period. Table A1 lists the variables examined by our study.

We use a two-sample means test and a Wilcoxon Median test to compare the sample and matched-firm subsamples. Most of the tests fail to reject the null hypothesis that the mean of our sample firms is equal to the mean of our matched firms. However, the tests do indicate that the sample firms exhibit lower EBIT, ROA, ROE, and stock price performance than the matched firms. Each of these variables is significant at the 5% level. Our results support the argument that class action lawsuits often follow a period of poor performance (see also Firth, Rui, & Wu, 2011; Hui, Lennox, & Zhang, 2014). Similar to Bonini and Boraschi (2010) we find that the sample firms have higher leverage ratios than the matched firms.

4.3. Logistic regression model

We develop a logistic regression model to test the determinants of a firm's likelihood of being sued (see Equation (1)). The dependent variable, SAM, is equal to one for the 84 sued firms and is equal to zero otherwise. The independent variables X_{ij} represent the firm-specific, stock price performance and corporate governance characteristics of firm i in period j. The period indexed by j identifies the violation cycle period (discussed below).

$$SAM_i = \beta_0 + \beta_j X_{ij} + \varepsilon_i \tag{1}$$

Previous research typically considers three categories of explanatory variables. First, we collect data on firm-specific characteristics, such as firm size, growth, and return on assets (ROA). Romano (1991), Field et al. (2005), and Ferris et al. (2007) argue that larger firms often have greater litigation risk because they attract more attention from attorneys. Ferris et al. (2007) also show that the market-to-book ratio is related positively to corporate fraud, which suggests that the monitoring of growth firms can be weaker due to less attention from securities analysts. Gande and Lewis (2009) find an inverse relationship between ROA and corporate fraud, which indicates that investors are more likely to sue when the firm's economic performance is poor.[9]

Second, previous studies indicate that stock-price-performance variables, such as stock return, volatility, and turnover can affect the likelihood of a firm being sued. Lowry and Shu (2002) find that poor stock price performance increases the likelihood of corporate fraud. Ferris et al. (2007) conclude that greater stock turnover, which implies that managers engage in self-dealing, can increase fraud risk. Bauer and Braun (2010) and Povel, Singh, and Winton (2007) find that litigation often follows stock price manipulation by managers after a boom period. Kim and Skinner (2012) conclude that greater stock price volatility can increase litigation risk because there is more uncertainty regarding the firm's intrinsic value.

Third, previous researchers often consider corporate governance variables, such as board size, CEO duality, institutional ownership, and block ownership. The latter variables control for board independence and outside monitoring power. Researchers who examine the importance of corporate governance find mixed results (see, for example, the literature survey conducted by Habib, Jiang, Bhuiyan, &

[9] We also examined several other firm-specific characteristics, such as free cash flow and discretionary accruals. Including these variables in our models does not affect the conclusions of our study.

Table 2
Sued and matching firms: A comparison.

	Mean Test			Wilcoxon Median Test		
	Sued	Matched	Difference (p-value)	Sued	Matched	Difference (p-value)
Firm-specific characteristics						
Assets(billion)	49,320.27	43,682.94	0.14	4603.46	4741.56	0.14
			(0.89)			(0.89)
Sales(billion)	3511.13	5950.11	−1.33	1046.88	1160.97	−1.30
			(0.19)			(0.19)
Market value (billion)	10,933.61	12,490.50	−0.28	2245.78	3459.20	−1.01
			(0.78)			(0.31)
BM ratio (%)	0.99	0.95	0.24	0.81	0.75	0.21
			(0.81)			(0.83)
RD ratio (%)	58.12	83.18	−0.98	11.94	33.12	−1.36
			(0.33)			(0.17)
Payout ratio (%)	1.99	2.53	−1.02	0.00	1.07	−0.96
			(0.31)			(0.34)
Debt ratio (%)	78.73	46.73	1.92 *	53.92	42.65	2.35**
			(0.06)			(0.02)
EBIT ratio (%)	−1.52	1.64	−3.11 ***	−0.05	1.46	−4.17 ***
			(0.00)			(0.00)
ROA (%)	−0.76	3.13	−3.34 ***	0.95	2.21	−3.88 ***
			(0.00)			(0.00)
ROE (%)	−7.81	2.22	−2.74 ***	−0.07	1.73	−3.89 ***
			(0.01)			(0.00)
Free cash flow (%)	−1.83	−0.44	−0.75	0.02	−0.02	0.04
			(0.46)			(0.97)
Stock price performance						
Stock return (%)	−0.23	−0.02	−0.21***	−0.11	−0.05	−0.06 **
			(0.00)			(0.01)
Stock turnover (%)	0.80	0.78	0.02	0.51	0.55	−0.04
			(0.86)			(0.98)
Stock volatility (%)	0.03	0.03	0.00 ***	0.03	0.03	0.01 ***
			(0.00)			(0.00)
Corporate Governance						
Board size (number)	9.07	9.19	−0.26	9.00	9.00	0.08
			(0.79)			(0.94)
Institution ownership (%)	35.41	37.41	−0.60	33.67	33.19	−0.82
			(0.55)			(0.41)
Insider ownership (%)	1.11	1.85	−1.45	0.33	0.38	−0.98
			(0.15)			(0.33)
Block ownership (%)	17.39	17.66	−0.15	14.89	15.55	−0.33
			(0.88)			(0.74)
Outsider directors (%)	78.09	75.58	0.92	83.33	80.00	0.94
			(0.36)			(0.35)
Gray directors (%)	65.94	63.68	0.71	66.67	62.10	0.46
			(0.48)			(0.65)

This table compares selected characteristics between our sued- and matching-firm subsamples. Table A1 in the Appendix shows the variable definitions. We measure the firm-specific characteristics and the corporate governance variables by using annual fiscal data in the filing year, and we measure the stock price performance variables by using daily stock price data over the one-year period preceding the filing date. The parentheses report p-values. ***, **, * indicate that the mean (median) value for the sued firms is statistically different from the value for the matched firms at the 1%, 5%, and 10% levels, respectively.

Islam, 2014). Dechow, Sloan and Sweeney (1996) find that when a CEO has more power, the CEO's opportunistic behavior, such as over-optimistic reporting, can cause greater litigation risk. On the other hand, Beasley (1996), and Fich and Shivdasani (2007) find that board size is related positively to the probability of corporate fraud. In general, researchers believe that independent directors serve a vital role in monitoring a firm's managers. Agrawal and Chadha (2005) find that board independence often deters fraud, and Ferris and Pritchard (2001) find that larger board size and higher independence are able to decrease the incidence of fraud. Finally, the presence of institutional and/or block ownership often plays an effective monitoring role (Carleton, Nelson, & Weisbach, 1998; Cheng, Huang, Li, & Lobo, 2010).

If a firm's corporate governance structure works well in deterring corporate fraud, then the occurrence of corporate fraud should be low. However, there is evidence that governance mechanisms are not always effective in deterring corporate fraud. Ferris et al. (2007) find an insignificant relationship between corporate governance variables and the incidence of corporate fraud. Fich and Shivdasani (2007) find that CEO tenure and ownership, director expertise, and the value of a corporate governance index are not significant determinants of securities litigation events. Sen (2007) finds that greater stock ownership by managers may not reduce the propensity to commit fraud. As a result, Karpoff et al. (2008b) provide arguments for additional regulatory intervention.

We also include an industry control variable in our model. Francis et al. (1994), Helland (2006) and Kim and Skinner (2012) find that

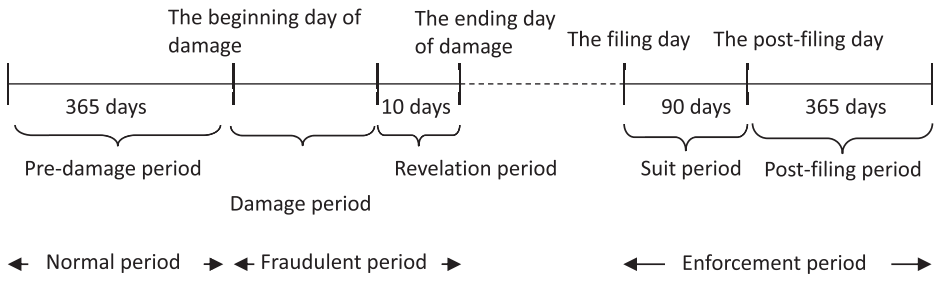

Fig. 1. The violation cycle of corporate fraud
This figure shows the timeline for the violation cycle of corporate fraud. We follow Rogers and Buskirk (2009) and identify five periods: the pre-damage, damage, revelation, suit, and post-filing periods. The pre-damage and post-filing periods contain 365 calendar days. The length of the revelation and suit periods are 10 and 90 calendar days, respectively. The dashed-line indicates the pre-litigation period. Following RBW we exclude this period from the regression periods.

the target firm's industry is an important predictor of litigation risk. They identify the biotechnology, computer, electronics, and retail industries as industries with high fraud litigation risk. Johnson et al. (2007) show that high-technology firms with greater fraud risk are more likely to re-state earnings. Because high-technology industries dominate the Taiwanese industrial sector, we include a high-tech dummy variable in our model specifications (Jones & Weingram, 1996a; 1996b).

4.4. Changes in shareholder wealth across the violation cycle of corporate fraud

Following Rogers and Buskirk (2009) (RBW) we examine stock price performance before and after three event days: the first day of the damage period, the last day of the damage period, and the day the IPC files a lawsuit. The procedure produces five periods (see Fig. 1). The first two event days are hand-collected either from the allegations announced by the IPC, or the indictment issued by the prosecutor.[10] Following RBW we select the revelation day, which is the 10th calendar day before the damage period ends, and a day to signify the end of the post-filing period, which is 91 calendar days after the filing day.

Fig. 1 illustrates the timeline and the definitions for each of the five periods. The pre-damage period contains 365 calendar days before the damage period begins. The damage period begins with the first day of damage and ends with the revelation day. The length of the revelation period is 10 calendar days. The lawsuit period ends 90 calendar days after the filing day, and the post-filing period contains 365 days after the post-filing day.

We examine the change in shareholder wealth for the 84 sued and 84 matching firms during each event window. We define five dummy variables to refer to the five violation periods of corporate fraud: PRE (the pre-damage period), DAM (the damage period), REV (the revelation period), SUIT (the suit period), and POST (the post-filing period). Each of the dummy variables takes a value of one during its respective time period and zero otherwise.

We use the market model (see Equation (2)) to estimate the daily abnormal returns and cumulative abnormal returns for the sample of 84 sued and 84 matching firms during the five periods.

$$R_{it} = \alpha_i + \beta_i R_{mt} + \varepsilon_{it} \tag{2}$$

where R_{it} is the rate of return on stock i at day t, which spans the entire violation cycle of corporate fraud from the first day of the pre-damage period to the last day of the post-filing period. R_{mt} is the market return of the TAIEX (Taiwan Stock Exchange Capitalization Weighted Index) or TPEX (TPEx Exchange Capitalization Weighted Stock Index). The coefficients α_{it} and β_{it} are the parameters produced from the OLS regression. The daily abnormal return (AR) is denoted by the residual term, ε_{it}, of the regression.

$$AR_{it} = R_{it} - \alpha_i - \beta_i R_{mt} \tag{3}$$

Following Brown and Warner (1985) we divide each firm's abnormal return by its standard deviation to calculate the standardized abnormal return (SAR).

$$SAR_{it} = \frac{AR_{it}}{S(AR_{it})} \tag{4}$$

To observe the changes in shareholders' wealth, we calculate the cumulative abnormal returns (CAR) during each of the five violation periods for all i events using Equation (5):

[10] If the IPC's allegation announcement does not specify a damage period, we identify the starting date from the indictments. For the 3 fraud cases in which the data source identifies only the damage month (but not the specific date), we use the first day of the month as the day of the damage period begins.

$$CAR_{i,[\tau_{j1},\tau_{j2}]} = \sum_{t=\tau_{j1}}^{\tau_{j2}} SAR_{it} \tag{5}$$

where τ_{j1} and τ_{j2} correspond to the beginning and ending days of the *j*th-period, respectively.

Following Gande and Lewis (2009) we also compute the value of AR and CAR in dollars, which we refer to as the economic dollar effect (DE). The daily dollar economic effect for firm *i* on date *t* is computed as

$$DE_{it} = P_{it-1} \times SAR_{it}, \tag{6}$$

where P_{it-1} is the stock price of firm *i* on the date *t-1*. The purpose of calculating the cumulative economic effect (CDE) is to summarize the daily dollar effect for firm *i* over [τ_{j1}, τ_{j2}] during the *j*th-period:

$$CDE_{i,[\tau_{j1},\tau_{j2}]} = \sum_{t=\tau_{j1}}^{\tau_{j2}} DE_{it} \tag{7}$$

5. Results

5.1. The determinants of corporate fraud

Table 3 presents the results of logistic regression models that test a firm's likelihood of being sued. Model specifications (1) through (3) test the importance of firm characteristics, stock price performance and corporate governance structure separately. Model (4) tests the importance of firm characteristics, stock price performance, and board size, and Model (5) contains all of the explanatory variables.

Table 3
The probability of being a sued firm.

Variable	Prediction	(1)	(2)	(3)	(4)	(5)
Intercept		−2.25 ***	−1.20 ***	−0.45	−4.35 ***	−4.79 ***
		(0.00)	(0.00)	(0.29)	(0.00)	(0.00)
Log(Asset)	+	0.15 ***			0.17 ***	0.19 ***
		(0.00)			(0.00)	(0.00)
Market-to-book	+	0.20 ***			0.15 *	0.17 **
		(0.01)			(0.07)	(0.04)
Return-on-asset	–	−0.05 ***			−0.04 ***	−0.04 ***
		(0.00)			(0.00)	(0.00)
Stock return	–		−0.23 ***		−0.12	−0.05
			(0.00)		(0.16)	(0.60)
Stock turnover	+		0.20 ***		0.20 ***	0.20 ***
			(0.00)		(0.01)	(0.01)
Stock volatility	+		0.27 ***		0.28 ***	0.30 ***
			(0.00)		(0.00)	(0.00)
Tech-dummy	+		0.43 ***		0.59 ***	0.62 ***
			(0.00)		(0.00)	(0.00)
Board size	?			0.05 **	0.05 **	0.07 **
				(0.04)	(0.04)	(0.01)
CEO duality	?			0.31 *		0.03
				(0.07)		(0.87)
Institutional ownership	?			−0.01		−0.01
				(0.14)		(0.20)
Block ownership	?			−0.00		0.01
				(0.58)		(0.49)
Officer ownership	?			−0.05 *		−0.06 **
				(0.06)		(0.05)
% of outsider director	?			0.01		0.01
				(0.15)		(0.27)
% of gray director	?			−0.01		−0.01
				(0.18)		(0.15)
Pseudo R^2		0.04	0.04	0.01	0.09	0.09

The dependent variable, SAM, is equal to one for the 84 sued firms; zero otherwise. The independent variables are the firm-specific characteristics, stock price performance and corporate governance variables for the *j*th-period. The *j*th-period variable identifies the pre-damage, damage, revelation, suit-filing, and post-filing periods. The firm-specific characteristics consist of firm size, growth, and ROA. The stock price performance measures include stock return, stock turnover, stock volatility, and a technology industry dummy. The corporate governance variables include board size, CEO duality, institutional ownership, block ownership, officer ownership, the ratio of outsider directors, and the ratio of gray directors. Table A1 in the Appendix lists the variables and their definitions. Model specifications (1) to (3) individually test the importance of the firm-specific characteristic, stock price performance, and corporate governance variables. Specification (5) contains all of the explanatory variables. The parentheses report the p-values. ***, **, * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

Table 4
Changes in shareholder wealth across the five periods.

Period		CAR(%)			CDE(in dollar/million)		
		Sued firms	Matched firms	Difference (p-value)	Sued firms	Matched firms	Difference (p-value)
Pre-damage	Mean	1.05	4.47	−3.43 ***	−23.63	55.05	−78.68 ***
	(S.D.)	(2.60)	(2.05)	(0.00)	(61.63)	(61.24)	(0.00)
Damage	Mean	4.96	3.98	0.99 ***	71.35	80.90	−9.55 ***
	(S.D.)	(2.12)	(2.05)	(0.00)	(70.27)	(31.75)	(0.02)
Revelation	Mean	7.27	6.10	1.18 ***	137.21	92.49	44.72 ***
	(S.D.)	(0.16)	(0.10)	(0.00)	(17.16)	(7.25)	(0.00)
Suit-filing	Mean	−0.74	−0.12	−0.62 ***	−214.94	−221.48	6.53 ***
	(S.D.)	(0.57)	(0.74)	(0.00)	(14.30)	(15.12)	(0.00)
Post-filing	Mean	1.32	1.31	0.01	−265.25	−188.33	−76.92 ***
	(S.D.)	(1.34)	(1.21)	(0.91)	(66.26)	(44.43)	(0.00)

This table reports the cumulative abnormal returns (CAR) and cumulative dollar effects (CDE) for the sued and matching firms during the five periods that define the violation cycle of corporate fraud. The two average changes are defined as $\overline{CAR} = \frac{1}{N}\sum_{i=1}^{N} CAR_{i,[\tau_{j1},\tau]}$, and $\overline{CDE} = \frac{1}{N}\sum_{i=1}^{N} CDE_{i,[\tau_{j1},\tau]}$. The estimated standard deviations (S.D.) for CAR and CDE are defined as $\sqrt{\sum_{i=1}^{N}(CAR_{i,j} - \overline{CAR_j})/(N-1)}$ and $\sqrt{\sum_{i=1}^{N}(CDE_{i,j} - \overline{CDE_j})/(N-1)}$. The parentheses show the p-values. ***, **, * indicate that the mean value for the sued firms is statistically different from the value for the matched firms at the 1%, 5%, and 10% levels, respectively.

The results in Table 3 indicate that larger firms, and higher-growth firms (i.e., firms with a larger market-to-book ratio), are more likely to be the targets of litigation. The likelihood of the IPC alleging corporate fraud is related positively to stock turnover and volatility, and related negatively to return on assets. High-technology firms have a higher probability of being sued. With the exception of board size, the other corporate governance variables have a weak or insignificant impact on the probability of being sued. The results indicate that firms with a larger number of board members are more likely to be sued.

5.2. Shareholder wealth effects by event period

Table 4 shows the mean change in shareholder wealth for the sued and matching firms. We report the results for each of the five violation periods, and we conduct a two-sample *t*-test to test the null hypothesis that the two sample means are equal. The results using CARs are similar to those using CDEs for the pre-damage and revelation periods. When compared to the matching firms, the shareholders of sued firms earn significantly lower returns during the pre-damage period and higher returns during the revelation period. However, we find mixed results for the other three violation periods. The shareholders of the sued firms earn higher CARs than the matching firms during the damage period, but the CDEs show the opposite result.[11] However, the results using CDE can be driven by the wealth effects of a few large firms.

The results in Table 4 show an increase in CAR of 7.27% for the sued firms during the revelation period (CDE increases by NT$ 137.21 million). However, the shareholders of the sued firms experience a negative wealth effect during the suit-filing period. Sued-firm shareholders earn a negative average CAR of −0.74% after a class-action litigation is filed, which corresponds to an average economic loss of NT$ 214.94 million. Fig. 2 shows the results graphically.

The stock market not only punishes the shareholders of the sued fraudulent firms, but also the matching-firm shareholders as a result of the industry spillover effect. Table 4 shows that the sued-firm shareholders earn an average loss of NT$ 480.19 (=214.94 + 265.25) million during the suit-filing and post-filing periods. The matching-firm shareholders earn negative CDEs of approximately NT$ 221.48 and NT$ 188.33 during these two periods, respectively.

Our estimated loss is similar to several studies that examine U. S. firms. For example, Bhagat et al. (1998) estimated an average CAR for defendant firms of −0.97%. Lieser and Kolaric (2016) showed an average CAR of −0.80% when lawsuits are filed. Our results also are similar to Bauer and Braun (2010).

5.3. Shareholder wealth effects across event periods

Hypothesis 2 predicts that shareholders' wealth should vary significantly across the five violation sub-periods. Table 5 compares the change in shareholders' wealth for the sued and matching firms between the pre-damage and damage periods, the revelation and damage periods, the suit-filing and revelation periods, and the post-filing and suit-filing periods.

We find that when compared to the pre-damage period, the shareholders of sued firms earn higher returns during the damage period. The mean CAR is equal to 3.92%, which corresponds to a CDE of NT$ 95 million. The difference between the revelation and damage period CARs for the sued firms is approximately 2.31% (or about NT$ 65.9 million). However, sued-firm shareholders lose wealth when the IPC files a lawsuit. The mean difference in the CARs between the suit-filing and revelation period is approximately −8.02%, or about

[11] We also find a conflicting result during the suit-filing period: the CARs for the sued firms are lower than for the matching firms, but the CDEs for the sued firms are higher.

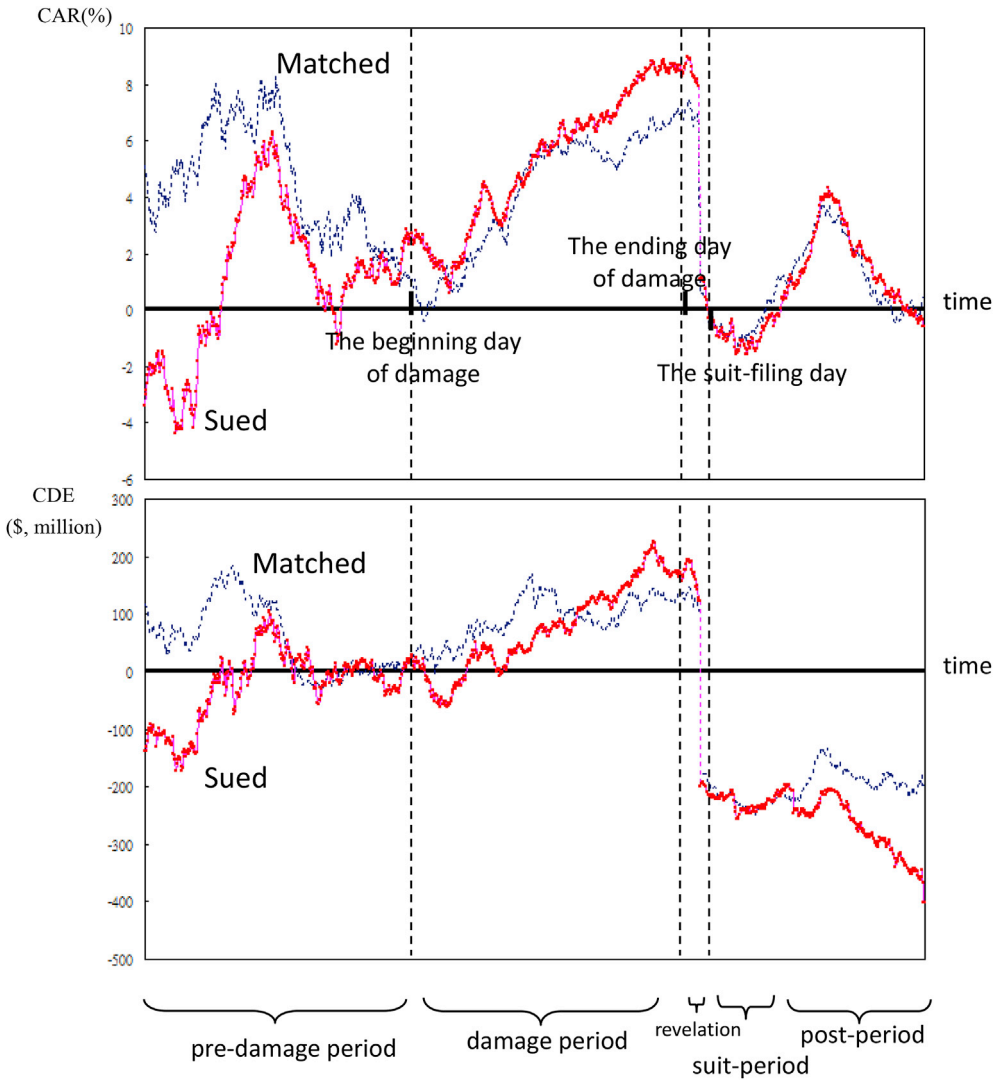

Fig. 2. The change in shareholder wealth across the five periods. The graphs show the cumulative abnormal returns (CAR) and cumulative dollar effect (CDE) across the five periods that define the violation cycle of corporate fraud. The length of the pre-damage period is 365 calendar days ending with the first day of the damage period. The mean length of the damage period is 378 calendar days. The length of the revelation period is 10 calendar days. The suit-filing period is 90 calendar days, and the post-filing period is 365 calendar days. The interval between the revelation day and the suit-filing day has a mean of 916 days for our sample.

NT$ 352.15 million. The mean difference in the CARs and CDEs for the sued firms is 2.06% and NT$ −50.31 million between the suit-filing and post-filing periods, respectively.

Table 5 also reports the results for the matched firms. In general, the mean changes in the CARs and CDEs of the sued and matching firms exhibit a similar pattern across the cycle of corporate fraud.

5.4. The litigation information effect

We also test the litigation information effect by using a multivariate model. The dependent variable is either CAR or CDE (which we refer to as *Wealth* in Equation (8)).

$$Wealth_{ij} = \beta_0 + \sum_{j=1}^{5} \beta_j Period\_dummies_j + \sum_{k=6}^{12} \beta_k Control\ Variables_{ikj} + \varepsilon_{ij} \quad (8)$$

Table 6 shows the results of regression models that examine shareholder wealth effects across the violation periods. The dependent variable is either CAR (Models 1 and 2) or CDE (Models 3 and 4). The coefficient for the dummy variable PRE shows that sued-firm shareholders earn positive returns during the pre-damage period. However, sued-firm shareholders lose wealth during the later

Table 5
Changes in shareholder wealth across the five periods: A comparison.

Periods		CAR(%)		CDE(in dollar/million)	
		Sued firms	Matched firms	Sued firms	Matched firms
Damage minus Pre-damage	difference	3.92 ***	−0.50 ***	94.98 ***	25.85 ***
	(p-value)	(0.00)	(0.00)	(0.00)	(0.00)
Revelation minus Damage	difference	2.31 ***	2.12 ***	65.86 ***	11.59
	(p-value)	(0.00)	(0.00)	(0.00)	(0.25)
Suit-filing minus Revelation	difference	−8.02 ***	−6.22 ***	−352.15 ***	−313.97 ***
	(p-value)	(0.00)	(0.00)	(0.00)	(0.00)
Post-filing minus Suit-filing	difference	2.06 ***	1.43 ***	−50.31 ***	33.14 ***
	(p-value)	(0.00)	(0.00)	(0.00)	(0.00)

This table compares the cumulative abnormal returns (CAR) and cumulative dollar effects (CDE) for the sued and matched firms across different periods. The two average changes are defined as $\overline{CAR} = \frac{1}{N}\sum_{i=1}^{N} CAR_{i,[\tau_{j1},\tau]}$, and $\overline{CDE} = \frac{1}{N}\sum_{i=1}^{N} CDE_{i,[\tau_{j1},\tau]}$. The estimated standard deviations (S.D.) are defined as $\sqrt{\sum_{i=1}^{N}(CAR_{i,j} - \overline{CAR_j})/(N-1)}$ and $\sqrt{\sum_{i=1}^{N}(CDE_{i,j} - \overline{CDE_j})/(N-1)}$. The parentheses show the p-values. ***, **, * indicate that the mean value for the sued firms is statistically different from the value for the matched firms at the 1%, 5%, and 10% levels, respectively.

violation periods. The significant control variables include the market-to-book ratio, the dividend payout ratio, firm size, stock turnover (Model 2) and firm size (Model 4).

The positive effect of the book-to-market ratio on shareholder wealth, and the negative relation between shareholders' wealth and firm size, are consistent with the findings of Bauer and Braun (2010). We also measure potential agency problems by including the firm's dividend payout ratio. The results in Table 6 show that the dividend payout ratio is related positively to CAR. Stock volatility and the technology industry dummy variable have an insignificant impact on shareholder wealth.

Table 7 extends our analysis by conducting robustness checks. We test the individual effect by analyzing the difference in shareholders' wealth after controlling for the sued or matching firms and the time periods, i.e., H_0:$\beta_1 = \beta_6$, $\beta_2 = \beta_7$, $\beta_3 = \beta_8$ … etc. We test the null hypothesis that the litigation information effect does not differ between the sued and matching firms.

Table 6
The determinants of changes of shareholder wealth.

	CAR		CDE	
	(1)	(2)	(3)	(4)
Intercept	2.93	7.20	22.57*	25.39**
	(0.53)	(0.12)	(0.08)	(0.05)
PRE	4.97***		8.21***	
	(0.00)		(0.00)	
DAM		−3.14**		−4.50
		(0.02)		(0.21)
REV		−5.61***		−6.74*
		(0.00)		(0.06)
SUIT		−4.91***		−9.74***
		(0.00)		(0.01)
POST		−4.16***		−6.66*
		(0.00)		(0.07)
Book-to-market	2.51***	2.60***	1.91	2.28*
	(0.00)	(0.00)	(0.11)	(0.05)
Size	−0.32	−0.31	−1.62**	−1.38*
	(0.25)	(0.25)	(0.03)	(0.06)
Payout	0.29**	0.32**	0.54	0.64*
	(0.02)	(0.01)	(0.12)	(0.06)
Stock turnover	0.82**	0.77**	0.42	0.41
	(0.02)	(0.04)	(0.67)	(0.68)
Stock volatility	−0.36	−0.36	0.04	0.01
	(0.30)	(0.30)	(0.97)	(0.99)
Tech-dummy	1.19	1.26	0.41	0.06
	(0.18)	(0.15)	(0.86)	(0.98)
Adj R^2	0.07	0.07	0.01	0.01

The dependent variables are the change in cumulative abnormal return (CAR) and cumulative dollar effect (CDE). The independent variables in the five period dummy variables (PRE, DAM, REV, SUIT, and POST), the book-to-market ratio, firm size, dividend payout, stock turnover, stock volatility, and a technology industry dummy. Table A1 in the Appendix lists the variables and their definitions. To avoid a singularity problem, specifications (1) and (3) consider only the impact of the pre-damage period on shareholders' wealth. Specifications (2) and (4) test the impact of the other violation periods. The parentheses report p-values. ***, **, * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

$$Wealth_{ij} = \beta_0 + \beta_1 PRE \times SAM + \beta_2 PRE \times MAT + \sum_{k=3}^{9} \beta_k Control\ Variables_{ikj} + \varepsilon_{ij} \quad (9)$$

$$Wealth_{ij} = \beta_0 + \beta_2 DAM \times SAM + \beta_3 REV \times SAM + \beta_4 SUIT \times SAM + \beta_5 POST \times SAM + \beta_6 PRE \times MAT + \beta_7 DAM \times MAT + \beta_8 REV \times MAT + \beta_9 SUIT \times MAT + \beta_{10} POST \times MAT + \sum_{k=11}^{17} \beta_k Control\ Variables_{ikj} + \varepsilon_{ij} \quad (10)$$

Table 7 presents the results for the individual litigation information effects. The results in Panel A are similar to the results in Table 6. Both the sued and matching firms experience a positive wealth effect during the pre-damage period. However, sued- and matching-firm shareholders earn lower returns during the remaining four violation periods. Panel B reports the p-values of the estimated differences

Table 7
The individual litigation information effect for sued and matching firms.

Panel A The regressions of individual litigation information effect for sued firms and matched firms				
	CAR		CDE	
	(1)	(2)	(3)	(4)
Intercept	3.29	8.33 *	23.67 *	32.78 **
	(0.48)	(0.09)	(0.07)	(0.01)
PRE × SAM (β_1)	5.93 ***		11.61 ***	
	(0.00)		(0.00)	
DAM × SAM (β_2)		−3.52 *		−9.10 *
		(0.06)		(0.07)
REV × SAM (β_3)		−6.78 ***		−11.73 **
		(0.00)		(0.02)
SUE × SAM (β_4)		−6.11 ***		−13.74 ***
		(0.00)		(0.01)
POST × SAM (β_5)		−4.62 **		−8.07
		(0.02)		(0.12)
PRE × MAT (β_6)	4.00 ***	−1.62	4.70	−9.69 *
	(0.01)	(0.40)	(0.23)	(0.06)
DAM × MAT (β_7)		−4.40 **		−9.49 *
		(0.02)		(0.06)
REV × MAT (β_8)		−6.05 ***		−11.41 **
		(0.00)		(0.02)
SUE × MAT (β_9)		−5.36 ***		−15.06 ***
		(0.00)		(0.00)
POST × MAT(β_{10})		−5.26 ***		−14.19 ***
		(0.00)		(0.00)
Firm size	2.53 ***	2.62 ***	1.96	2.32 *
	(0.00)	(0.00)	(0.10)	(0.05)
Book-to-market	−0.34	−0.33	−1.69 **	−1.50 **
	(0.22)	(0.23)	(0.03)	(0.05)
Payout	0.29 **	0.32 **	0.54	0.65 *
	(0.02)	(0.01)	(0.12)	(0.06)
Stock turnover	0.83 **	0.79 **	0.44	0.54
	(0.02)	(0.04)	(0.65)	(0.60)
Stock volatility	−0.37	−0.38	−0.01	−0.25
	(0.28)	(0.28)	(0.99)	(0.83)
Tech-dummy	1.14	1.22	0.24	−0.50
	(0.20)	(0.17)	(0.92)	(0.83)
Adj R^2	0.07	0.06	0.01	0.01
Panel B The estimated difference of individual litigation information effect for sued firms and matched firms				
H0:β_1-β_6 = 0	1.93		6.91	
	(0.32)		(0.19)	
β_2-β_7 = 0		0.89		0.39
		(0.63)		(0.94)
β_3-β_8 = 0		−0.73		−0.32
		(0.70)		(0.95)
β_4-β_9 = 0		−0.75		1.32
		(0.69)		(0.79)
β_5-β_{10} = 0		0.64		6.11
		(0.73)		(0.23)

The dependent variables are the cumulative abnormal return (CAR) and cumulative dollar effect (CDE). Table A1 in the Appendix lists the variables and their definitions. SAM and MAT refer to the sample and matching firms. The parentheses report p-values. ***, **, * indicate statistically significance at the 1%, 5%, and 10% levels, respectively.

Table 8
The SFIPA, corporate fraud and shareholder wealth.

	Full Sample				Pre-SFIPA period (Sample occurred before 2003)				Post-SFIPA period (Sample occurred after 2003)			
	CAR		CDE		CAR		CDE		CAR		CDE	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Intercept	5.24	2.58	27.57**	19.62	3.51	2.22	-6.87	-5.88	10.08	8.28	52.23***	46.32**
	(0.28)	(0.60)	(0.04)	(0.82)	(0.71)	(0.82)	(0.31)	(0.20)	(0.10)	(0.18)	(0.00)	(0.00)
SFIPA	3.80***	3.74***	8.92***	8.24***								
	(0.00)	(0.00)	(0.00)	(0.00)								
SAM×suit-risk	-0.35	1.29	4.64	7.50*	-0.59	0.83	8.11	8.71	-0.75	1.45	-0.54	4.58
	(0.83)	(0.42)	(0.27)	(0.08)	(0.80)	(0.74)	(0.23)	(0.24)	(0.71)	(0.49)	(0.92)	(0.37)
PRE×suit-risk	9.27***		15.91***		6.14*		8.70		10.87***		25.39***	
	(0.00)		(0.01)		(0.07)		(0.36)		(0.00)		(0.00)	
DAM×suit-risk		-7.69***		-9.92		-4.89		-1.93		-8.44**		-16.29**
		(0.00)		(0.14)		(0.18)		(0.86)		(0.01)		(0.04)
REV×suit-risk		-10.27***		-12.69**		-6.35*		-3.34		-11.64***		-20.48**
		(0.00)		(0.04)		(0.06)		(0.73)		(0.00)		(0.01)
SUIT×suit-risk		-8.22***		-16.68**		2.25		-3.72		-14.68***		-27.01***
		(0.00)		(0.02)		(0.55)		(0.73)		(0.00)		(0.00)
POST×suit-risk		-6.27**		-10.64		-6.75*		-3.90		-5.18		-5.28
		(0.02)		(0.13)		(0.08)		(0.23)		(0.12)		(0.52)
Book-to-market	2.48***	2.54***	1.73	2.08*	1.75***	1.71***	2.07	2.12	3.03***	2.96***	1.44	1.58*
	(0.00)	(0.00)	(0.15)	(0.08)	(0.01)	(0.01)	(0.26)	(0.26)	(0.00)	(0.00)	(0.36)	(0.30)
Size	-0.51*	-0.23	-2.14***	-1.45*	-0.35	-0.25	1.64	2.23	-0.61*	-0.34	-3.40***	-2.73**
	(0.08)	(0.43)	(0.01)	(0.06)	(0.55)	(0.67)	(0.32)	(0.20)	(0.08)	(0.34)	(0.00)	(0.00)
Payout	0.22*	0.16	0.42	0.41	0.24	0.18	0.51	0.45	0.21	0.18	0.34	0.34
	(0.10)	(0.20)	(0.24)	(0.24)	(0.39)	(0.51)	(0.52)	(0.58)	(0.16)	(0.21)	(0.36)	(0.34)
Stock turnover	0.85**	1.14***	0.22	0.61	1.12**	1.28**	0.12	-0.17	0.67	0.75	0.01	0.61
	(0.02)	(0.00)	(0.82)	(0.55)	(0.04)	(0.02)	(0.94)	(0.92)	(0.18)	(0.15)	(1.00)	(0.63)
Stock volatility	-0.62	-0.18	-0.44	0.19	-0.44	-0.14	-1.84	-0.96	-0.80	-0.16	0.87	1.66
	(0.17)	(0.70)	(0.72)	(0.88)	(0.48)	(0.84)	(0.30)	(0.62)	(0.21)	(0.80)	(0.59)	(0.31)
Tech-dummy	0.24	1.23	-2.31	-1.09	-1.20	-0.10	-4.49	-2.87	1.34	1.90	0.32	0.59
	(0.80)	(0.18)	(0.35)	(0.66)	(0.45)	(0.95)	(0.32)	(0.53)	(0.26)	(0.11)	(0.91)	(0.84)
Adj R^2	0.08	0.09	0.03	0.02	0.02	0.03	0.00	0.00	0.08	0.09	0.05	0.05

The dependent variables cumulative abnormal return (CAR) and cumulative dollar effect (CDE). The independent variables include suit-risk to measure the probability of being sued, which we estimate by using Model Specification (4) of Equation (1). SAM is equal to one if the firm is a sued firm; zero otherwise. PRE, DAM, REV, SUIT, and POST are period-dummies during the violation cycle of corporate fraud. The independent variables also include firm size, the book-to-market ratio, dividend payout, stock turnover, stock volatility, and a technology industry dummy. Table A1 in the Appendix lists the variables and their definitions. To avoid a singularity problem, Specifications (1), (3), and (5) consider the impact of the interaction between PRE and suit-risk on shareholders' wealth. Specifications (2), (4), and (6) examine the impact of the interactions between the other period-dummies and suit-risk. The parentheses report p-values. ***, **, * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

between the two groups for the same violation period. None of the p-values are significant at conventional levels. We conclude that the sued- and matched-firms exhibit similar stock price performance after including the control variables.

5.5. The effectiveness of class-action litigation threat and SFIPA on shareholders' wealth

Hypothesis 1 examines the impact of the SFIPA, and the formation of the IPC, on shareholder wealth during the violation cycle of corporate fraud. Models 1–4 test the impact of the SFIPA by including a dummy variable which is equal to one if an event occurred after 2003, and zero otherwise. We expect the sign of the SFIPA dummy variable to be positive. Models 5–8 test models during the pre-SFIPA period, and Models 9–12 examine the post-SFIPA period.

Our models also include lawsuit risk by using the fitted value of Equation (1) (specifically Model 4 in Table 3) to examine the change in shareholder wealth. We test whether lawsuit risk (*suit-risk*) differs across the periods. We introduce five interaction items of suit-risk and the violation period dummy variables. Because firms with a greater propensity to commit fraud have a higher suit-risk, we expect the coefficients of the interaction terms to be related negatively to shareholders' wealth.

$$Wealth_{ij} = \beta_0 + \beta_1 SFIPA + \beta_2 SAM \times suit\_risk_{ij} + \beta_3 PRE \times suit\_risk_{ij} + \sum_{k=4}^{10} \beta_k Control\ Variables_{ikj} + \varepsilon_{ij} \tag{11}$$

$$Wealth_{ij} = \beta_0 + \beta_1 SFIPA + \beta_2 SAM \times suit\_risk_{ij} + \beta_3 DAM \times suit\_risk_{ij} + \beta_4 REV \times suit\_risk_{ij} + \beta_5 SUIT \times suit\_risk_{ij} + \beta_6 POST \times suit\_risk_{ij} + \sum_{k=7}^{12} \beta_k Control\ Variables_{ikj} + \varepsilon_{ij} \tag{12}$$

Table 8 shows the results for models that test Hypothesis 1. Models 1–4 show a significantly positive relation between the change in shareholder wealth and the SFIPA. Sued-firm shareholders earned higher returns after the passage of the SFIPA.

In general, the results for the other coefficients are similar across the models. The positive and significant coefficient for the interaction term of PRE and *suit-risk* indicates that investors earned higher returns during the pre-damage period when investors anticipated a class action lawsuit. This result supports Hypothesis 3. In contrast, the coefficients for most of the other interaction terms that examine *suit-risk* and violation period are related inversely to shareholders' wealth. The results indicate that sued fraudulent firms with higher litigation risk (i.e. lower firm quality) produced larger losses for shareholders. Finally, the results in Table 8 show a weak effect regarding the legal threat on shareholders' wealth in the pre-SFIPA period (Models 5–8), but a stronger effect during the post-SFIPA period (Models 9–12).

6. Robustness tests

6.1. The filing effect and the industry spillover effect

Our final tests examine the filing and industry spillover effects by using the following model.

$$Sued\ firm's\ wealth_{ij} = \beta_0 + \beta_1 SFIPA + \beta_2 PRE \times SAM \times Suit_{riskij} + \beta_3 PRE \times MAT \times Suit_{riskij} + \sum_{k=4}^{10} \beta_k Control\ Variables_{ikj} + \varepsilon_i \tag{13}$$

$$Sued\ firm's\ wealth_{ij} = \beta_0 + \beta_1 SFIPA + \beta_2 DAM \times SAM \times Suit\_risk_{ij} + \beta_3 REV \times SAM \times Suit\_risk_{ij} + \beta_4 SUIT \times SAM \times Suit\_risk_{ij} + \beta_5 POST \times SAM \times Suit\_risk_{ij} + \beta_6 PRE \times MAT \times Suit\_risk_{ij} + \beta_7 DAM \times MAT \times Suit\_risk_{ij} + \beta_8 REV \times MAT \times Suit\_risk_{ij} + \beta_9 SUIT \times MAT \times Suit\_risk_{ij} + \beta_{10} POST \times MAT \times Suit\_risk_{ij} + \sum_{k=11}^{17} \beta_k Control\ Variables_{ikj} + \varepsilon_i \tag{14}$$

The dependent variable for both regressions is the change in shareholders' wealth. We separate the impact of corporate fraud into two parts to identify the cause: 1) the interaction terms with the period-dummies, SAM, and suit_risk to capture the filing effect across the various periods, and 2) the interaction terms and period-dummies, MAT, and suit-risk to capture the industry spillover effect.

The results in Table 9 show that the largest loss for the sued-firm shareholders is a negative CAR of 8.45% during the revelation period. In addition, all of the interaction terms including the period dummy variables (i.e., period-dummies × MAT × suit_risk), which measure the industry spillover effect, are significantly negatively related to the shareholder wealth.

6.2. Alternative matching approach

Our results reflect a procedure of identifying a matching firm by using each sample firm's size (measured by total assets) and industry classification. Although previous researchers, such as Ferris et al. (2007) and Fich and Shivdasani (2007), often use this approach, a reviewer suggested that we examine the sensitivity of our results to the matching procedure by identifying additional firm characteristics.

Table 9
The filing and industry spillover effects.

	Sued firms' CAR		Sued firms' CDE	
	(1)	(2)	(3)	(4)
Intercept	4.47	2.01	20.56***	14.95*
	(0.21)	(0.57)	(0.01)	(0.06)
SFIPA	1.75***	1.75***	3.23**	2.98**
	(0.01)	(0.01)	(0.02)	(0.03)
PRE × SAM × suit-risk	10.45***		19.84***	
	(0.00)		(0.00)	
DAM × SAM × suit-risk		−5.73**		−13.79***
		(0.01)		(0.01)
REV × SAM × suit-risk		−8.45***		−14.12***
		(0.00)		(0.00)
SUIT × SAM × suit-risk		−6.89***		−17.97***
		(0.00)		(0.00)
POST × SAM × suit-risk		−4.22*		−7.29
		(0.08)		(0.18)
PRE × MAT × suit-risk	−2.27	−10.36***	−2.99	−18.75***
	(0.32)	(0.00)	(0.54)	(0.00)
DAM × MAT × suit-risk		−9.73***		−18.47***
		(0.00)		(0.00)
REV × MAT × suit-risk		−9.67***		−18.37***
		(0.00)		(0.00)
SUIT × MAT × suit-risk		−10.20***		−18.31***
		(0.00)		(0.00)
POST × MAT × suit-risk		−10.50***		−18.66***
		(0.00)		(0.00)
Book-to-market	1.71***	1.74***	0.93	0.95
	(0.00)	(0.00)	(0.19)	(0.18)
Size	−0.38*	−0.10	−1.51***	−0.87*
	(0.07)	(0.65)	(0.00)	(0.06)
Payout	0.05	−0.00	0.00	−0.13
	(0.59)	(0.98)	(0.99)	(0.54)
Stock turnover	0.44*	0.64**	0.12	0.55
	(0.10)	(0.02)	(0.84)	(0.38)
Stock volatility	−0.33	0.17	0.46	1.42*
	(0.30)	(0.61)	(0.50)	(0.06)
Tech-dummy	0.13	1.24*	−0.57	1.57
	(0.85)	(0.07)	(0.69)	(0.29)
Adj R^2	0.07	0.07	3.23	2.98

The dependent variables are the shareholders' wealth of the sued firms measured by SAM × CAR and SAM × CDE respectively. The SAM dummy variable is equal to one if the firm is a sued firm; zero otherwise. MAT is equal to one if the firm is a matching firm; zero otherwise. SFIPA is equal to one if the corporate fraud event occurred after 2003; zero otherwise. PRE, DAM, REV, SUIT, and POST are period dummies during the violation cycle of corporate fraud. The other independent variables include firm size, the book-to-market ratio, dividend payout, stock turnover, stock volatility, and a technology industry dummy. Table A1 in the Appendix lists the variables and their definitions. To avoid a singularity problem, Specifications (1) and (3) consider the impact of the interaction between PRE and SAM on shareholders' wealth. Specifications (2) and (4) examine the impact of the interactions between the other period-dummies and suit-risk. The parentheses report p-values. ***, **, * indicate statistically significance at the 1%, 5%, and 10% levels, respectively.

We follow Lieser and Kolaric (2016), who use a standardized Euclidean approach to identify their matching firms. The approach considers multiple dimensions as a way to find the minimum distance between a sued firm and its industry peers. We conduct the matching process by using two dimensions (total assets and return on assets) and three dimensions (total assets, return on assets and sales) (see, for example, Barber and Lyon (1996) and Hankir, Rauch and Umber (2011)).[12] The method normalizes each dimension by subtracting the industry mean from the sample firm's characteristic. The Euclidean distances for two and three dimensions are defined below.

$$dist_{i,t} = \sqrt{(NormAsset_{suedi,t} - NormAsset_{i,t})^2 + (NormROA_{suedi,t} - NormROA_{i,t})^2} \tag{15}$$

$$dist_{i,t} = \sqrt[3]{\begin{array}{r}(NormAsset_{suedi,t} - NormAsset_{i,t})^2 + (NormROA_{suedi,t} - NormROA_{i,t})^2 \\ +(NormSales_{suedi,t} - NormSales_{i,t})^2\end{array}} \tag{16}$$

[12] Lieser and Kolaric (2016) and Hanker, Rauch and Umber (2011) use market value as one of two dimensions. However, we use sales instead of market value due to data restrictions.

Table 10
The probability of being a sued firm: Alternative matching procedures.

Variable	Control firms screened by single dimension	Control firms screened by Euclidean approach with two dimensions	Control firms screened by Euclidean approach with three dimensions
	(1)	(2)	(3)
Intercept	−4.79***	0.73	1.64
	(0.00)	(0.53)	(0.16)
Log(Asset)	0.19***	−0.13**	−0.17**
	(0.00)	(0.04)	(0.01)
Market-to-book	0.17**	0.18**	0.19**
	(0.04)	(0.05)	(0.04)
Return-on-asset	−0.04***	−0.03***	−0.02**
	(0.00)	(0.00)	(0.02)
Stock return	−0.05	−0.12	−0.11
	(0.60)	(0.16)	(0.19)
Stock turnover	0.20***	0.32***	0.23***
	(0.01)	(0.00)	(0.01)
Stock volatility	0.30***	0.33***	0.32***
	(0.00)	(0.00)	(0.00)
Tech-dummy	0.62***	−0.20	0.15
	(0.00)	(0.28)	(0.41)
Board size	0.07**	0.05*	0.08***
	(0.01)	(0.06)	(0.00)
CEO duality	0.03	−0.12	−0.58***
	(0.87)	(0.53)	(0.00)
Institutional ownership	−0.01	0.01**	0.01
	(0.20)	(0.03)	(0.16)
Block ownership	0.01	−0.02**	−0.01*
	(0.49)	(0.03)	(0.06)
Officer ownership	−0.06**	−0.00	−0.01
	(0.05)	(0.97)	(0.75)
% of outsider director	0.01	0.02**	0.00
	(0.27)	(0.04)	(0.67)
% of gray director	−0.01	−0.02***	−0.02***
	(0.15)	(0.00)	(0.01)
Pseudo R^2	0.09	0.10	0.09

The dependent variable, SAM, is equal to one for the 84 sued firms; zero otherwise. The independent variables include the firm-specific characteristics, stock price performance, and corporate governance variables for the *j*th-period. The *j*th-period indicates the pre-damage, damage, revelation, suit-filing, and post-filing periods, respectively. The firm-specific characteristics consist of firm size, growth, and ROA. The stock price performance variables include stock return, stock turnover, stock volatility, and a technology industry dummy. The corporate governance variables include board size, CEO duality, institutional ownership, block ownership, officer ownership, the ratio of outsider directors, and the ratio of gray directors. Table A1 in the Appendix lists the variables and their definitions. The parentheses report p-values. ***, **, * indicate statistically significance at the 1%, 5%, and 10% levels, respectively.

We re-estimate suit-risk, the probability of being a sued firm, by using Equation (1) and the new matching firms. The results in Table 10 are similar to the results shown in Table 3. The primary difference is that some of the corporate governance variables are now statistically significant.

We also re-estimate Equations (11) and (12) with the new matching firms. Table 11 compares the results for the different methods of identifying the matching firms. Panel A shows the results with our original matching approach, and Panels B and C show the results with the Euclidean approach for two and three dimensions, respectively.

Our primary hypothesis examines how (if at all) the SFIPA affected changes in shareholder wealth. The most important result in Table 11 is that the variable SFIPA is positive and statistically significant regardless of the matching procedure. However, we also find that some of our results vary with the matching procedure. First, the interaction term for SAM and *suit-risk* is negative for the CDE models in Panel B (two-dimension matching) and Panel C (three-dimension matching). Shareholders of sued firms earn lower CDE when litigation risk is high. Second, consistent with the pattern of Fig. 2, fraudulent firms experience greater CDE during the damage period. Third, shareholders' wealth increases during the post-filing period.

6.3. *The endogenous problem between corporate fraud risk and shareholders' wealth*

We also examine whether endogeneity creates a bias in the results obtained by using OLS. We employ a two-stage least squares regression (TSLS) model to test this issue. We use the Durbin-Wu-Hausman procedure (Durbin, 1954; Hausman, 1978; Wu, 1973) which regresses shareholders' wealth on the residuals from Equation (18) to identify endogenity. We use a logistic regression of Equation (18)

Table 11
Shareholder wealth effects and matching procedure robustness tests.

	Panel A				Panel B				Panel C			
	Control firms screened by single dimension				Control firms screened by Euclidean approach with two dimensions				Control firms screened by Euclidean approach with three dimensions			
	CAR		CDE		CAR		CDE		CAR		CDE	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Intercept	5.24	2.58	27.57**	19.62	4.78	3.77	258.26	181.01	4.71	3.26	375.78	281.15
	(0.28)	(0.60)	(0.04)	(0.43)	(0.32)	(0.43)	(0.12)	(0.28)	(0.42)	(0.58)	(0.11)	(0.24)
SFIPA	3.80***	3.74***	8.92***	8.24***	2.03**	2.05**	73.34**	76.15**	2.60**	2.78***	122.69***	131.81***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.02)	(0.02)	(0.02)	(0.01)	(0.02)	(0.01)	(0.00)	(0.00)
SAM × suit-risk	−0.35	1.29	4.64	7.50*	−0.34	−0.54	−89.41*	−108.56**	−0.56	−0.89	−115.92*	−147.98**
	(0.83)	(0.42)	(0.27)	(0.08)	(0.81)	(0.72)	(0.08)	(0.04)	(0.75)	(0.62)	(0.10)	(0.04)
PRE × suit-risk	9.27***		15.91***		−2.36		−119.82*		−2.74		−177.15*	
	(0.00)		(0.01)		(0.23)		(0.08)		(0.24)		(0.06)	
DAM × suit-risk		−7.69***		−9.92		2.89		152.56**		3.96		203.25*
		(0.00)		(0.14)		(0.19)		(0.05)		(0.14)		(0.06)
REV × suit-risk		−10.27***		−12.69**		−0.75		101.01		−0.52		141.87
		(0.00)		(0.04)		(0.73)		(0.19)		(0.85)		(0.19)
SUIT × suit-risk		−8.22***		−16.68**		1.26		106.41		2.34		152.79
		(0.00)		(0.02)		(0.61)		(0.22)		(0.42)		(0.19)
POST × suit-risk		−6.27**		−10.64		5.44**		148.98*		10.31***		266.57**
		(0.02)		(0.13)		(0.03)		(0.10)		(0.00)		(0.03)
Book-to-market	2.48***	2.54***	1.73	2.08*	2.07***	2.10***	15.83	19.60	2.46***	2.54***	27.12	33.15
	(0.00)	(0.00)	(0.15)	(0.08)	(0.00)	(0.00)	(0.31)	(0.20)	(0.00)	(0.00)	(0.21)	(0.12)
Size	−0.51*	−0.23	−2.14***	−1.45*	−0.42	−0.39	−15.72	−13.47	−0.45	−0.42	−26.33*	−24.22*
	(0.08)	(0.43)	(0.01)	(0.06)	(0.13)	(0.17)	(0.11)	(0.17)	(0.19)	(0.23)	(0.06)	(0.08)
Payout	0.22*	0.16	0.42	0.41	−0.04	−0.04	−1.61	−0.68	−0.04	−0.02	−0.39	0.65
	(0.10)	(0.20)	(0.24)	(0.24)	(0.65)	(0.71)	(0.63)	(0.84)	(0.75)	(0.84)	(0.94)	(0.89)
Stock turnover	0.85**	1.14***	0.22	0.61	0.44	0.52	19.47	11.64	0.75*	0.97**	34.32*	28.65
	(0.02)	(0.00)	(0.82)	(0.55)	(0.24)	(0.19)	(0.14)	(0.41)	(0.10)	(0.04)	(0.06)	(0.13)
Stock volatility	−0.62	−0.18	−0.44	0.19	−0.34	−0.57	−26.54*	−33.61**	−0.51	−0.94*	−27.23	−38.49*
	(0.17)	(0.70)	(0.72)	(0.88)	(0.43)	(0.20)	(0.08)	(0.03)	(0.32)	(0.08)	(0.19)	(0.07)
Tech-dummy	0.24	1.23	−2.31	−1.09	1.30	1.20	17.59	19.57	1.98*	1.60	14.39	3.47
	(0.80)	(0.18)	(0.35)	(0.66)	(0.13)	(0.17)	(0.56)	(0.52)	(0.07)	(0.14)	(0.74)	(0.94)
Adj R^2	0.08	0.09	0.03	0.02	0.04	0.04	0.02	0.01	0.04	0.06	0.02	0.02

The dependent variables are the cumulative abnormal returns (CAR) and cumulative dollar effects (CDE). The independent variables include suit-risk to measure the probability of being a sued firm. SAM is equal to one if firm is a sued firm; zero otherwise. PRE, DAM, REV, SUIT, and POST are period dummies during the violation cycle of corporate fraud. SFIPA is equal to one if the fraud event occurred after 2003; zero otherwise. The independent variables also include firm size, the book-to-market ratio, dividend payout, stock turnover, stock volatility, and a technology industry dummy. Table A1 in the Appendix lists the variables and their definitions. The parentheses report p-values. ***, **, * indicate statistically significance at the 1%, 5%, and 10% levels, respectively.

Table 12
Robustness tests for endogeneity between suit-risk and shareholders' wealth.

	Panel A				Panel B				Panel C			
	Control firms screened by single dimension				Control firms screened by Euclidean approach with two dimensions				Control firms screened by Euclidean approach with three dimensions			
	CAR		CDE		CAR		CDE		CAR		CDE	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Intercept	1.58	3.16	1.53	2.71	3.81	5.28	3.98	5.40	2.58	4.06	1.54	3.14
	(0.77)	(0.56)	(0.78)	(0.61)	(0.45)	(0.29)	(0.43)	(0.28)	(0.67)	(0.50)	(0.80)	(0.60)
Suit-risk	0.67	−8.37	−1.37	−8.19	4.62	−2.11	4.30	−2.19	12.19*	1.94	13.83**	2.87
	(0.93)	(0.11)	(0.85)	(0.12)	(0.42)	(0.55)	(0.45)	(0.54)	(0.07)	(0.64)	(0.04)	(0.49)
SAM × suit-risk	−8.07	0.74	−5.90	0.76	−7.21	−0.41	−7.05	−0.49	−12.22**	−1.76	−13.01**	−1.86
	(0.12)	(0.69)	(0.25)	(0.67)	(0.13)	(0.81)	(0.14)	(0.77)	(0.04)	(0.37)	(0.02)	(0.35)
SFIPA			3.70***	3.83***			2.11**	2.14**			2.92***	2.82***
			(0.00)	(0.00)			(0.01)	(0.01)			(0.01)	(0.01)
Size	−0.04	−0.02	−0.12	−0.11	−0.35	−0.35	−0.43	−0.42	−0.41	−0.35	−0.47	−0.41
	(0.92)	(0.96)	(0.73)	(0.75)	(0.20)	(0.21)	(0.12)	(0.13)	(0.23)	(0.30)	(0.17)	(0.23)
ROA	−0.06	−0.06	−0.08	−0.07	−0.08*	−0.07*	−0.09**	−0.08*	−0.07	−0.06	−0.08*	−0.07
	(0.24)	(0.28)	(0.16)	(0.17)	(0.06)	(0.09)	(0.04)	(0.06)	(0.13)	(0.21)	(0.09)	(0.15)
Book-to-market	2.36***	2.39***	2.28***	2.30***	1.89***	1.91***	1.87***	1.89***	2.43***	2.45***	2.42***	2.44***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Stock Turnover	1.16***	1.10***	1.18***	1.13***	0.68	0.58	0.71*	0.61	0.87*	0.73	0.89*	0.74
	(0.01)	(0.01)	(0.00)	(0.01)	(0.10)	(0.16)	(0.09)	(0.14)	(0.07)	(0.12)	(0.06)	(0.11)
Stock Volitility	−0.36	−0.32	−0.34	−0.31	−0.27	−0.28	−0.24	−0.24	−0.69	−0.69	−0.69	−0.69
	(0.51)	(0.56)	(0.53)	(0.57)	(0.55)	(0.54)	(0.60)	(0.60)	(0.21)	(0.21)	(0.21)	(0.20)
Tech_dummy	2.40**	2.49**	1.73	1.77	1.99**	1.89**	1.51*	1.42*	2.71**	2.58**	1.94*	1.84*
	(0.04)	(0.03)	(0.14)	(0.13)	(0.02)	(0.02)	(0.08)	(0.10)	(0.01)	(0.02)	(0.08)	(0.10)
SAM_res	4.80*		3.63		3.84		3.71		6.04*		6.44**	
	(0.07)		(0.17)		(0.13)		(0.14)		(0.06)		(0.04)	
Adj R^2	0.04	0.04	0.06	0.06	0.04	0.03	0.04	0.04	0.04	0.04	0.05	0.04

The dependent variable is cumulative abnormal return (CAR). The independent variables include suit-risk to measure the probability of being a sued firm. SAM is equal to one if firm is a sued firm; zero otherwise. SFIPA is equal to one if the fraud event occurred after 2003; zero otherwise. *SAM_res* is the residual of Equation (18). The independent variables also include firm size, ROA, the book-to-market ratio, stock return, stock turnover, stock volatility, and a technology industry dummy. Table A1 in the Appendix lists the variables and their definitions. The parentheses report p-values. ***, **, * indicate statistically significance at the 1%, 5%, and 10% levels, respectively.

to estimate the probability of a firm's being sued, *suit_risk,* and then estimate Equation (17). A statistically significant coefficient indicates that *suit_risk* is related endogenously to shareholders' wealth.[13]

$$Wealth_{ij} = \beta_0 + \beta_1 Suit\_risk_{i,j} + \beta_2 SAM \times Suit\_risk_{i,j} + \beta_3 SFIPA + \sum_{k=4}^{9} \beta_k X_{ikj} + \varepsilon_{ij} \quad (17)$$

$$SAM_i = \beta_0 + \beta_j X_{ij} + \delta_1 Z_1 + \upsilon_i \quad (18)$$

The instrument variable, Z_1, is excluded in X_i. We use the debt ratio to control it (Kim & Skinner, 2012). The procedure also requires a fitness test to determine if the instrument variable passes a correlation test (i.e. $cor(sam,z) \neq 0$). As a result, we find that the instrument variables are statistically significant. Moreover, the F-statistics are greater than 10, which is the critical value used by Stock and Watson (2007). Our results support the correlation test and the weak-instrument tests for the instrument variables.

Table 12 shows the results of the tests for endogeneity between shareholders' wealth and *suit_risk*.[14] We find a weak significance of SAM_res in Panel A, which indicates endogeneity does exist for our original matching approach before controlling for the SFIPA. However, the result does not hold after we control for the effect of the SFIPA.

Panel B, which uses the Euclidean matching approach with two dimensions, shows no evidence on an endogeneity problem. Panel C, which uses the Euclidean matching approach with three dimensions, produces a statically significant result for SAM_res. However, the two coefficients of suit-risk in Models 10 and 12 are insignificant. Overall, we conclude that endogeneity does not have a significant impact on our results.

7. Conclusions

Our paper examines several issues related to the shareholder wealth effects of corporate fraud involving Taiwanese firms. First, we test models that examine the likelihood of a firm's being sued. Second, we examine the impact of class action lawsuits on the wealth of Taiwanese shareholders over different periods during the violation cycle. Third, we examine the impact of the Securities Investors and Futures Traders Protection Act (SFIPA) on changes in shareholder wealth. Fourth, we examine damage channels, which measure the litigation-information and industry-spillover effects. Finally, we conduct robustness tests by considering alternative matching procedures and by testing for endogeneity.

Our results indicate that the likelihood of being sued is greater for firms that have exhibited poor past performance relative to peers. In addition, we find that sued-firm shareholders lose wealth during the violation cycle of corporate fraud, and that the losses are due to the filing effect and the industry-spillover effect. Finally, we find evidence that shareholders earned higher returns after the passage of the SFIPA. The results hold after conducting the robustness tests. As a result, we conclude that shareholders can benefit from external monitoring of the firm's managers, particularly in cases when firms operate in environments with weaker internal governance mechanisms.

Legislative actions that provide greater investor protection can benefit a country by attracting capital, reducing agency problems at the firm level, and stimulating economic growth. Based on the results of our study, we conclude that the passage of the SFIPA had a beneficial impact on Taiwanese investors. However, we recognize that Taiwan's experience may not be applicable to other countries necessarily. Legislators, corporate managers and investors should recognize that the effectiveness of any proposed legislation ultimately will depend on a number of factors including the protections provided, the strength and fairness of the country's legal system, and cultural norms.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.iref.2019.09.010.

[13] The Durbin-Wu-Hausman procedure (see Equation (19) below) regresses shareholders' wealth on the residual of Equation (18), i.e. v is defined as *SAM_res*. If δ_1 is significant, then we conclude that suit_risk is endogenously related to shareholders' wealth. $Wealth_{ij} = \beta_0 + \beta_1 Suit\_risk_{i,j} + \beta_2 SAM \times Suit\_risk_{i,j} + \beta_3 SFIPA + \sum_{k=4}^{9} \beta_k X_{ikj} + \delta_1 SAM\_res_{i,t} + \varepsilon_{ij}$ (19).

[14] We find no evidence of an endogenous relation between CDE and suit_risk. As a result, Table 12 reports only the results of the endogeneity test between CAR and suit_risk.

Appendix

Table A1
Variables definitions.

variables	definition
Shareholders' wealth	
CAR	CAR is the cumulative standardized abnormal return (SAR), which we calculate by using the event study procedure of Brown and Warner (1985).
CDE	CDE is the cumulative dollar economic effect, which we calculate by using the procedure described by Gande and Lewis (2009).
Sample	
SAM	is equal to one if the firm is a sued firm; zero otherwise.
MAT	is equal to one if the firm is a matching firm; zero otherwise.
Litigation dummies	
PRE	is equal to one during the pre-damage period; zero otherwise.
DAM	is equal to one during the damage period; zero otherwise.
REV	is equal to one during the revelation period; zero otherwise.
SUIT	is equal to one during the suit-filing period; zero otherwise.
POST	is equal to one during the post-filing period; zero otherwise.
SFIPA	is equal to one if the corporate fraud event occurred after 2003; zero otherwise.
Suit-risk	measures the probability of a firm being sued firm by Specification (4) of Equation (1).
Firm-specific	
Firm size	Log of a firm's total assets at t-1.
Book-to-market	The ratio of book value at t scaled by market value at t-1.
Payout	The ratio of total cash dividend at t scaled by market value at t-1.
Leverage	The ratio of total debt at t scaled by total asset at t-1.
EBIT ratio	The ratio of EBIT at t scaled by total asset at t-1.
ROA	The ratio of net income at t scaled by total asset at t-1.
ROE	The ratio of net income at t scaled by total equity at t-1.
Tech-dummy	Takes a value of one if a firm's industry classification (SIC code) is M23 or M24; zero otherwise.
Stock price performance	
Stock return	For the logistic regressions using Equation (1), stock return is the compounded rate of daily return over the one-year calendar period preceding the filing of the litigation (see (Ferris et al., 2007)). When we test wealth effects across the violation cycle of corporate fraud, stock return is the compounded rate of daily return during each period.
Stock turnover	For the logistic regressions using Equation (1), stock turnover is the average daily ratio of (trade volume ÷ total outstanding shares) over the one-year calendar period preceding the filing of the litigation (see (Ferris et al., 2007)). When we test wealth effects across the violation cycle of corporate fraud, stock turnover is the mean ratio during each period.
Stock volatility	For the logistic regressions using Equation (1), stock volatility is the standard deviation of daily return over the one-year calendar period preceding the filing of the litigation (see (Ferris et al., 2007)). When we test the wealth effects across the violation cycle of corporate fraud, stock volatility is the standard deviation of daily return during each period.
Corporate Governance	
Board size	Log of the number of board directors.
CEO duality	Measured as a dummy variable with a value of one if the position of chair and CEO are held by one person; zero otherwise.
Institution ownership	The percentage of shares held by institutional investors.
Officer ownership	The percentage of shares held by officers.
Block ownership	The percentage of shareholders that own at least 10% of a firm's shares.
Outsider directors	The percentage of board members classified as outsider directors.
Gray directors	The percentage of board members classified as either non-executive directors or independent outsiders.

This table provides definitions for all of the variables used in our study. For the logistic regressions (see Equation (1), we collect the firm-specific and corporate governance variables by using annual fiscal data in the filing year (see (Ferris et al., 2007)). When we test for wealth effects across the violation cycle of corporate fraud, we collect the data at the quarter ending prior to the start of each period (see Fig. 1). Because most of the corporate governance variables in the Taiwan Economic Journal (TEJ) database are yearly data, the corporate governance variables are the closest (either quarterly or yearly figures) to the first day of each period. All accounting data is obtained from TEJ.

References

Agrawal, A., & Chadha, S. (2005). Coporate governance and accounting scandals. *The Journal of Law and Economics, 48*, 371–406.
Aman, H., & Moriyasu, H. (2017). Volatility and public information flows: Evidence from disclosure and media coverage in the Japanese stock market. *International Review of Economics & Finance, 51*, 660–676.
Arena, M., & Ferris, S. (2017). A survey of litigation in corporate finance. *Managerial Finance, 43*, 4–18.
Barber, B. M., & Lyon, J. D. (1996). Detecting abnormal operating performance: The empirical power and specification of test statistics. *Journal of Financial Economics, 41*, 359–399.
Bauer, R., & Braun, R. (2010). Misdeeds matter: Long-term stock price performance after the filing of class-action lawsuits. *Financial Analysts Journal, 66*, 1–19.
Beasley, M. S. (1996). An empirical analysis of the relation between the board of director composition and financial statement fraud. *The Accounting Review, 71*, 443–465.
Bhagat, S., Bizjak, J., & Coles, J. L. (1998). The shareholder wealth implications of corporate lawsuits. *Financial Management, 27*, 5–27.
Bhagat, S. J., Brickley, J. A., & Coles, J. L. (1994). The wealth effects of interfirm lawsuits: Evidence from corporate lawsuits. *Journal of Financial Economics, 35*, 221–247.

Bittlingmayer, G., & Hazlett, T. W. (2000). DOS capital: Has antitrust action against Microsoft created value in the computer industry? *Journal of Financial Economics, 55*, 329–359.
Bizjak, J. M., & Coles, J. L. (1995). The effect of private antitrust litigation on the stock-market valuation of the firm. *The American Economic Review, 85*, 436–459.
Bonini, S., & Boraschi, D. (2010). Corporate scandals and capital structure. *Journal of Business Ethics, 95*, 241–269.
Boone, A. L., & White, J. T. (2015). The effect of institutional ownership on firm transparency and information production. *Journal of Financial Economics, 117*, 508–533.
Brown, S. J., & Warner, J. B. (1985). Using daily stock returns: The case of event studies. *Journal of Financial Economics, 14*, 3–31.
Carleton, W., Nelson, J., & Weisbach, M. (1998). The influence of institutions on corporate governance through private negotiations: Evidence from TIAA-CREF. *The Journal of Finance, 53*, 1335–1362.
Chava, S., Cheng, C. S. A., Huang, H., & Lobo, G. J. (2010). Implications of securities class actions for cost of equity capital. *International Journal of Law and Management, 52*, 144–161.
Cheng, C. S. A., Huang, H., Li, Y., & Lobo, G. J. (2010). Institutional monitoring through shareholder litigation. *Journal of Financial Economics, 95*, 356–383.
Chen, C. C., Weng, P. Y., & Chien, C. Y. (2018). Qualified foreign institutional investor ownership deregulation and the restatement of financial reports-empirical findings from Taiwan. *International Review of Economics & Finance, 56*, 465–485.
Chiou, W. J. P., Lee, A. C., & Lee, C. F. (2010). Stock return, risk, and legal environment around the world. *International Review of Economics & Finance, 19*, 95–105.
Decohow, P., Solan, R., & Sweeney, A. (1996). Causes and consequences of earning manipulations: An analysis of firms subject to enforcement actions by the SEC. *Contemporary Accounting Research, 13*, 1–36.
Demirguc-Kunt, A., & Maksimovic, V. (1998). Law, finance, and firm growth. *The Journal of Finance, 53*, 2107–2139.
Deng, S., Willis, R. H., & Xu, L. (2014). Shareholder litigation, reputational loss, and bank loan contracting. *Journal of Financial and Quantitative Analysis, 49*, 1101–1132.
Durbin, J. (1954). Errors in variables. *Review of the International Statistical Institute, 22*, 23–32.
Ferris, S. P., Jandik, T., Lawless, R. M., & Makhija, A. (2007). Derivative lawsuits as a corporate governance mechanism: Empirical evidence on board changes surrounding filings. *Journal of Financial and Quantitative Analysis, 42*, 143–166.
Ferris, S. P., & Pritchard, A. C. (2001). *Stock price reactions to securities fraud class actions under the Private Securities Litigation Reform Act*. The University of Michigan Law and Economics Research. Paper No. 01-009.
Fich, E. M., & Shivdasani, A. (2007). Financial fraud, director reputation, and shareholder wealth. *Journal of Financial Economics, 86*, 306–336.
Field, L., Lowry, M., & Shu, S. (2005). Does disclosure deter or trigger litigation? *Journal of Accounting and Economics, 39*, 487–507.
Firth, M., Rui, O. M., & Wu, W. (2011). Cooking the books: Recipes and costs of falsified financial statements in China. *Journal of Corporate Finance, 17*, 371–390.
Francis, J., Philbrick, D., & Schipper, K. (1994). Shareholder litigation and corporate disclosures. *Journal of Accounting Research, 32*, 137–164.
Gande, A., & Lewis, C. M. (2009). Shareholder-initiated class aaction lawsuits: Shareholder wealth effects and industry spillovers. *Journal of Financial and Quantitative Analysis, 44*, 823–850.
Habib, A., Jiang, H., Bhuiyan, M. B. U., & Islam, A. (2014). Litigation risk, financial reporting and auditing: A survey of the literature. *Research in Accounting Regulation, 26*, 145–163.
Hankir, Y., Rauch, C., & Umber, M. P. (2011). Bank M&A: A market power story? *Journal of Banking & Finance, 35*, 2341–2354.
Hausman, J. A. (1978). Specification tests in econometrics. *Econometrica, 46*, 1251–1271.
Helland, E. (2006). Reputational penalties and the merits of class-action securities litigation. *The Journal of Law and Economics, 49*, 365–395.
Hui, K. W., Lennox, C., & Zhang, Z. (2014). The market's valuation of fraudulently reported earnings. *Journal of Business Finance & Accounting, 41*, 627–651.
Humphery-Jenner, M. L. (2012). Internal and external discipline following securities class actions. *Journal of Financial Intermediation, 21*, 151–179.
Johnson, M. F., Kasznik, R., & Nelson, K. K. (2000). Shareholder wealth effects of the private securities litigation reform act of 1995. *Review of Accounting Studies, 5*, 217–233.
Johnson, M. F., Nelson, K. K., & Pritchard, A. C. (2007). Do the merits matter more? The impact of the private securities litigation reform act. *Journal of Law, Economics, and Organization, 23*, 627–652.
Jones, C., & Weingram, S. (1996a). *The determinants of 10b-5 litigation risk*. Unpublished Working Paper. George Washington University.
Jones, C., & Weingram, S. (1996b). *Why 10b-5 litigation risk is higher for technology and financial services firms*. Unpublished Working paper. Stanford University.
Jo, H., Song, M. H., & Tsang, A. (2016). Corporate social responsibility and stakeholder governance around the world. *Global Finance Journal, 29*, 42–69.
Karpoff, J. M., Lee, D. S., & Martin, G. S. (2008a). The cost to firms of cooking the books. *Journal of Financial and Quantitative Analysis, 43*, 581–612.
Karpoff, J. M., Lee, D. S., & Martin, G. S. (2008b). The consequences to managers for financial misrepresentation. *Journal of Financial Economics, 88*, 193–215.
Kim, I., & Skinner, D. J. (2012). Measuring securities litigation risk. *Journal of Accounting and Economics, 53*, 290–310.
Kouwenberg, R., & Phunnarungsi, V. (2013). Corporate governance, violations and market reactions. *Pacific-Basin Finance Journal, 21*, 881–898.
Kumar, P., & Langberg, N. (2009). Corporate fraud and investment distortions in efficient capital markets. *The RAND Journal of Economics, 40*, 144–172.
La Porta, R., Lopez-De-Silanes, F., & Shleifer, A. (2006). What works in securities laws? *The Journal of Finance, 61*, 1–32.
La Porta, R., Lopez-De-Silanes, F., Shleifer, A., & Vishny, R. (2000). Agency problems and dividend policies around the world. *The Journal of Finance, 55*, 1–33.
La Porta, R., Lopez-De-Silanes, F., Shleifer, A., & Vishny, R. (2002). Investor protection and corporate valuation. *The Journal of Finance, 57*, 1147–1170.
Lang, L. H. P., & Stulz, R. M. (1992). Contagion and competitive intra-industry effects of bankruptcy announcements: An empirical analysis. *Journal of Financial Economics, 32*, 45–60.
Lieser, S., & Kolaric, S. (2016). *Securities class action litigation, defendant stock price revaluation, and industry spillover effects*. European Financial Management Association Conference. paper no. 0388.
Lowry, M., & Shu, S. (2002). Litigation risk and IPO underpricing. *Journal of Financial Economics, 65*, 309–335.
McTier, B. C., & Wald, J. K. (2011). The causes and consequences of securities class action litigation. *Journal of Corporate Finance, 17*, 649–655.
Mishra, D., & Tannous, G. (2010). Securities laws in the host countries and the capital structure of US multinationals. *International Review of Economics & Finance, 19*, 483–500.
Murphy, D. L., Shrieves, R. E., & Tibbs, S. L. (2009). Understanding the penalties associated with corporate misconduct: An empirical examination of earnings and risk. *Journal of Financial and Quantitative Analysis, 44*, 55–83.
Nagar, V., Nanda, D., & Wysocki, P. D. (2003). Discretionary disclosure and stock-based incentives. *Journal of Accounting and Economics, 34*, 283–309.
O'Connor, T., Kinsella, S., & O'Sullivan, V. (2014). Legal protection of investors, corporate governance, and investable premia in emerging markets. *International Review of Economics & Finance, 29*, 426–439.
Pinheiro, M. (2008). Overinvestment and fraud. *Journal of Mathematical Economics, 44*, 484–512.
Povel, P., Singh, R., & Winton, A. (2007). Booms, busts, and fraud. *Review of Financial Studies, 20*, 1219–1254.
Rajan, R., & Zingales, L. (1998). Financial dependence and growth. *The American Economic Review, 88*, 559–586.
Ramnath, S. (2002). Investor and analyst reactions to earnings announcements of related firms: An empirical analysis. *Journal of Accounting Research, 40*, 1351–1376.
Rogers, J. L., & Buskirk, A. V. (2009). Shareholder litigation and changes in disclosure behavior. *Journal of Accounting and Economics, 47*, 136–156.
Romano, R. (1991). The shareholder suit: Litigation without foundation? *Journal of Law, Economics, and Organization, 7*, 55–87.
Sen, P. K. (2007). Ownership incentives and management. *Journal of Business Finance & Accounting, 34*, 1123–1140.
Shleifer, A., & Wolfenzon, D. (2002). Investor protection and equity markets. *Journal of Financial Economics, 66*, 3–27.
Stock, J. H., & Watson, M. W. (2007). *Introduction to econometrics* (2nd ed.). Pearson.
Wei, Z., Xie, F., & Posthuma, R. A. (2011). Does it pay to pollute? Shareholder wealth consequences of corporate environmental lawsuits. *International Review of Law and Economics, 31*, 212–218.
Wu, D. M. (1973). Alternative tests of independence between stochastic regressors and disturbances. *Econometrica, 41*, 733–750.

Wurgler, J. (2000). Financial markets and the allocation of capital. *Journal of Financial Economics, 58*, 187–214.
Yuan, Q., & Zhang, Y. (2015). Do banks price litigation risk in debt contracting? Evidence from class action lawsuits. *Journal of Business Finance & Accounting, 49*, 1310–1340.
Zhou, F., Zhang, Z., Yang, J., Su, Y., & An, Y. (2018). Delisting pressure, executive compensation, and corporate fraud: Evidence from China. *Pacific-Basin Finance Journal, 48*, 17–34.